MAISON DIEU SOLAR FARM

Environmental Impact Statement



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20 August 2024

rpsgroup.com

Version	Purpose of document	Authored by	Approved by	Review date
1.0	EIS Draft	Luke Wiggins	Dianne Munro	22 May 2024
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Approval for issue

Dianne Munro  20 August 2024

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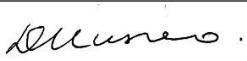
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REAP DECLARATION

Project details	
Project name	Maison Dieu Solar Farm
Application number	SSD-48160216
Address of the land on which the infrastructure is to be carried out	956B Maison Dieu Road, Maison Dieu NSW 2330
Applicant details	
Applicant name	Terrain Solar Pty Ltd
Applicant address	Level 7, 341 George Street Sydney NSW 2000
Details of person by whom this EIS was prepared	
Name	Dianne Munro
Address	2a/45 Fitzroy Street Carrington NSW 2294
Professional qualifications	Master of Environmental Law Bachelor of Science
Declaration by registered environmental assessment practitioner	
Name	Dianne Munro
Registration number	PIA No. 100073
Organisation registered with	Planning Institute of Australia
Declaration	The undersigned declares that this EIS: • Has been prepared in accordance with Division 5, Part 8 of the *Environmental Planning and Assessment Regulation* 2021; • Contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates; • Does not contain information that is false or misleading; • Addresses the Planning Secretary's environmental assessment requirements for the Project; • Identifies and addresses the relevant statutory requirements for the Project, including any relevant matters for consideration in environmental planning instruments; • Has been prepared having regard to the Department's State Significant Development Guidelines - Preparing an Environmental Impact Statement; • Contains a simple and easy to understand summary of the Project as a whole, having regard to the economic, environmental and social impacts of the Project and the principles of ecologically sustainable development; • Contains a consolidated description of the Project in a single chapter of the EIS; • Contains an accurate summary of the findings of any community engagement; and • Contains an accurate summary of the detailed technical assessment of the impacts of the Project as a whole.
Signature	
Date	20 August 2024

EXECUTIVE SUMMARY

This summary provides a non-technical overview of the project and assessment outcomes only and should be read in conjunction with the Environmental Impact Statement.

Introduction

This Environmental Impact Statement has been prepared for Terrain Solar Pty Ltd (Applicant) to assess the environmental matters relating to the development of Maison Dieu Solar Farm (Project) as shown conceptually on **Figure ES-1**.

This solar generation project will provide a reliable and affordable source of electricity and help reduce greenhouse gas emissions associated with energy generation. It will also provide significant economic benefits to Singleton, Maison Dieu and the wider region.

The Project is located in the rural suburb of Maison Dieu, approximately 10 kilometres north-west of Singleton, NSW. The Project is within the Hunter-Central Coast Renewable Energy Zone, one of five areas identified by the New South Wales Government for targeted development of new renewable energy generation, transmission and storage Projects. The New South Wales Government has indicated Renewable Energy Zones will play a vital role in delivering affordable energy generation following the retirement of coal power stations over the coming decades.

The Project Area affects five lots, making up 203 hectares of land that has historically been used for agricultural production. The Disturbance Footprint comprises 90 ha of the Project Area which will be directly impacted for the construction, operation and decommissioning of the Project.

The Project is State Significant Development under Part 2.2, clause 2.6 and Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021*. The Project (SSD- 48160216) requires development consent under *Part 4 of Environmental Planning and Assessment Act 1979*.

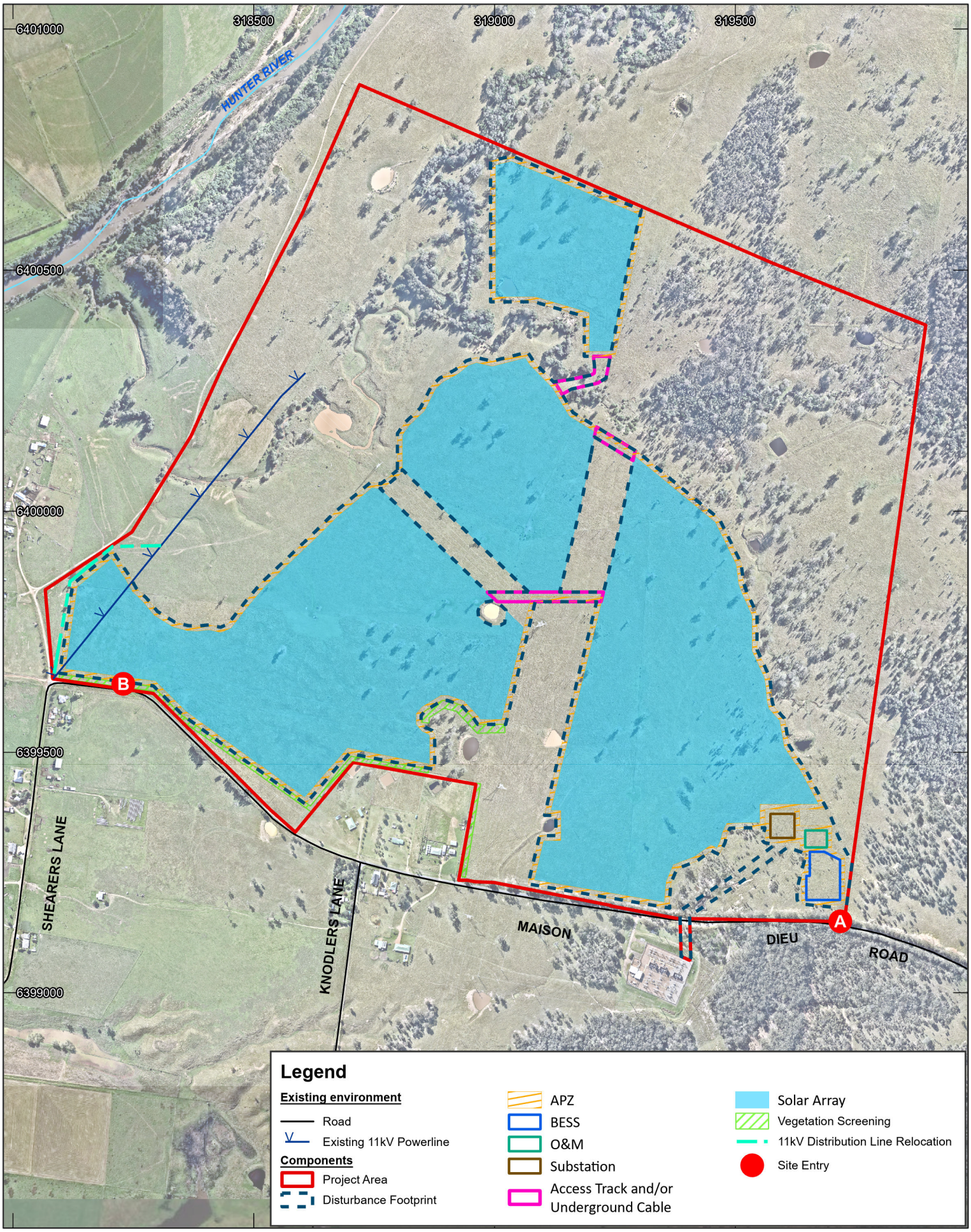
RPS AAP Consulting Pty Ltd has prepared this Environmental Impact Statement to support State Significant Development application SSD-48160216 and Section 75 *Environmental Protection Biodiversity Conservation Act 1999* EPBC Referral 2023/09638.

Project Need

Electricity is Australia's largest source of greenhouse gas emissions, accounting for around 33% of Australia's total annual emissions (CSIRO, 2023). Commonwealth and New South Wales Governments have made a commitment to reduce emissions under the United Nations Paris Agreement and have set a target to achieve net zero emissions by 2050. The transformation of the Australian energy sector to a mix of low-emission renewable energy sources, such as wind and solar will help achieve this target.

The Project will support the transformation of the energy sector from a centralised system of large fossil fuel (coal and gas) generation towards an array of smaller scale and widely dispersed wind, solar and other renewable energy generators. Existing New South Wales coal-fired power plants (capacity of approximately 8,000 Megawatts) are planned to be retired by 2040. New, low emission energy sources are required to replace power plants and to meet future energy demands.

The Australian Energy Market Operator's 2022 'Integrated System Plan' forecasts a substantial growth in electricity demand, due to the electrification of transport, industry, office and homes; reduced use of fossil fuels; and economic growth. To meet this demand by 2050, the amount of electricity delivered to the National Energy Market will need to significantly increase. The Project will help meet the demand for renewable electricity by providing 60 MWac of renewable energy capacity to the National Energy Market.



CONCEPTUAL PROJECT LAYOUT

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Conceptual Layout_Contractor
VERSION: F
DATE EXPORTED: 16/04/2024
TECHNICIAN: Natalie.Wood

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE ES-1

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Project Summary

The Project involves the construction, operation and decommissioning of a large-scale solar photovoltaic generation facility, including an integrated Battery Energy Storage System, a high-voltage electricity substation, connection to the national electricity grid through the existing Ausgrid Substation, and associated infrastructure. The Project will generate and supply 60 MWac of clean, renewable electricity to the grid with a storage capacity of 40 MW / 80 MWh.

The Project underwent a comprehensive design process with multiple refinements, considering community and stakeholder feedback, as well as the findings of environmental and social studies. This process aims to maximise positive social, economic and environmental outcomes while minimising any negative impacts.

The key features of the Project are:

- Approximately 110,000 solar panels with a targeted generation capacity of 60 MWac;
- Battery Energy Storage System;
- Electrical infrastructure including:
  - Solar PV power conversion units with inverters;
  - Substation compound and switching station;
  - Electrical reticulation grid and infrastructure connecting to the existing Ausgrid Singleton Substation;
- Site access and external transport;
- Other associated infrastructure (including temporary construction infrastructure and its maintenance); and
- Internal and external ancillary activities.

Stakeholder Engagement

The Applicant has been actively engaging with the community and stakeholders to inform the design of the Project to ensure potential environmental and social impacts were minimised and benefits to the community and stakeholders were maximised. The Applicant is committed to effective and genuine engagement with stakeholders and the local community to obtain feedback to help inform the Project. Engagement will continue through all subsequent phases of the Project.

The range of stakeholders that has been, and will continue to be engaged is extensive, and includes various New South Wales and Commonwealth government agencies, the local council, host landholders (one with a dwelling, one without), neighbouring landholders, the local community, community groups, Aboriginal parties, and infrastructure owners.

Engagement with stakeholders commenced in 2022 with a focus on establishing long term relationships and gaining insights into the views and requirements of those living around the Project. This targeted engagement involved discussions with local landowners (including adjacent property owners), the Department of Planning, Housing and Infrastructure, surrounding coal mines and Singleton Council.

Early consultation provided an opportunity to understand key stakeholder sentiment towards the Project and feedback relating to environmental and social aspects required to be addressed as part of the Environmental Impact Statement. A Stakeholder Engagement Plan was prepared during the development of the EIS to guide ongoing consultation and engagement. Engagement during the EIS has been led by specialists - bdinfrastructure.

All interactions with stakeholders were captured in a stakeholder register including stakeholder details, interaction details and follow up actions. Several tools were used to engage and seek feedback from stakeholders including face to face discussions, briefings and meetings, a community newsletter, a dedicated project email and 1800 info line, stakeholder briefings, doorknocking, an online feedback survey, distribution of a 'Kitchen Table Discussion Guide', a Project website and an online Community Information Session. All are available on the Project website at www.maisondieusolarfarm.com.

Feedback from stakeholders and the community included both positive and negative views on a range of aspects of the Project. The majority of respondents were in favour of a shift towards renewable energy and understand and support the positive environmental impacts of this move. However, there was concern about the shift away from fossil fuels industry and what that means for the local community. Respondents raised environmental concerns, including the state and productivity of the land after the Project's life, impacts to fauna, visual impacts, construction noise and construction traffic. The Applicant considered the issues raised and incorporated these where relevant into the Project design.

The Applicant will continue to engage with the community throughout construction, operation and decommissioning of the Project under an internal Community Engagement Plan.

Environmental and Social Impact Assessment

The EIS includes a detailed assessment of potential environmental, social and economic outcomes of the Project and proposes, where required, mitigation measures to manage adverse environmental, social and economic aspects.

The Project will be constructed and operated in accordance with all conditions imposed by any Development Consent granted and will implement the mitigation and measures detailed in the Environmental Impact Statement. An Environmental Management System will be implemented and include at least a Construction Environmental Management Plan and Operations Environmental Management Plan inclusive of commitments in this Environment Impact Statement.

Each detailed assessment has been prepared for the EIS in consideration of relevant guidelines, the Project's Secretary's Environmental Assessment Requirements, and stakeholder engagement.

The following table provides a summary of the potential positive outcomes and negative impacts that may occur during construction, operation and decommissioning of the Project.

Issue	Potential Impacts
Noise	• The Noise and Vibration Impact Assessment did not predict any exceedances of applicable noise criteria during operations. • Exceedances of noise criteria during peak construction are predicted at 11 non-associated receivers in worst-case noise modelling scenarios. • No vibration exceedances are predicted. • A draft Construction Noise Management Plan has been prepared to minimise noise impacts to sensitive receivers.
Landscape and visual	• Negligible or low-level visual impacts to the four surrounding Landscape Character Zones. • No exceedances of low-level visual impacts to any dwellings with mitigation in place. • Low level visual impacts to Maison Dieu Road. • Low level glare impacts to one non-associated dwelling (following mitigation). • 1.4 hours per year of glare risk on western approach to Warkworth Airstrip.

Issue	Potential Impacts
Biodiversity	• The Biodiversity Development Assessment Report found the Project will directly impact: - 75.8 ha of native vegetation habitat comprising the following Plant Community Types and Threatened Ecological Communities: o 75.7 ha of PCT 3431 (Central Hunter Ironbark Grassy Woodland), including 10.8 ha of Central Hunter Grey Box Ironbark Woodland (Endangered under the *Biodiversity Conservation Act 2016*), and 1.83 ha Central Hunter Eucalypt Forest and Woodland (Critically Endangered under the *Environmental Protection and Biodiversity Conservation Act 1999*) o 0.10 ha of PCT 4015 Coastal Swamp Oak Forest (Endangered under the *Environmental Protection and Biodiversity Conservation Act 1999*) o 10.9 ha of Brush-tailed Phascogale o 75.7 ha of Striped Legless Lizard o 50.8 ha of Southern Myotis - 10.9 ha of habitat for four ecosystem credit species microbats: o Eastern Coastal Free-tailed Bat o Eastern False Pipistrelle o Greater Broad-nosed Bat o Yellow-bellied Sheathtail-bat - 10.9 ha of foraging habitat for the following species credit species microbats o Eastern Cave Bat o Large Bent-winged Bat o Large-eared Pied Bat o Little Bent-winged Bat - 4.0 ha of native vegetation within the Powerful Owl species polygon and four trees that meet the habitat constraint for Powerful Owl (all four trees are either isolated paddock trees (three trees) or part of a small patch) - 10.9 ha of Grey-crowned Babbler and Speckled Warbler (ecosystem credit species) habitat - 10.9 ha of Grey-headed Flying-fox foraging habitat - 20 hollow bearing trees • A Biodiversity Management Plan will be prepared in consultation with relevant regulators and will be implemented to manage the direct, prescribed and indirect impacts of the Project. • A Biodiversity Offset Strategy will be implemented and comprise: - PCT 3431 – 817 credits - PCT 4015 – 3 credits - Striped Legless Lizard – 660 credits - Brush-tailed Phascogale – 167 credits - Southern Myotis – 608 credits - Powerful Owl – 55 credits
Aboriginal heritage	• An Aboriginal Cultural Heritage Assessment Report determined no specific cultural values within the Project Area in consultation of 20 Registered Aboriginal Parties. • 23 Aboriginal sites were identified through field survey within the Project Area. • Test excavation was conducted and revealed an additional seven sites. • A reduction in the Project Area resulted in the avoidance of 48 Aboriginal heritage sites. • Two Aboriginal heritage sites will be directly impacted by the Disturbance Footprint. • The eight Aboriginal heritage sites within 50 m of the Disturbance Footprint will be demarcated during construction and included on all relevant site plans during operations to avoid harm. • An Aboriginal Cultural Heritage Management Plan will be developed in consultation with Registered Aboriginal Parties and relevant regulators to minimise impacts to Aboriginal heritage.
Historic Heritage	• The Historic Heritage Assessment Report was prepared inclusive of a field survey and significance assessment. • The Project Area was determined to have associative heritage significance only, which will not be significantly impacted by the Project. • An Historic Heritage Unanticipated Finds Protocol will be developed and implemented.

Issue	Potential Impacts
Soils and Agriculture	• A Soil and Agricultural Impact Assessment inclusive of a Land Use Conflict Risk Assessment was undertaken. • The estimated primary productivity loss is $34,812 per year (0.07% of the Singleton LGA agricultural industry's gross value). • The Project Area accounts for 0.1% of the agricultural land in the Singleton Local Government Area and less than 0.01% of beef cattle sold in NSW. • The Project will not cause any loss of agricultural productivity outside the Project Area. • Only 1 hectare of the 22 hectare total Land and Soil Capability Class 3 (high capability) land within the Project Area will be temporarily removed from Agricultural production. • The land will be returned to its original Land and Soil Capability with the implementation of the Soil Stripping and Respreading Strategy. • An Agricultural Biosecurity Management Plan will be developed in consultation with landowners, prior to construction to control risks in relation to pests, weeds and diseases. • A Decommissioning and Rehabilitation Plan will detail decommissioning and infrastructure removal (in consultation with landowners) for post-Project agricultural land use.
Flooding	• The Flooding Assessment predicted a small increase in local catchment flooding outside of the Project Area to the west. • Small decreases will occur east of the Project Area due to topographic changes for the hardstand area needed to support infrastructure. • The Project is not predicted to cause significant adverse flood impacts within or outside the Project Area. • Design refinements were made to avoid 1% AEP flooding area modelled under the Draft Singleton Floodplain Risk Management Study and Plan' (BMT, 2022) • The Construction Environmental Management Plan and Operational Environmental Management Plan will contain mitigation measures recommended in the Flooding Assessment to manage flooding impacts.
Surface water	• A Surface Water Impact Assessment identified key construction impacts including erosion, sedimentation, chemical runoff and changes to watercourses. • Operational impacts include erosion, sedimentation, water demand, changes to watercourses and chemical spills. • A Soil and Water Management Plan will be prepared in accordance with Managing Urban Stormwater: Soils and Construction – Volume 1' (Landcom 2004) (the Blue Book) to avoid / minimise surface water impacts. • The water demand of the Project is negligible at an estimated 35 Megalitres for the total construction period, then 5.7 Megalitres per year of operation. • Controlled Activity Approvals will be sought from the Natural Resources Access Regulator where required.
Traffic	• A Traffic Impact Assessment found the majority of traffic impacts will occur during construction, with up to 84 vehicle trips per hour during the AM and PM peak periods of 8 am – 9 am and 4 pm to 5 pm. • The Project will experience a maximum of ten vehicle trips per hour in peak periods during operations. • SIDRA microanalytical traffic modelling showed the Project would increase the delay and queue length at the New England Highway / Magpie Street intersection by less than two seconds and less than two cars. • The transport route for over size and over mass vehicles was determined safe with no need for upgrades in a separate route assessment. • A Construction Traffic Management Plan with a Traffic Control Plan will be developed to manage construction traffic impacts. • Access to the Project will be conducted with traffic management under the Traffic Control Plan in place. • A Road Safety Audit and, Dilapidation Report will be prepared for the impacted road in consultation with Singleton Council. • A Decommissioning Traffic Management Plan will address traffic impacts after the Project's end of life.

Issue	Potential Impacts
Hazards	• A Preliminary Hazards Analysis determined the dangerous goods to be stored on site are diesel, transformer oil and batteries. No exceedances of the threshold quantities outlined in *State Environmental Planning Policy (Resilience and Hazards) 2011* will occur. • BESS technology and design was selected to minimise the risk of fire propagation and thermal runaway. • The Project does not carry any risk of potential offsite impacts and will not exceed any relevant risk criteria.
Bushfire	• The Bushfire Assessment Report determined the Project Area contains bushfire prone land. Vegetation and slope assessments were conducted and used to determine the required Asset Protection Zones and management measures for compliance with 'Planning for Bushfire Protection 2019'. • A Bushfire Emergency Management and Operations Plan will be prepared in consultation with the relevant regulators inclusive of stated mitigation measures.
Air Quality	• An air quality assessment identified potential dust and air quality risks during construction. • No significant dust generation is expected during operation. • While there will be an increase in greenhouse gas emissions associated with construction machinery and vehicles, the Project will generate electricity without directly emitting air pollutants that are known to affect the climate and human health during operations. • The Project will contribute to the general improvement of air quality locally and broadly through the displacement of greenhouse gas emissions that would otherwise be generated by fossil fuels combustion to generate electricity through coal power stations. • A Construction Environmental Management Plan will be prepared prior to construction and include the management measures provided in the air quality assessment to avoid and minimise air quality impacts.
Waste	• A desktop waste assessment was conducted. • The construction phase of the Project will generate a moderate amount of waste. • Waste production will be avoided where possible, as the highest priority action on the NSW Environment Protection Authority Waste Hierarchy. • Where avoidance is not feasible, reuse and recycling will be employed. • A Waste Management Plan will be prepared prior to construction with measures to avoid and minimise waste production throughout construction and operation. • The Decommissioning Rehabilitation Plan will contain measures to avoid and minimise waste during decommissioning.
Social	• A Social Impact Assessment identified positive and negative social impacts. • Key construction impacts include changes to visual amenity, increased noise, increased traffic and increased employment. • Key operational impacts include community investment in the form of a Voluntary Planning Agreement with Singleton Council, landscape changes, glare, loss of agricultural land, loss of access to Aboriginal heritage sites and increased employment. • Community engagement informed design refinements and will be ongoing throughout construction and operation. • An internal Community Communications Strategy, Community Engagement Plan, Social Licence Commitments Plan and Project Procurement and Workforce Development Strategy will be developed to avoid / minimise negative social impacts and maximise positive social impacts. These may be part of a single, overarching document. • An Accommodation Strategy will be developed prior to construction to minimise the Project's impacts on local accommodation availability.

Issue	Potential Impacts
Economic	• The Estimated Development Cost report indicated a total Estimated Development Cost of $127 M. • Up to 10% of the investment will remain in the local economy through retail expenditure, contracts and wages. Therefore, the Singleton Local Government Area's economy will experience an influx of up to the value of the Estimated Development Cost. • Local businesses will be engaged where possible for equipment purchases, transport, machinery hire and labour costs. • Up to 150 full time jobs will be supported during the 18-month construction phase and five full time jobs will be supported for the anticipated 30 years of operation. • A Voluntary Planning Agreement will be entered into with Singleton Council.
Cumulative	• Cumulative impacts were assessed generally in accordance with 'Cumulative Impact Assessment Guidelines for State Significant Projects' (DPIE, 2022b). • Projects with a potential for cumulative impacts were identified through the NSW Planning Portal and engagement with relevant regulators. • There will potentially be some cumulative construction impacts from Brigman Solar Farm, Bowman's Creek Wind Farm and the Hunter Transmission Project (should each be approved and progress in line with currently available public information) with the key impact being traffic. • There is a potential for construction and operational cumulative impacts from the Singleton Bypass with key impacts being traffic, noise and dust. • The Applicant will engage with relevant developers and Singleton Council during construction to assist in minimising cumulative impacts.

Justification and Evaluation

The Project is part of the national and global response to combatting anthropogenic climate change. It will contribute positively to the energy sector-wide transition from traditional fossil fuel energy generation to wholesale renewable energy generation and will contribute to the NSW and Commonwealth greenhouse gas emission reduction commitments. The Project also aligns with government objectives for energy security and reliability and will contribute to the ongoing growth of renewable energy generation and storage capacity.

The Project is in the Hunter-Central Coast Renewable Energy Zone, one of five Renewable Energy Zones created within NSW which will combine wind, solar, hydroelectric and energy storage, together with high-voltage transmission lines, to generate and deliver clean, renewable energy. The location of the Hunter-Central Coast Renewable Energy Zone was selected following detailed statewide geospatial mapping undertaken by the NSW Government which identified areas of strong renewable energy resource potential (i.e. solar irradiance and wind speeds) which were in the vicinity of existing transmission infrastructure and compatible with existing land uses.

The Project is consistent with the Ecologically Sustainable Development principles as it will:

- Deliver renewable, low-cost energy to the National Electricity Market and contribute to Government net zero emissions targets, providing new power generation capacity to replace coal-fired power stations;
- Be developed on agricultural land which has historically been disturbed and/or cleared. Solar farms are compatible with existing farming operations as landowners can continue normal operations surrounding the solar arrays;
- Maximise the use of existing disturbed areas and refined to avoid or minimise environmental and social impacts, particularly those relating to biodiversity and Aboriginal cultural heritage values;
- Deliver economic benefits to NSW, regional and local communities including:
  - Direct and indirect capital investment;
  - A diversified income stream through payments to associated landholders; and
  - Benefits to regional infrastructure and services through a Voluntary Planning Agreement.

The Applicant will plan and manage construction to minimise disturbance and impacts by:

- Regularly communicating with the community;
- Working during standard construction hours;
- Communicating with affected stakeholders where necessary if work outside standard working hours is required or work is expected to be disruptive;
- Coordinating with Project Managers of nearby projects to manage potential cumulative issues;
- Developing a rigorous safety culture; and
- Conducting environmental monitoring and maintaining an Environmental Management System.

Any residual environmental or social impacts associated with the Project can be appropriately managed through the implementation of the mitigation and management measures recommended in the EIS.

The Applicant considered several alternatives to the Project, including alternative site locations, maximising the site layout and the 'do-nothing' approach. Proceeding with the Project was determined the most environmentally and economically appropriate action. Should the Project not proceed, the potential benefits would not be realised, the future security of electricity supply in NSW would be weakened and it would become more difficult for the Commonwealth and NSW Governments to achieve their pressing renewable energy targets.

The Project meets statutory and strategic requirements. A positive determination would be in the best interest of the public and the environment. Therefore, the Project is available to be positively determined by the Minister for Planning and Public Spaces.

1 INTRODUCTION

This Section provides context for the detailed Project assessment in this Environmental Impact Statement. It includes the Applicant's details, a high-level Project description, Project objectives and regional setting.

This Section further provides background (including any relevant history), strategies to avoid, minimise or offset the Project's impacts; description of any related or development to be relied upon; and any restrictions or covenants which apply to the Project Area.

1.1 Background

Maison Dieu Solar Farm consists of the construction, operation and decommissioning of a large-scale solar photovoltaic (PV) generation facility and integrated Battery Energy Storage System (BESS), associated infrastructure and connection to the existing Ausgrid Substation (Project).

The Project is located in Maison Dieu, approximately 10 kilometres (km) north-west of Singleton, as shown in **Figure 1-1**. The Project is in the Singleton Local Government Area (LGA) of New South Wales (NSW), within the Hunter-Central Coast Renewable Energy Zone (REZ).

Terrain Solar Pty Ltd (Applicant) is an Australian owned and operated developer of innovative, strategically located solar farms across regional Australia. The Applicant includes any person who seeks to carry out the approved Project. The Project will be constructed and operated by RATCH Australia Corporation Pty Ltd, a long-term owner and operator of electricity generators in the Australian electricity market.

The Project is State Significant Development (SSD) pursuant to Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP). Development consent for the Project is sought under Part 4, Division 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The Project Team is listed in **Appendix A.**

The SSD Application to the Department of Planning House and Infrastructure (DPHI) for the Project is supported by this Environmental Impact Statement (EIS) which was prepared by RPS AAP Consulting Pty Ltd (RPS) on behalf of the Applicant.

The EIS has been prepared in accordance with (at least) the following documents:

- Secretary's Environmental Assessment Requirements (SEARs) SSD48160216 issued on 4 October 2022 and Supplementary SEARS issued on 12 February 2024 (see **Appendix B**);
- 'State Significant Development Guidelines – Preparing an Environmental Impact Statement' (EIS Guidelines) (DPE, 2022); and
- 'Large Scale Solar Energy Guideline' (DPE, 2022) (Solar Guidelines).

This EIS also considers the findings from stakeholder engagement including community, regulators, the Aboriginal community and other interested stakeholders.

The Project was determined as "Controlled Action 2023/09638" on 31 January 2024 (EPBC Act Application) under Section 75 the *Environmental Protection Biodiversity Conservation Act 1999* (EPBC Act) as further discussed in **Section 4.** This EIS also supports the EPBC Act Application.

Appendix C presents a summary of statutory compliance. A consolidated summary of management and mitigation measures within this EIS is provided in **Appendix D**.

Individual technical studies which support this EIS are included in **Appendix E** to **Appendix Q**.

1.2 History

The Project Area was identified by the Applicant as an ideal location for a solar farm in 2020 due to being relatively unconstrained and in close proximity to existing energy grid infrastructure.

A Scoping Report (SR) was prepared and lodged to the DPHI (formerly Department of Planning and Environment (DPE))) in August 2022 to accompany a request for SEARs.

The preparation of the SR involved a number of technical studies which confirmed positive attributes for solar farm development within the SR Project Site. These aspects included:

- Low, relatively flat terrain for cost-effective construction;
- Good solar resource;
- Located away from towns and urbanised areas;
- Proximity to the regional centre of Singleton, and other Hunter Valley locations, allowing for optimal sourcing of labour from the local community;
- Suitable land use zoning;
- Efficient access to existing electricity infrastructure, transmission and distribution network;
- Access to a major road (New England Highway (NEH) and the Golden Highway); and
- High level of available capacity on the grid transmission and distribution system.

The land within the Project Area is currently used for livestock grazing and has historically been used for agricultural purposes.

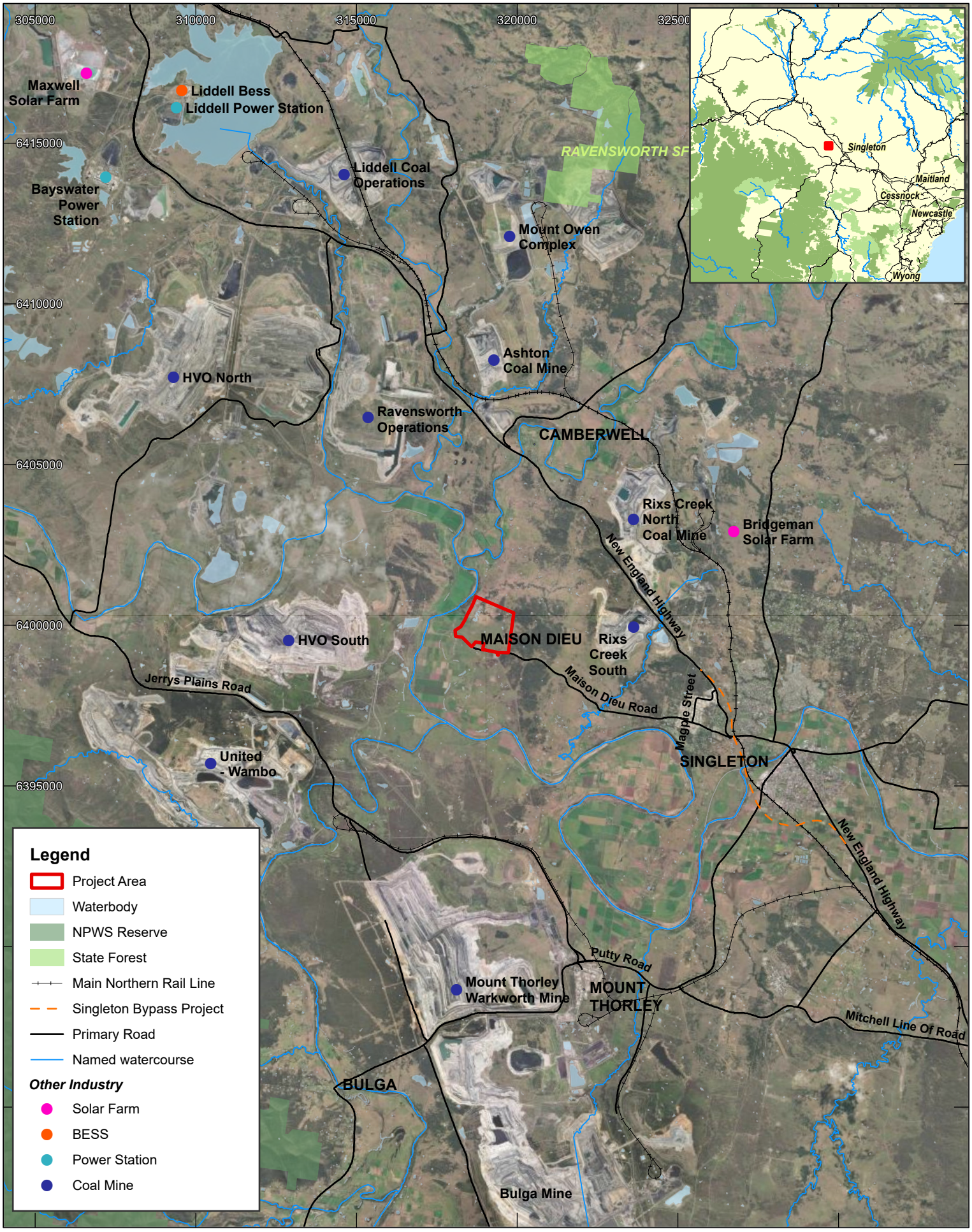
1.3 Applicant

Terrain Solar is an Australian owned and operated business that is developing innovative and strategically located solar farms across regional Australia. From initially locating suitable land and partnering with landowners, the Applicant takes projects through engineering design, planning approval, grid connection, financing and investment stages and into construction and operation.

Terrain Solar is an experienced, Australian owned and operated solar company which has eight solar projects in different stages of development across regional Australia. Terrain Solar is committed to working with the community throughout the development of all projects. The existing solar projects span across a broad range of regional locations in NSW and **Table 1-1** lists the Applicant's details.

Table 1-1 Applicant Details

Requirement	Details
Name	Terrain Solar Pty Ltd
Point of contact	Matilda Wachsmann
Address	Level 7, 341 George Street, Sydney NSW 2000
ABN	13 616 856 172
Contact email	info@terrainsolar.com



REGIONAL LOCALITY MAISON DIEU EIS

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Earthstar Geographics

MAP: Regional Locality
VERSION: C
DATE EXPORTED: 15/04/2024
TECHNICIAN: Natalie.Wood

0 1 2 3 4 5 km

SCALE 1:150,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 1-1:

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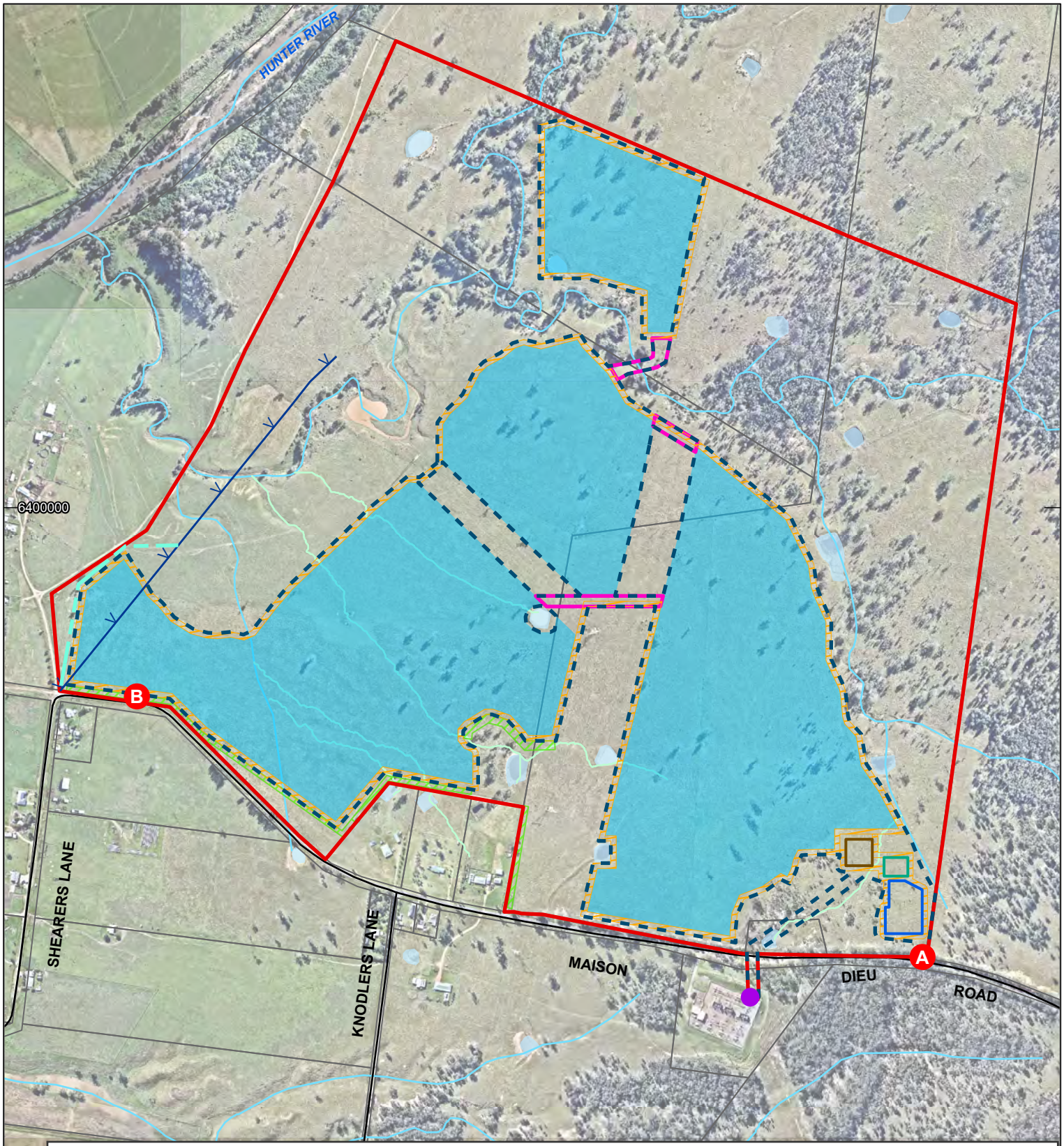
PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

1.4 Project Overview

The Project will involve the construction, operation and decommissioning of a PV solar farm, BESS and associated infrastructure.

The Project is generally within the Project Area as shown on **Figure 1-2** and includes:

- Construction:
  - Up to 18 months with up to a maximum of 150 Full Time Equivalent (FTE) personnel;
  - Hours of work generally between 7 am to 6 pm, Monday to Friday and 8 am to 1 pm, Saturday;
  - Pre-construction activities and site establishment;
  - Civil works and access upgrades;
  - Major components transported via Port of Newcastle or Port Botany;
  - PV array construction utilising external equipment;
  - Installation and use of temporary infrastructure (including office, parking, amenities, laydown, waste storage, stockpile, power supply, fencing, communications, services and utilities);
  - Ancillary activities (including import of gravel, sand and aggregate; and water);
  - Rehabilitation;
- Operation:
  - Approximately 110,000 PV solar panels with a total capacity of 60 megawatts alternating current (MWac);
  - BESS with a capacity of 40 megawatts (MW) / 80 megawatt hours (MWh);
  - Electrical infrastructure including:
    - Solar PV power conversion units with inverters;
    - Substation compound and switching station;
    - Electrical reticulation grid and infrastructure connecting to the existing Ausgrid Singleton Substation;
  - Site access and external transport;
  - Other associated infrastructure (including retained temporary construction infrastructure and its maintenance);
  - Internal and external ancillary activities;
  - 24 hours a day, 7 days a week with up to five FTE personnel;
- Decommissioning:
  - Individual components are expected to operate for up to 30 years, after which one of the following actions will be taken:
    - Replace the existing project components within the project description and impacts assessed in this EIS and continue operations in consultation with relevant associated holders; or
    - Seek relevant approvals should technological advances not confirm the viability of Option 1; or
    - Decommission the Project and rehabilitate the site.



Legend

Existing environment

- Road
- Watercourses
- Drainage lines
- Existing 11kV Powerline
- Cadastral Boundary
- Existing Dams

Components

- Project Area
- Disturbance Footprint
- 11kV Distribution Line Relocation
- APZ
- BESS
- O&M
- Substation
- Access Track and/or Underground Cable
- Solar Array
- Vegetation Screening
- Site Entry
- Ausgrid Singleton Substation / Grid Connection Point

CONCEPTUAL PROJECT LAYOUT OVERVIEW

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Project Layout
VERSION: C
DATE EXPORTED: 19/08/2024
TECHNICIAN: natalie.wood

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 1-2:

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d. RPS Australia East Pty Ltd relying on surface indicators that are incorrect or inaccurate;
e. the Client or any Third Party not verifying information in this plan where recommended by RPS Australia East Pty Ltd;
f. Lodgment of this plan with any local authority against the recommendation of RPS Australia East Pty Ltd;
g. the accuracy, reliability, suitability or completeness of any approximations or estimates made or referred to by RPS Australia East Pty Ltd in this plan.
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PROJECT PATH: C:\Users\natalie.wood\OneDrive - Tetra Tech, Inc\TerrainSolar\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

1.5 Objectives

The objectives of the Project are to:

- Generate electricity equivalent to the use of approximately 19,000 homes from a clean and renewable energy source with minimal negative cultural and environmental impacts, through an energy generation facility that has been developed in a manner acceptable to the local community;
- Contribute to meeting Australia's Large-scale Renewable Energy Target in future years and the continued growth of renewable energy generation and storage capacity in the Hunter-Central Coast REZ;
- Provide significant economic stimulus to the region through construction and operation jobs, supplier contracts, and associated flow-on benefits;
- Assist in the reduction of Australia's Greenhouse Gas (GHG) emissions intensity and contribute to State and Commonwealth government efforts to meet climate change mitigation targets; and
- Minimise environmental impacts where possible through the design and placement of project infrastructure (including PV panels, site access, substation and BESS locations).

The Project's objectives align with the Commonwealth and NSW Government's objectives for energy security and reliability and emissions reductions, thereby contributing to the continued growth of renewable energy generation and storage capacity in NSW.

1.6 Strategies to Avoid or Minimise

Design iterations for the Project were progressed in accordance with the Avoid-Minimise-Mitigate-Offset design hierarchy, including:

- Avoid – in the first instance, all efforts were made to avoid potential environmental and social impacts;
- Minimise – where potential impacts could not be avoided, design principles aimed to minimise environmental and social impacts, as far as feasibly possible;
- Mitigate – mitigation strategies will be implemented to manage the extent and severity of remaining environmental and social impacts; and
- Offset – environmental and social offsets shall be used only as applicable, following all efforts to first avoid, minimise and mitigate environmental impacts.

Significant amendments to the Project layout have been made to avoid and/or minimise environmental impacts. **Section 7.1** provides significant detail on the key strategies that have been adopted to avoid, minimise and offset the impacts of the Project. Ecological offsets are described in **Section 6.1.4**.

Table 1-2 provides a summary of the environmental benefits of the Project compared to the SR Project Site as shown in **Figure 2-4**.

Table 1-2 Benefits of the Project Compared to Earlier Designs

Feature	Layout Changes	Environmental Benefits
Solar PV Array	Reduction from 352 ha to 90 ha total disturbance.	• Ongoing field investigations in 2022 and 2023 determined the locations of highest biodiversity value (such as Threatened Ecological Communities (TECs) and high-density hollow-bearing trees) and areas more suited to development. Project layout refinement occurred in three main stages, April 2023, August 2023 and April 2024. • The refinements resulted in avoidance of nearly all of Plant Community Type (PCT) 3431_High and the vast majority of 3431_Regen. These areas of vegetation are the highest condition areas of PCT 3431 and associated TECs and the highest quality habitat for Brushed-tailed Phascogale. • The reduction allowed for the avoidance of 46 Aboriginal sites that were within the SR Project Area. • The reduction allowed all farm dams to be retained with the exception of one within the northern solar array, reducing impacts to agricultural infrastructure and resources. • 330.4 ha of Striped Legless Lizard habitat was avoided. • 79.5 ha of flood prone land was avoided within the 1% Annual Exceedance Probability modelled on the 'Draft Singleton Floodplain Risk Management Study and Plan' (BMT, 2022) (Singleton Flood Study). • The refinement resulted in lower coverage of the Project Area of 53.2 ha of Category 1 bush fire prone land.
BESS	Location in south-eastern corner of Project Area selected (of two potential locations).	• The SE location was chosen for efficient connection to other supporting infrastructure and minimisation of cabling and therefore associated disturbance. • The location was also determined to minimise risk by the Preliminary Hazards Assessment (PHA) and Bushfire Assessment Report (BAR), assuming effective management of an Asset Protection Zone (APZ).
Access Tracks	Removal of some largely segregated PV arrays in the north reduced access track lengths. Access tracks designed to avoid environmental impacts based on environmental studies.	• Fewer access tracks resulted in less disturbance of dispersive soils and reduced loss of agricultural land use. • Access tracks use previously cleared land where possible and designed to avoid impacts to 1.87 ha of native vegetation including listed TECs and habitat for a number of threatened species, including Striped Legless Lizard.
Underground Cabling	Underground cabling was largely selected instead of overhead cabling. Cabling will coincide with access tracks where possible.	• The underground cabling will run underneath access tracks where practical to do so. • Where this is possible, cabling beneath access tracks minimises environmental impacts, with no pole installation required.
Grid connection easement	The grid connection easement to the existing Ausgrid Singleton Substation was determined during the EIS phase, when the location of the onsite substation was decided.	The grid connection easement takes the shortest feasible route and has been designed to avoid high condition native vegetation.
Water tanks	Addition of three 45,000L water tanks.	Tanks have been included to ensure compliance with 'Planning for Bushfire Protection' (PBP 2019) (RFS, 2019). This change provides mitigation for potential bushfire impact.
Screening	Vegetation screening was added to the southern sections of the Project Area.	Vegetation screening will be planted along the southern section of the Project Area to mitigate against visual impact and glare reflection.

1.7 Related Development

The Project will connect to the existing Ausgrid Singleton Substation for efficient energy input directly to the grid. The connecting transmission line from the solar farm and BESS has been factored into the Project Area and assessed in all technical studies. The Applicant has engaged with Ausgrid regarding a suitable connection point to their Singleton Substation. The connecting transmission line from the northern side of Maison Dieu Road to the Ausgrid Singleton Substation may be constructed in accordance with a separate approval under Part 5 of the EP&A Act from the appropriate authority which would be subject to the agreement of Ausgrid.

REZs are dedicated areas in NSW where renewable energy projects are grouped for efficient storage and transmission of clean energy. The Project is located within the Hunter-Central Coast REZ and was formally declared by the Minister for Energy under Section 19(1) of the *NSW Electricity Infrastructure Investment Act 2020* (EII Act) dated 9 December 2022. The Project will operate independently of other projects and will contribute to the uptake of renewable energy in the Hunter-Central Coast REZ.

1.8 Restrictions or Covenants

A title search has been undertaken for the Project Area. Restrictions and covenants that apply to the Project Area are shown on **Figure 2-3** and listed in **Table 1-3.** Easement holders have been consulted by the Applicant throughout the EIS stage of the Project as described in **Section 5**.

The easement for the 11kV powerline shown on **Figure 2-2** will be amended in consultation with Ausgrid to facilitate the Project. The Rights of Way on Lot 104/-/817010 shown on **Figure 2-2** will be retired prior to construction. Each easement has been considered in the Project design in **Section 3**.

Table 1-3 Restrictions and Covenants

Lot	Detail	Type	Owner	Impact
104/-/817010	20 m wide Right of Way benefitting Lots 2, 3 and 4 in DP252505 and Land in Certificate of Title Volume 7518 Folio 79. Allows owners, visitors, tenants, servants and others to pass, repass and maintain the Right of Way.	Right of Way	Private	In the process of retiring
104/-/817010	10.06 m wide Right of Way created by Dealing A710483 benefitting Portion 75 and part of Portions 88 and 83. Allows owners, visitors, tenants, servants and others to pass and repass over road.	Right of Way	Private	In the process of retiring
104/-/817010, 51/1133756	60 m wide easement for transmission line created by Transfer NP706564.	Easement	Transgrid	No impact
3/-/252505, 104/-/817010, 51/-/1133756	45.72 m wide easement for transmission line created by N/R No K427999	Easement	Transgrid	No impact

2 STRATEGIC CONTEXT

This Section identifies the key strategic issues that are relevant to the assessment of the Pottinger Solar Farm. It justifies the Project in relation to Government strategies, policies and plans, including the regional and local land use planning context. It also identifies key features of the Project Area and surround which have a potential to affect or be affected by the Project, including cumulative impacts with other known developments.

Agreements which have been entered into with other parties to mitigate or offset impacts are also described. This Section provides an analysis of feasible alternatives which have been considered in relation the Project's objectives.

2.1 Government Strategies, Policies and Plans

2.1.1 International

2.1.1.1 UN Sustainable Development Goals

The United Nations declaration of, and commitment to the 'Transforming our world: the 2030 Agenda for Sustainable Development' (UN, 2015) set in place 17 Sustainable Development Goals (SDGs) with 169 distinct targets, in an effort to progress the principles of Ecologically Sustainable Development (ESD) and create more equitable outcomes from a socio-economic and sustainability perspective. All member states of the UN General Assembly are in agreeance to achieving the SDGs by 2030 and bringing the most disadvantaged member states and individuals to greatly improved outcomes.

The Project aligns with the following SDGs:

- Goal 7: 'Affordable and Clean Energy', aligning with Target 7.2 - "By 2030, increase substantially the share of renewable energy in the global energy mix" (UN, 2015); and
- Goal 11: 'Sustainable Cities and Communities', aligning primarily with Target 11.6 - "By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management" (UN, 2015).

The Project will contribute an additional source of renewable energy to the National Energy Market (NEM) in Australia, while simultaneously reducing the power generation needed from fossil fuel sources, reducing GHG emissions and improving environmental health outcomes.

2.1.1.2 UN Framework Convention on Climate Change COP26 and COP28

The United Nations Convention on Climate Change Conference of Parties (COP) 26 was the 26th climate change conference held by the UN in Glasgow, during early to mid-November 2021. All 197 member states of the UN agreed to the Glasgow Climate Pact, which established a series of key commitments, including 'Recognizing the emergency', 'Accelerating action', and 'Moving away from fossil fuels'. In alignment with these commitments, the Australian federal government committed to net zero GHG emissions by 2050 and agreed to shift away from traditional fossil fuel energy generation.

COP 28 occurred from 30 November to 12 December 2023 and "*marked the conclusion of the first 'global stocktake of the world's efforts to address climate change under the Paris Agreement*". An agreement to commence the "'*beginning of the end' for the fossil fuel era*" was established and includes aiming to "*triple renewable energy capacity and doubling energy efficiency improvements by 2030*".

The Project will assist in helping Australia to meet these international commitments through generating solar power, helping replace the need for daytime fossil fuel energy generation. This will result in helping to achieve Australia's net zero emissions by 2050 commitment.

2.1.1.3 UN Framework Convention on Climate Change COP21

The “Paris Agreement” (COP21) was held in Paris during mid-December 2015 and was the UN’s 21st climate change conference. This Agreement, committed to by 194 UN member states, involved an official commitment to the following key long-term goals:

- Substantially reduce global GHG emissions to limit the global temperature increase in this century to 2 degrees Celsius while pursuing efforts to limit the increase even further to 1.5 degrees;
- Review countries’ commitments every five years; and
- Provide financing to developing countries to mitigate climate change, strengthen resilience and enhance abilities to adapt to climate impacts.” (UN, 2015).

Australia is one of the signatory states to this agreement, having set a target of a 26-28% reduction in GHG emissions (from a 2005 baseline) by 2030. This target has since been raised by a successive government to a target of a 43% reduction by 2030.

The Project will assist Australia in achieving its reduction targets by generating solar energy, a renewable resource, resulting in yearly emissions reductions.

2.1.2 Federal

2.1.2.1 Government’s Renewable Energy Target

Established by the *Renewable Energy (Electricity) Act 2000,* the Renewable Energy Target (RET) is a Federal Government scheme that has been legislated to reduce reliance on fossil fuel energy generation and “encourage the additional generation of electricity from sustainable and renewable sources.” (Clean Energy Regulator, 2022).

This target is separated into two distinct parts, being a Large-scale RET (LRET) and a Small-scale RET (SRET). The LRET creates an incentivised market for renewable energy power stations across Australia. At present, the current LRET is a total of 33,000 GWh.

The Project is eligible for the LRET scheme, providing 60 MWac to the NEM, equivalent to powering approximately 19,000 average homes. The Project will provide non-emitting, renewable and low-cost energy to the NEM, helping to replace the primary power generation from coal-fired power and helping achieve the Federal Government’s 43% emissions cut by 2030 and the NSW Government’s net zero by 2050 commitment.

2.1.2.2 Climate Change Act 2022

The Federal Government’s *Climate Change Act 2022* details the measures and mechanisms to create down-ward pressure on GHG emissions, while legislating Australia's GHG reduction targets of a 43% reduction (from 2005 levels) by 2030 and achieving net GHG emissions to zero by 2050.

The Project will assist Australia in achieving its reduction targets by generating solar energy, a renewable resource. If approved, the Project will be operational before the 2030 target, contributing to yearly emissions reductions.

2.1.2.3 National Electricity Market

The NEM is a wholesale market through which electricity is traded, incorporating approximately 40,000 km of transmission lines and cables in Australia and spanning the eastern and south-eastern coasts (including QLD, NSW, ACT, SA, VIC and TAS) (AEMO, 2022a). It delivers around 80% of all electricity consumption in Australia (DCCEEW, 2023).

The NEM facilitates the exchange of electricity between generators and retailers. Retailers resell the electricity to businesses and households. The Australian Energy Market Operator (AEMO) controls the NEM and is responsible for monitoring electricity consumption and for the security and reliability of the power system.

AEMO recognises that the NEM needs to be modernised to accommodate and respond to changes in electricity generation, emerging technologies, such as solar batteries, and shifting consumer preferences (DCCEEW, 2023).

The Project will contain infrastructure to connect to the NEM and allow for distribution of the energy produced to retailers. The Project will directly feed into the NEM and contribute to the large-scale goal of renewable energy generation.

2.1.3 New South Wales

2.1.3.1 Net Zero Plan Stage 1: 2020-2030

The 'NSW Government Net Zero Plan Stage 1: 2020-2030' (DPIE, 2020) establishes a path forward to NSW's net zero emissions target by 2050 and a 70% reduction (on 2005 levels) of GHG emissions by 2035. The plan has four key parts:

- A global challenge with local opportunities – the trends and opportunities arising from global climate change action;
- Progress and projections – NSW's progress to date in reducing emissions and future emission reduction projections;
- The net zero priorities – the NSW Government's net zero priorities; and
- Keeping track – the Government's approach to keeping track of its progress.

The NSW Government's Net Zero Plan Implementation Update 2022 (Office of Energy and Climate Change, 2022) announced an aim to reach a 70% reduction on GHG emissions by 2036, raised from an original target of a 50% reduction. The 2022 Implementation Update also announced a series of new initiatives and strategies to aid in achieving this objective, including further milestones and investment into the Electricity Infrastructure Roadmap (DPIE, 2020).

The Project will assist in achieving the reduction targets of the Net Zero Plan by generating solar energy, a renewable resource.

2.1.3.2 NSW Electricity Strategy

The 'NSW Electricity Strategy' (DPIE, 2019) is the NSW State Government's plans to deliver reliable, affordable, and sustainable electricity to the NEM. It supports a variety of new schemes to achieve this, including the declaration of five REZs across NSW, which concentrate electricity infrastructure upgrades to encourage investment from other entities. The strategy will drive $10.7 billion in private investment, approximately 830 operational jobs, and 1,250 construction jobs each year.

The NSW Electricity Strategy aligns closely with the NSW Government's 'Net Zero Plan Stage 1: 2020 – 2030' (DPIE, 2020) supporting an affordable and reliable energy grid through:

- Delivering Australia's first coordinated Renewable Energy Zone in the Hunter region;
- Saving energy via the Energy Security Safeguard;

- Supporting the development of new electricity generators;
- Setting a target to increase the state's energy resilience; and
- Making it easier to do energy business in NSW.

The Project is in accordance with the NSW Electricity Strategy, providing private investment into renewable energy generation and an increase in BESS storage capacity that will help reduce cost of electricity within the NEM. The Project will assist in securing the NEM's resilience to power demands as coal fired power stations across the state are phased out over the next 15 years.

2.1.3.3 NSW Transmission Infrastructure Strategy

The 'NSW Transmission Infrastructure Strategy' (DPE, 2018) is the NSW Government's plan to enable private sector investment in priority energy infrastructure projects, with the goal of lowering cost of energy to consumers by 2040. This strategy builds on existing state government strategies and aims to:

- Boost NSW's interconnection with Victoria, South Australia and Queensland, and unlock more power from the Snowy Hydro Scheme;
- Increase NSW's energy capacity by prioritising Energy Zones in the Central-West, South-West and New England regions of NSW to deliver affordable energy into the future; and
- Work with other states and regulators to streamline regulation and improve conditions for investment.

The strategy aims to deliver a total of 17,700 MW of new transmission projects by 2040. This would have flow-on effects to the entire energy generation industry, including improving energy efficiency, reliability and security, decreasing costs, and enabling quicker project delivery.

Part of this strategy includes the Hunter Transmission Project (HTP), which will provide 8 GW of transmission capacity upon its completion. The transmission corridor for the HTP is located on the western side of the Hunter River and does not correspond with the Project.

The Project will include connection to the existing Ausgrid Singleton Substation and will contribute to the development of the Hunter – Central Coast REZ, which will result in an overall increase to NSW's energy capacity.

2.1.3.4 NSW Electricity Infrastructure Roadmap

The 'NSW Electricity Infrastructure Roadmap' (DPIE, 2020) (Roadmap) is the NSW Government's plan to transform the NSW electricity sector into a clean, cheap, and reliable energy market. The roadmap builds on the 'NSW Electricity Strategy' (DPIE, 2019) and the 'NSW Transmission Infrastructure Strategy' (DPE, 2018). The roadmap lays the foundations for the replacing of NSW's retiring coal-fired power stations through new energy generation stream, new network infrastructure, and new storage and firming to strengthen the grid.

The roadmap emphasises the need to transition to renewable energy sources, noting that four of the state's six coal fired power stations are expected to close by 2037. These power stations currently provide around 75% of NSW's electricity supply and 66% of the firm capacity needed during heat waves (DPIE, 2020).

Facilitated through the *Electricity Infrastructure Investment Act 2020* (NSW), the roadmap provides a coordinated regulatory and strategic framework to support $32 billion in private investment in at least 12 GW of renewable energy generation infrastructure and at least 2 GW of long-duration storage infrastructure by 2030 (DPIE, 2020). This action aims to reduce GHG emissions in the NSW electricity sector by 90 million tonnes by 2030, helping to deliver on NSW's carbon footprint reduction targets.

The Project will provide large-scale renewable energy to the NEM, helping to offset the retirement of coal-fired power stations in NSW. The Project will assist in meeting the commitments of the roadmap, alongside NSW's energy generation and storage requirements. Additionally, the Project will contribute to the development of the Hunter – Central Coast REZ, which will add to regional growth and investment.

2.1.3.5 Hunter – Central Coast Renewable Energy Zone

The 'NSW Electricity Strategy' (DPIE, 2019) and 'Electricity Infrastructure Roadmap' (DPIE, 2020) establishes the framework to deliver the state's first five REZs in strategic areas across the state, including in the Hunter – Central Coast region. The REZs will play a significant role in delivering renewable energy generation, storage and transmission, to help replace existing coal fired power stations as they come to the end of their operational life.

The Hunter – Central Coast region has been identified as one of five REZs to be created in NSW, with others being declared or proposed in the Central-West Orana, Illawarra, South-West and New England regions of NSW. REZs combine wind, solar and hydroelectric energy generation, energy storage, and high-voltage transmission lines, to generate and deliver clean, renewable energy. REZs aim to use economies of scale to deliver cheap, reliable, and clean electricity for NSW by concentrating transmission infrastructure.

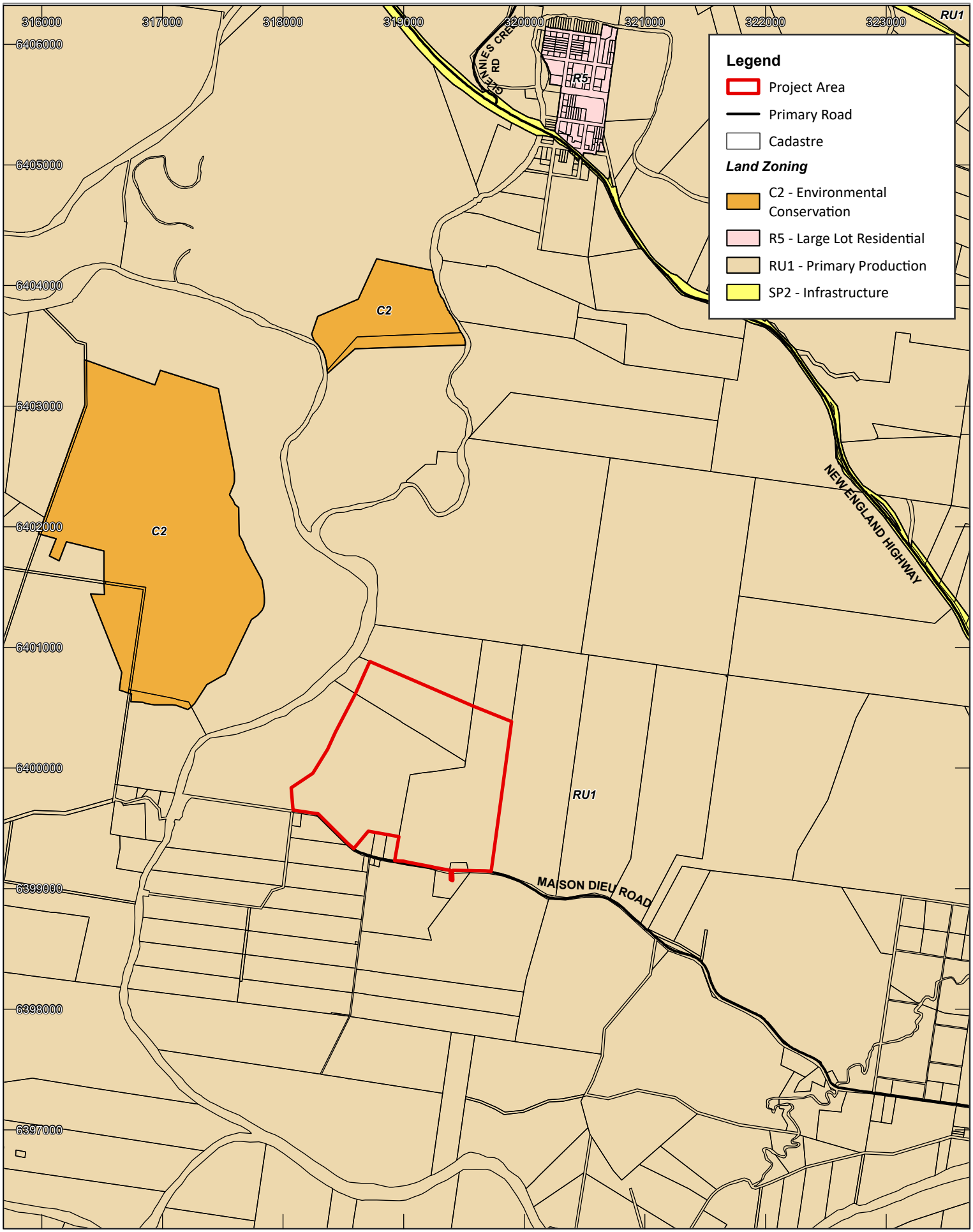
The objectives of REZs are to:

- Deliver affordable energy into the future;
- Diversify the NSW energy mix;
- Expand electrical transmission capabilities; and
- Open new parts of the NEM for energy generation in locations that can benefit from diverse weather patterns.

The Hunter – Central Coast REZ has been selected due to its existing access to decommissioned power station sites, rehabilitated mine owned land, highly developed transmission infrastructure, a significant and growing population, and a strong freight and logistics network. Alongside wind, solar, and hydroelectric power generation, it will also enable more experimental renewable technologies, such as hydrogen and ammonia.

The Project is deliberately located within and aligns with the strategic objectives of the Hunter – Central Coast REZ.

The Project will consistently deliver renewable energy at a low-cost, helping to diversify the NEM's energy sector and justifying expansion of electrical transmission capabilities.



LAND ZONING

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Nearmaps 6/05/2022,

MAP: Land Zoning
VERSION: A
DATE EXPORTED: 15/04/2024
TECHNICIAN: Natalie.Wood

0 500 1,000 1,500 m

SCALE 1:40,000
A4 SIZE / Projection: GDA 1994 MGA Zone 56

N

FIGURE 2-1:

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2.1.4 Local

2.1.4.1 Hunter Regional Plan

The 'Hunter Regional Plan 2041' (DPE, 2022) (Hunter Regional Plan) is the new strategic planning guidance for future development in the Hunter. Objective 1 of the Hunter Regional Plan is to diversify the Hunter's mining, energy and industrial capacity. The Hunter Regional Plan acknowledges that the region has the infrastructure assets and skilled workforce to support more renewable energy generation, including the required established high-voltage power lines and existing transport infrastructure. These assets place the Hunter in an important role in providing power.

The Project aligns with Objective 1 of the Hunter Regional Plan through the provision of greater renewable energy generation within the region, diversifying existing energy sources, improving the region's energy efficiency, and replacing electricity that would have been generated by burning coal, effectively reducing GHG emissions. These aspects of the Project serve to improve outcomes for residents and businesses of the Hunter Region. The Project aligns with multiple objectives of the Hunter Regional Plan, as demonstrated in **Table 2-1**.

Table 2-1 Directions of the Hunter Regional Plan 2041

Direction	Alignment of the Project
Objective 1: Diversify the Hunter's mining, energy and industrial capacity. Renewable energy production	The NSW Government's Electricity Infrastructure Roadmap provides a coordinated framework for a modern electricity system and a plan to transform the electricity sector into one that is cheap, clean and reliable. The Hunter–Central Coast is one of at least five renewable energy zones in NSW. The Project is located within the Hunter-Central Coast REZ, contributing to developing an economy of scale for energy production in the local area. The Project will aid in the delivery of cheap, reliable and clean electricity to Hunter homes and businesses. The Project aligns with Strategy 1.2 of the HRP by providing up to 150 FTE job opportunities during construction. The Project is strategically located in an area where sensitive land uses do not encroach on the Project Area.
Objective 6: Conserve heritage, landscapes, environmentally sensitive areas, waterways and drinking water catchments	The Project aligns with the performance outcomes of this objective. Areas of high environmental value have been strategically avoided in the design stage through extensive ecological assessment and reduction of disturbance to avoid sections of the Project Area that were identified to have high biodiversity values. Aboriginal cultural heritage has also been considered with utmost care in the design of the Project. Site survey was conducted in the presence of Registered Aboriginal Parties. Design was adjusted in accordance with the results of the Aboriginal Cultural Heritage Assessment Report (ACHAR) to avoid significant places and the eight cultural sites within 50 m of the Project Area will be fenced during construction and placed on all relevant plans during operation.
Objective 7: Reach net zero and increase resilience and sustainable infrastructure	The Project will greatly contribute to the goal of The NSW Climate Change Policy Framework for net zero emissions by 2050. Maison Dieu Solar Farm will produce clean, reliable and stable energy throughout its entire lifetime. This will aid in managing the effects of climate change by reducing GHG emission requirements for electricity and equipping communities with an alternate source of power generation. The Project also adheres to the NSW Government's 20-year plan for the generation, storage, firming and transmission infrastructure needed for clean, cheap and reliable power. The renewable energy generation that will occur at Maison Dieu Solar Farm will contribute to the stabilisation and reduction of electricity prices, resulting in greater communal equity and a reduction in the overall cost of living in NSW. Solar energy production also protects residents from air pollution as no emissions occur.
Objective 9: Sustain and balance productive rural landscapes	The Project enables a multi-faceted economic land use on its local rural landscape. The solar arrays would be constructed at a height which allows grazing of sheep or other smaller livestock around and underneath the array, allowing the Project Area to maintain its historical agricultural use. This potential use of sheep grazing would be done in consultation with the landowner. This promotes upscaling of productivity without the acquisition of more land, providing additional income streams for farmers. Solar arrays on agricultural landscapes have been known to produce a greening effect on pasture by capturing condensation which subsequently falls off the underside of the panel onto the pasture.

2.1.4.2 Singleton Local Strategic Planning Statement 2041

The 'Singleton Local Strategic Planning Statement 2041' (Singleton Council 2020) (SLSPS) is Singleton's primary local strategic plan for land uses in the Singleton LGA to 2041. The SLSPS is 20-year framework for future land uses and development, detailing the desired planning objectives and actions for the Singleton LGA. The SLSPS's strategic vision involves the Singleton LGA being internationally recognised as a mining centre of excellence, transitioning to a more diverse and innovative economy, refocusing on post-mining development outcomes, and preparing for long-term population growth.

Priority 4.1 of the SLSPS identifies that creating an industry base that is innovative, resilient and productive is key for building on the future sustainability of the LGA's economy. The positions around this priority that relate to renewable energy generation are:

- Emerging opportunities for economic diversification in the LGA will be investigated; and
- Land use planning constraints and opportunities for renewable energy will be investigated.

The Project is aligned with the SLSPS as it aims to support continual economic development and industrial diversification in the Singleton LGA. The Project provides the LGA with the opportunity to capitalise on existing and future energy transmission and storage infrastructure and create more sustainable outcomes for the region. Potential impacts from the Project will be managed and mitigated to minimise effects on surrounding land uses as far as practicable.

2.1.4.3 Singleton Sustainability Strategy 2019-2027

Singleton Council (SC) released the 'Singleton Sustainability Strategy 2019-2027' (Singleton Council, 2019) in 2019, which provides a framework to provide an integrated and coordinated approach to advancing social, economic and environmental sustainability. This strategy aligns with the UN SDGs and notes the global attention on reducing the reliance on coal-fired power stations. It is acknowledged in the strategy that although progression in clean fuel and technology has made significant inroads, more intensification of renewable energy generation is required regarding the integration of renewable energy and technologies in end-use application in buildings, transport and industry.

The Project will contribute to the Singleton Sustainability Strategy 2019-2027 by reducing reliance on coal fired power stations in the region, thereby aligning with UN SDG Goal 7 'Affordable and Clean Energy' and Goal 11 'Sustainable Cities and Communities'. Further discussion in relation to the UN SDGs is provided in **Section 2.1.1.1**.

2.1.4.4 Singleton Local Environment Plan

The 'Singleton Local Environmental Plan 2013' (SLEP) provides the local environmental planning provisions for land within the Singleton LGA. It details permissibility of all land uses within the LGA. The Project Area is in the Singleton LGA and is zoned RU1 – Primary Production.

Solar electricity generating works are not permissible with development consent in the RU1 zone under the SLEP, but this prohibition is superseded by Section 2.36 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP), which permits the creation of any electricity generating works on any prescribed non-residential zone, including RU1. The objectives of the RU1 zone and the alignment of the Project with these objectives is outlined in **Table 2-2**.

Table 2-2 Singleton LEP 2013 Applicable Land Use Objectives for RU1

Objective	Project Alignment
To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.	The Project aligns with this objective by preserving the existing pastoral land on the site with minimal transformation, while employing a sustainable primary industry production in the form of renewable solar energy generation. Through this, the natural resource base is maintained while simultaneously being enhanced by an additional, sustainable use.
To encourage diversity in primary industry enterprises and systems appropriate for the area.	The Project encourages diversity in primary industry enterprises by proposing a large-scale renewable solar energy generation development, which is a relatively novel industry within the Singleton LGA and the greater Hunter region.
To minimise the fragmentation and alienation of resource lands.	The Project Area will be restored to its pre-development state at the Project's end of operational life. Soil will be stripped and respread during rehabilitation. The Project design minimises the fragmentation and continuity of surrounding existing resource lands by ensuring that the existing landform will be retained and no broadscale recontouring will take place. A Land Use Conflict Risk Assessment (LUCRA) was conducted as part of the Soils and Agricultural Impact Assessment provided in **Appendix J.** The LUCRA found no high-risk potential conflicts between neighbouring land uses.

2.2 Natural Features

This section provides a background summary of natural features relevant to the assessments in this EIS. **Figure 2-2** shows key natural features. This section specifically describes topography, geology, climate, soils and watercourses.

2.2.1 Topography and Geology

The Project Area is a stable, generally free-draining landform. The landscape is characterised by undulating and low rolling hills, crossed by drainage lines which run into the Hunter River. The Project Area has an elevation of 50 m at its lowest point in the western section and rises to 105 m on a hillslope at the south-eastern boundary.

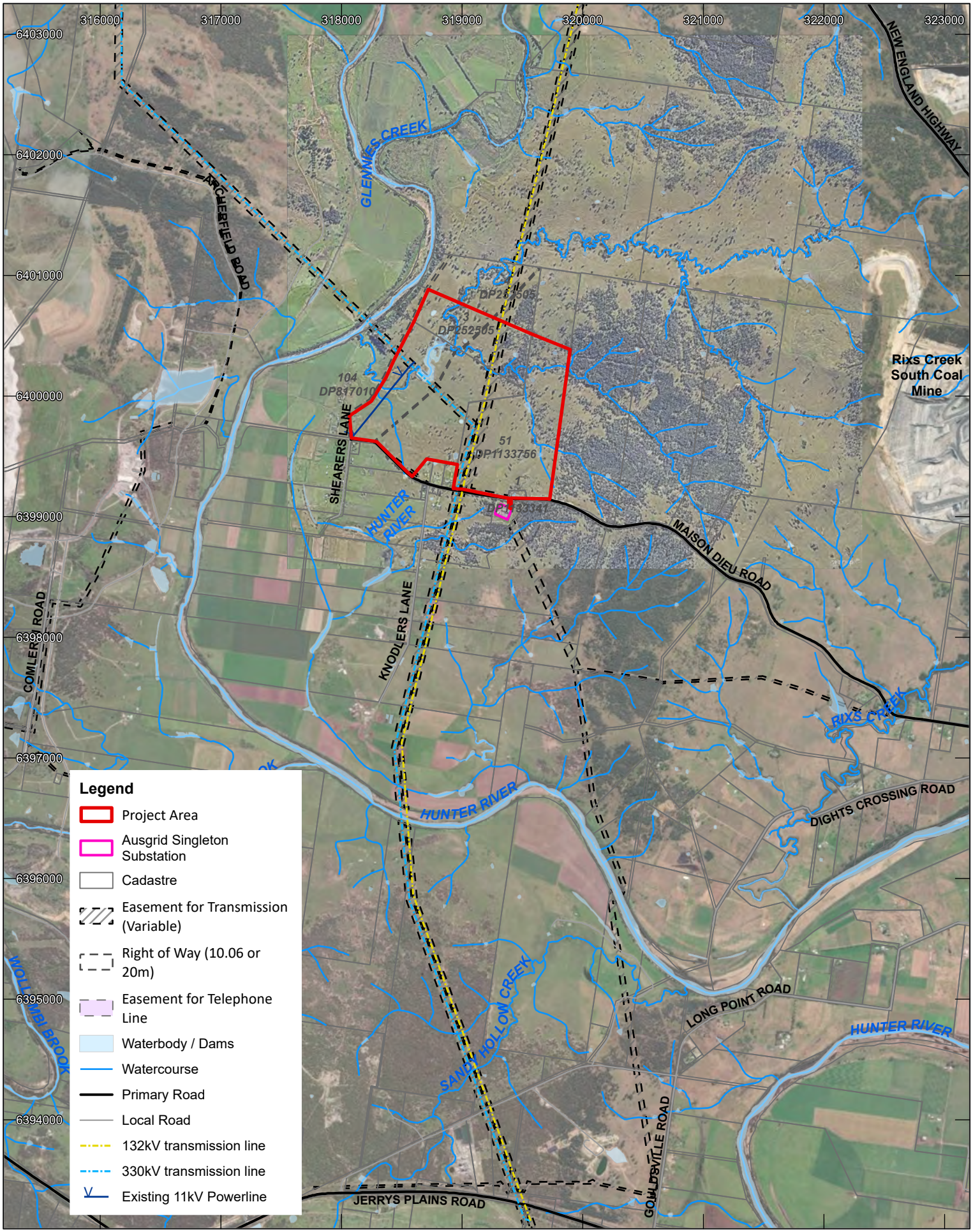
The majority of the Project Area is within the Vane Subgroup of the Wittingham Coal Measures, a coal bearing sequence with narrow ridges of sandstone and siltstone. The south-western section of the Project Area contains alluvial terrace deposits.

2.2.2 Climate

The Upper Hunter Region experiences variable climatic conditions. The Southern Oscillation Index causes La Niña-like and El Niño-like periods, with extended drought periods influencing production on floodplains and hills in the area.

The average maximum temperature based on data recorded at the closest Bureau of Meteorology (BOM) weather station to the Project Area (Cessnock Airport AWS 061260) ranges from 30.4°C in January to 17.5°C in July. Average minimum temperatures range from 4.1°C in July to 17.1°C in January.

Average annual rainfall is 758 mm. The month of February experiences the highest average rainfall with 102 mm, whilst August experiences the lowest with 34.2 mm. Rainfall generally occurs 75 days per year.



EXISTING ENVIRONMENT

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Existing Environment
VERSION: B
DATE EXPORTED: 24/05/2024
TECHNICIAN: natalie.wood

0 500 1,000 1,500 m

SCALE 1:40,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 2-2:

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PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

2.2.3 Soils

The dominant soil types within the Project Area are Sodosols and Dermosols. Sodosols are soils with a clear or abrupt textural B horizon, with the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) being sodic and not strongly acid.

The Project Area does not contain any signs of Acid Sulphate Soils (ASS) as described in **Section 6.6**.

The dominant soil fertility classes were found to be Moderately Low (Class 2) and Moderately High (Class 4), whereas the dominant Land and Soil Capability (LSC) classes are Class 4 and Class 6. The Project Area contains 108 ha of LSC Class 4 moderate capability land, 73 ha of LSC Class 6 low capability land and 22 ha of LSC Class 3 high capability land. More detail about soils is provided in **Section 6.6**.

2.2.4 Watercourses

The Project is located in the Hunter River catchment, with the Hunter River located 400 m west of the Project Area. The Project Area contains several first, second, third and fourth order, unnamed watercourses under the Strahler Stream Classification System as shown on **Figure 2-2**. The watercourses within the Project Area have a Riparian Corridor (RC) with a Vegetated Riparian Zone (VRZ), a transition zone between the land and watercourse which is important for protection of ecosystem, water quality and bank stability.

The fourth order stream within the Project Area connects directly to the Hunter River downstream. The surrounding watercourses are mostly ephemeral. There are no wetlands in the vicinity of the Project Area. More detail about watercourses is provided in **Section 6.7**.

The Project will have a negligible impact on coastal processes and hazards, being over 78 km from the nearest shoreline. Climate change is further discussed int **Section 2.1** and **Section 6.12.3.4**.

2.2.4.1 National Parks and Conservation Areas

The world heritage listed Wollemi National Park is located approximately 13 km south-west of the Project Area. At 501,703 ha, it is the second largest national park in NSW. The Project will not interact with, nor impact Wollemi National Park.

There are two Environmental Conservation (E2) zones located north-west and shown on **Figure 2-1**, the closest of which is over 1 km from the Project Area. Under the SLEP, these land zones are designed to protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values and to prevent development that could destroy, damage or otherwise have an adverse effect on those values.

The Project will neither interact with, nor impact the C2 land to the north-west, outside the Project Area

2.3 Built Environment

There is a 132 kV transmission line running north-east to south-west through the Project Area. A 330 kV transmission line runs parallel to the 132 kV line in the south of the Project Area before turning in a north-west direction. There is also an 11 kV transmission line in the west of the Project Area. The Project Area contains 12 farm dams.

The southern boundary of the Project Area runs adjacent to Maison Dieu Road and perpendicular to Shearer's Lane at the south-west corner. The existing Ausgrid Singleton Substation is located on the southern side of Maison Dieu Road.

Built features around the Project Area are shown on **Figure 2-2** and described in detail below.

2.3.1 Community

Maison Dieu is a relatively small, rural social locality surrounded by agricultural and mining land uses and infrastructure. The locality has a population of 175, which has been slightly declining since 2016 (ABS, 2021).

Housing in the locality is typical of that found in a rural area, with 100% of Maison Dieu's dwellings being separate houses. Nearby community infrastructure such as churches and education facilities are in Singleton.

2.3.1.1 Local

Local areas relevant to the Project include Maison Dieu, Camberwell and McDougalls Hill. The three State Suburb Codes making up the local area had a combined population of 408 people at the time of the 2021 census.

Coal mining is prominent in the local area, making up 31% of jobs in Maison Dieu and 46.2% of jobs in McDougalls Hill. Dairy farming is also prominent in Maison Dieu at 10.3%. These employment types require a built environment that favours these types of industries, with appropriate infrastructure installed.

Coal mines are a prominent built feature, with Hunter Valley Operations, Rix's Creek Mine, Mount Thorley Warkworth, Ashton, Wambo, Integra Underground, Ravensworth Underground and Glendell operating nearby as shown on **Figure 1-1**. The closest coal mine, Hunter Valley Operations, is less than 3 km from the Project Area.

The limited areas of land surrounding the Project Area that do not contain coal mines mostly consist of cleared, agricultural pastures.

2.3.1.2 Regional

The regional area relevant to the Project is the Singleton LGA. Singleton had a population of 24,577 at the time of the 2021 census. The most common industry of employment in the regional area is coal mining, accounting for 22% of jobs.

There are 2,086 registered businesses in the Singleton LGA. The most prominent business category is agriculture, forestry and fishing with 565 local businesses. (ABS, 2021).

2.3.2 Land Use

2.3.2.1 Mining

The Project's regional locality is dominated by coal mines. In the immediate vicinity, Rix's Creek Coal Mine is to the north-east and Hunter Valley Operations (HVO) to the west across the Hunter River. Mount Thorley Warkworth is located further to the south, with United Wambo to the south-west and Ravensworth to the north.

Rix's Creek Coal mine currently has an application with DPHI to extend its operations towards the Project across the New England Highway and continue coal mining until 2050. HVO has two applications for each of its north (SSD 11826681) and South (SSD 11826621) operations to continue mining until 2050, supported by the 'Hunter Valley Operations Continuation Project Environmental Impact Statement' (EMM, 2022) (HVO EIS).

Assessment Lease (AL) 34 for "coal and oil shale" is held by Coal & Allied Operations Pty Ltd (CNA) and Anotero Pty Ltd and corresponds with the Project Area. AL 34 is shown on **Figure 2-2** and has an expiry date of 3 November 2026. The HVO EIS does not include any reference to coal extraction within AL34.

Engagement with lease holders and mines is included at **Section 5**.

2.3.2.2 Agriculture

Key agricultural infrastructure within the Project Area includes fencing, gates and access tracks. Access tracks within the Project Area will be maintained as a result of the Project, and improved where practical in consultation with the landholders. High quality security fencing will be constructed around the Project Area. Access tracks, fencing, gates and other farm infrastructure will either be decommissioned with the Project at the end of its operational life or left in place if the landowner prefers.

Agricultural service centres near the Project include Singleton, Muswellbrook and Maitland, hosting local businesses which supply agricultural goods. The Hunter Regional Livestock Exchange (HRLX) is located off Gresford Road, Clydesdale, approximately 13 km west-south-west of the Project Area. HRLX provides a covered sales facility, feeding services for livestock (pre- and post-sale) and a truck wash system. Prime cattle sales are conducted weekly and store cattle sales occur monthly. The closest abattoirs to the Project Area are in Scone and Singleton.

The agricultural industry relies on the road and rail network to connect retailers, suppliers and producers on a local, regional and state scale.

2.3.3 Powerlines

Utilities identified within the Project Area include 330 kV,132 kV and 11 kV overhead lines. Setbacks from overhead transmission line easements in accordance with relevant guidelines and in consultation with infrastructure owners are shown on **Figure 3-1**. The 11kV line transecting the disturbance footprint will be relocated to accommodate the solar arrays. Ausgrid has been engaged with by the Applicant throughout the development of the EIS as described in **Section 5**. The proposed 11 kV line relocation is shown on **Figure 3-1**.

EnergyCo's HTP is a proposed 500 kV overhead transmission line, connecting Bayswater Power Station to Eraring Power Station. The transmission line will be approximately 115 km in length and will support NSW's transition to renewable energy by supplying energy to the Hunter, Sydney and Illawarra regions, where 80% of the state's electricity demand is situated.

The corridor for the HTP does not interact with the Project Area and is located on the western side of the Hunter River. The Project will not impact the transmission infrastructure, nor will it rely on the transmission infrastructure, due to its connection to the nearby Ausgrid Singleton Substation.

Engagement with powerline operators is described in **Section 5.**

2.3.4 Roads

2.3.4.1 State Roads

The New England Highway is a classified state highway which joins the Pacific Highway at Newcastle to the Upper Hunter and New England. The New England Highway runs in a north-west to south-east direction, 4 km to the north-east of the Project Area, connecting with Maison Dieu Road near McDougalls Hill. This intersection will be upgraded to a roundabout as part of the New England Highway – Singleton Bypass project (Singleton Bypass).

The Singleton Bypass requires the construction of a bridge over the New England Highway, 50 m from the Maison Dieu turnoff. The bridge will feature an exit which results in the departure of traffic through the roundabout. The Singleton Bypass was approved in August 2020 and is expected to be available for use from late 2026 (TfNSW, 2023).

The current road network surrounding the Project along with the Singleton Bypass is shown on **Figure 1-1.**

2.3.4.2 Local Roads

The local roads that will be used for Project access are Maison Dieu Road and Magpie Street. Both roads have an intersection with the New England Highway.

Maison Dieu Road

Maison Dieu Road is a local, rural collector road that collects and distributes traffic from Maison Dieu to the New England Highway and provides access to rural properties. 50 km/h speed zoning applies from the new England Highway to 500 m west of St David's Close, after which a 100 km/h speed zoning applies through to the Project Area. Between the New England Highway and Enterprise Crescent, Maison Dieu Road has a 9-metre sealed carriageway with centre line and edge line marking. Although Maison Dieu Road is not a designated B-double route west of Enterprise Crescent, SC has been consulted in relation to B-double delivery to the Project Area.

Magpie Street

Magpie Street is a local, sealed, industrial collector road and designated B-double route, running between the New England Highway and Maison Dieu Road. Magpie Street collects and distributes traffic from the McDougall's Hill industrial area to the New England Highway and provides access to rural properties off the Street.

Magpie Street is two-lane and two-way with a sealed pavement width of 13 m between upright kerb and gutter. This allows two lanes of traffic flow, with parking lanes on both sides of the road. Magpie Street experiences a large amount of heavy vehicle use as it services the industrial estate known as McDougall Business Park. The entirety of Magpie Street is centre line marked and the speed limit is 60 km/h.

2.3.5 Rail Lines

The Project Area does not contain any rail facilities. The nearest rail line, the Main North Line (also known as the Great Northern Railway), runs in a north-south direction approximately 7.3 km east of the Project Area.

The Project will not have any impact on the Main North Line, nor any other rail lines.

2.3.6 Land Ownership

145 potential receivers were identified by desktop review as summarised in **Table 2 3**. 80 of these were confirmed dwellings within 4 km of the Project Area. Potential receivers are described below and engagement is described in **Section 5.**

2.3.6.1 Mine-owned

This category includes the vast majority of land to the north, west and east of the Project. Most of the 80 identified dwellings surrounding the Project Area are mine-owned. The timeframe of each mining operation is described in **Section 2.5**.

2.3.6.2 Crown Land

The Applicant advises there is no Crown Land within the Project Area and as such the Project will not have any impact on Crown Land.

2.3.6.3 Private Associated

Five private dwellings owned by one host landholder are associated with the Project (IDs R12 – R16). There is also a host landholder with no dwelling.

2.3.6.4 Private Non-Associated

Privately owned land containing residential dwellings occurs to the north, south and south-east of the Project Area. Many residences are in the Zone of Affectation (ZOA) or Zone of Management (ZOM) of mines.

Table 2-3 provides a summary of the relevant receivers identified in desktop review. Receivers R1 – R80 indicate dwellings within 4 km of the Project Area. Land ownership is detailed on **Figure 2-3**.

Table 2-3 Receivers Summary

ID	Associated	Non-associated and Private	Mine-owned	Non-Associated (in mine ZOA or ZOM) *
R1			Yes	
R2		Yes		
R3			Yes	
R4			Yes	
R5			Yes	
R6			Yes	
R7				Yes
R8				Yes
R9			Yes	
R10			Yes	
R11			Yes	
R12	Yes			
R13	Yes			
R14	Yes			
R15	Yes			
R16	Yes			
R17			Yes	
R18				Yes
R19				Yes
R20				Yes
R21				Yes
R22				Yes
R23				Yes
R24				Yes
R25			Yes	
R26				Yes
R27				Yes
R28				Yes
R29				Yes
R30				Yes
R31				Yes
R32				Yes
R33				Yes
R34				Yes
R35				Yes
R36			Yes	
R37				Yes

ID	Associated	Non-associated and Private	Mine-owned	Non-Associated (in mine ZOA or ZOM) *
R38			Yes	
R39			Yes	
R40			Yes	
R41			Yes	
R42			Yes	
R43		Yes		
R44		Yes		
R45		Yes		
R46		Yes		
R47			Yes	
R48			Yes	
R49		Yes		
R50				Yes
R52			Yes	
R53			Yes	
R54			Yes	
R55			Yes	
R56			Yes	
R57			Yes	
R58			Yes	
R59			Yes	
R60			Yes	
R61			Yes	
R62			Yes	
R63		Yes		
R64		Yes		
R65		Yes		
R66		Yes		
R67		Yes		
R68		Yes		
R69		Yes		
R70		Yes		
R71		Yes		
R72		Yes		
R73			Yes	
R74			Yes	
R75			Yes	
R76			Yes	
R77			Yes	
R78			Yes	
R79			Yes	
R80			Yes	
R81		Yes		

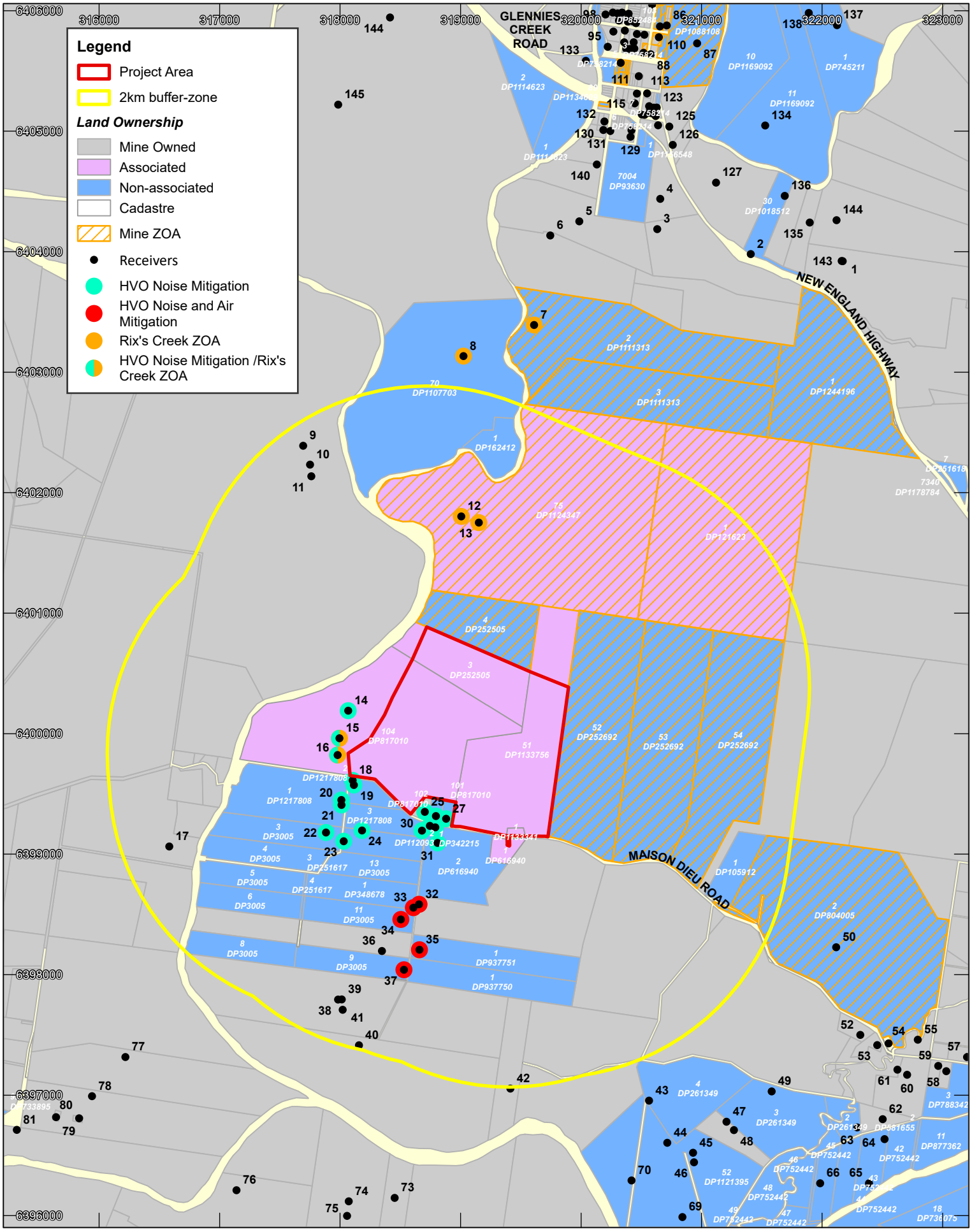
ID	Associated	Non-associated and Private	Mine-owned	Non-Associated (in mine ZOA or ZOM) *
R82		Yes		
R83		Yes		
R84		Yes		
R85		Yes		
R86		Yes		
R87		Yes		
R88			Yes	
R89		Yes		
R90		Yes		
R91		Yes		
R92		Yes		
R93		Yes		
R94		Yes		
R95			Yes	
R96			Yes	
R97		Yes		
R98		Yes		
R99		Yes		
R100		Yes		
R101		Yes		
R102		Yes		
R103		Yes		
R104		Yes		
R105		Yes		
R106		Yes		
R107		Yes		
R108		Yes		
R109		Yes		
R110		Yes		
R111			Yes	
R112		Yes		
R113			Yes	
R114		Yes		
R115		Yes		
R116		Yes		
R117		Yes		
R118		Yes		
R119		Yes		
R120		Yes		
R121		Yes		
R122		Yes		
R123			Yes	
R124		Yes		

ID	Associated	Non-associated and Private	Mine-owned	Non-Associated (in mine ZOA or ZOM) *
R125			Yes	
R126			Yes	
R127			Yes	
R128		Yes		
R129			Yes	
R130			Yes	
R131			Yes	
R132			Yes	
R133		Yes		
R134		Yes		
R135			Yes	
R136		Yes		
R137		Yes		
R138		Yes		
R139		Yes		
R140			Yes	
R141		Yes		
R142		Yes		
R143		Yes		
R144			Yes	
R145			Yes	

** ZOA – receiver which has rights to acquisition upon request by the mining company due to very high noise, air quality or visual impact predictions*

** ZOM - receiver which has rights to mitigation upon request by the mining company due to moderate noise, air quality or visual impact predictions*

R51 was removed as error in original identification.



LAND OWNERSHIP

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Nearmaps 6/05/2022,

MAP: Landownership
VERSION: B
DATE EXPORTED: 18/07/2024
TECHNICIAN: NATALIE.WOOD

0 500 1,000 1,500 m

SCALE 1:40,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 2-3:

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PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

2.4 Risks and Hazards

Section 2.4 describes key Project risks or hazards that could affect or be affected by the Project and where relevant, indicates where each is addressed in this EIS.

Table 2-4 Key Project Risks

Aspect	Section
Flooding	**6.7**
Bushfire prone land	**6.11**
Contaminated land	**4.2.3**
Land use conflict	**6.6**
Loss of agricultural productivity	**6.6**
Waste	**6.13**
Mine subsidence	**4.3**
Risks and hazards	**6.10**
Climate change	**6.12**
Air quality	**6.12**
Aboriginal heritage	**6.2**
Non-Aboriginal heritage	**6.3**
Visual amenity	**6.5**
Traffic impacts	**6.9**
Biodiversity	**6.1**
Soils	**6.6**
Surface water	**6.7**
Flooding	**6.7**
Economics	**6.14**

2.5 Cumulative Impacts

'Cumulative Impact Assessment Guidelines for State Significant Projects' (DPIE, 2022b) (Cumulative Guidelines) provides a framework for assessing project-level cumulative impacts in an EIS. **Table 2-5** addresses the six key questions from the Cumulative Guidelines.

Projects with a potential for cumulative impacts identified through the NSW Planning Portal and through engagement with relevant regulators with the Project are described in **Table 2-6**.

Table 2-5 Cumulative Impact Guidelines Key Questions

Scoping Questions	Considerations	Comment
What to assess?	The government's strategic planning framework for the area, having regard to any relevant legislation, plans, policies or guidelines	Consideration of key legislation, plans, policies or guidelines is provided in **Section 2**. The Project's setting is discussed in **Section 2**, which identifies: • The key land uses and economic activities within the region are agriculture and mining. • The closest population centre is Singleton. • The Project will connect to the existing Ausgrid Singleton Substation • There are proposed renewable energy projects located in proximity to the Project Area, as well as operational mines. These are described in **Table 2-6.** • There is potential for the Project to increase visual impacts when combined with the other projects' impacts. The Landscape Character and Visual Impact Assessment (LCVIA) identified potential cumulative landscape character and visual impacts.
	The project and other potentially relevant future projects that may be developed over the same time period or similar timeframes as the project.	The EIS will address the cumulative impacts of the Project with the other projects identified in **Table 2-6.**
	Potential material impacts on features including National Parks and other protected areas, environmentally sensitive areas, threatened species and ecological communities, important natural resources, culturally significant resources, key infrastructure and industries, sensitive land use zones, population centres, settlements and residential areas.	The preliminary visual assessment as discussed in **Section 6.5** includes a preliminary review of all these parameters. The cumulative impacts of the Project with other projects are identified in **Table 2-6.**
	The likely scale and nature of the cumulative impacts of these projects.	The preliminary visual assessment discussed in **Section** Error! Reference source not found. includes a preliminary review of all these parameters. The cumulative impacts of the Project with other projects are identified in **Table 2-6.**
What study area?	The study area selected for the cumulative impact assessment of each matter will vary depending on the specific characteristics of the assessment matter and the scale and nature of the potential impacts on the matter resulting from the project with other relevant future projects.	The preliminary visual assessment as discussed in **Section 6.5** includes a preliminary review of all these parameters. The cumulative impacts of the Project with other projects are identified in **Table 2-6.**
Over what time period?	Like the study area, the time period selected for the cumulative impact assessment on each matter will vary depending on the characteristics of the matter and the scale and nature of the potential impacts on the matter.	The proposed timeframe for the development of the Project is in **Table 3-5.**

Scoping Questions	Considerations	Comment
	In most cases, the period selected is likely to match the life of the project (e.g. 25 years). However, in some cases the period selected may be much shorter than this and cover a single phase of the project, or much longer periods.	Various levels of cumulative impacts may occur during the various Project phases. These impacts have been addressed in **Table 2-6.**
What other projects to include?	Build on these assessments by considering the cumulative impacts of the proposed project on key matters when other future proposed projects are included in the assessment.	The EIS addresses the cumulative impacts of the Project with the other projects identified in **Table 2-6.**
	The following types of development need to be identified for inclusion as 'relevant' future projects: • Other SSD projects. • Projects that are classified as designated development and require an EIS. • Projects that require assessment under division 5.1 of the EP&A Act that are likely to significantly affect the environment and require an EIS. • Projects that have been declared to be controlled actions under the EPBC Act. • Any major greenfield and urban renewal developments that are scheduled for the area.	The EIS addresses the cumulative impacts of the Project with the other projects identified in **Table 2-6.**
What is the approach to assessment?	Identify the proposed approach to assessing the cumulative impacts on the Project having regard to key aspects identified in the Cumulative Guidelines. These include: • Data available • Ability to avoid or mitigate the impacts of the Project on the key matter • Ability to predict the cumulative impacts, and the limitations of any proposed method • Key assumptions that will be used in the assessment • Any relevant criteria that are used to evaluate the acceptability of the cumulative impacts.	The EIS addresses the approach to assessment and cumulative impacts on the Project with other projects in **Section 6.16**.
What are the key uncertainties?	Document any key uncertainties to undertaking the cumulative impact assessment.	The EIS addresses key uncertainties for cumulative impacts in **Section 6.16**. Key matters relating to cumulative impact are identified in **Table 2-6.**

Table 2-6 Proximate Projects with a potential for Cumulative Impacts

Project	Application type	Status	Potential Timing Overlap **with the Project**	Potential Impact / key matters
Hunter Valley Operations – North	Part 4	Approved to operate until 2025. Seeking to extend operations until 2050.	Construction and operation overlap if continuation is approved. Construction overlap between Q2 2025 – Q4 2026. Operation overlap from 2027 – 2050 if Hunter Valley Operations – North extended.	Limited to none.
Hunter Valley operations - South	SSD	Approved to operate until 2030. Seeking to extend operations until 2050.	Construction and operation overlap. Construction overlap between Q2 2025 – Q4 2026. Operation overlap from 2027 – 2050 if Hunter Valley Operations – South extended.	Limited to none.
Rix's Creek North	SSD	Currently seeking approval for continuation project.	Construction and operation overlap if continuation is approved. Construction overlap between Q2 2025 – Q4 2026. Operation overlap	Limited to none.

Project	Application type	Status	Potential Timing Overlap with the Project	Potential Impact / key matters
			between 2027 - 2035 (if continuation approved, then until 2049).	
Rix's Creek South	SSD	Approved to operate until 12 October 2040.	Construction and operation overlap. Construction overlap between Q2 2025 – Q4 2026. Operation overlap between 2027 – 2040.	Limited to none.
Bridgman Solar Farm	SSD	Preparing EIS, timing unknown.	Potential simultaneous construction and operation if approved. Potential operational overlap from Q2 2025 for operational lifespan of 30 years.	Construction impacts including: Traffic Potential biodiversity Social
Bowmans Creek Wind Farm	SSD	Approved, construction late 2024.	Potential construction overlap, simultaneous operations. Construction overlap between Q4 2024 – Q4 2026. Operational overlap from 2027 until decommissioning.	Construction impacts including: Traffic Biodiversity
Singleton Bypass	DA	Under Construction (currently undertaking early work activities), expected to be in use by 2026.	Potential construction overlap, simultaneous operations. Likely construction overlap in 2026, operational overlap from 2027 until decommissioning of the Project.	Construction or operational impacts including: Traffic Noise Air Quality Social
Hexham Straight Widening Project	Part 4	Under construction, expected to be open 2026.	Potential construction overlap, simultaneous operations. Construction overlap between Q2 2025 and Q4 2026. Operational overlap from 2027 until decommissioning of the Project.	Construction or operational impacts including: Traffic
M1 Pacific Motorway Extension to Raymond Terrace	SSI	Under construction, expected to be open 2028.	Construction and operation overlap. Construction overlap between Q2 2025 and Q4 2026. Operational overlap from 2028 until decommissioning of the Project.	Construction impacts including: Traffic
Port of Newcastle to Central West Orana REZ	MOU	Pre-assessment, expected to begin late 2024, with road upgrades expected to start in 2025.	Construction and operation overlap. Potential construction overlap end of 2025. Operational overlap from 2027 until decommissioning of the Project.	Construction impacts including: Traffic
Hunter Transmission Project	Critical State Significant Infrastructure (CSSI)	Construction scheduled 2026, operating early 2028.	Construction and operation overlap. Construction overlap expected in 2026. Operational overlap expected 2027 until decommissioning of the Project.	Construction impacts including: Traffic Noise Social Visual

2.6 Project Justification

2.6.1 Benefits

The Project is within the Hunter-Central Coast REZ and will form an important part of Australia's response to climate change and Commonwealth and NSW Government commitments to the reduction of GHG emissions from the electricity industry. The Project aligns with government objectives for energy security and reliability and will contribute to the continued growth of renewable energy generation and storage capacity. The Project will generate 60 MWac of clean, renewable energy, enough to power the equivalent of approximately 19,000 homes.

The NSW electricity network is set to lose up to 8,000 MW worth of power generation by 2035 following the closure of coal fired power stations. The Project will support the NSW electricity network in helping to fill the capacity gaps left by the closures, enhancing the reliability and security of electricity supply. The transition to renewable energy will decrease the amount of pollution entering the atmosphere, water and land.

The additional supply of solar generated electricity will contribute to the affordability of electricity in NSW. The capital cost of large-scale solar energy projects in Australia decreased by 25% from $1.87 to $1.39 per watt between 2015 and 2020 and is expected to continue decreasing with increased supply (Clean Energy Regulator, 2020).

The Project will contribute to the Commonwealth and NSW Government's emission reduction targets (see **Section 2.1**). This will be achieved by providing clean, renewable energy to the grid, which would have otherwise been generated by burning coal. This supports the transition to renewable energy production and net zero emissions by 2050.

The Project will support the development of the Hunter-Central Coast REZ and the growth of a skilled, renewable energy workforce, which will contribute to other projects within the REZ and other REZs in NSW. The NSW REZs will provide the following benefits:

- Provide up to 12 GW of renewable energy capacity within the state;
- Reduce wholesale electricity costs, providing electricity bill savings;
- Reduce GHG emissions;
- Increase the reliability of electricity supply; and
- Provide community benefits through strategic planning, effective engagement and a voluntary planning agreement.

The Project will provide benefits to local, regional and state communities, including:

- Support 150 FTE construction jobs in the local area at its peak;
- Direct investment in the Singleton LGA;
- Opportunities for local contractors and businesses;
- Diversified income stream and protection against adverse conditions for landholders currently relying on agricultural production;
- Provision of stable, low-cost, renewable energy to the grid; and
- Development of skilled renewable energy workforce in the region equipped to contribute to growing industry.

2.6.2 Site Suitability and Selection

The Applicant has reviewed the solar generation potential of many areas in NSW by considering grid connectivity and capacity, as well as planning and environmental constraints.

The Project Area provides optimal conditions for the development of a solar farm and associated infrastructure for the following reasons:

- Low, relatively flat terrain for cost-effective construction;
- Good solar resource;
- Located away from towns and urbanised areas;
- Proximity to the regional centre of Singleton, and other Hunter Valley locations, which should allow for optimal sourcing of labour from the local community;
- Suitable land use zoning;
- Good access to existing electricity infrastructure, transmission and distribution network;
- Good access to a major road (New England Highway and the Golden Highway); and
- High level of available capacity on the grid transmission and distribution system.

Section 2.35 of the 'Singleton Development Control Plan 2014 (Scenic Protection)' aims to "ensure development on land to which this clause applies is located and designed to minimise its visual impact on those environments" (section 2.35(1b)). There is no land identified for scenic protection in the 'Singleton Development Control Plan 2014' (SDCP) in or around the Project Area. Visual impacts are further discussed in **Section 6.5**.

2.7 Alternatives Considered

2.7.1 No Project

If the Project did not proceed, the equivalent of 19,000 homes in NSW would need to be powered by an alternative source of electricity. This would require the use of either coal fired power generation (most of which is currently undergoing closure and decommissioning in NSW), gas or another renewable or non-renewable energy project. The Applicant has assessed this Project as being the most feasible and environmentally sound method of powering the equivalent of 19,000 homes.

Without the Project, the socio-economic benefits to the region detailed in **Section 6.14** would not be realised.

2.7.2 Alternative Sourcing of Energy

Australia has an abundance of renewable energy sources including solar incidence and wind. Alternative power generation options have been economically limited from a private investment standpoint, but solar and wind are becoming the cheapest forms of new build electricity generating capacity globally and in Australia.

There are significant constraints for the private sector to invest in other technologies (such as pumped hydro) due to their relatively higher costs and higher risks. There is currently a coal mining assessment lease coinciding with the Project Area, identified as AL34 (see **Section 2.3.2.1**). Replacing retiring coal-fired power plants with a combination of wind farms, solar farms, BESSs and pumped hydro is the most economically viable and environmentally friendly option for the foreseeable future.

2.7.3 Alternative Site Location

Other locations for the Project were considered, however the current Project Area was chosen based on its proximity to existing grid connection infrastructure and relatively unconstrained nature.

The suitability of the site in comparison to alternative sites is detailed in **Section 2.6.2**

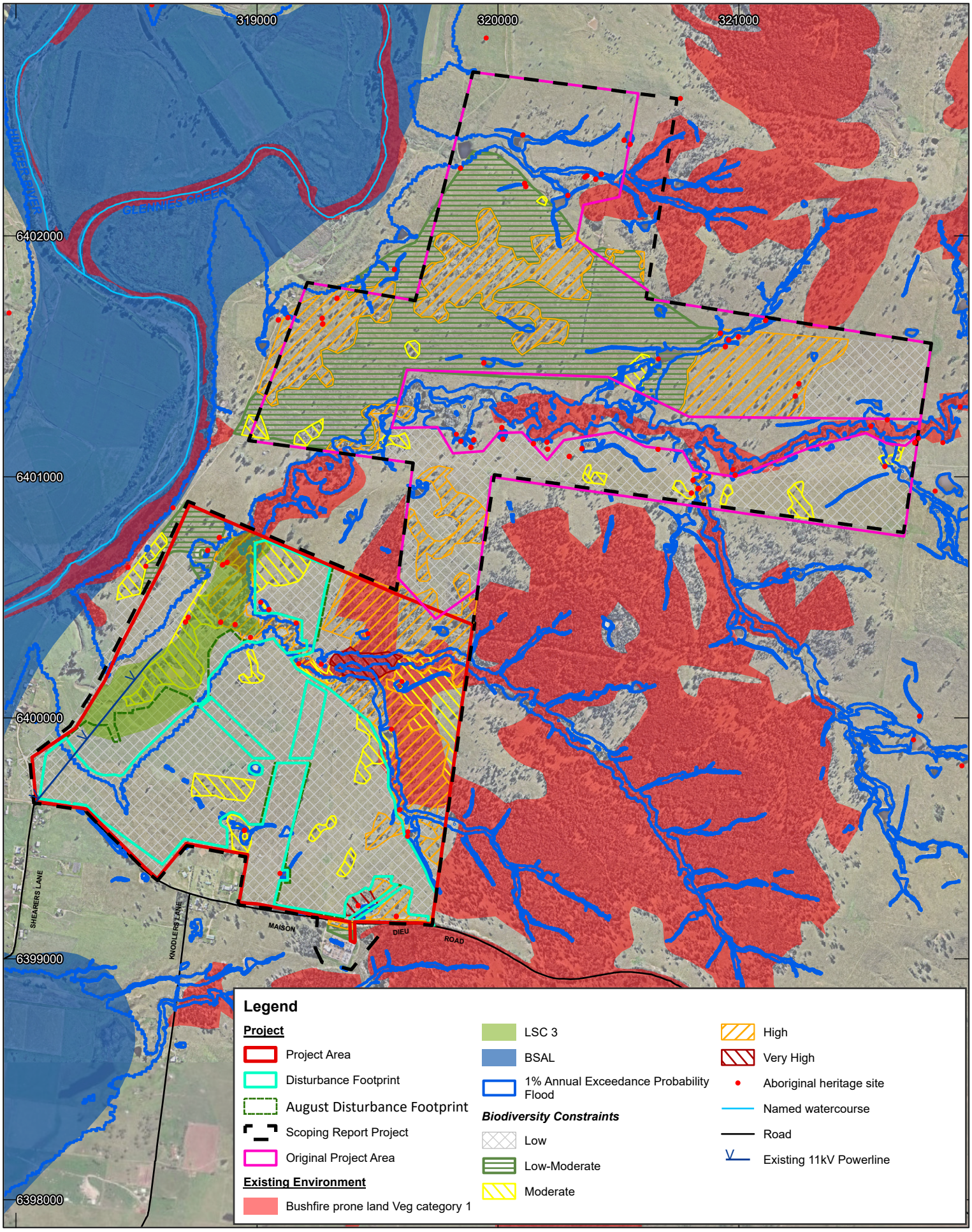
The Project Area was the best potential location considered based on these factors.

2.7.4 Maximised Site Layout

The Applicant began investigating the Maison Dieu area for solar generation potential and engaging with potential host landowners in late 2020. Additional lots adjacent to the Project Area were considered for hosting more PV arrays to increase the generation capacity for the Project. The current site layout is the result of multiple refinements informed by environmental technical studies to avoid and minimise the potential environmental impacts of the Project.

The current layout maximises the use of previously disturbed land and avoids areas of environmental significance. A full description of the benefits of the current Project layout compared to the original and maximised SR Project Site layout is provided in **Section 7.1**.

Figure 2-4 shows the current Project layout compared to the SR Project Site layout and key constraints including bushfire prone land (BPL), flood prone land, Biophysical Strategic Agricultural Land (BSAL), Aboriginal heritage sites, LSC Class 3 Land and biodiversity constraints (such as Striped Legless Lizard habitat).



PROJECT REFINEMENT AND CONSTRAINTS

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Project Constraints
VERSION: A
DATE EXPORTED: 16/04/2024
TECHNICIAN: Natalie.Wood

0 200 400 600 800 m

SCALE 1:20,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 2-4:

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3 PROJECT DESCRIPTION

This Section provides a comprehensive description of the of the construction, operation, maintenance and decommissioning phases of the Project for which approval is sought. It provides an overview and table which summarises the main components of the Project as well as suitable maps and plans.

Where project description flexibility is sought (e.g. for detailed design, micro-siting, technological advancements, demand-driven production or staging), it has been described in this Section.

3.1 Overview

The Project includes the construction, operation, maintenance and decommissioning of an approximately 60 MWac PV solar facility, with an associated 40 MW / 80 MWh BESS behind the same connection point, and associated infrastructure.

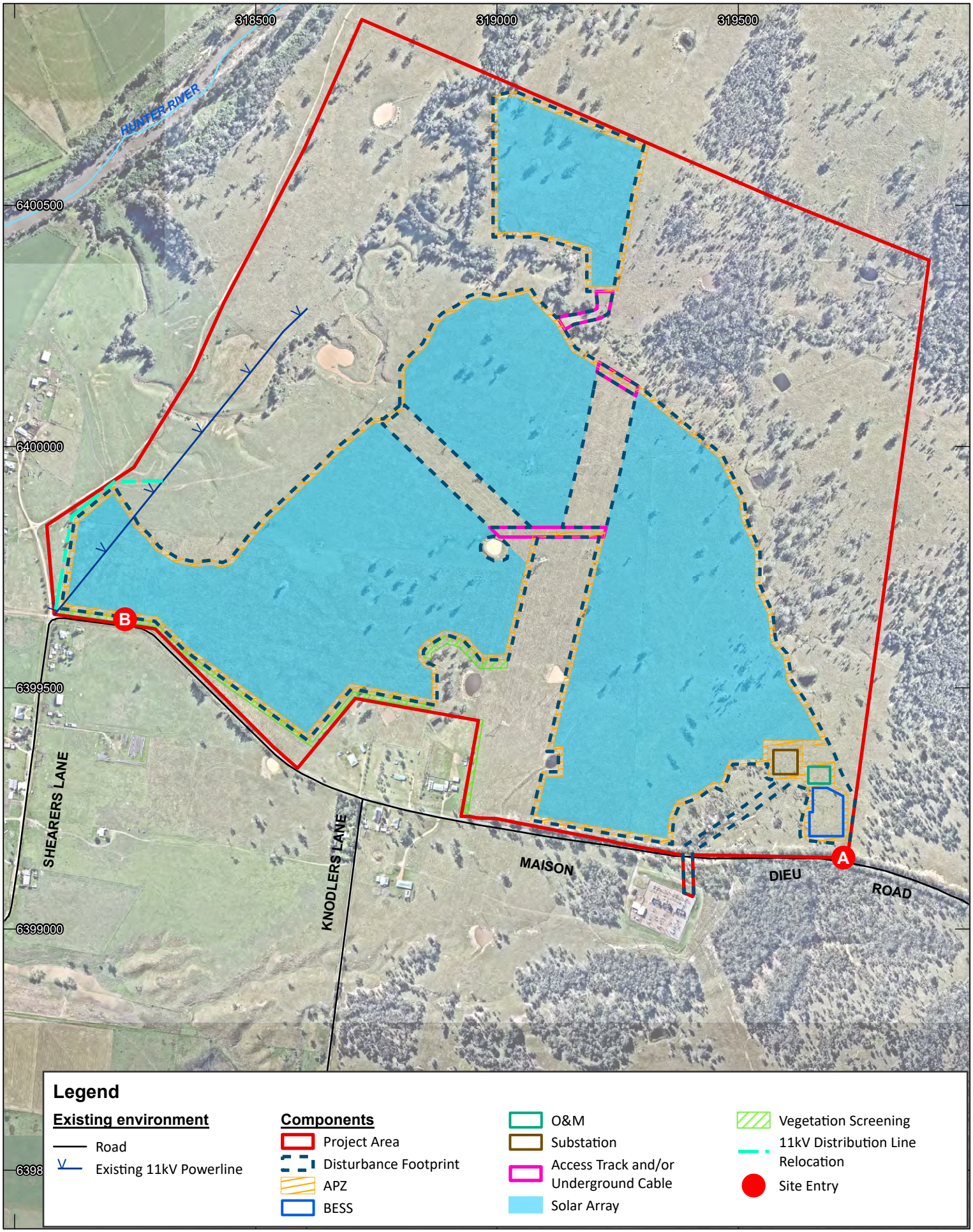
The Project will supply clean electricity to the national electricity grid via the existing electricity transmission network to power the equivalent of approximately 19,000 homes.

Table 3-1 provides the Project summary as shown conceptually in **Figure 3-1**. Values in **Table 3-1** are approximate and will be confirmed during detailed design.

Table 3-1 Conceptual Project Summary

Project Component	Summary
Applicant	Terrain Solar Pty Ltd
Project Area	203 ha shown as the red boundary on **Figure 3-1.**
Disturbance Footprint	90 ha
Estimated Development Cost (EDC)	$127 M
Project Elements	
Solar Arrays	• Approximately 110,000 PV modules. • 1P Tracking single axis units. • 60 MWac capacity. • Up to 2.7 m in height.
BESS	• Alternating current (AC) coupled lithium-ion BESS with up to 2 hour storage. • 40 MW / 80 MWh. • 14 inverters.
Substation	One 33/66 kV substation with associated structures
Electrical Reticulation Infrastructure	• Internal underground high-voltage (HV) cables between solar arrays, BESS and transformers and overhead 66 kV conductors. • Underground or overhead between the substation and the existing Ausgrid substation.
On-Site Permanent Supporting Infrastructure	• Site entry A and B. • Internal access tracks. • Control room, storage facilities, workshop, parking spaces, septic, water supply utilities, waste management facilities, lighting, fencing and APZs.
Off-Site Supporting Infrastructure	• Waste disposal facilities • Existing public roads and communication network
Subdivisions	None.
Construction	
Construction Duration	Up to 18 months.
Construction Hours	Generally standard daytime hours in line with ‘Interim Construction Noise Guideline’.
Construction Workforce	• Up to 150 FTE personnel.

Project Component	Summary
On-Site Temporary Infrastructure	Temporary site office, amenities facilities, car parking spaces, shuttle bus laydown area, temporary compound and laydown area, temporary fencing, power connection, communication connections, storage, access roads.
Services and Utilities	Protection or potential relocation of existing utilities as needed including 11 kV distribution lines.
Ancillary Activities	Import of various materials and water for construction activities.
Transport Route	• Equipment to be transported from Port of Newcastle or Port Botany. • Smaller deliveries from local Singleton area and wider NSW.
Operations	
Hours of Operation	24/7
Operational Workforce	Up to 5 FTE



Legend

Existing environment

- Road
- Existing 11kV Powerline

Components

- Project Area
- Disturbance Footprint
- APZ
- BESS
- O&M
- Substation
- Access Track and/or Underground Cable
- Solar Array
- Vegetation Screening
- 11kV Distribution Line Relocation
- Site Entry

CONCEPTUAL PROJECT LAYOUT

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Conceptual Project Layout
VERSION: G
DATE EXPORTED: 23/05/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 3-1:

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PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

3.2 Interaction with or Reliance on other Projects

The Project will not interact with or rely on any other project. The Project will connect to the existing Ausgrid Singleton Substation, located approximately 50 m south of the Project Area on the opposite side of Maison Dieu Road.

No additional or separate approvals under the EP&A Act are required to operate the Project.

3.3 Project Area and Key Boundaries

The Project Area is shown by the red boundary in **Figure 3-2**, covering 203 ha. It consists of five lots as shown in **Table 3-2**.

The Survey Area is shown in **Figure 3-2**. It describes the defined area over which detailed survey and impact assessment has been undertaken and may be larger than the Disturbance Footprint and external to the Project Area.

The Disturbance Footprint of 90 ha represents the maximum area to be directly impacted by the Project.

Some minor infrastructure as described in **Section 3.4** may be installed within the Project Area but outside the Disturbance Footprint. These activities would only occur outside the Disturbance Footprint if generally consistent with this EIS and following a Due Diligence procedure which will conduct a risk assessment and consider at least ecology and archaeology.

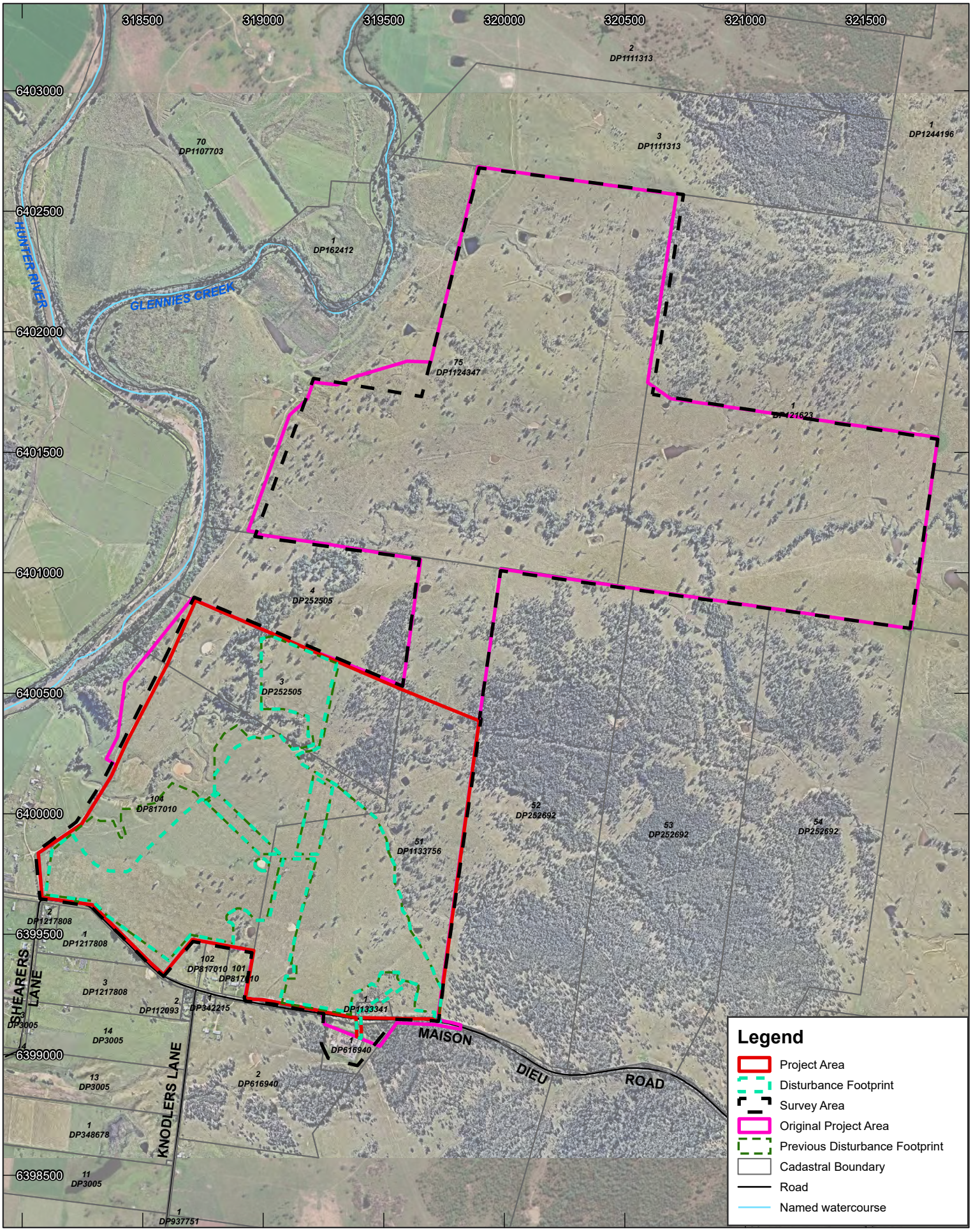
The BDAR Subject Land includes the Disturbance Footprint, as well as additional areas where indirect and prescribed impacts may occur, and ultimately the areas to which the Biodiversity Assessment Method (DPIE, 2020) (BAM) has been applied.

The BDAR Assessment Area includes the Subject Land and the area of land within a 1,500 m buffer zone surrounding the Subject Land that is determined as per the BAM.

APZs have been incorporated as generally described in **Section 6.11**.

Table 3-2 Lots to which the Application Applies

Lot	Deposited Plan	Landholder
3	252505	Private
51	1133756	Private
1	1133341	Private
104	817010	Private
1	616940	Ausgrid
Maison Dieu Road (parts of)	-	SC



PROJECT BOUNDARIES

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Project Bdy
VERSION: C
DATE EXPORTED: 19/08/2024
TECHNICIAN: natalie.wood

0 100 200 300 400 500 600 700 m

SCALE 1:20,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 3-2:

IMPORTANT NOTE
1. This plan was prepared for the sole purposes of the client for the specific purpose of producing a photographic overlay plan. This plan is strictly limited to the Purpose and does not apply directly or indirectly and will not be used for any other application, purpose, use or matter. The plan is presented without the assumption of a duty of care to any other person (other than the Client) ("Third Party") and may not be relied on by Third Party.
2. RPS Australia East Pty Ltd will not be liable (in negligence or otherwise) for any direct or indirect loss, damage, liability or claim arising out of or incidental to:
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4. The aerial photography used in this plan has not been rectified. This image has been overlaid as a best fit on the boundaries shown and position is approximate only.

PROJECT PATH: C:\Users\natalie.wood\OneDrive - Tetra Tech, Inc\TerrainSolar\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

3.4 Project Components

This section details the Project for which approval is sought, conceptually shown on **Figure 3-1**.

The design has been refined from that presented in the SR to maximise solar yield and minimise environmental impacts.

Minor changes within the Project Area will be made during the detailed design phase and in response to commercial, environmental and technical decisions. The minor changes will be of a scale within the impacts assessed in this section.

3.4.1 Solar Arrays

The PV array makes up the largest component of the Project, comprising approximately 110,000 PV panels. The expected life of the solar PV array is 30 years.

The PV panels will be installed on single axis tracking structures across four solar arrays (Area 1, 2, 3 and 4). Each PV module has an approximate length and width of 2.7 m by 1.3 m. The single axis tracking structures (rows) are typically 40 m to 120 m in length (depending on the site conditions) and are spaced apart by generally 5.0 m to 5.5 m between rows. Between 30 and 90 PV modules are installed on each tracker row (depending on the tracker length).

Tracking units in select parts of the southern array (Area 1), will be set to a 2-degree resting angle during backtracking to minimise glare.

The PV modules may be frameless or have a thin aluminium bevel frame support. Each will utilise a non-reflective tempered glass layer or frameless with a lower reflective glass than normal glass, with a stippled finish coating to further diffuse any reflected light. The glass provides mechanical protection and structural rigidity to the sensitive semiconductors and electrical interconnector layers.

Detailed design, equipment availability, and commercial considerations will confirm the final number of PV modules within the arrays and tracker design. A minimum of 10 m bushfire APZ will surround PV areas.

3.4.2 Battery Energy Storage System

An AC coupled lithium-ion phosphate (LFP) BESS with a capacity of 40 MW / 80 MWh will be constructed. The BESS will convert electrical energy into chemical energy and store the energy internally. BESSs generally require replacing or refurbishing around 20 years after installation. Technologies other than lithium may be utilised as technology advances during detailed design where impacts are within those assessed in this EIS.

The BESS will be located in proximity to the substation and be comprised of lithium-ion batteries, bi-directional inverters and transformers.

The 40 MW / 80 MWh BESS will be capable of storing the electricity generated by the PV array, which can be dispatched based on electricity demand fluctuations, providing the opportunity for greater supply dispatch flexibility when electricity demand is highest.

The BESS will be designed, installed and tested in accordance with UL9540A, the standard Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems and manufacturer safety data sheets. This includes any required clearances between units and fire protection systems. The BESS design will also be in accordance with any other relevant standards and regulations at the time. A minimum 10 m bushfire APZ will surround the BESS.

3.4.3 Electrical Infrastructure

3.4.3.1 Power Conversion Units

Approximately 11 modular Power Conversion Units (PCUs) will be utilised within the solar array, and approximately seven modular PCUs will be required for the BESS. Each modular PCU comprises one step-up transformer, two inverters and associated control and circuit breaker equipment. Each modular PCU structure will typically be the size of a large shipping container structure, with an installed height of up to 3 m.

The PCUs will be connected to the solar array blocks to convert the DC electricity generated by the PV modules into AC power for reticulation around the site and connection to the electricity grid. Similarly, the PCUs will be utilised in the BESS to convert the battery's DC power to AC power for export to the grid, and vice versa when charging.

3.4.3.2 Substation Compound

A 33 kV / 66 kV on-site substation is required to step up the voltage to a suitable level for connection to the existing Ausgrid Singleton substation on Maison Dieu Road for export. Voltage will be stepped up at the on-site substation through the transformer(s) to match the voltage of the transmission network.

The substation will comprise one or two power transformers, high voltage switchgear, metering, protection, and communications infrastructure.

The substation and associated equipment will be designed in accordance with AS2067, AS3000 and associated referenced standards. The design will consider the environmental conditions of the Project Area.

Internal structures within the fenced compound will generally include:

- Control building / control room, switch room with a height of approximately 6 m;
- Up to two 33/66 kV power transformers with a height of 6 m to 8 m;
- Overhead or underground line structures;
- Transformer bunding and associated environmental controls;
- Integrated earthing systems;
- Drainage and civil work including footing support for equipment;
- Cable trenching and cable conduits;
- Lightning protection masts up to 22 m high;
- Associated high voltage switchgear including busbars, conductors, circuit breakers, and disconnectors, with a height of approximately 8 m; and
- Communications infrastructure.

A minimum of 10 m bushfire APZ will surround the substation compound.

3.4.3.3 Electrical Reticulation and Grid Connection

The Project will connect directly to the existing 66 kV/132 kV Ausgrid Singleton substation, opposite the Project's southern boundary on Maison Dieu Road as shown on **Figure 3-1**. No switching station is required.

The connection from the on-site substation to Ausgrid's Singleton Substation will be via underground 66kV cables or overhead 66 kV line over Maison Dieu Road to the existing Ausgrid substation. An associated access track will be constructed, which will also be used for site access. These may require works within the Maison Dieu Road reserve.

Underground cables connecting the PV areas and infrastructure will typically follow access tracks but will remain within the Project Area. A small section of the existing 11 kV western line will be relocated generally as shown on **Figure 3-1**.

3.4.4 Site Access and Transport Route

3.4.4.1 External Transport Route

Project components will be transported from Port Botany or the Port of Newcastle. Other required equipment and consumables will be sourced locally within the Singleton LGA where feasible or from wider NSW.

Heavy vehicles will transport materials and equipment associated with the Project's construction. These will consist of vehicles including a standard semi, low loader/float, truck and dog, bi-axle agitator.

Up to three oversize overmass (OSOM) deliveries will be required due to the relatively large size of some components (e.g. substation switchroom and transformer, and the transport of some heavy construction machinery/equipment).

The transport routes below, assessed in the Maison Dieu Solar Farm OSOM Route Study (Ares, 2024), will be used by Restricted Access Vehicles (RAVs) for OSOM deliveries:

- Port Botany – via Bumborah Point Road, Botany Road, Beauchamp Road, Denison Street, Wentworth Avenue, Botany Road, Gardeners Road, Kent Road /Canal Road, Princes Highway, Forest Road, Stoney Creek Road, King Georges Road, M5, M7, M2, M11, Pennant Hills Road (if over-height), M1, Hunter Expressway, New England Highway and Maison Dieu Road; or
- Port of Newcastle – via Quayside Close, Selwyn Street, George Street, Industrial Drive, Pacific Highway, John Renshaw Drive, Hunter Expressway, New England Highway and Maison Dieu Road.

An alternate route through Magpie Road off the New England Highway may also be taken to enter the Project. All heavy and OSOM vehicles exiting the site will use this route.

3.4.4.2 Site Access

All vehicles from light personal vehicles to those used for OSOM deliveries will access the Project through the eastern access point 'Access A' on Maison Dieu Road. The western entry point 'Access B' will be utilised only for light vehicle access. Access A will be at least 12.5 m wide to cater for the swept turning paths of delivery vehicles.

The entries will encroach onto the Maison Dieu Road reserve and comprise standard rural property accesses in accordance with SC requirements. No additional emergency or temporary accesses are required. Construction employee car parking will be provided on the grassed areas adjacent to the construction lay down area (with parking bay sizes of at least 2.4 m x 5.4 m and aisle widths of 5.8 m).

3.4.4.3 Internal Access Tracks

Access tracks of up to 4 m in width will be constructed within the Project Area. The tracks will have localised widening on curves to support OSOM vehicles, where required. Each will be constructed within the Project Area to facilitate access to the PV arrays, substation and other associated infrastructure for construction, maintenance, operation and decommissioning.

Internal access tracks will provide access for workers to infrastructure within the Project Area. The access tracks will be connected to Maison Dieu Road through the eastern site entry point.

Where feasible, the internal access track network, which will also serve as fire trails and buffers, will be constructed along existing tracks. Tracks within the Project Area will be constructed with approximately 200 mm of gravel after removal of topsoil and restored to their predevelopment condition during the decommissioning phase.

The access tracks will be designed in accordance with the following provisions of PBP, 2019.

- All access tracks will be two-wheel drive, all weather roads;
- All access tracks will be through roads (except where unavoidable, there dead ends should be no more than 200 m, incorporate a minimum 12 m turning circle and be clearly sign-posted as dead ends);

- The capacity of road surfaces is sufficient to carry fully loaded fire fighting vehicles;
- Non perimeter roads will comply with PBP 2019 'Road widths for Category 1 Tanker';
- Curves of roads other than perimeter roads will have a minimum inner radius of 6 m and be minimal in number, to allow for rapid access and egress;
- Maximum grade for sealed roads will not exceed 12.5°;
- All access tracks will have a minimum vertical clearance of 4 m; and
- No services or hydrants will be located within parking areas.

3.4.5 Other Associated Infrastructure

3.4.5.1 O&M Facility

The Operations and Maintenance Facility (O&M) will include at least a main office, workshops, storage sheds and areas, and laydown areas.

Supporting infrastructure will also be required including at least car parking, security fencing, water tank/s, septic system and related signage.

Security measures will be implemented and will include at least fencing, responsive lighting for out of hours access, and gate access procedures.

Accessibility requirements under the *Disability Discrimination Act and Disability (Access to Premises – Buildings) Standards 2010*, as directed by the SDCP will be incorporated in the Project and be addressed during detailed design.

The finished floor level for all habitable buildings within the Project Area such as office and control rooms will be at least 1% Annual Exceedance Probability (AEP) flood level + 500 mm freeboard. The finished floor level for non-habitable facilities will be 1% AEP flood level + 300 mm freeboard.

3.4.5.2 Additional Infrastructure

Additional minor infrastructure may be identified during detailed design including water management and sediment and erosion control structures, fencing up to 2.4m high, geotechnical work and investigations, additional vegetation planting for visual mitigation and habitat enhancement, and minor creek crossings.

The Project will intercept and close an existing access easement held by a host landholder as shown on **Figure 2-3**. Water use and waste management are described in **Section 6.8** and **Section 6.13**, respectively.

3.4.6 Ancillary Activities

3.4.6.1 Communications

Communication channels will be developed within the Project Area. The relevant communication infrastructure that will be constructed within the Project Area includes, but is not limited to, radio support (type, channel and call-signs) and fibre optics with cellular backup.

3.4.6.2 Lighting

Lighting will be installed on various infrastructure components as required.

Security lighting will be installed adjacent to the security fencing. All lighting will be designed, managed and operated in accordance with 'AS 4282 Control of Obtrusive Effects of Outdoor Lighting' to manage light spill.

Permanent lighting is not required. Lighting will be responsive only for out of hours access.

3.4.6.3 Landscaping

Existing trees along Maison Dieu Road will largely be retained to minimise visual impacts and reduce glint and glare from PV modules on traffic. Planting will take place along Maison Dieu Road to limit views of the Project Area from viewpoints as conceptually shown on **Figure 3-1**.

Other associated landscaping includes planting of low maintenance, native trees, shrubs and groundcovers to enhance the natural habitat in the existing environment and shield public viewpoints as required within the Project Area. Shade cloth will be placed along sections of the southern boundary to reduce glare impacts while vegetation is establishing.

3.4.7 Subdivisions

The Applicant advises that no subdivisions required to facilitate the Project.

3.5 Construction

Project construction will occur for up to an 18-month period from commencement to commissioning, with the peak period likely between months 9 to 15.

The construction duration will be influenced by factors such as weather and ground conditions, commercial activities, personnel availability, detailed design and delivery of equipment.

Table 3-3 shows the anticipated timing of key Project milestones as well as indicative peak workforce FTEs.

Each stage is described below.

Table 3-3 Indicative Construction Schedule

Stage	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10-	M11	M12	M13	M14	M15	M16	M17	M18
1. Site establishment, mobilisation, clearing and earthworks.																		
2. Clearing, bulk earthworks, fencing and foundations.																		
3. Clearing, bulk earthworks, fencing and foundations, construction of solar farm, BESS, grid connection and piling.																		
4. Construction of solar farm BESS and grid connection, piling and rehabilitation.																		
5. Commissioning, final rehabilitation and demobilisation.																		
Workforce	30	50				100						150					20	

3.5.1 Site Establishment

Prior to the commencement of construction, geotechnical site investigations and site surveys will be undertaken to confirm ground conditions. Detailed design will inform the final infrastructure positioning and placement. Given the Project Area is within solar array mounting structure tolerances, minimal site preparation and civil works are expected to be required prior to construction.

Earthworks will be required for site preparation and continue during construction. This may involve clearing, erosion and sediment control, site levelling, access tracks, site drainage works, grid connection, fencing, concrete foundations and hardstands, office and car parking areas largely within the Disturbance Footprint.

All existing dams will be retained, apart from the northern-most dam within the Disturbance Footprint which will be filled for the solar array, as shown on **Figure 3-1**. Minor levees and drainage lines will also be constructed to manage erosion and sediment control. All water will be imported by licensed contractors.

Most of the infrastructure will be prefabricated off site and delivered to the Project area, where it will be assembled and installed.

Following minor site preparation, PV arrays and associated infrastructure will be installed. Following set up of the temporary construction compound areas and ancillary facilities, the upgrade of existing internal access tracks and construction of new access tracks will take place.

This will be followed by the phased installation of the Project components in **Section 3.4**.

Construction activities will include (but are not limited to):

- Civil works
  - Upgrade of existing access tracks and construction of new access tracks;
  - Grading, levelling and earthworks;
  - Grading for the implementation of sediment/erosion controls and water management structures; and
  - Minor earthworks;
- PV array
  - Minor trenching and land forming including localised cut and fill areas to achieve more consistent gradients beneath the PV modules and to facilitate drainage;
  - Driven, predrilled or screw piles around 1.5 m;
  - Install mounting structures and tracker torque tubes; and
  - Secure PV modules to tracker torque tubes;
- Excavation of trenches and laying of power and instrumentation cables;
- Installation of signage at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site;
- Install concrete foundations for and construct PCUs, BESS, maintenance compound, O&M facility and associated infrastructure; and
- Test and commission infrastructure.

3.5.2 Plant and Equipment

Table 3-4 provides an indicative list of plant and equipment anticipated to be utilised to construct the Project, as well as vehicles required to transport these items to the Project Area. Heavy vehicle movements and OSOM movements are described in **Section 6.9**.

A water cart, forklift, telehandler, excavator, piling rig, grader, trencher, loader, crane, dump trucks, rollers and light vehicles will be on site for the entirety of the construction phase. Earth moving machinery will only be required for the beginning of the construction phase.

Table 3-4 Indicative Construction Equipment

Stage	Equipment	Number
1. Site establishment, mobilisation, clearing and earthworks	Bulldozer	1
	Loader	1
	Grader	1
	Vibratory Roller	1
	Water Cart	1
	Excavator	1
	Mulcher	1
	Franna Crane (20t)	1
	Diesel Generator	1
	Bulldozer	1
2. Clearing, bulk earthworks, fencing and foundations	Bulldozer	2
	Loader	2
	Grader	2
	Vibratory Roller	2
	Water Cart	1
	Excavator	1
	Slasher	1
	Mulcher	1
	Diesel Generator	1
3. Clearing, bulk earthworks, fencing and foundations, construction of solar farm, BESS, grid connection and piling	Bulldozer	2
	Loader	3
	Grader	2
	Vibrator roller	2
	Water Cart	1
	Excavator	3
	Franna Crane (20t)	1
	Diesel Generator	1
	Piling Machine	3
	Trencher	1
4. Construction of solar farm BESS and grid connection, piling and rehabilitation	Loader	1
	Water Cart	1
	Excavator	2
	Franna Crane (20t)	1
	Diesel Generator	1
	Piling Machine	3
	Trencher	1
5. Commissioning, final rehabilitation and demobilisation	Franna Crane (20t)	1

3.5.3 Temporary Compound

A temporary construction compound will be maintained during works, including:

- Site offices, car parking spaces and amenity facilities for employees;
- Temporary laydown areas for storage of construction materials, plant, equipment solar modules and other relevant components;
- A short-term waste storage area;
- Stockpile area for materials;
- Power supply for construction purposes; and
- Security fencing and CCTV.

Adequate parking for up to light vehicles will be provided and car-pooling will be encouraged.

All temporary infrastructure will be located within the Disturbance Footprint as shown on **Figure 3-1**.

3.5.4 Ancillary Activities

Gravel, concrete, blue metal, aggregate and sand will be required to be brought in from offsite via various trucks to facilitate construction.

Local quarries and suppliers within the Singleton LGA will be utilised to source these materials where practical and economical to do so.

No onsite borrow pits will be required for the Project.

Culverts or level crossings will be built and installed as needed at road crossings as recommended in Section 4.2 of the Surface Water Impact Assessment, provided in **Appendix K.** The need for a culvert or level crossing will be confirmed in the detailed design stage. This scope would be included in a Controlled Activity Approval (CAA) application to the relevant regulator.

Detailed design will also inform the need for flood protection infrastructure such as flood protection walls largely within the Project Area.

3.5.5 Services and Utilities

A Dial Before You Dig has been completed for the Project Area and an ‘All Clear Letter’ was received 11 July 2023. No services or utilities were identified within the Project Area.

3.5.5.1 Water Supply

The construction of the Project will require 23 Megalitres (ML) of water per year, for (at least) earthworks, roadworks, dust suppression and concreting. This water will be sourced externally only. No water will be taken from existing dams or groundwater bores. No new dams are required.

A small amount of potable (drinking) water (estimated at 1.7 ML per annum in an average year) will be collected in rainwater tanks or imported during the construction period on an as-needs basis to top up the water tanks.

A minimum of three 45,000 litre static supply water tanks will be provided for firefighting purposes in the northern extent of the Project BESS Area (within 120 m). The water tanks will be adjacent to the internal access roads and within 120 m of infrastructure. One of the water storage tanks will be placed at the main entrance.

Volumes are approximate for the purposes of assessment only and subject to weather conditions. No unregulated discharge of water from the Project’s activities will occur.

No water network upgrade will be required for construction nor operation. Water supply agreements will be secured in consultation with SC and/or local water suppliers to ensure adequate water supply is secured for construction and operation. The Applicant has identified and commenced consultation with three potential water suppliers. Emails were sent to the suppliers in July 2024 to notify them of the project and request preliminary information on availability of supply.

A rainwater capture and reuse system will offset water usage on site during the operation phase for top up of equipment reservoirs, washdown, toilet flushing and bushfire suppression.

Over the 18-month construction period, the Project is estimated to require 35 ML of water in total. A further 5.7 ML per year will then be required for operational activities.

3.5.5.2 Power Supply

Agreements with the local network operator will be sought and made before any connection or usage occurs.

Diesel generators will be utilised in the early construction phase and potentially from local network.

3.5.5.3 Waste Management

All construction waste and any potential operational waste will be stored in designated waste storage locations within the Project Area. The waste storage areas will provide space for sorting, recycling and reuse of materials.

Section 6.13 details waste management strategies during the various phases of the Project. It also describes the key waste streams expected to be generated during construction, operation and decommissioning.

3.5.6 Rehabilitation

Rehabilitation will occur throughout the construction phase as the option to rehabilitate becomes feasible. Plant and machinery will be relocated once the Project moves into the operation phase, allowing for further rehabilitation. Once machinery is removed, all disturbed areas that are not in use for operation will be revegetated following consultation with the landowners of the Project Area.

Sedimentation and soil erosion controls will be put in place generally in accordance with ‘Managing Urban Stormwater: Soils and Construction - Volume 1’ (Landcom, 2004) (The Blue Book).

3.5.7 Workforce and Hours of Operation

A peak construction workforce of up to 150 FTE personnel will be required.

This workforce will be largely sourced locally within the Singleton and Muswellbrook Shires with a minor amount coming from the Newcastle and Maitland Shires. Some specialist staff and contractors will be externally sourced. An internal Project Procurement and Workforce Development Strategy (PPWDS) will be developed to maximise the hiring and upskilling of workers from the local community during construction and operation, with training regimes for working on renewable energy infrastructure. 75% of employees are anticipated to travel from Singleton and Lower Hunter (Newcastle and Maitland) with the remaining 25% from Muswellbrook.

Construction activities will be restricted to standard daytime construction working hours as follows:

- 7 am to 6 pm, Monday to Friday; and
- 8 am to 1 pm Saturday.

No construction activities will occur on Sundays or public holidays (as excepted below).

Activities outside these hours will be undertaken in accordance with the ‘Interim Construction Noise Guideline’ (DECC, 2009) (ICNG) under the following terms:

- For the delivery of materials required by NSW Police or other authorities for safety reasons;
- Where required in an emergency to avoid the loss of lives, property and/or prevent environmental harm; and
- By agreement with DPHI.

No additional accommodation is required to be constructed to facilitate the Project.

3.5.7.1 Accommodation Strategy

Cumulative Project impacts inclusive of current, publicly known information are discussed in **Section 2.5**.

The majority of the construction workforce will be sourced locally. The skills required for the construction of the Project are similar to those required in the mining industry for the majority of the workforce. The existing mining workforce is already travelling local roads and highways daily, similar to the Project's workforce.

Due to the short duration of the Project and its relatively small workforce size, no accommodation commitments are required other than development of an 'Accommodation Strategy' prior to commencement of construction.

The Accommodation Strategy will detail cumulative impacts from other projects closer to construction of the Project and confirm required strategies. The Accommodation Strategy will:

- Confirm the status of nearby projects;
- Confirm likely accommodation impacts;
- Commit to local training and workers (where feasible) relevant to the short project duration;
- Detail opportunities for industry collaboration to draw workers to the area where required, resulting in a semi-permanent resident workforce to the area;
- Maintain relationships and partnerships with industry capability network (ICN), economic development and industry groups, training providers and local councils to maximise training and recruitments of locals where possible;
- Provide a local procurement strategy;
- Provide strategies to maintain an interested workers database;
- Work with First nations and Aboriginal businesses; and
- Provide actions for monitoring and evaluating the program.

3.6 Operations

3.6.1 Commissioning

The Project components in **Section 3.4** will be commissioned with a staged approach to allow partial commissioning of chosen plant during the construction phase.

Commissioning will be generally in accordance with the schedule in **Table 3-3**. Authorisation will be required for high voltage equipment to be used before the Project is connected to the 66 kV bus of the existing Ausgrid Singleton substation.

All components in **Section 3.4** may continue to be utilised for operations, except where described as temporary.

3.6.2 Maintenance

Key project components will require routine maintenance and servicing on an as-needed basis which will be generally identified via remote monitoring. Maintenance activities include (but are not limited to):

- PV arrays servicing;
- Electrical reticulation network servicing;
- Access road maintenance;
- Substation and associated equipment maintenance;
- Transmission line servicing;
- Stormwater and wastewater management;
- Cleaning and maintenance of water supply tanks;
- Monitoring and remedial actions as required for hazards in culverts and level crossings such as corrosion, debris, fire damage, water ingress and settlement;
- Groundcover management;
- Landscaping; and
- Land rehabilitation activities.

3.6.3 Workforce and Hours of Operation

Project operations will occur 24 hours a day, 7 days a week.

Routine maintenance works will generally be carried out during standard working hours, however unexpected equipment failure will be undertaken 24 hours a day, 7 days a week. Any work outside standard working hours will be in accordance with **Section 3.5.7**.

Operations will require up to five FTE personnel. Some additional contractors will be required from time to time. Maintenance will require some additional FTE personnel to that indicated in **Section 1.4**.

3.7 Decommissioning and Rehabilitation

One of the following decommissioning options will be implemented:

1. Replacement of existing project components consistent with the project description and impacts assessed in this EIS, and continue operations in consultation with relevant associated landholders;
2. Seek relevant approvals should technological advances not confirm the viability of Option 1; or
3. Decommission the Project and rehabilitate the site in accordance with the Decommissioning and Rehabilitation Management Plan.

Engagement with relevant stakeholders will be undertaken in relation to the above options.

At the end of the project life, the Project will be fully decommissioned. Activities will include (but not be limited to):

- Removal of all above ground structures;
- Rehabilitation of land to a suitable state for previous agricultural land use;
- Infrastructure may be retained as desired by the landowner (e.g. internal access tracks);
- Below ground infrastructure may be retained to avoid environmental disturbance, unless removal is requested by the landowner;
- Where possible, decommissioned infrastructure will be recycled or reused; and
- Any general waste that cannot be recycled will be removed and taken to a licensed waste management facility.

3.8 Staging

Table 3-5 provides an indicative timeline for the various phases of the Project. Project timelines are subject to various factors including approvals timeframes, market conditions, policy change and other factors outside the Applicant's control.

Table 3-5 Project Indicative Timeline

Stage		Commencement	Duration (months)
1.	Site establishment, mobilisation, clearing and earthworks.	Q2 2025	1
2.	Clearing, bulk earthworks, fencing and foundations.	Q3 2025	2
3.	Clearing, bulk earthworks, fencing and foundations, construction of solar farm, BESS, grid connection and piling.	Q4 2025	4
4.	Construction of solar farm BESS and grid connection, piling and rehabilitation.	Q3 2026	8
5.	Commissioning, final rehabilitation and demobilisation.	Q4 2026	3
6.	Decommissioning.	As per **Section 3.7**	6

3.9 Environmental Management System

An Environmental Management Strategy (EMS) will be developed for the Project. The EMS will comprise (at least) a Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) for the Project.

The EMS will guide all environmental management activities throughout construction, operation, maintenance and decommissioning. Environmental risks will be identified and mitigation measures determined to minimise environmental impacts from the Project.

The EMS will describe measures to monitor and publicly report via the Project website on the environmental performance of the Project and will generally include summary of monitoring results in accordance with development consent required approved management plans and programs.

3.10 Voluntary Planning Agreement

Prior to commencing construction or by any other timeframe agreed by the Planning Secretary, the Applicant will enter a VPA with SC in accordance with: Division 7.1 of Part 7 of the EP&A Act (or as otherwise agreed).

4 STATUTORY CONTEXT

This section identifies the relevant statutory requirements for both NSW and Commonwealth legislation for in relation to all aspects of the Project. It identifies relevant statutory requirements that must be considered before the Application is determined. A discussion on how each is relevant to the justification and evaluation of the Project is included. It includes a grouped and tabulated summary of requirements.

4.1 Power to Grant Approval

NSW approval for the Project will be sought under Part 4, Division 4.7 of the EP&A Act, which outlines the approval pathway for development deemed to be SSD.

Section 4.36(2) of the EP&A Act states:

> "(2) A State environmental planning policy may declare any development, or any class or description of development, to be State significant development."

Relevant State Environmental Planning Policies (SEPPs) include *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and T&I SEPP.

Under section 2.6(1) of the Planning Systems SEPP, a development is classified as SSD 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…"

Schedule 1, section 20 in Chapter 2 of the Planning Systems SEPP determines "electricity generating works" to be SSD if it meets the following criteria:

> "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: has a capital investment value of more than $30 million…"

The term "capital investment value" is not defined in the Planning Systems SEPP. Clause 2.2(3) of the Planning System SEPP provides that language used in Chapter 2 of the Planning Systems SEPP has the same meaning as per the standard local environmental planning instrument prescribed by the *Standard Instrument (Local Environmental Plans) Order 2006*. Its Dictionary defines "electricity generating works" as "electricity generating works means a building or place used for the purpose of - (a) making or generating electricity, or (b) electricity storage."

As the Project involves development for the purpose of electricity generating works using solar power and will have a capital investment value of more than $30 M, the Project is classified SSD under Part 4.

4.2 Permissibility

4.2.1 Transport and Infrastructure SEPP 2021

The permissibility of solar farm developments in NSW is determined by the T&I SEPP.

Section 2.36(1) states that "electricity generating works" may be carried out with development consent on land within a prescribed rural, industrial or special use zone.

The Project Area is zoned RU1 Primary Production within the SLEP. Electricity generating works are not permitted within the RU1 zoning. Clause 2.36(1)(b) of the T&I SEPP states that development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial, or special use zone.

Under clause 2.7(1) of the T&I SEPP, the provisions prevail where there are inconsistencies with any other EPIs, including LEPs. Therefore, the Project is permissible with development consent.

4.2.2 Electricity Infrastructure Investment Act 2020

The Project is situated within the Hunter-Central Coast REZ (see **Figure 1.1**), the second most recent of five REZs to be announced in NSW, with the area selected due to the heavy concentration of existing electricity infrastructure and capability to support multiple streams of renewable energy generation.

The Hunter-Central Coast REZ was formally declared by the Minister for Energy under section 19(1) of the *Electricity Infrastructure Investment Act 2020* and published in the NSW Gazette (NSW Government, 2022) on 9 December 2022. The Hunter-Central Coast REZ is expected to support up to 1 GW of additional transmission capacity.

Additionally, the HTP is expected to contribute an additional 8 GW of additional transmission capacity, with the NSW Minister for Planning declaring the HTP to be CSSI in accordance with the powers attributed to the Minister under section 5.12 of the *Environmental Planning & Assessment Act 1979.*

4.2.3 Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* (CLM Act) is administered by the NSW Environment Protection Authority (EPA) and local councils. It provides a regime for investigating, and, where appropriate, remediating land affected by contamination which represents a significant risk of harm to human health or the environment. The CLM Act specifies responsibilities for managing contaminated land and the role of the EPA in the assessment of contamination and the supervision of the investigation, remediation, and management of contaminated sites.

There is limited potential for the Project to impact on contaminated land. The Soils and Agricultural Impact Assessment did not find significant concentrations of contaminating materials within the Project Area during soil surveys and laboratory testing. The Project Area is 9 km from the nearest contaminated site on the EPA Contaminated Land Register (Singleton Gasworks) and 1.1 km from the nearest operational coal mine (HVO South Open Cut).

A search of the *Protection of the Environment and Operation Act 1997* (POEO Act) Contaminated Lands Register was conducted on 10 April 2024. No contaminated land records were found within or proximate to the Project Area.

4.2.4 Climate Change (Net Zero Future) Act 2023

The *Climate Change (Net Zero Future) Act 2023* (Climate Change Act) was passed in parliament during the development of this EIS. The Climate Change Act legislates the NSW Government's net zero emissions target by 2050 to minimise climate change harm, build resilience and maximise opportunities from new technology and industries.

The Project objectives in **Section 1.5** are consistent with those of the Climate Change Act. The Project will contribute to the reduction of emissions in NSW by providing clean, renewable energy, where coal-based power generation would otherwise have occurred. This additional renewable energy will contribute to the achievement of net zero emissions by 2050 and the state's resilience in a changing climate.

4.3 Other Approvals

Table 4-1 identifies other approvals and pre-conditions required for exercising the power to grant approval for the Project and justifies each in relation to section 4.42 of the EP&A Act, federal approvals and other NSW approvals. It also describes approvals that would have been required if the Project was not an SSD Project in accordance with section 4.41 of the EP&A Act.

Table 4-1 Other Required Approvals

Approval Category	Legislation	Requirement
Consistent Approvals as per section 4.42 of the EP&A Act.	*Roads Act 1993* (Roads Act)	Consent from the appropriate roads' authority under section 138 of the Roads Act is required for any works undertaken on or under public roads. **No external road upgrades are required. Aspects of the Project to connect to the Ausgrid Substation will require approval under section 138 of the Roads Act. Subject to detailed design, the site entry(ies) may also require approval under section 138 of the Roads Act.**
	Crown Land Management Act 2016 (CL Act)	The CL Act provides for the administration and management of Crown land in NSW. Crown land may not be occupied, used, sold, leased, licensed, dedicated, reserved, or otherwise dealt with unless authorised by the CL Act. **Crown land does not exist in the Project Area. No further action is required.**
	Protection of the Environment Operations Act 1997 (POEO Act)	As the solar generation works required for this Project do not fall under the definition of 'electricity generation', **an EPL will not be required for the Project.**
	Coal Mine Subsidence Compensation Act 2017 (CMS Act)	Part 3 clause 22 of the CMS Act specifies that an application for approval to alter or erect improvements, or to subdivide land, within a mine subsidence district is to be made. The entirety of the Project Area is located within the Patrick Plains Mine Subsidence District. **An approval under the CMS Act will be made for the Project**.
	Mining Act 1992	The Mining Act 1992 aims to encourage and facilitate the discovery and development of mineral resources in NSW. A review of MinView (MinView, 2023) indicates is one standing mineral exploration licence over the entirety of the Project Area (Authorisation Lease (AL)34 (1992)). **As the Project Area is located on lands where an exploration licence exists, engagement with the lease holder has been undertaken as described in Section 5.6.**
	Petroleum (Onshore) Act 1991	The Petroleum (Onshore) Act 1991 aims to encourage and facilitate the discovery and development of petroleum resources in NSW. A review of MinView (MinView, 2023) indicates there are no standing petroleum exploration licences over the Project Area. **As the Project Area is located on lands where no petroleum exploration licence exists, no further action is required.**
	Pipelines Act 1967	The Pipelines Act 1967 controls pipeline construction, operation, and licensing in NSW. Part 3 section 11 of the Pipelines Act 1967 requires a person to be a registered holder of a licence before any construction of a pipeline commences. **The Project does not involve the construction and operation of water pipelines and as such, no approvals in this regard are required.**
Native Title (Cwlth)	*Native Title Act 1993* (NT Act)	For any Crown land within the Project Area where Native Title has not been extinguished under the NT Act a strategy should be developed. No current claims under the NT Act exist within the Project Area. **Crown land does not exist in the Project Area. No further action is required.**
EPBC Act Approval (Cwlth)	'Amending Agreement – No.1 – New South Wales Assessment Bilateral Agreement' (Bilateral Agreement)	Where an NSW SSD Project is deemed "Controlled" it is assessed in accordance with the 'Bilateral Agreement' (Commonwealth of Australia & NSW, 2020). Under the Bilateral Agreement, the NSW determining authority's Assessment Report will be provided to DCCEEW inclusive of a recommendation as to whether the Project should be approved and conditions that may be applied to any Federal approval. **The Project will be assessed under the Bilateral Agreement. Biodiversity is further discussed in Section 6.1.**

Approval Category	Legislation	Requirement
	Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	Approval from the Australian Minister for the Environment and Heritage for the is required for any action that will or is likely to have a significant impact on one or more Matters of National Environmental Significance (MNES) under the EPBC Act. The Project will be assessed in the manner specified in Schedule 1 to that Agreement including addressing the matters outlined in Schedule 4 of the Environment Protection and Biodiversity Conservation Regulation 2000. **An application under Part 9 of the EPBC Act has been prepared and the Project was deemed a controlled action (EPBC 2023/09638) for listed threatened species and communities (sections 18 & 18A) on 31 January 2024. The Project was assessed under the Bilateral process. Biodiversity is further discussed in Section 6.1.**
Other Approvals	*Aboriginal Land Rights Act 1983* (AL Act)	The AL Act establishes Aboriginal Land Councils at State and Local levels. These Land Councils have a statutory obligation under the Act to take action to protect the culture and heritage of Aboriginal persons in the council's area, subject to any other law, and promote awareness in the community of the culture and heritage of Aboriginal persons in the council's area. Under the Act, Aboriginal Land Councils can claim Crown land which is not lawfully used or occupied and that are not needed, nor likely to be needed, for an essential public purpose. The Project Area is located within the Wanaruah Local Aboriginal Land Council (LALC) boundaries. No current claims under the AL Act exist within the Project Area. **The Applicant advises that Crown land does not exist in the Project Area. No further action is required.**
	Water Management Act 2000 (WM Act)	Any person or organisation, including a local water utility, taking water from a water source must be authorised to take water by a water access licence and a water supply work approval under section 60A of the WM Act unless an exemption applies. **A Controlled Activity Approval is required under the WM Act as some works are on waterfront land as described in Section 6.7.**
	Conveyancing Act 1919 (Conveyancing Act)	The Project Area will require lease of premises under the Conveyancing Act. Subdivision consent is generally not required under section 23G of the Conveyancing Act, may apply if subdivision for the purpose of construction, operation and maintenance of a substation is required. **No subdivisions are required for the Project.** **Amendments are required for two easements in the Project Area. Section 1.8 further discusses these requirements.**
	Biodiversity Conservation Act 2016 (BC Act)	Part 7, Division 2 of the BC Act specifies the requirements for a biodiversity assessment depending on the planning pathway under the EP&A Act. If an activity is likely to have a significant impact or will be carried out in a declared area of outstanding biodiversity value, the proponent must apply the BAM and a BDAR. **A BDAR has been prepared for the Project, providing a discussion of the management and protection of listed threatened species of native flora and fauna and TECs and assessing biodiversity offsets consistent with the Biodiversity Offset Scheme. Biodiversity is discussed in Section 6.1.**
	Local Land Services Act 2013 (LLS Act)	Division 5 clause 60S, clearing of native vegetation in a regulated rural area is authorised without any approval or other authority under this Part if it is clearing carried out by or on behalf of the landholder in accordance with a land management (native vegetation) code under this Division. **A review of land categorisation under the LLS Act was undertaken to clarify the native vegetation management regime. Category 1 "Exempt Land" is not assessed under the BAM. The land category assessment in Appendix E concluded 29.9 ha within the Disturbance Footprint (within Lot 104 DP817010) contains Category 1 land.** **The draft Native Vegetation Regulatory (NVR) map was reviewed and deemed consistent with the findings of the land category assessment.** **Biodiversity is further discussed in Section 6.1.**

Approval Category	Legislation	Requirement
Approvals not required under SSD section 4.41 of the EP&A Act.	*Fisheries Management Act 1994* (FM Act)	Section 201, 205 and 219 require a permit for the purpose of dredging works, any harm to marine vegetation, or for any activities that block the passage of fish, respectively. **The Project will not involve dredging works, impact marine vegetation or block the passage of fish and as such, no approvals in this regard are required. The methodology of the BDAR is discussed at Section 6.1.**
	Heritage Act 1977 (Heritage Act)	Approval is required to carry out an act, matter or thing referred to in Section 57(1), or an excavation permit under section 139. **The Project will not require an approval under section 57 or 139 subject to section 4.41 of the EP&A Act. The methodology of the Historic Heritage assessment is discussed at Section 6.3.**
	National Parks and Wildlife Act 1974 (NPW Act)	Sections 86, 87 and 90 require approval for any works which may impact an item of Aboriginal heritage. **The Project will not require approvals under 86, 87 or 90 subject to section 4.41 of the EP&A Act. The methodology of the ACHAR assessment is discussed at Section 6.2**.
	Rural Fires Act 1997 (RF Act)	Where a project requires subdivision for residential or rural residential development, a bush fire safety authority under Section 100B is required. **An approval under section 100B will not be required subject to section 4.41 of the EP&A Act as the Project does not involve subdivision for, or creation of, residential or rural residential development. The methodology of the Bushfire assessment is discussed at Section 6.11.**
	Water Management Act 2000 (WM Act)	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 is required where impacts are predicted. **No water use approvals under the WM Act are required for the Project. The methodology of the water assessment is discussed at Section 6.7.**
	Waste Avoidance and Resource Recovery Act 2001 (WARR Act)	The WARR Act provides objectives and guidance on reuse and resource recovery in order to minimise waste generation in NSW. **No approval is required for the Project under the WARR Act. Further discussion on waste is included at Section 6.13**.

4.4 Mandatory Matters for Consideration

Appendix C describes mandatory conditions that must be satisfied before the determining authority may grant approval. Pre-conditions to exercising the power to grant approval (including mandatory conditions) are identified and indicate where each is addressed in the EIS.

5 STAKEHOLDER ENGAGEMENT

This section provides a summary of the stakeholder engagement undertaken for the Project. It further provides an overview of the engagement process, the findings that have been incorporated into this EIS, and describes the Applicant's commitment to ongoing engagement.

5.1 Introduction

Stakeholder and community engagement plays a critical role in the determination of development. Engagement is being undertaken alongside the development of the Project and the EIS and will continue throughout the lifespan of the Project. A range of stakeholders likely to have an interest in the Project, or who will be impacted by the Project have been identified, including State and local Government agencies, the local community, special interest groups and nearby landholders.

'bd infrastructure Pty Ltd' was engaged to work collaboratively with the Applicant to develop and implement a Stakeholder Engagement Plan (SEP) for the Project.

By engaging stakeholders effectively, the Project team can enhance understanding of the potential impacts and improve the benefits of the Project leading to better outcomes for both the Project team and the wider community.

The Applicant is committed to considering and addressing the concerns of the public. Attempts to minimise, offset, mitigate or avoid public concern have been made where practical. Additionally, publicly beneficial aspects of the Project have been enhanced where feasible.

Key engagement-related documents discussed in this Section are available for download on the Project's website at https://maisondieusolarfarm.com.au/

Regulator names in this section are as they were at the time of engagement.

5.2 Early Engagement

Correspondence was sent to DPHI on 12 April 2022 to introduce the Project and request a pre-scoping meeting to discuss the Project and understand DPHI's requirements for the SR phase. A pre-scoping meeting was held with DPHI on 27 April 2022 with SEARs awarded on 4 October 2022.

Engagement activities during the Scoping Phase were undertaken between May and August 2022, and included liaison with key stakeholders and the community through direct outreach; a project information letter; and in person discussions. This program was implemented to interested neighbouring landowners; commercial stakeholders, neighbouring landholders, mine owners and SC as in **Table 5-1**.

Table 5-1 Early Engagement Issues Summary

Stakeholder	Method	Findings	Section
Neighbours within a 4 km radius	Face to face meetings, emails, phone and project information letter.	The majority of adjacent landholders, community and stakeholders did not raise any concerns during this phase.	**5.6**
		Four adjacent landholders raised concerns during face-to-face meetings in this phase, including impacts: – On visual amenity – On property values – From construction traffic and noise – To ground water from planting of screening vegetation near boundary – In general, as the landholder was not supportive of land being used for the Project.	**6.5, 6.14, 6.9, 6.8**

Stakeholder	Method	Findings	Section
Neighbouring coal mines	Face to face meetings, emails, phone and project information letter	Potential sterilisation of future coal resources within the Project Area	**2.3.2.1**
Council	Face to face meetings, emails and phone.	Potential impacts on biodiversity and Aboriginal heritage values.	**6.1** and **6.2**
		Impacts from the Project's construction workforce on short term accommodation availability and short-term housing affordability in the region.	**3.5.7.1**
		SC policy requirements in relation to VPA.	**3.10**

5.3 Stakeholder Engagement Plan and Objectives

The SEP was prepared for the Project's EIS-phase in June 2023. The SEP considers the International Association of Public Participation's 'Engagement Spectrum' (IAP2, 2022) (IAP2). Therefore, all engagement activities as part of the Project are designed to 'Inform', 'Consult', 'Involve', 'Collaborate' and 'Empower'.

The SEP has been regularly reviewed to achieve best interest outcomes for stakeholders and was prepared in consideration of the SEARs for SSD-48160216 (**Appendix B**) and:

- Section 3.6 of the 'State Significant Development Guidelines – Preparing an Environmental Impact Statement (DPE, 2022) (EIS Guidelines);
- 'Undertaking Engagement Guidelines for State Significant Projects' (DPIE, 2022) (Engagement Guidelines);
- 'Social Impact Assessment Guideline' (DPIE, 2023) (SIA Guidelines);
- 'Large-Scale Solar Energy Guidelines' (DPE, 2022) (Solar Guidelines); and
- 'Aboriginal Cultural Heritage Consultation Requirements for Proponents' (DECCW, 2010).

The SEP allows for the delivery of open and inclusive engagement with stakeholders, providing information which is easily and readily accessible, relevant, timely and meaningful, as required in the Engagement Guidelines (DPIE, 2022). The SEP also demonstrates the Applicant's ability to re-evaluate throughout the Project and adapt as required, ensuring stakeholder expectations are being met. The SEP seeks to deliver:

- An on the ground approach which can continue to build Terrain Solar's trust-based relationship with the community and build social license to operate;
- Community and stakeholder engagement to help relevant groups better understand the Project, its benefits and planning timeline; and
- Open channels of communication to ensure the Project team can gather feedback about benefits and impacts that can be used to inform Project development and delivery.

The SEP details the Project's engagement objectives which were formulated to fit the SIA Guidelines and the Engagement Guidelines with the best interests of the Project and the community in mind. The key objectives of the Applicant's consultation and engagement process are to:

- Provide an update and inform stakeholders about the Project, its impacts and benefits;
- Use quality engagement, to develop open relationships with the community built on trust, and understand community values relevant to drafting the EIS;
- Build capacity of the local community to understand the Project, its benefits, the development process and how they can contribute; and
- Enable authentic conversations through all stages of the EIS by using high-quality communications materials that enable community members and stakeholders to provide informed feedback that will be considered in the project development and assessment.

5.4 Guidelines Requirements

Table 5-2 lists the community participation objectives and the engagement requirements from the Engagement Guidelines during the EIS phase and demonstrates where each is met in this EIS.

Table 5-2 Engagement Guidelines and Where Addressed

Ref	Issue	Section
Community participation objectives		
1.	Identify the people or groups who are interested in or are likely to be affected by the Project	**5.5**
2.	Use appropriate engagement techniques. This is particularly important when engaging with specific groups, such as Aboriginal and Torres Strait Islander groups, where engagement should be a discrete, planned activity undertaken by and with experienced Indigenous engagement specialists.	**5.6**
3.	Ensure the community are provided with safe, respectful and inclusive opportunities to express their views.	**5.4**
4.	Involve the community, councils and government agencies early in the development of the proposal, to enable their views to be considered in project planning and design.	**5.6**
5.	Be innovative in their engagement approach and tailor engagement activities to suit the: Context (e.g. sensitivity of the site and surrounds) Scale and nature of the project and its impacts Level of interest in the project.	**5.6.1**
6.	Provide clear and concise information about what is proposed and the likely impacts for the relevant people or group they are engaging with.	**5.6**
7.	Clearly outline how and when the community can be involved in the process.	**5.3**
8.	Make it easy for the community to access information and provide feedback.	**5.3**
9.	Seek to understand issues of concern for all affected people and groups and respond appropriately to those concerns.	**5**
10.	Provide feedback about how community and stakeholder views were used to shape the project or considered in making decisions.	**7.4**
11.	Be able to demonstrate how the demography of the area affected has been considered in how and what engagement activities have been undertaken.	**5.5**
Engagement during preparation of the EIS		
The proponent must:		
12.	Implement any engagement activities required by the SEARs (including engagement with relevant government agencies, council and the community).	**5.6**
13.	Inform the community about the opportunities to engage.	**5.3**
14.	Explain how community feedback will be considered and documented.	**5.1**
15.	Provide relevant information in plain English so that potential impacts and implications can be readily understood.	**5.6**
16.	Be clear about the level of influence engagement will have by identifying what elements can be changed as a result of feedback.	**7.4**
17.	Give the community the opportunity to voice their concerns or share local knowledge so that this information can be considered early in the planning, design and assessment.	**5.3**
18.	Consider the issues raised by the community, council and relevant government agencies when making Project refinements and accurately reflect how these issues have been addressed in EIS documentation.	**7.4**
19.	Keep the community, council and relevant government agencies informed with up-to date information on the project.	**5.6**
The community is able to:		
20.	Seek clarification about the Project and its impacts.	**5.3**
21.	Provide timely feedback to the Applicant about aspects of the Project which they support, do not support or wish to be adjusted.	**5.6.2.1**
22.	Provide clear reasons for any concerns to enable the Applicant to consider possible alternative approaches to address the issues.	**5.6**

5.5 Identification

The SEP was designed to enable community and stakeholders to be part of the Project planning and development process, and to provide them with the opportunity to engage in a meaningful way at an early stage in the assessment process for the Project to ensure that their priorities are considered in the assessment process.

Stakeholder identification was undertaken in the SEP as part of the scoping phase and was updated during the development of the EIS for the Project.

Stakeholders were identified through various methods, including:

- The compilation of land ownership information;
- Consideration of the local and wider community, industry and service providers;
- Networking with different individuals and community organisations;
- Media advertisements;
- Newsletter distribution and community information sessions;
- Discussion with regulators; and
- Inclusion of all stakeholders referenced in the SEARs.

Table 5-3 lists key stakeholders relevant to the Project. These have been grouped based on organisation type, individual interest or interaction with the Project.

Table 5-3 Identified Stakeholders

Group	Stakeholder	Description
Community	Landholders	• Host • Associated • Associated (local) < 5 km* • Non-Associated (local) > 5 km*
	Nearby communities (<4km)	• Maison Dieu • Singleton
	Regional communities (<100 km)*	• Muswellbrook • Newcastle • Scone • Maitland • Cessnock • Merriwa • Aberdeen
	State (> 100 km)*	Sydney
	Elected Representatives	• Dan Repacholi MP (Federal Member for Hunter) • David Layzell MP (State Member for Upper Hunter)
	Community groups	• CWA, Singleton Branch • NSW Farmers Association • Rotary Club of Singleton Inc. • Singleton Men's Shed • Business Singleton – formerly Singleton Business Chamber • Ungooroo Aboriginal Corporation • Wonnarua Nation Aboriginal Corporation
	Commercial mining operations in community (<5km)	• Hunter Valley Operations (Coal & Allied Operations Pty Ltd; Anotero Pty Ltd) • Rixs Creek (Bloomfield Collieries Pty Ltd)

Group	Stakeholder	Description
	RAPs	As per **Section 6.2**
Others	Infrastructure owners	• Transgrid and Ausgrid • Easement owners
	Exploration Holders	Coal & Allied Operations Pty Ltd and Anotero Pty Ltd
	Media	• The Singleton Argus • The Hunter River Times • Radio
Regulators	Local	Singleton Council
	State	DPE Biodiversity and Conservation Division (BCD)
		DPE Crown Lands
		DPE Water
		DPE Heritage NSW
		Department of Primary Industries (DPI)
		Fire and Rescue NSW
		NSW Rural Fire Service
		Department of Regional NSW – Mining, Exploration and Geoscience
		Transport for NSW (TfNSW)

** As per the EIS Guidelines. ^ As per SEARs*

5.6 Engagement Conducted

Engagement for the Project has been conducted for the Applicant by bd infrastructure and undertaken in accordance with the SEP. During the preparation of the EIS, the Applicant consulted with the relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence and/or mineral title holders potentially impacted by the Project.

Engagement activities were undertaken as part of the EIS and scoping phase to discuss the Project with stakeholders and community and to build an understanding of potential concerns, opportunities, and mitigation strategies. Engagement also aimed to gather information that could inform the broader communication required to support future stages of the Project including during the delivery stage.

Engagement activities involved various methods such as face to face discussions, briefings and meetings, a community newsletter, a dedicated project email and 1800 info line, stakeholder briefings, doorknocking, an online feedback survey, distribution of a Kitchen Table Discussion Guide, and hosting an online Community Information Session.

5.6.1 Engagement Tools

The engagement strategy for the Project employed a diverse range of communication channels and activities to foster community and stakeholder involvement and feedback. Community engagement tools used a combination of face to face and online approaches to reach a broader cross-section of the community and to connect with more people at a time and in a manner that suits them. This variety of engagement tools and methods results in more thorough and representative data, thereby facilitating better decision-making regarding the Project.

Table 5-4 lists the engagement tools employed as part of the SEP for the Project. Engagement materials are shown on the Project website at www.maisondieusolarfarm.com.au.

Table 5-4 Engagement Tools

Project Tools	Summary	Stakeholder categories	Timing
Advertising	Advertising (local paper) to promote Project wide communications and engagement materials, such as project specific website, engagement activities, information sessions and community surveys.	• All stakeholders	• The Singleton Argus on 5 October 2023 • The Hunter River Times printed on 20 October 2023
Community values survey	An online survey to identify social and economic impacts associated with the Project and understand community views and aspirations for the Project. The survey was advertised formally through the paper, newsletter, kitchen table discussion guide and website.	• Nearby Landholders • Nearby communities (<4 km) • Regional communities (<100 km) • Community groups • RAPs	• Opened 5 October 2023 until 31 October. The survey was extended until 15 November 2023 and advertised via the website and MP Dan Repacholi's weekly newsletter.
Doorknocking campaign	Doorknocking to outline specific project impacts to stakeholders with the potential to be directly affected by the Project and collect their feedback directly. Appropriate materials such as newsletters, a self-guided kitchen table discussion guide and survey forms were available to provide residents with relevant information and provide various methods for input.	• Nearby communities	• 10 and 11 October 2023
Stakeholder Customer Relationship Manager (CRM)	A stakeholder CRM keeps a record of communications with stakeholders during all engagement phases. This included an analysis of stakeholder sentiment and provides a record of key concerns, issues and follow up actions required by the wider Project team.	• All stakeholders	• Since May 2022
Information sessions	Online information session to provide community members and stakeholder groups with an opportunity to meet the project team, learn more, provide informed feedback and ask questions.	• Nearby Landholders • Nearby communities • Regional communities • State • Community groups • RAPs • Media	• 24 October from 5:30-6:30pm

Project Tools	Summary	Stakeholder categories	Timing
Newsletters	Project newsletters to provide a high-level information to local communities and residents and give forward notice of upcoming consultation programs.	• Nearby Landholders • Nearby communities • Regional communities • Community groups • Commercial mining operations in community (< 5 km)	• Hand delivery on 13 September 2023. • Sent via mail to identified residents on Dights Road Crossing and Maison Dieu Road on 15 September 2023. • Emailed to community groups, Elected Representatives commercial mining operations(<5km) on 21 September 2023.
Media Release	Media release with Project details and information.	• All stakeholders	• The Singleton Argus printed on 2 October 2023 – "Australian company Terrain Solar has secured 200 hectares of land at Maison Dieu where it plans to build and operate a 60-megawatt solar farm with an integrated battery energy storage system and on-site electricity substation" • Sent to the Hunter River Times on 13 October 2023 • Sent to the 2HD and NewFM on 3 October 2023
Fact Sheet – Self-guided Kitchen Table Discussion Guide	The 'Kitchen Table Discussion Guide' provided objective and factual information paired with a large infographic about solar projects in general to enable community members to engage with the project visually. The Guide provided education around solar farm development process, impacts, outcomes, and community benefits. It also included self-directed conversation instructions for residents to interact with themselves, their families and friends. The Guide encouraged community members to provide input during in person doorknocking activities or via the online community survey, email or phone line.	• Nearby landholders • Nearby communities	• Distributed on 10 and 11 October 2023 and included on emails to interested community and stakeholders since 10 October.
Stakeholder briefings and meetings	Briefings and face to face meetings were used to provide targeted and tailored information to a specific stakeholder or stakeholder group and gather feedback. Briefings were typically closed, invite only forums.	• Nearby Landholders • Nearby communities • Regional communities • Elected Representatives • Community groups	• Pre-booked briefings were conducted during doorknocks 10 and 11 October 2023 with five nearby community groups or members. • Briefings with State and Federal elected representatives on 13 October and 24 October 2023.

Project Tools	Summary	Stakeholder categories	Timing
		• Commercial mining operations in community • Exploration Holders • Local • State regulators	• Offered briefings to community groups in the community during September 2023 • Offered briefings to commercial mining operations, including Hunter Valley Operations (HVO) via email on 14 September 2023. The offer was acknowledged by HVO.
Phone and email	Ongoing access to information and feedback for community and stakeholders was maintained through a dedicated project phone and email line.	• All stakeholders	• The Applicant continuously monitors the project email address and phone number. Emails and phone calls have been received intermittently throughout the process, with a higher volume seen just before and after doorknocking or a project update is released. • May 2022 to Present
Stakeholder letters	Letters were used to provide specific stakeholders with notification of planning matters that affect them. This included: • notification of consultation periods • briefing offers • matters requiring notification under legislation.	• Nearby communities • Regional communities • State • Elected Representatives • Community groups • Commercial mining operations in community • RAPs • Infrastructure owners • Exploration Holders • Media • Local • State	• Project information letters were sent to identified stakeholders. • May 2022, August 2022
Webpage or website	The website acts as a central repository of information relating to the Project, including publicly available documents and communications materials prepared by the proponent.	• All stakeholders	• The Applicant set up a dedicated project website as a central location for project information. • May 2022 to Present

5.6.2 Consultation

5.6.2.1 Community

The engagement tools facilitated various meetings and public information events with community members, organisations and representatives. These engagement activities are summarised in **Table 5-6**.

Table 5-5 Community Engagement Conducted

Stakeholder	Method	Reach
Landholders	• Phone, Email and dace to face meetings	• Two landholders are involved in the Project, with contact as needed throughout the development.
Nearby communities	• Community survey	• 6 respondents
	• Doorknocking campaign	• 86 residents
	• Information session – online	• 2 residents
	• Newsletters	• Hand delivery to 39 residents within 2 km of the Project Area. • Mailed to additional 25 residents to Dights Road Crossing and Maison Dieu Road.
	• Fact Sheet – Self-guided Kitchen Table Guide	• 86 residents
	• Stakeholder briefings and face to face meetings	• Meetings with 5 nearby community groups or members on 10 and 11 October 2023. • Follow up meetings with two landholders in March, May and July 2024
	• Phone and email	• The Applicant continuously monitors the project email address and phone number. Emails and phone calls have been received intermittently throughout the process, with a higher volume seen just before and after doorknocking or a project update is released.
	• Stakeholder letters	• Project information letters were sent to 16 adjacent sensitive receivers in May 2022.
	• Landscape Plan	• 5 respondents
Regional communities	• Community survey	• 4 respondents
	• Phone and email	• The Applicant continuously monitors the project email address and phone number. Emails and phone calls have been received intermittently throughout the process, with a higher volume seen just before and after doorknocking or a project update is released.
Elected representatives	• Stakeholder briefings and face to face meetings	• 2 briefings with elected representatives
Community groups	• Emails out	• 8 emails out – no response
	• Newsletter – emailed	• 8 community groups – no response
Business groups	• Emails out	• 2 emails out to nearby mines with briefing offer acknowledged but not taken up.
RAPs	• Newsletter – emailed	• Sent to 3 Aboriginal Corporations or Land Councils.
Easement holders	• Email	• Project update emails have been sent to easement holders with the offer for a project briefing.
Potential water suppliers	• Email	• Notification of project and requests for information sent to three water suppliers in July 2024.
Others	• Website	• Project specific website and the link is advertised

Stakeholder	Method	Reach
	• Media release	• 1 article published in the Singleton Argus.
	• Advertising	• 2 adverts in the Singleton Argus and the Hunter River Times.

5.6.2.2 Regulators

The engagement tools facilitated various meetings and correspondence with regulators which are summarised in **Table 5-6**.

Table 5-6 Regulatory Engagement Conducted

Stakeholder	Method and Date	Purpose
Singleton Council	• Meeting 11/10/2023 • Email 18/10/2023 • Meeting 14/12/2023 • Phone call 19/12/2023 • Meeting 08/05/2024 • Email and phone call 21/05/2024	• Introduction, Applicant details, Project background and description, consultation overview, discussion of key issues / input to SEARs (especially traffic and social) way forward, Voluntary Planning Agreement expectations, community expectations. • Briefed the traffic engineer on Project details. The Applicant advises that the Traffic Engineer raised no specific issues with B-double use of Maison Dieu Road. • Terrain advised SC of finalised traffic movements. SC noted that community consultation, particularly with residents along Maison Dieu Road is a requirement from Council.
DPHI	• Email 14/04/2023 • Meeting 16/10/2023 • Meeting 11/03/2024 • Meeting 16/05/2024	• Invite for meeting. • Introduction, Applicant details, Project background, Project description, community consultation, regulator consultation, way forward, revision letter, VPA, accommodation, regulatory engagement, submission. • Discuss findings of the technical specialist reports and visual impacts.
BCS	• Email 18/04/2023 • Email 25/07/2023 • Meeting 17/08/2023 • Email 05/09/2023 • Email 6/10/2023 • Site visit 10/11/2023 • Email 13/11/2023 • Meeting 11/04/2024 • Email 23/04/2024	• Request NVR map to assist with land category assessment. • Invite for meeting. • Introduction, Project details, avoid and minimise strategy, constraints, biodiversity assumptions, findings and commitments, approval pathway, BCD responses. • Email requesting input on Delma survey methodology. • Email requesting site visit for November to be accommodated. • BCD site inspection accompanied by Biosis. • BCD following up on site inspection. • Discussion on approach and general consensus for offsetting requirements for Delma.
OEH ROD Hunter Central Coast	• Email 05/09/2023	• Email requesting input on Delma surveys.
DPE Crown Lands	• Email 04/09/2023 • Email 15/09/2023 • Email 18/09/2023	• Invite for meeting. • Email from DPE Crown Lands asking to confirm no Crown Land within Project Area or required for access, buffer areas or offsets. • Response received 18/09 advising no input.
DPE Water	• Email 04/09/2023	• Request for meeting to discuss the Project. No response to date.
DPE Heritage NSW	• Email 04/09/2023 • Email 26/09/2023	• Invite for meeting. • Response received 26/09 advising no input.

Stakeholder	Method and Date	Purpose
DPI Agriculture	• Email 04/09/2023 • Meeting 04/10/2023	• Invite for meeting. • Introductions, Project background, SEARs, Project description, DPI's key issues / input to SEARs, way forward, consideration for optional agrisolar.
Department of Climate Change, Energy, the Environment and Water	• Meeting 03/08/2023	• EPBC Referral pre-meeting to provide the background, design, vegetation communities, findings to date, approval pathways and timeline.
Fire and Rescue NSW	• Email 04/09/2023 • Email 16/10/2023 • Email 18/10/2023	• Invite for meeting. • Follow up invite for meeting. • FRNSW advised no comments or recommendations at this time.
NSW Rural Fire Service	• Email 04/09/2023	• Invite for meeting. No response to date.
Department of Regional NSW – Mining, Exploration and Geoscience	• Email 04/09/2023 • Email 16/10/2023	• Invite for meeting. • Follow up invite for meeting. No response to date.
TfNSW	• Email 04/09/2023 • Email 16/10/2023 • Email 17/11/2023 • Meeting 6/12/2023 • Email 11/12/2023	• Email requesting engagement. • Follow up email requesting engagement. • TfNSW responds requesting a meeting. • Meeting held to discuss project, traffic movements and access. • Email requesting information discussed at project meeting.
Member for Upper Hunter – Dave Layzell	• Meeting 13/10/2023 • Email 22/12/2023	• Introduction, Applicant details, Project background, Project description, consultation, way forward. • Project update
Member for Hunter – Dan Repacholi	• Meeting 24/10/2023 • Email 22/12/2023	• Introduction, Applicant details, Project background, Project description, consultation, way forward. • Project update
Ausgrid	• Meeting 01/08/2023 • Detailed Enquiry	• Discuss connection to Ausgrid Singleton Substation.
Transgrid	• Email 31/10/2023	• Provide Transgrid with the September 2023 project update and asking for any questions or comments.

5.7 Feedback

5.7.1 Regulatory

The engagement tools facilitated various meetings and correspondence with regulators. These are summarised by 'aspect' in **Table 5-7** which also illustrates where each is addressed in this EIS.

Table 5-7 Regulatory Engagement Feedback

Regulator	Detail	Issues Raised	Section
Singleton Council	Issues raised in meeting held 11/10/2023	• Traffic impacts considering Singleton Bypass commencing 2024. • Accommodation for workers – It was suggested accommodation needs could be minimised by procuring a local workforce. • VPA requirements to follow the Council policy	**6.9** **3.5.7.1** **3.10**

Regulator	Detail	Issues Raised	Section
Singleton Council	Issues raised in project briefing 14/12/23	• Opportunity to engage with a large variety of council committees, stakeholders and community. • Concerns about the cumulative impact of the project and other construction/roadworks including: – Construction for the Singleton bypass, including the roundabout. – Heavy traffic moving from east to west. – Terrain to add detail of Council requests and commitments made. • All projects heading to the New England REZ area and west Orana must use Singleton. • The accommodation and housing stock in Singleton is close to capacity as many properties and land are owned by mining operations and most remain unused. The same mining operations regularly book local accommodation. • Workforce accommodation and transport to site during construction. Council was clear that a local workforce and planned transport from accommodation to site will significantly reduce housing pressures. • Clarity around how the project contributes to Singleton's (local) economy and opportunity for Voluntary Planning Agreements (VPAs). • The opportunity to reskill workers from closing mines to renewable energy purposes. • Condition and use of the land at project completion. • Whether the project footprint covers any Biophysical Strategic Agricultural Land (BSAL).	**5** **2.5** **6.9** **3.5.7.1** **6.14** **6.15** **6.6**
Singleton Council	Advised via phone call 19/12/2023	• Discussed route for heavy vehicles being inbound via Maison Dieu Rd off New England Highway and Magpie St, outbound only via Magpie St. – Council sees no issue with heavy vehicle route. – Council expects that the businesses along Magpie St will be notified when there is expected to be an increase in traffic along this street. This can occur closer to construction commencing. Council can assist with this through their business notification systems. • Access to site will be done under traffic management. – Council sees no issue with this and noted that end of Maison Dieu Road is not very busy. • Council noted approval for B-doubles along part of the route will be needed but, pending appropriate project information, envision no concern with that.	**6.9**
Singleton Council	Meeting held 08/05/2024	• Discussion on the VPA offer provided by the Applicant. • Ensure a climate change scenario is included in the flooding assessment. • To consult with the SC Traffic Engineer on the finalised TIA. • To ensure cumulative traffic impacts are assessed.	**6.7** **6.9**
Singleton Council	Advised via phone call 21/05/2024	• Advised that the TIA was being finalised and shared the anticipated vehicle numbers. • No issues raised.	**6.9**
DPHI	Issues raised in meeting held 16/10/2023	• Revision letter will need to be provided to sit alongside SEARs for Project changes. • Accommodation arrangements will need to be agreed upon with Singleton Council. • Breakdown of accommodation should be provided in EIS. • TfNSW should be engaged with.	**3.5.7.1** **5.6**
DPHI	Issues raised in meeting held 16/05/2024	• The visual assessment needs to consider adjacent landowners	**5** **6.5**

Regulator	Detail	Issues Raised	Section
		• Consultation with adjacent landowners needs to be ongoing	
DPE BCD	Advice for surveys from meeting 17/08/2023:	• Large eared pied bat – BCD advised artificial habitats such as culverts and gutters should be considered and assessed. • Systematic surveys and transects – ensuring consultation with BCD before surveys to avoid issues later. Advised transects are dependent on vegetation density. Advised to confirm widest spacings applied and why appropriate.	**6.1**
DPE BCD	Issues raised via email 13/11/2023	• Targeted survey effort will be required for the bilateral assessment for the spotted-tailed quoll (*Dasyurus maculatus*). There is a known population in Muswellbrook. • Plot field data sheets and plot field data (MS Excel format) are required to be submitted with the BDAR. • The BDAR should treat the recorded legless lizard as Delma impar until a taxonomic revision is accepted under the BC Act. A nomination to list *Delma vescolineata* under the BC Act and EPBC Act is currently under review.	**6.1**
DPE BCD	Meeting 11/04/2024	• There are different options BCS are willing to consider for mitigating impacts to the Delma • The preferred option is to be presented in the BDAR.	**6.1**
DPE Crown Lands	Issue raised in email 15/09/2023	• Confirm whether any Crown Land (including roads and waterways) is inside the project boundary or required for access, buffer areas or offsets.	**1.8**
DPE Water	No response	• No comments or recommendations.	N/A
DPE Heritage NSW	Advised via email 26/09	• No comments or recommendations.	N/A
DPI Agriculture	Issue raised in meeting 04/10/2023	• Biosecurity Management Plan commitment – including consideration of foot and mouth disease.	**6.6**
Department of Climate Change, Energy, the Environment and Water	Issue raised in meeting 03/09/2023	• EPBC Referral – threatened species identified within 5 km, to be assessed. • Describe tree clearing required.	**6.1**
Fire and Rescue NSW	Advised via email 19/10/2023	• No comments or recommendations.	N/A
NSW Rural Fire Service	No response to date	• No comments or recommendations	N/A
Department of Regional NSW – Mining, Exploration and Geoscience	No response to date	• No comments or recommendations	N/A
TfNSW	Issues raised in meeting 6/12/2023	• Project Managers of cumulative projects must be contacted to determine interactions, especially with Singleton Bypass at Maison Dieu Road. • Pinch points and any road upgrades need to be considered with an OSOM assessment. • Consider routes if shuttle bus is being used to transport workers.	**6.9**
Ausgrid	Detailed enquiry response received 29/08/2023 Meeting 01/08/2023	• Ausgrid raised no issues regarding the connection of solar farm. Proponent is required to fund all the expenses incurred in connecting solar farm with the grid. • Ausgrid will provide all relevant information that will be required to submit AEMO R0 connection application and to connect the solar farm with Ausgrid owned Singleton substation. Ausgrid scheduled fortnightly meeting to support the solar farm grid connection process.	N/A
Transgrid	Advised via email 31/10/2023	• No comments or recommendations	N/A

5.7.2 Community

This section summarises the key findings of the community engagement that was carried out during the preparation of the EIS and identifies community views on the Project.

Table 5-8 provides a summary of the feedback received via engagement. It also indicates where each is addressed in this EIS.

bd Infrastructure advises that feedback was gathered through various methods as outlined in **Table 5-5**. Analysis of the community engagement activities detailed in **Table 5-6** and the breakdown of comments received in **Table 5-8** reveals a notable increase in interest closer to the Project Area.

The majority of community interest stemmed from residents residing within a 4 km radius of the Project, with significant interest from those directly adjacent to the Project Area. Conversely, interest from regional communities located greater than 50 km was minimal, with notable engagement limited to elected representatives.

Table 5-8 Community Engagement Feedback

Type	Aspect	Method	Community views and issues raised	Section
Nearby community	Visual impact	• Door knocking • Online survey	• Glare and reflection impacting neighbouring residents.	**6.5**
		• Direct email and phone	• Reduction of visual amenity, and the addition of this reduction in combination with visual impacts from existing mining projects in the area.	**6.5**
			• Possibility of vegetation screening to be offered to adjacent landowners and road users to reduce visual impact.	**6.5**
			• Community want input into screening options and maintenance responsibilities.	**5.6**
	Environment	• Door knocking	• The level of survey being conducted for wildlife presence.	**6.1**
		• Online information session	• How animals, specifically kangaroos, would be prevented from entering the site.	**6.1**
		• Direct email and phone	• How biosecurity management for fauna and flora pests on farms will be implemented.	**6.6**
			• Implementation of an injured animal plan for construction and operation of the solar farm.	**6.1**
			• Concern for local animals who use the land for grazing and mating (kangaroos and bandicoots).	**6.1**
			• Questions as to the recycling process for panels and batteries both during operation and at end of project.	**6.13**
			• Condition and use of the land at project completion. Doubts that the land would be turned back to prior agricultural use and status.	**6.6**
	Engagement	• Door knocking	• Wanting a clear understanding of the development application process.	**5.6**
		• Online information session	• The need for a broad representation of community to be engaged in the planning process.	**5.6**
	Social	• Door knocking	• Community is hopeful cost-of-living pressures may be eased by renewable energy.	**6.14**
		• Direct email and phone	• Creation of local jobs and economic benefits for the community.	**6.14**
	Housing	• Door knocking	• Concerns regarding potential decreases in property value due to the solar farm.	**6.14**
		• Direct email and phone	• Questions as to whether properties will be acquired in the development process.	**6.14**

Type	Aspect	Method	Community views and issues raised	Section
	Water	• Door knocking	• Clarity around whether water usage during operation impact on drainage lines and the water table.	**6.8**
			• The impact on local water sources if battery fires occur and whether there are suitable access points for firefighters.	**6.11**
	Hazards	• Door knocking • Online information • Direct email and phone	• Concerns about potential fire hazards from batteries and solar panels putting properties and the local land at risk. Wanting clarity around whether barriers will be used to mitigate battery fires.	**6.10**
			• Concerns around the combination of wind direction and location of the project site potentially increasing the fire risk to homes and property.	**6.11**
			• Safety concerns for children due to solar panel heat attracting hazardous pests, specifically snakes.	**6.10**
	Traffic	• Door knocking • Online information session	• Increased traffic along Maison Dieu Road increasing congestion and safety hazards for road users and children (particularly during school hours at 8 am and 4 pm).	**6.9**
			• Concerns about parking impacts for residents during construction.	**6.9**
			• Doubt as to the suitability of the bridge and road conditions for construction vehicles.	**6.9**
	Noise and dust	• Door knocking	• Dust and noise impacts are considered normal due to their proximity to mines; however, concerns were raised about cumulative impact to the noise and dust of the mines during construction.	**6.4**
			• The need for a noise and dust mitigation plan. The nearby mines have agreed to regularly clean water tanks and air conditioning systems in response to increased dust impacts from mining activities.	**6.4** **6.12**
			• Concerns raised about the operational noise level of solar panel trackers, suggesting it was 75dB and “as loud as a lawn mower”.	**6.4**
	Land use	• Door knocking • Online information session • Direct email and phone	• Community values agricultural use of the land rather than solar farming or mining. Preference for sheep grazing amidst the solar panels where possible. Counter views raised that sheep may be hard to farm in the area due to wild dogs and lack of sheep facilities.	**6.6**
			• Why the former Liddell Power station was not considered as a more suitable location for the solar farm.	**2.7.2**
	Indigenous Heritage/ RAPs	• Door knocking	• Indigenous involvement during both the construction and operation phases of the project.	**6.2**
			• Whether the developer will undertake an Indigenous Participation and Reconciliation Action Plan (RAPs) during the process.	**6.2**
			• Concerns the Project may impact any Indigenous communities and their use of the land. Community wants to know this has been considered and addressed.	**6.2**
	Landscape Plan	• Direct email and phone	• Concern raised about planting trees near powerlines.	**6.5**

Type	Aspect	Method	Community views and issues raised	Section
		• Face to face meeting	• Glad vegetation selected is short and condensed due to height restrictions near transmission lines. • Make sure vegetation selected is native and will survive. • Does not want vegetation that will attract bats and would prefer vegetation that will attract native birds. • Annoyance that the trees will take five years to grow. • Annoyance that the panels will still be visible in some locations regardless.	
Elected members	Engagement	• Project briefing	• Encourage to continue engaging with the community and stakeholders impacted by the project.	**5.8**
			• Engagement should cover a variety of council committees, stakeholders and community members impacted by the Project.	**5.6**
			• The need for ongoing consultation with other developers in the area to map out overlaps in schedules, impacts and benefits.	**5.8**
	Environment	• Project briefing	• Question as to the existing land condition and whether any degradation from mining may impact the Project.	**6.6**
	Hazards	• Project briefing	• Concerns about potential fire hazards from batteries and solar panels putting properties and the local land at risk.	**6.11**
Commercial mining operations in community (<5km)	Engagement	• Direct email	• No issues raised.	N/A
Community Groups	Engagement	• Project briefing	• No response.	N/A
Business groups	Engagement	• Offer of project briefing email	• Offer of project briefing acknowledged and considered.	N/A
RAPs	Aboriginal heritage	-	• See **Section 6.2.**	**6.2**

5.7.3 Community Values

As discussed in **5.6.1**, a community values survey collected information about the views and values of the surrounding community. The survey provided an alternative method for local community members to provide input and feedback around the social, environmental and economic benefits and impacts of the Project. The survey provided the following insights:

- The most important aspects of the local area are:
  - The landscape and natural environment, especially protecting what hasn't been damaged by the coal mines or local industry to date;
  - Health and wellbeing of the neighbourhood and community;
  - The open space, peace and quiet of a country lifestyle;
- The biggest challenges facing the local area include:
  - Keeping young people in the area through jobs, cheaper rent, activities targeted at engaging the younger generation;
  - Pollution in terms of air quality and dust from the current mines and industry;
  - Cost of living;
  - Employment outside of coal mines; and
  - Loss of the environment and rising climate change related issues;
- The community would benefit from the following use of the community benefits scheme:
  - Local employment and business opportunities;
  - Programs that target youth in the area to keep them occupied, build self-esteem and provide pathways to employment;
  - Rebuilding the local environment; and
  - Contribution towards local infrastructure such as footpaths, community centre, libraries and recreational facilities;
- The community's attitude towards the Project in general:
  - Nearly all respondents were in favour of a shift towards renewable energy and strongly understood and support the positive environmental impacts of this move;
  - However, there was equal concern about the shift away from fossil fuels industry and what that means for the local community. The community currently relies on grants and opportunities from coal mining and associated industries. As coal mining dries up or changes to renewables the community needs a plan to supplement that reliance; and
- The community's main concerns relating to the Project, as addressed in **Table 5-8**.
  - Safety and hazard management of the solar farm during its operation, including bushfire risks;
  - Decommissioning (i.e. use of land once solar farm operational life has finished);
  - Construction impacts on the local environment (e.g., removal of vegetation, biosecurity risks); and
  - Construction or operational impacts on Aboriginal cultural heritage values or sites.

5.8 Proposed Future Engagement

Ongoing engagement with stakeholders will be undertaken during the EIS exhibition and assessment phase to support the community to make formal submissions and continue to foster a trusted relationship by providing responses to those submissions. This will include:

- Newsletter factsheets based on key areas of community concern to be distributed to community;
- An in-person 'drop in' session for community individuals, organisations or representatives. Advertising ahead of all opportunities in local media outlets;
- Ongoing consultation with other regulatory agencies to address issues raised during exhibition phase of the EIS and as part of preparation of the Response to Submissions (RTS);
- Ongoing monitoring of community phoneline and email for complaints and feedback from the community;
- Maintain the Project website for the Project; and
- Ongoing media relations into the future to drive community awareness around the Project;

The SEP will be regularly reviewed and updated over the Project duration to ensure it remains effective and encourages community participation.

Should the Project be approved, a CEMP will be prepared prior to the commencement of construction for the Project that will include a process for receiving and responding to community complaints, including the management response.

An OEMP will similarly guide environmental management during the operational phase.

6 IMPACT ASSESSMENT AND MITIGATION

This section provides a detailed summary of the potential environmental and social impacts of the Project. It is structured in a clear and logical way and separately describes the detailed and standard assessment of aspects. The summary of impacts is appropriate to the likely scale and nature of the Project-specific impacts and accurately summarises the key findings of the detailed technical studies which support this EIS.

This section focuses on the risk assessment. It then describes the key findings of the assessment of performance measures, exceedances of relevant standards and provides a detailed explanation of the methods which support these findings. Where exceedances are predicted, justification is provided. Where any residual uncertainties are identified, actions taken to address each is stipulated. Lastly, it highlights any key linkages between relevant assessments and likely cumulative impacts.

6.1 Biodiversity

6.1.1 Background

A Biodiversity Development Assessment Report (BDAR) has been prepared for the Project by Biosis Pty Ltd (Biosis) and is provided in **Appendix E**. The BDAR was prepared in accordance with the SEARs, supplementary SEARs and regulatory guidelines provided in **Appendix B**, and community engagement detailed in **Section 5**.

The “subject land”, assessed under the BAM within the BDAR, includes the Disturbance Footprint and additional lands outside of the Project Area assessed for indirect and prescribed impacts. The BDAR “Study Area” is larger than the subject land and was the initial focus of early field investigations to explore constraints and opportunities, as well as avoid and minimise strategies.

The key objectives of the BDAR were to:

- Address the BAM and the NSW Biodiversity Offset Scheme;
- Identify how the Applicant has avoided and minimised impacts to biodiversity;
- Identify any potential impact that could be characterised as serious and irreversible (SAII);
- Describe the offset obligations required to compensate for any unavoidable biodiversity impacts resulting from the Project; and
- Consider and assess the proposal in accordance with other relevant legislation (e.g. EPBC Act).

6.1.2 Methodology

The BDAR was prepared in accordance with the methodology required by the BAM. Site visits and desktop investigations were used to assess the biodiversity values of the Project. Detailed methodology is provided in **Appendix E.**

6.1.2.1 Avoid and Minimise Impacts

Project biodiversity impacts were assessed for the Project within the BDAR. A large area was investigated in the SR for feasibility. Field investigations through late 2022 and early 2023 determined the locations of highest biodiversity value, which have now been avoided (such as TECs and high-density hollow-bearing trees). The results of these investigations were considered during early design planning in December 2022.

Biodiversity constraints were mapped to conceptualise the constrained areas within the Project Area. Biodiversity constraints were placed into five categories from Very Low to Very High and used to inform avoidance and minimisation strategies.

The Project Area and Disturbance Footprint were then refined and reduced iteratively to avoid and minimise impacts to areas of highest biodiversity values.

A substantial revision was made in August 2023, whereby the disturbance footprint was reduced by 89 ha from the April 2023 iteration; and 262 ha in total from the SR Project Area. The Disturbance Footprint was refined again in February 2024, with a small section of the south-western area removed to avoid areas of flood risk considering the modelled 1% AEP.

The key biodiversity constraints for the Project are the presence of the following:

- PCT 3431 High, Regen and Low condition classes (BC Act Endangered Ecological Community (EEC);
- PCT 3431 High and Regen classes (EPBC Act Critically Endangered Ecological Community (CEEC);
- Foraging and general habitat for Grey-headed Flying-fox, Brush-tailed Phascogale, Powerful Owl and threatened microbats;
- Striped Legless Lizard habitat (PCT 3431);
- Dams that provide foraging habitat for Southern Myotis; and
- Hollow bearing trees.

Table 6-1 details the PCTs that were mapped during field surveys within the Project Area. **Figure 6-1** illustrates the PCTs.

Table 6-1 Biodiversity Mapped PCTs

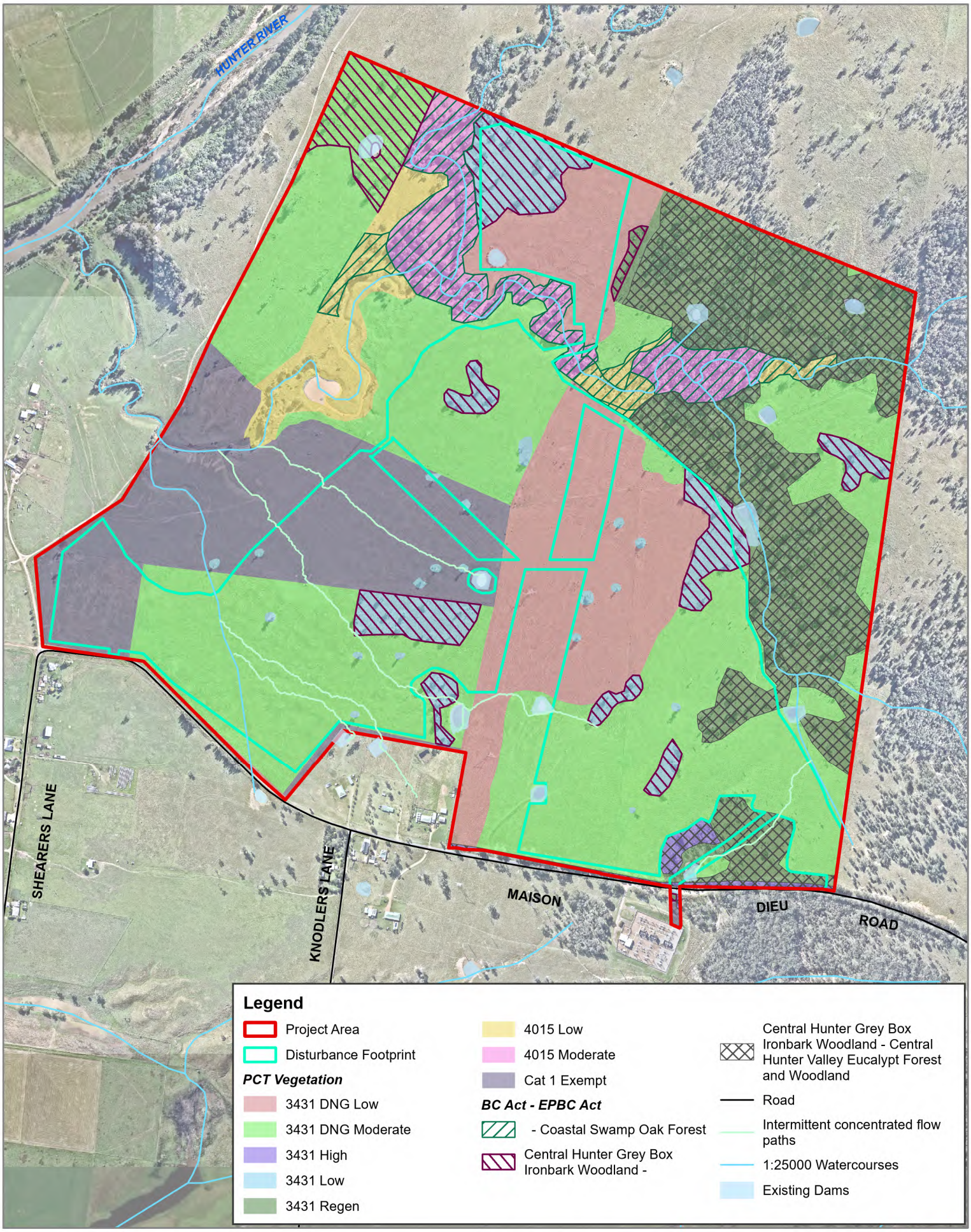
PCT ID	PCT Name	Condition	Subject Land (ha)	Disturbance Footprint (ha)
3431	Central Hunter Ironbark Grassy Woodland	• 30.09 ha of 3431_DNG_Low: DNG with low cover and abundance of native species. • 89.56 ha of 3431_DNG_Moderate: DNG with markedly higher cover and abundance of native species than 3431_DNG_Low. • 2.14 ha of 3431_High: A small section of fully structured forest with cover and abundance of native species. • 42.25 ha of 3431_Regen: Areas of forest with mature canopy and canopy regeneration. Generally lacking a consistent shrub layer. • 11.87 ha of 3431_Low: Patches of trees over DNG or single trees surrounded by Category 1 Land.	181.25	75.74
4015	Central Hunter Swamp Oak Riparian Forest	• 9.97 ha of 4015_Moderate: Areas with near benchmark or higher tree cover. • 8.38 ha of 4015_Low: Areas with lower than 50% benchmark tree cover.	18.35	0.10

6.1.2.2 Threatened Ecological Communities

One TEC listed under the BC Act and two TECs listed under the EPBC Act were found during field surveys. **Table 6-2** details the TECs found during the field surveys.

Table 6-2 Threatened Ecological Communities

Ecological Community	Listing Status	Total (ha)	Disturbance Footprint (ha)
Central Hunter Grey Box—Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions (Central Hunter Grey Box Ironbark Woodland).	Endangered (BC Act)	56.26	10.79
Central Hunter Valley eucalypt forest and woodland.	Critically Endangered (EPBC Act)	44.39	1.83
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community (Coastal Swamp Oak Forest).	Endangered (EPBC Act)	9.87	0.10



PCT VEGETATION

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: PCT Vegetation
VERSION: B
DATE EXPORTED: 17/07/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-1:

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6.1.2.3 Threatened Species

Table 6-3 details the threatened species and associated habitat within the Disturbance Footprint that are likely to be impacted by the Project. The risk weighting is a value used to determine the number of species credits and ecosystem credits required to offset residual impacts, based on combining the sensitivity to loss and the sensitivity to gain of the species. The attributes column describes the characteristics of the areas each threatened species was mapped in.

Figure 6-2 shows the locations threatened species identified within the Project Area.

Table 6-3 Threatened Species

Species	Impact (ha)	Risk Weighting	Attributes
Delma impar Striped Legless Lizard	75.74	1.50	The species polygon for this species was informed by the vegetation zones that the species was recorded in. All of PCT 3431 is included, though some areas may contain marginal habitat only due to high canopy cover.
Myotis macropus Southern Myotis	50.83	2.00	All associated PCTs (PCTs 3431 and 4015) within 200 m of potential foraging habitat (waterbodies with pools/stretches 3 m wide or greater).
Phascogale tapoatafa Brush-tailed Phascogale	10.89	2.00	Predominantly habits continually wooded vegetation, however, paddock trees are noted as important habitat in the Threatened Biodiversity Data Collection (TBDC) for this species. As such, all wooded areas within PCTs 3431 and 4015 have been included in the species polygon.
Ninox strenua Powerful Owl	4.02	NA	A species polygon was drawn to include all vegetation zones within 800 m of the estimated location containing a living or dead tree with a hollow >20 cm diameter that occurs >4 m above the ground.

6.1.3 Impact Assessment

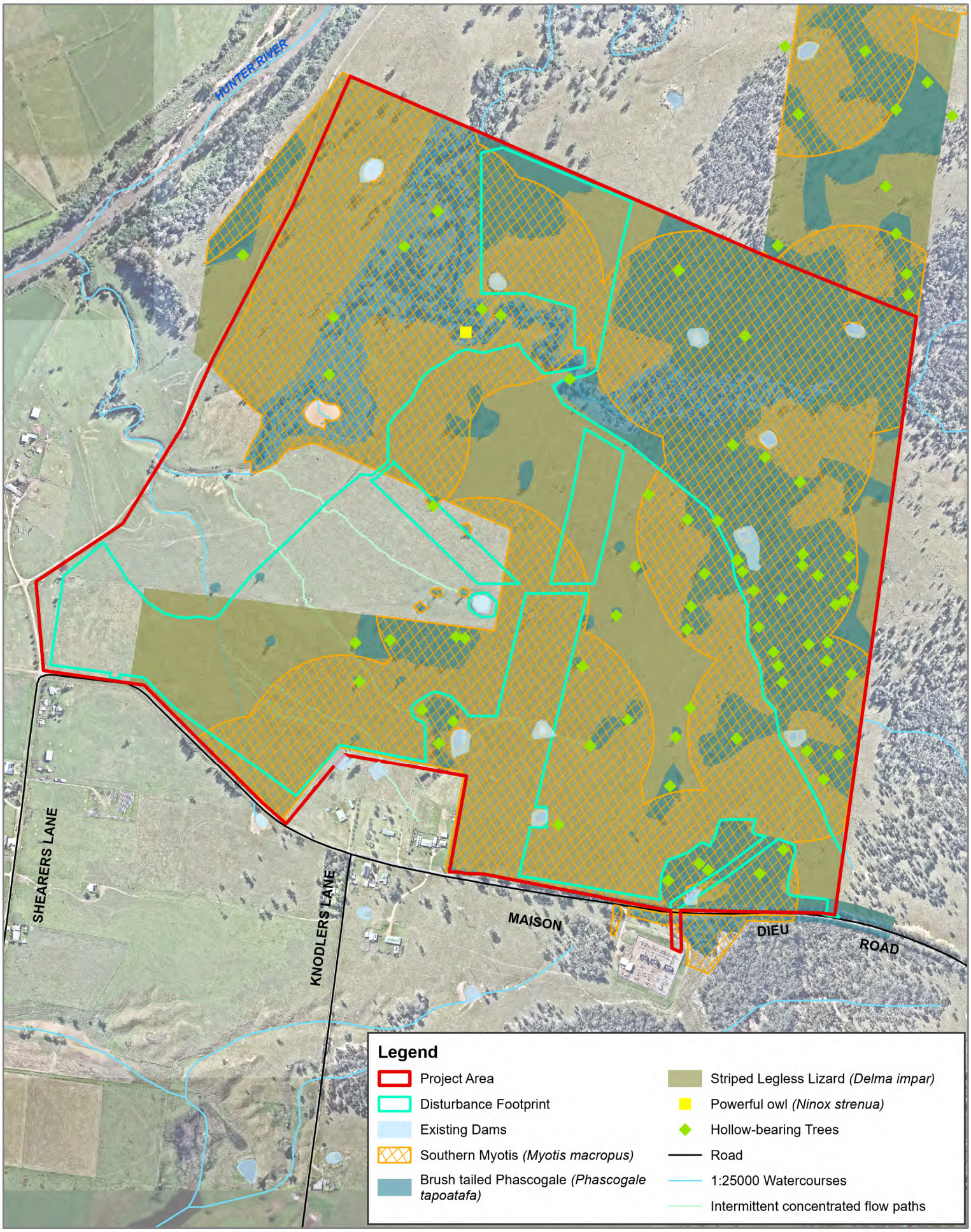
6.1.3.1 Impacts Unable to be Avoided / Direct Impacts

The following direct impacts are anticipated to occur from the 90 ha total Disturbance Footprint of the Project with the removal of:

- 75.84 ha of native vegetation comprising the following PCTs and TECs:
  - 75.74 ha of PCT 3431, 10.79 ha of Central Hunter Grey Box Ironbark Woodland (Endangered, BC Act), and 1.83 ha Central Hunter Eucalypt Forest and Woodland (Critically Endangered, EPBC Act); and
  - 0.10 ha of PCT 4015 Coastal Swamp Oak Forest (Endangered, EPBC Act);
- 10.89 ha of Brush-tailed Phascogale habitat;
- 75.74 ha of Striped Legless Lizard habitat;
- 50.83 ha of Southern Myotis habitat;
- 10.89 ha of habitat for four ecosystem credit species microbats:
  - Eastern Coastal Free-tailed Bat;
  - Eastern False Pipistrelle;
  - Greater Broad-nosed Bat;
  - Yellow-bellied Sheath tail-bat;

- 10.89 ha of foraging habitat for several species credit species microbats:
  - Eastern Cave Bat;
  - Large Bent-winged Bat;
  - Large-eared Pied Bat;
  - Little Bent-winged Bat;
- 4.02 ha of native vegetation within the Powerful Owl species polygon and four trees that meet the habitat constraint for Powerful Owl (all four trees are either isolated paddock trees (three trees) or part of a small patch). This does not preclude them from use by Powerful Owl, as suggested by the TBDC, but in consideration of the relatively undisturbed and higher quality habitat that occurs within and contiguous with the subject land to the east, they are less likely to be utilised by a breeding pair;
  10.89 ha of Grey-crowned Babbler and Speckled Warbler (ecosystem credit species) habitat.
- 10.89 ha of Grey-headed Flying-fox foraging habitat; and
- 20 hollow bearing trees.

The mitigation measures provided in **Section 6.1.4** will minimise the Project's related impacts to biodiversity values.



THREATENED FLORA AND FAUNA

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Th Species
VERSION: B
DATE EXPORTED: 17/07/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-2:

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6.1.3.2 Prescribed Impacts

Prescribed impacts are those which are defined by clause 6.1 of the *Biodiversity Conservation Regulation 2017* (BC Regulation). **Table 6-4** outlines the prescribed impacts of the Project, including relevant habitat features, species likely to utilise the habitat and the severity of the likely impact.

Table 6-4 Prescribed Biodiversity Impacts

Prescribed impact	Relevant habitat features	Threatened Species	Severity of Impact
Karst, caves, crevices, cliffs, rocks and other geological features of significance	The subject land does not contain any karst, caves, crevices, cliffs, or other geological features of significance. There is a localised area in the south-west of the subject land where a small amount of embedded rock is present. However, this area has been avoided by the disturbance footprint, therefore this prescribed impact is not discussed further.	NA	NA
Occurrences of human-made structures and non-native vegetation	The subject land does not contain any human-made structures of note other than transmission line towers which will not be impacted. The Category 1 land mapped in the west of the subject land contains a high degree of non-native grass cover.	The Striped Legless Lizard is known to prefer open grassland habitat. This is supported by the findings of the targeted survey undertaken for this BDAR. However, the areas of exotic grassland are not considered viable habitat for Striped Legless Lizard, due to the lack of structural diversity. Currently these areas are grazed to the extent that ground vegetation is unlikely to provide adequate cover for Striped Legless Lizard. Given this prescribed impact is not considered likely to impact threatened entities, this prescribed impact is not considered further.	Low
Corridors or other areas of connectivity linking habitat for threatened entities	The Project Area does not form part of a recognised corridor, but it is situated on the west edge of a considerable patch of connected native vegetation. Furthermore, there is some diffuse (stepping stone) connectivity through the subject land linking this large patch of vegetation with that lining the Hunter River to the east.	Central Hunter Grey Box Ironbark Woodland Central Hunter Eucalypt Forest and Woodland Coastal Swamp Oak Forest Striped Legless Lizard Brush-tailed Phascogale Southern Myotis Powerful Owl Ecosystem credit microbats Species credit microbats Grey-crowned Babbler Speckled Warbler Grey-headed Flying-fox	Connectivity of habitats is an ecological function important for the sustenance of ecological communities, flora and fauna. The Project has been designed to take advantage of cleared or sparsely vegetated areas to have minimal impact. This means that any connective function the subject land may serve for the mobile species listed would remain. In the case of Striped Legless Lizard, populations are most likely sedentary and not reliant on connective features for viability.

Prescribed impact	Relevant habitat features	Threatened Species	Severity of Impact
			Nevertheless, the population, or populations, present within the subject land will remain connected to habitat to the north, west and south of the subject land.
Water bodies or any hydrological processes that sustain threatened entities	The subject land contains a number of natural waterways and artificial waterbodies (dams). The current hydrological processes, coupled with other abiotic factors, have resulted in the present ecology of the subject land. Given a significant change in land use, the Project is likely to alter the processes. The Project also has the potential to impact surface water flow and quality by: Introducing sediment-laden runoff. Transporting pollutants. Leaks and spills mixing with run-off. Exposing contaminated soils to rainfall and runoff. Obstructing water flows by temporary access tracks and earthworks during construction.	Central Hunter Grey Box Ironbark Woodland Central Hunter Eucalypt Forest and Woodland Coastal Swamp Oak Forest Striped Legless Lizard Brush-tailed Phascogale Southern Myotis Powerful Owl Ecosystem credit microbats Species credit microbats Grey-crowned Babbler Speckled Warbler Grey-headed Flying-fox	The dams within the subject land represent foraging habitat for Southern Myotis, of which, one would be filled. Given the availability of similar habitat within the subject land and assessment area, a single dam is unlikely to be important to the persistence of the local population of the species. A Water Impact Assessment (WIA) prepared for the Project found that the Project should not result in any significant adverse impacts to surface water or groundwater in the Project Area or local vicinity. Impacts can be appropriately controlled via management and mitigation measures outlined in **Section 6.8.3.** The Project is considered unlikely to alter the hydrological processes that currently sustain the threatened entities present within the subject land.
Protected animals that may use the proposed wind farm development site as a flyway or migration route	This prescribed impact is not relevant to the Project.	N/A	N/A
Where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community	The Project will result in increased vehicle traffic during construction and to a far less extent, the operational phase of the Project. This increased vehicle traffic has the potential to impact upon native fauna species that are active during the day, and generally with a higher potential for impact in areas where refuge/forage habitat exists immediately adjacent to areas where vehicle movements will occur, primarily Maison Dieu Road.	Commonly occurring fauna, including birds and macropods could be affected. Construction hours are limited to the day or early evening time, so possible vehicle strike of nocturnal fauna, including microbats and Brush-tailed Phascogale) is not anticipated.	Non-threatened, ground dwelling fauna known to inhabit the general area, particularly macropods (such as Swamp Wallaby Wallabia bicolor and Eastern Grey Kangaroo Macropus giganteus) are notoriously prone to vehicle strike. Vehicle strike of macropods is likely to be already occurring and may be exacerbated during construction.

Habitat Connectivity

The subject land does not form part of a recognised wildlife corridor, but it is located adjacent to a 7.5 km long, significant connective feature between the NEH to the north and the Hunter River to the south. The subject land serves as a link to habitats along the Hunter River to the west.

The fence around the Project may impede the movement of less mobile, ground-dwelling fauna. However, these species can still navigate through the Project Area, east to west via a vegetated creek line, and around the Project to the north and south.

The Project is unlikely to interrupt habitat connectivity for mobile fauna such as birds, microbats and arboreal mammals. Some single trees or small patches of woody vegetation on the forest edge will be removed, but no consistent canopy will be severed.

Although the Striped Legless Lizard has a limited dispersal capability of up to 60 m, areas of occupancy and connectivity of retained habitat for Striped Legless Lizard may be reduced. Mitigation measures to minimise the impacts to the species are listed in **Section 6.1.4**.

Impacts to habitat connectivity will be one off and permanent, although after decommissioning, habitat connectivity may be restored.

The Project is unlikely to be of any discernible consequence to any threatened entities as free passage of individuals and propagules will still be possible.

Water Bodies, Water Quality and Hydrological Processes

Threatened entities rely on the vegetation that is supported by the existing water quality and hydrological processes. The removal of the dam in the northern array would be a one off and permanent impact causing a very small reduction in local foraging habitat for Southern Myotis.

This is unlikely to have a discernible impact on the persistence of the local population. Surface water mitigation measures will minimise the impact to water quality and hydrological processes and are contained in **Section 6.7**.

Vehicle Strikes

The Project has the potential to result in increased vehicle strikes during construction due to increased light and heavy vehicle movements. The majority of vehicles movements will be around edges of vegetation rather than through patches of retained habitat. Therefore, this impact is not expected to increase vehicle strike levels above existing levels during operation. This will be managed through the traffic mitigation measures contained in **Section 6.9.**

6.1.3.3 Indirect Impacts

Indirect impacts are potential impacts that occur following the implementation of proposed avoidance and minimisation measures and located external to the Disturbance Footprint. These impacts are generally expected to occur within the subject land. **Table 6-5** details the predicted indirect impacts of the Project.

Table 6-5 Indirect Biodiversity Impacts

Indirect impact	Impacted Entities	Extent	Frequency	Duration	Timing	Likelihood and consequences
Inadvertent impacts on adjacent habitat or vegetation	• Central Hunter Grey Box Ironbark Woodland (CHGBIW) • Central Hunter Eucalypt Forest and Woodland (CHEFW) • Coastal Swamp Oak Forest • Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Powerful Owl • Ecosystem credit microbats • Species credit microbats (foraging) • Grey-crowned Babbler • Speckled Warbler • Non-threatened vegetation zones	Up to 30.56 ha of adjacent native vegetation	One off	Long term	Construction and operation	Impacts to adjacent vegetation during construction and operation can be prevented or minimised through appropriate exclusion fencing, implementation of a CEMP detailing environmental protection measures, water quality practices and stormwater controls, and by ensuring any lighting is directed towards the developed area, rather than towards the adjacent retained habitats.
Reduced viability of adjacent habitat due to edge effects	• CHGBIW • CHEFW • Coastal Swamp Oak Forest • Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Powerful Owl • Ecosystem credit microbats • Species credit microbats (foraging) • Grey-crowned Babbler • Speckled Warbler	Up to 30.56 ha of adjacent native vegetation	Unknown	Indefinite for noise and light spill, short term for dust	Construction and operation	The potential for the Project to increase edge effects significantly to adjacent vegetation and habitats is relatively low. Vegetation present within and adjacent to the disturbance footprint is largely already subject to moderate to high levels of edge effects given the adjoining large areas of cleared farmland. Efforts have been made to minimise and avoid impact to vegetation in higher ecological condition and parts of large, connected areas.

Indirect impact	Impacted Entities	Extent	Frequency	Duration	Timing	Likelihood and consequences
Reduced viability of adjacent habitat due to noise, dust or light spill	• CHGBIW • CHEFW • Coastal Swamp Oak Forest • Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Powerful Owl • Ecosystem credit microbats • Species credit microbats (foraging) • Grey-crowned Babbler • Speckled Warbler	Up to 30.56 ha of adjacent native vegetation	Unknown	Indefinite for noise and light spill, short term for dust	Construction and operation	The adjacent habitat will be impacted by noise, dust and light spill, during construction and to a lesser extent, operation of the Project. During construction, this will be managed via practices outlined in the CEMP. Increased light spill during operation can affect microbat activity. Effects vary from positive, such as an increase in prey (insects) to negative whereby bats may not fly through overly lit areas rendering any adjacent habitat no longer viable. Although there is uncertainty, given the threatened microbat species recorded are often detected in urbanised areas, it is reasonable to assume that they are in some way resilient to light pollution, and any impacts are not likely to be substantive.
Transport of weeds and pathogens from the site to adjacent vegetation	• CHGBIW • CHEFW • Coastal Swamp Oak Forest • Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Ecosystem credit microbats • Species credit microbats (foraging) • Grey-crowned Babbler • Speckled Warbler	Up to 30.56 ha of adjacent native vegetation	Unknown	Possibly long term	Construction and operation	Weeds occurring within the disturbance footprint are common with those occurring within adjacent vegetation to be retained. Increased transport of pathogens and weeds is unlikely to occur, however will be managed by biosecurity measures outlined in the CEMP.
Increased risk of starvation, exposure and loss of shade or shelter	• Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Powerful Owl • Ecosystem credit microbats • Species credit microbats (foraging) • Grey-crowned Babbler • Speckled Warbler	Up to 30.56 ha of adjacent native vegetation.	One off	Long term	Construction	The removal of 5.84 ha of native vegetation and one farm dam (Southern Myotis foraging habitat) will constitute a loss of foraging resources. This is not considered likely to increase the risk of starvation for these species when the broad extent of available habitat within the assessment area is considered. The Project will remove sheltering resources for hollow-dependent microbats (20 trees). While the removal of sheltering vegetation is a small proportion of the habitats available, the removal of potential roost/ sheltering sites is a more adverse impact, but not one that is likely to result in mortality of individuals.

Indirect impact	Impacted Entities	Extent	Frequency	Duration	Timing	Likelihood and consequences
Loss of breeding habitats	• Brush-tailed Phascogale • Powerful Owl • Eastern False Pipistrelle • Eastern Coastal Free-tailed Bat • Yellow-bellied Sheathtail-bat • Greater Broad-nosed Bat • Southern Myotis • Striped Legless Lizard	20 hollow bearing trees and up to 30.56 ha of adjacent native vegetation	One off	Long term	Construction	20 hollow-bearing trees will be removed. Threatened species that may use these hollows based on surveyed results include the listed hollow-dependent microbats, Powerful Owl and Brush-tailed Phascogale. Indirect impacts associated with the loss of breeding habitats are not considered likely to be substantial or significant to any locally occurring threatened, or non-threatened, microbat species. Up to 75.74 ha of habitat for Striped Legless Lizard habitat will be removed. It is highly likely a portion of this is used for breeding. This will be mitigated by the mitigation measures outlined in **Section 6.1.4**.
Trampling of threatened flora species	• No threatened flora species were found. Threatened flora is considered unlikely to occur. • Therefore, trampling of threatened flora species is unlikely.	N/A	N/A	N/A	N/A	N/A
Inhibition of nitrogen fixation and increased soil salinity	• CHGBIW and CHEFW • Coastal Swamp Oak Forest • Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Powerful Owl • Ecosystem credit microbats • Species credit microbats (foraging) • Grey-crowned Babbler • Speckled Warbler • Non-threatened vegetation zones	None	N/A	N/A	N/A	It is unlikely the future development of the subject land would result in substantial changes to the level of nitrogen fixation or soil salinity.
Fertiliser drift	• As for nitrogen fixation	None	N/A	N/A	N/A	The Project does not include the use of fertilisers. If anything, use of the subject land as a solar farm may reduce fertiliser in the local context.
Rubbish dumping	• As for nitrogen fixation	None	N/A	N/A	N/A	Potential for this indirect impact to occur is negligible. Appropriate measures for the management of construction related waste will be detailed in the CEMP and Waste Management Plan.

Indirect impact	Impacted Entities	Extent	Frequency	Duration	Timing	Likelihood and consequences
Wood collection	• As for nitrogen fixation	None	N/A	N/A	N/A	The Project is unlikely to increase access to retained vegetation, beyond current access capacity. Unauthorised access and collection of wood is expected to be a negligible risk.
Removal and disturbance of rocks, including bush rock	• Striped Legless Lizard	Minimal	One off	Long term	Construction	Contains minimal exposed rock and no appreciable areas of 'bush rock' or rocky outcropping. Some small areas with rock sized up to around 50 cm in diameter is present in the south-east, the bulk has been avoided but is habitat for Striped Legless Lizard. Rock removal is not considered an additional indirect impact to the general habitat removal for Striped Legless Lizard.
Increase in predators	• As for nitrogen fixation	None	N/A	N/A	N/A	Potential for this indirect impact to occur is negligible as there is no foreseeable means to increase predators within the subject land.
Increase in pest animal populations	• As for nitrogen fixation	None	N/A	N/A	N/A	Potential for this indirect impact to occur is considered negligible as there is no foreseeable means to increase pest animal populations within the subject land.
Changed fire regimes	• As for nitrogen fixation	None	N/A	N/A	N/A	Potential for this indirect impact to occur is considered negligible, and the requirements for legislated bushfire hazard reduction and asset protection will be implemented during construction and operation of the Project. This is further discussed in **Section 6.11**.
Disturbance to specialist breeding / foraging habitat	None	None	N/A	N/A	N/A	The subject land is not within Important Habitat Mapping.
Fragmentation of movement corridors	• Striped Legless Lizard • Brush-tailed Phascogale • Southern Myotis • Powerful Owl • Ecosystem credit microbats • Species credit microbats (foraging only) • Grey-crowned Babbler • Speckled Warbler	Negligible	One off	Long term	Construction and operation	Whilst the subject land sits on the western border of a prominent connective feature within the assessment area and broader locality, the Project has been designed so little woody vegetation will be removed. Any connective function the subject land may serve for the mobile species listed would remain. In the case of Striped Legless Lizard, populations are most likely sedentary and not reliant on connective features for viability. Nevertheless, the population, or populations present within the will remain connected to north, west and south.

6.1.3.4 Impacts to Groundwater Dependent Ecosystems (GDEs)

The 'Ground Water Dependent Ecosystems Atlas' (Bureau of Meteorology, 2024) indicates that the PCTs within the subject land are likely to have some degree of groundwater dependence. The Water Impact Assessment (**Section 6.7.3**) found the Project will not have any significant impacts on groundwater. Therefore, the Project will have a negligible impact on GDEs.

6.1.3.5 Impacts Considered Uncertain

There are some impacts that cannot be quantified using GIS and are difficult to predict, including a number of indirect and prescribed impacts. Monitoring, adaptive management and adequate response actions outlined in the CEMP and sub-plans will manage any uncertain impacts to negligible or satisfactory levels.

A total loss of groundcover has been assumed to occur as a direct impact within the disturbance footprint, including areas of temporary shading and in between solar panel row alignments as well as APZs. This is considered a conservative measure as groundcover and a reduced level of biodiversity value is known to persist in currently operating solar farms in NSW, and within which grassland communities will persist in the future, possibly experiencing improvement. Required management measures between arrays and APZs for bushfire and insurance purposes cause uncertainty around the level of biodiversity that will remain.

Other uncertain impacts include:

- Inadvertent impacts to native vegetation adjacent the disturbance footprint;
- Introduction of pests, pathogens and weeds to native vegetation adjacent the disturbance footprint and further afield;
- Degradation of downstream habitats via worsening of water quality or alteration to hydrological processes (although the Surface Water Impact Assessment considers downstream water quality impacts unlikely with appropriate mitigation in place); and
- Vehicle strikes.

6.1.3.6 Cumulative Biodiversity Impacts

Cumulative impacts of recent nearby projects with similar PCTs and habitats were considered. Impacts resulting from the Project are generally consistent with impacts that are considered to occur at other nearby developments, particularly those occurring within 50 km or less, except for the impacts to the Striped Legless Lizard. Despite the possibility that the species could coexist with a solar farm, this is currently unknown. The monitoring and mitigation measures in **Section 6.1.4** will minimise impacts and determine the ability of the species to coexist with a solar farm development.

Table 6-6 details the potential cumulative biodiversity impacts with nearby developments.

Table 6-6 Cumulative Biodiversity Impacts

Project	Distance	Overview	Potential Impact
Bridgman Solar Farm	10 km east	Development of a 50 MW solar farm and associated infrastructure.	• Impacts are currently unknown due to approval stage. • The development footprint is 100 ha and would impact derived grasslands that may be commensurate with that within the subject land.
Bowmans Creek Wind Farm	40 km north	Construction and operation of a wind farm with up to 60 wind turbines and associated infrastructure.	• 35 ha of impact to PCTs and TECs commensurate to those within the subject land. • 32 ha of habitat removal for Brush-tailed Phascogale.

Project	Distance	Overview	Potential Impact
Muswellbrook Solar Farm	40 km north	Development of a 135 MW solar farm and associated infrastructure, including battery storage facility.	• 196.6 ha of impact to PCTs and TECs. • 19.8 ha of habitat removal for Brush-tailed Phascogale. • 0.42 ha of habitat removal for Southern Myotis.
Muswellbrook BESS	50 km north	Development of a 150 MW / 300 MWh battery energy storage facility with associated infrastructure.	• <1 ha of impact to native vegetation including habitat for Striped Legless Lizard (assumed present).
Upper Hunter BESS	50 km north	BESS with a capacity of 400MW/ 800MWh and associated infrastructure	• No anticipated impacts to native vegetation.
Mount Pleasant Optimisation Project	50 km north-west	Extend the life of the open cut operation by mining deeper coal seams, using existing and proposed new infrastructure.	• 236.9 ha of impact to PCTs and TECs commensurate to those within the subject land. • 27.4 ha of impact (habitat removal) for Striped Legless Lizard.
Liverpool Range Wind Farm	200 km north-west	Wind farm containing 185 turbines and associated infrastructure.	• 1,650.5 ha of native vegetation impact, but non commensurate with that of the subject land.

6.1.3.7 Biodiversity Credits

The Applicant has committed to offsetting biodiversity in accordance with the NSW Biodiversity Offsets Scheme.

Table 6-7 details the biodiversity credits that the Applicant will retire. These credits may be updated following detailed design in consultation with relevant regulators and in accordance with any conditions of Development Consent.

Table 6-7 Project Biodiversity Credits to be Retired

Biodiversity Value	Credits
PCT 3431 – Central Hunter Grey Box Ironbark Woodland (Endangered under BC Act, Critically Endangered under EPBC Act)	817
PCT 4015 - Coastal Swamp Oak Forest (Endangered under both BC Act and EPBC Act)	3
Striped Legless Lizard	660
Brush-tailed Phascogale	167
Southern Myotis	608
Powerful Owl	55

6.1.3.8 Reduction of Impacts to Biodiversity Values

Table 6-8 details the reduction of impacts to biodiversity values / constraints through iterative design.

Table 6-8 Reduction of Impacts to Biodiversity values

Biodiversity Value / constraint	Study Area (ha)	Original Disturbance Footprint (ha)	Subject land (ha)	Disturbance Footprint	Reduction in Disturbance Footprint (ha)
PCT 3431 High, Regen and Low condition classes (BC Act EEC)	120.17 ha	17.56	56.26 ha	10.79 ha	109.38
PCT 3431 High and Regen classes (EPBC Act CEEC)	94.06 ha	8.54	44.39 ha	1.83 ha	92.23

Biodiversity Value / constraint	Study Area (ha)	Original Disturbance Footprint (ha)	Subject land (ha)	Disturbance Footprint	Reduction in Disturbance Footprint (ha)
Foraging and general habitat for Grey-headed Flying-fox, Brush-tailed Phascogale, Powerful Owl and threatened microbats	145.74 ha	18.74	66.23 ha	10.89 ha	134.85
Striped Legless Lizard habitat (all PCT 3431)	406.13	194.45	175.92	75.74	330.39
Dams that provide foraging habitat for Southern Myotis	21	9	15	1	20
Hollow-bearing trees	132	31	74	20	112

6.1.4 Mitigation and Management

Impacts to biodiversity values will be minimised by implementing specific biodiversity management and mitigation measures as listed in **Table 6-9**.

Credits will be retired in accordance with **Section 6.1.3.7** (unless updated following detailed design in consultation with relevant regulators and in accordance with any conditions of consent).

Native vegetation will only be cleared within areas as described in **Section 3.3**.

Each will be detailed within the Biodiversity Management Plan (BMP) will be prepared, and a Biodiversity Offset Strategy (BOS) will be created and implemented in accordance with the NSW Biodiversity Offsets Scheme.

Table 6-9 Biodiversity Mitigation Measures

Impacts	Mitigation measures	Phase
Removal of native vegetation	The BMP will include at least the following mitigation measures: • Minimise vegetation clearance and disturbance, including impacts to standing dead trees and riparian zones. • Physically delineate vegetation to be cleared and/or protected within the Project Area and install appropriate signage prior to works commencing. • 'No-Go Zones' external to the Disturbance Footprint will be erected during the construction phase at the extent of clearing works in patches of vegetation to ensure clearing limit is not exceeded and no vehicle or plant equipment movement occurs outside the clearing limit. These areas will be checked as part of the pre-clearing survey. • Protect trees in accordance with the requirements of AS 4970-2009 Protection of Trees on Development Sites (Australian Standards, 2009). • Do not damage tree roots unless absolutely necessary. • Engage a qualified arborist where roots >50mm are impacted within the Tree Protection Zone. • Retain dead tree trunks, bush rock or logs in-situ unless they are in the disturbance footprint and moving is unavoidable. Reposition material elsewhere on the site or approved adjacent sites. Dead wood and coarse woody debris should be lifted and placed into adjacent vegetation, not pushed. • Undertake pre-clearance inspections of vegetation by a licenced ecologist to ensure all no-go areas are appropriately fenced.	Preconstruction and construction

Impacts	Mitigation measures	Phase
	• If any threatened species (flora or fauna) is discovered during the works, stop work immediately at the site of species identification and notify the onsite Manager. Work will only recommence once the impact on the species has been assessed and appropriate control measures provided. • If any damage occurs to vegetation outside of the disturbance footprint (as shown in the CEMP), notify the onsite Manager and Environmental Representative so that appropriate remediation strategies can be developed. • A biosecurity management plan will be prepared as part of the Project's CEMP and will prevent the spread of weeds, pathogens, and other biosecurity risks into or out of the disturbance footprint upon implementation. • Secure biodiversity offsets in accordance with the NSW Biodiversity Offset Scheme.	
Displacement of resident fauna	The BMP will include: • Plans showing areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas. • Pre-clearance surveys. including: - Survey of all areas to be cleared to be conducted prior to construction to identify and mark all fauna habitat to be impacted including hollow-bearing trees. - All hollow bearing trees to be removed will follow a two-stage removal process, including knocking of the tree to be removed 24 hours prior to removal. - All fauna habitat to be removed will be surveyed by a suitably qualified ecologist, prior, during and after removal. - Capture and relocation of Delma species from impacted areas to adjacent habitats prior to and during early construction of solar farm infrastructure. - Active nests will be avoided by clearing as far as practicable until fledging occurs. - If native fauna is likely to be present, a licenced ecologist should inspect the removal and undertake fauna relocation. - All vegetation to be removed is to be clearly marked for removal. • Demarcation areas will be in place along the clearing extent where partial clearing of a patch is to occur. Demarcation areas will be retained until the completion of the construction phase. Clearing protocols. • Procedures for unexpected threatened species finds and fauna handling.	Preconstruction and construction
Impacts to Striped Legless Lizards	• Minimise ground disturbance as far as practicable during installation of solar infrastructure. • Feral animal control including control of rabbits (land degradation) and foxes and cats (predation). • Prior to construction, 3 linear tile grids (30 tiles) will be placed adjacent to solar arrays in the south east of the subject land and within the APZ, at locations which receive early morning sun, during normal operation of the solar farm. These roof tiles will augment habitat for Striped Legless Lizard and allow for monitoring of the population within the disturbance area. Additional tile grids (30 tiles) will be installed at control sites within the subject land, including areas of known Striped Legless Lizard occupation (e.g. the north-east of the subject land). • Continue existing biomass reduction management regime within the fenced development via mowing/slashing. This will be carried out prior to summer. The goal of which is to recreate the conditions of moderate grazing which are currently present. • Ensure that the Project does not cut off the retained Striped Legless Lizard habitat on site from likely habitat areas located outside the subject land. If this occurs, establish a corridor to habitat areas outside the subject land. • Where areas of existing occupation are fragmented by the Project, establish at least one habitat corridor with a width of 30 m within the disturbance	Preconstruction, construction and operations

Impacts	Mitigation measures	Phase
	footprint. The minimum corridor width suggested by the EPBC Act referral guidelines Section 7 (Hadden 1995) is considered adequate as the disturbance footprint either side of the corridor is not considered totally unsuitable for occupation by Striped Legless Lizard (although highly uncertain, individuals may persist in the area under solar panels, and are unlikely to be significantly obstructed or face mortality either side of the established 30 m corridor. • The Project Area will be demarcated or signs will be installed to restrict unauthorised vehicular access.	
Indirect impacts on adjacent native vegetation and habitat	• Exclusion zones, including fencing will be set up at the limit of clearing. • Where practicable, native vegetation will be re-established. • A biosecurity management plan will be prepared as part of the Project's CEMP to reduce the risk of spreading weeds and pathogens, and other biosecurity items into or out of the disturbance footprint upon implementation. • Shading and artificial light impacts will be minimised through detailed design. • All material stockpiles, vehicle parking and machinery storage, and other ancillary works are to be located within areas considered impacted within the current assessment and not be located within retained vegetation outside the disturbance footprint unless an updated impact assessment is undertaken. • Dust suppression will be undertaken as required using water sprays, water carts or other media on: – Unpaved work areas subject to traffic or wind. – Sand, spoil and aggregate stockpiles. – During the loading and unloading of dust generating materials. • Consider biodiversity as sensitive receivers in Construction Noise Management Plan (CNMP). • Noise will be managed as part of the CEMP. • Lighting will be designed in general accordance with 'Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting'.	Preconstruction and during construction
Prescribed biodiversity impacts	• Plans will show areas to be cleared and areas to be protected, including exclusion zones, protected habitat features and revegetation areas. • Clearing protocols will be stablished. • Relevant management plans will have an adaptive component, outlining a cycle of 'do, monitor, evaluate and respond'. this is the foundation of adaptive management widely applied to terrestrial and aquatic ecosystem management. • The BMP will: – Describe measures that will be employed to minimise soil erosion and the discharge of sediment and other pollutants from the site during construction of the Project. – Describe how water will be managed to achieve compliance with relevant consent and licence conditions. – Establish responsibilities and reporting requirements. – Establish surface water quantity and quality monitoring requirements. – Establish trigger action response plans to enable progressive improvement.	Preconstruction, during construction and operations
Biodiversity impacts that are uncertain	• The BMP will include an adaptive management component, for impacts on biodiversity that are uncertain such as: – Inadvertent impacts to native vegetation adjacent to the disturbance footprint. – Introduction of pests, pathogens and weeds to native vegetation adjacent the disturbance footprint and further afield. – Vehicle strikes.	Preconstruction, during construction and operations

Impacts	Mitigation measures	Phase
General BMP commitments	The BMP will include the following general commitments for the protection of biodiversity: – Protect vegetation and fauna habitat outside the disturbance footprint and manage the remaining remnant vegetation and fauna habitat within the subject land toward a benchmark state using improve and maintain principles, minimising indirect impacts, especially to known threatened flora species and potential fauna species such as Hunter Valley Delma and Brush-tailed Phascogale. – Fauna monitoring and management protocol including identification and reporting of fauna mortalities to the relevant BCS office. – Collect detailed baseline weed data and ensure no increase of key emerging weeds or invasive pests. – Commit to ongoing consultation about vertebrate pest control baiting programs working cooperatively with local landholders. – Training and education awareness for all construction staff and operational staff on key threatened species, both flora and fauna, relevant to the region and project. – Mapping and identification of individual active tree hollows and active stick nests within the disturbance footprint and within 50 meters of the disturbance footprint boundary and to developing measures to minimise impacts to these features. – Pre-clearing protocols, including pre-clearing inspections, establishment of exclusion zones and on-ground identification of specific habitat features to be retained and/ or relocated. – Monitoring of soil and water controls to prevent indirect impacts associated with water pollution to all waterways. – Clear performance targets and monitoring criteria. – Corrective actions. – Timing and responsibilities.	Construction

6.2 Aboriginal Heritage

6.2.1 Background

An ACHAR has been prepared for the Project by Ozark Environmental and Heritage Management Pty Ltd (Ozark) and is included in **Appendix F.**

The ACHAR considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**. The scope of the ACHAR included:

- Review of relevant legislation and guidelines, and desktop investigation;
- A field survey of 504 ha (the heritage survey area);
- Identification of Aboriginal cultural heritage sites;
- Subsurface archaeological test excavation;
- Significance assessment;
- Harm assessment; and
- Mitigation and management recommendations.

6.2.2 Methodology

The ACHAR was compiled with consideration of the following documents:

- ‘The Burra Charter’ (Australia International Council on Monuments and Sites, 2013);
- EPBC Act*;*

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984;*
- EP&A Act;
- *National Parks and Wildlife Act 1974;*
- 'Code of Practice for the Investigation of Aboriginal Objects in New South Wales' (DECCW, 2010);
- 'Guide to investigating, assessing and reporting on Aboriginal cultural heritage' (OEH, 2011); and
- 'Aboriginal Cultural Heritage Consultation Requirements for Proponents' (DECCW, 2010) (ACHCRs).

The key objectives of the ACHAR were to:

- Undertake background research on the Project Area to formulate a predicative model for site location within the Project Area;
- Identify and record Aboriginal cultural heritage values within the survey areas. This includes intangible cultural values, Aboriginal objects, and any landforms likely to contain further archaeological deposits;
- To assess the significance of any recorded Aboriginal cultural values, Aboriginal objects, or sites in consultation with Registered Aboriginal Parties (RAPs); and
- Assess the likely impacts of the proposed work to Aboriginal cultural heritage values and provide management recommendations.

6.2.2.1 Aboriginal Community Consultation

The ACHAR methodology followed the 'Aboriginal Cultural Heritage Consultation Requirements for Proponents' (DECCW, 2010) (ACHCRs) to identify cultural values within the landscape in which the Project is located. This ensures that any identified values could be recognised and considered in the Project's management and mitigation measures. No specific cultural values were identified through Aboriginal community engagement within the Project Area, however, the strong cultural values of Aboriginal communities towards landscapes and cultural heritage sites in the region were recognised.

ACHCRs consultation is required to be undertaken in the following four stages as described below.

Stage 1

Stage 1 involved the notification and registration of RAPs wishing to be involved in Project related consultation. An advertisement was placed in the Singleton Argus on 22 December 2022 to gather expressions of interest from Aboriginal parties. A letter seeking contact details for Aboriginal people with the knowledge required to determine the significance of the Project Area was sent to the following agencies on 14 December 2022.

- Heritage NSW;
- Wanaruah Local Aboriginal Land Council (Wanaruah LALC);
- Office of the Registrar, NSW Department of Aboriginal Affairs;
- National Native Title Tribunal (NNTT);
- Native Tittle Services Corporation Limited (NTSCorp Ltd);
- Singleton Shire Council; and
- Hunter Local Land Services (HLLS).

On 2 February 2023, letters were sent to individuals and groups whose contact details had been provided by the government agencies. 20 individuals and groups responded, advising that they wished to be consulted in relation to the ACHAR. RAPs are listed in **Table 6-10**.

Table 6-10 Registered Aboriginal Parties

Name
A1 Indigenous Services
AGA Services
Cacatua Culture Consultants
Culturally Aware
Didge Ngunwal Clan
Gomery Cultural Consultants
Hunter Traditional Owner
Kamilaroi Yankuntjatjara Working Group
Kauwul Pty Ltd tading as Wonn1 Sites
Murra Bidgee Mullangari Aboriginal Corporation
Nunawanna Aboriginal Corporation
Thomas Dahlstrom
Tocomwall Pty Ltd
Wallagan Cultural Services
Wannaruagh Local Aboriginal Land Council
Widescope Indigenous Group
Wurrumay Pty Ltd
Amanda De Zwart
Raw Cultural Healing
Stakeholder 1 (details withheld from public distribution)

Stage 2

Stage 2 of the ACHCRs informs RAPs about the details of the Project.

Project information was provided in an assessment methodology sent to RAPs for consideration on 2 March 2023. No responses were received from RAPs regarding the survey arrangements set out in this document.

Stage 3

Stage 3 builds an information bank regarding Aboriginal cultural values associated with the Project Area by consulting RAPs and conducting field work.

In Stage 2, the assessment methodology was issued to all RAPs for their consideration. The document provided the archaeological context of the Project Area, a description of the proposed survey, and asked whether there were any cultural values that should be considered in the assessment.

RAPs were provided 28 days to comment on the Assessment Methodology. The field survey was undertaken with the assistance of representatives from the following RAP groups over four days (8–11 May 2023):

- AGA Services;
- Cacatua Culture Consultants;
- Kauwul T/A Wonn 1 Sites; and
- Wanaruah LALC.

Stage 4

A draft ACHAR was developed and provided to RAPs on 13 November 2023 for review, with an open comment period of 28 days. The ACHAR details the results of the assessment, suggests opportunities for Aboriginal cultural value conservation and provides mitigation and management measures considering unavoidable impacts to Aboriginal objects.

Two RAPs provided comment on the ACHAR, both of which were acknowledged and addressed in the ACHAR.

6.2.2.2 Test Excavation

RAP groups were asked for input on the methodology of the test excavation program, which aimed to confirm the nature and extent of Aboriginal objects and deposits within the Disturbance Footprint following initial fieldwork. The methodology was sent to the RAPs on 4 August 2023.

There were no comments provided on the methodology. The notice of test excavation was emailed to Heritage NSW on 15 August 2023.

6.2.2.3 Environmental Factors

Analysis of the environmental factors within and around the Project Area was carried out as part of the ACHAR to provide insight to the historical Aboriginal significance of the area.

Topography

The Heritage Survey Area was divided into four survey units, according to the different landforms occurring in each. The topography of each survey unit was assessed via desktop study and during site visits. The results of the topography and hydrology survey are discussed in **Section 6.7**. **Table 6-11** details the survey units used in the ACHAR.

The Disturbance Footprint is contained in SU1 and is characterised as gentle slopes tending from a watercourse to a ridge. The Hunter River runs in a north-east to south-west direction, at its closest point approximately 400 m to the west north-west of the Disturbance Footprint. A minor waterway runs to the east and another occurs in the north. Most of the bank areas of these waterways have been excluded from the Disturbance Footprint.

Table 6-11 Landforms in the Survey Area

Landforms	Landform Description	Landform Area (ha)
SU1	Low slopes / watercourse to ridge –southern section of the Survey Area	209
SU2	Gully to mid slopes / ridge –middle section of Survey Area	133
SU3	Watercourse to ridge – eastern section of Survey Area	96
SU4	Mid slopes – northern section of Survey Area	66

Land Use and Disturbance

The Project Area has been cleared for historical and current agricultural land use. Historical imagery of the Project Area shows that the predominant land use was for pasture. Disturbance has historically been limited to the surface, with small areas of work relating to subsurface soils, such as dams and banks. There is no evidence that deep excavation has occurred within the Project Area.

Ethnography

The Wonnarua people are the traditional custodians of the Singleton area, with lands extending throughout the Hunter region. Archaeological studies suggest that Aboriginal people have occupied the area for more than 35,000 years.

6.2.3 Impact Assessment

6.2.3.1 AHIMS Search

An Aboriginal Heritage Information Management System (AHIMS) search on 24 October 2023 revealed 112 sites within the Heritage Survey Area (5 x 5.7 km area around the Project Area).

Of the 112, 14 sites were identified within the Project Area. These sites were recorded as a result of RPS site survey. The most common and likely to occur site types in the Project Area were identified to be artefact scatters and isolated artefacts.

6.2.3.2 Field Survey

The field survey considered the SR Project Site, prior to refinement. The SR Project Site was refined to avoid Aboriginal places where possible, as a result of the survey.

Within the Aboriginal Heritage Survey Area as shown on **Figure 6-3,** 48 sites were identified outside the Project Area and 23 sites within the Project Area. Two sites were located within the Disturbance Footprint.

6.2.3.3 Test Excavation

Ten locations within the Project Area were selected to be excavated with six test units excavated at each location. All test excavation was undertaken by hand, with hand tools only. Test units were excavated to depths of up to 10 cm, with excavated materials dry sieved and recorded. Seven additional subsurface sites were revealed via test excavation. Details on the test excavation conducted is provided in **Appendix F.**

6.2.3.4 Direct Impacts

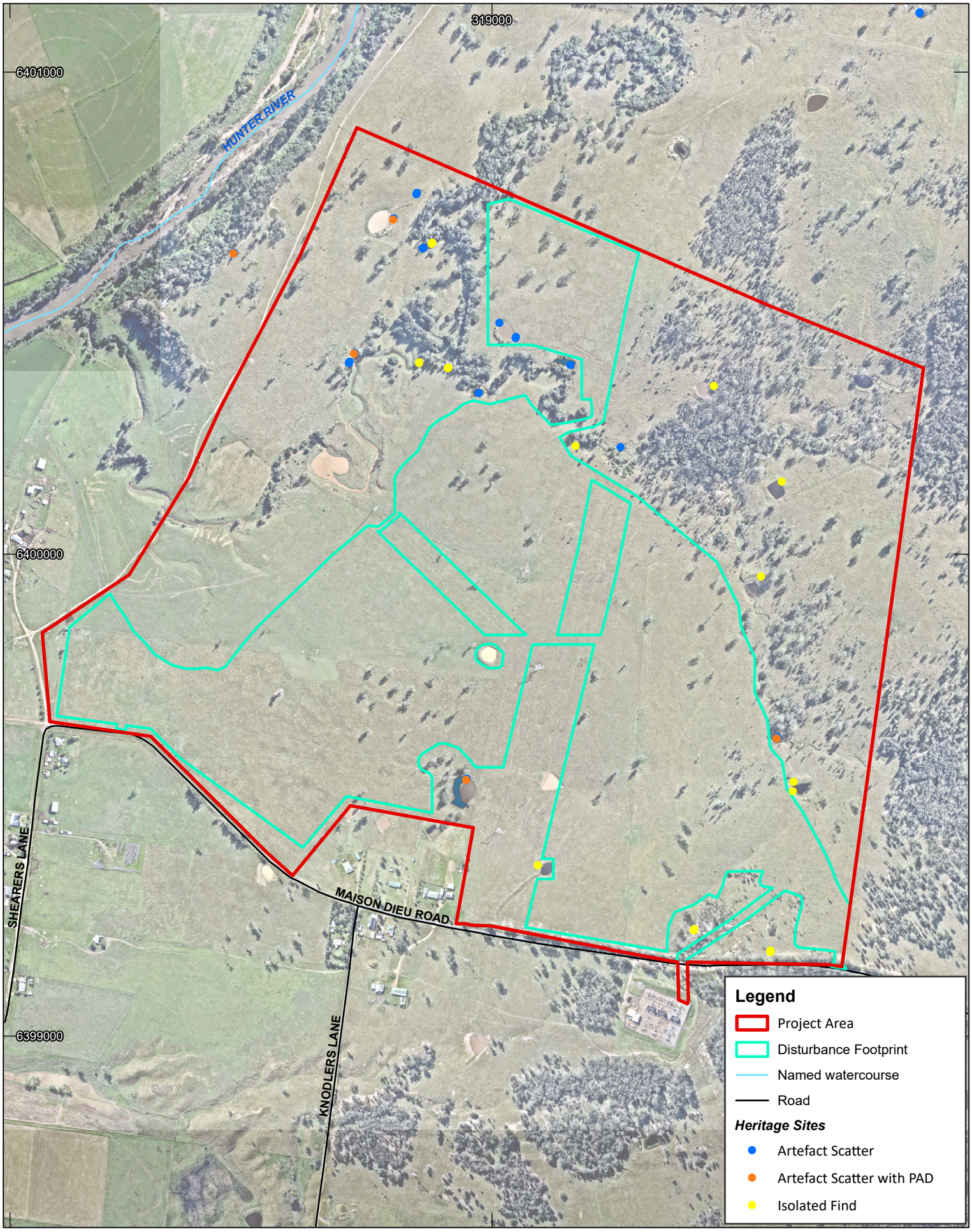
Table 6-12 describes the Aboriginal heritage sites and provides a summary of impacts from the Project. **Figure 6-3** shows sites within the Project Area and the Disturbance Footprint.

No sites within the Project Area were identified to have intangible cultural significance or have teaching potential. The Disturbance Footprint avoids 97% of the sites identified within the Project Area.

The ACHAR concludes that there is a low impact to Aboriginal cultural heritage values as two low density artefact scatters are located within the Disturbance Footprint. A further seven low density subsurface artefact scatters are within 50 m of the Disturbance Footprint but not directly impacted as indicated in **Table 6-12**.

Table 6-12 Aboriginal Heritage Impact Summary

Site ID	Location	Description	Impact
(37-6-4314) MD011	Northern portion of SU1 on the edge of dam, close to ephemeral watercourse	MD011 comprises several stone artefacts located on the edge of a dam wall. This site is located within a highly disturbed landform, being on the dam's edge where damage from cattle treading is common. The eroded dam wall has exposed ground on the south-eastern edge, revealing multiple stone artefacts.	Within Disturbance Footprint
(33-6-0046) MD012	Northern portion of SU1 on the edge of dam, close to ephemeral watercourse	MD012 comprises an artefact scatter of 5+ stone fragments. The site is located on the outer section of the dam wall facing south towards the water on an eroded section falling away.	Within Disturbance Footprint
(37-6-4326) MD071	Area 6	Two artefacts were recorded in the buffer. This site has a low potential for further subsurface artefacts and no further archaeological investigation is warranted.	Outside Disturbance Footprint
(37-6-4332) MD072	Area 7	Three artefacts were recorded in the buffer. This site has a low potential for further subsurface artefacts and no further archaeological investigation is warranted.	Outside Disturbance Footprint
(37-6-4331) MD073	Area 9	Nine artefacts were recorded in the buffer. This site has a low potential for further subsurface artefacts and no further archaeological investigation is warranted.	Outside Disturbance Footprint
(37-6-4330) MD074	Area 5	14 artefacts were recorded in the buffer. While there is the possibility of further artefacts in this landform, the low density of artefacts does not warrant further archaeological investigation. This site has been avoided due to the reduction in Project Area.	Outside Disturbance Footprint
(37-6-4329) MD075	Area 4	19 artefacts were recorded in the buffer. While there is the possibility of further artefacts in this landform, the low density of artefacts does not warrant further archaeological investigation.	Outside Disturbance Footprint
(37-6-4328) MD076	Area 3	Three artefacts were recorded. This site has a low potential for further subsurface artefacts and no further archaeological investigation is warranted.	Outside Disturbance Footprint
(37-6-4327) MD077	Area 1	Five artefacts were recorded in the buffer. This site has a low potential for further subsurface artefacts and no further archaeological investigation is warranted.	Outside Disturbance Footprint



ABORIGINAL HERITAGE SITES BY TYPE

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Heritage by Type
VERSION: A
DATE EXPORTED: 15/04/2024
TECHNICIAN: Natalie.Wood

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-3:

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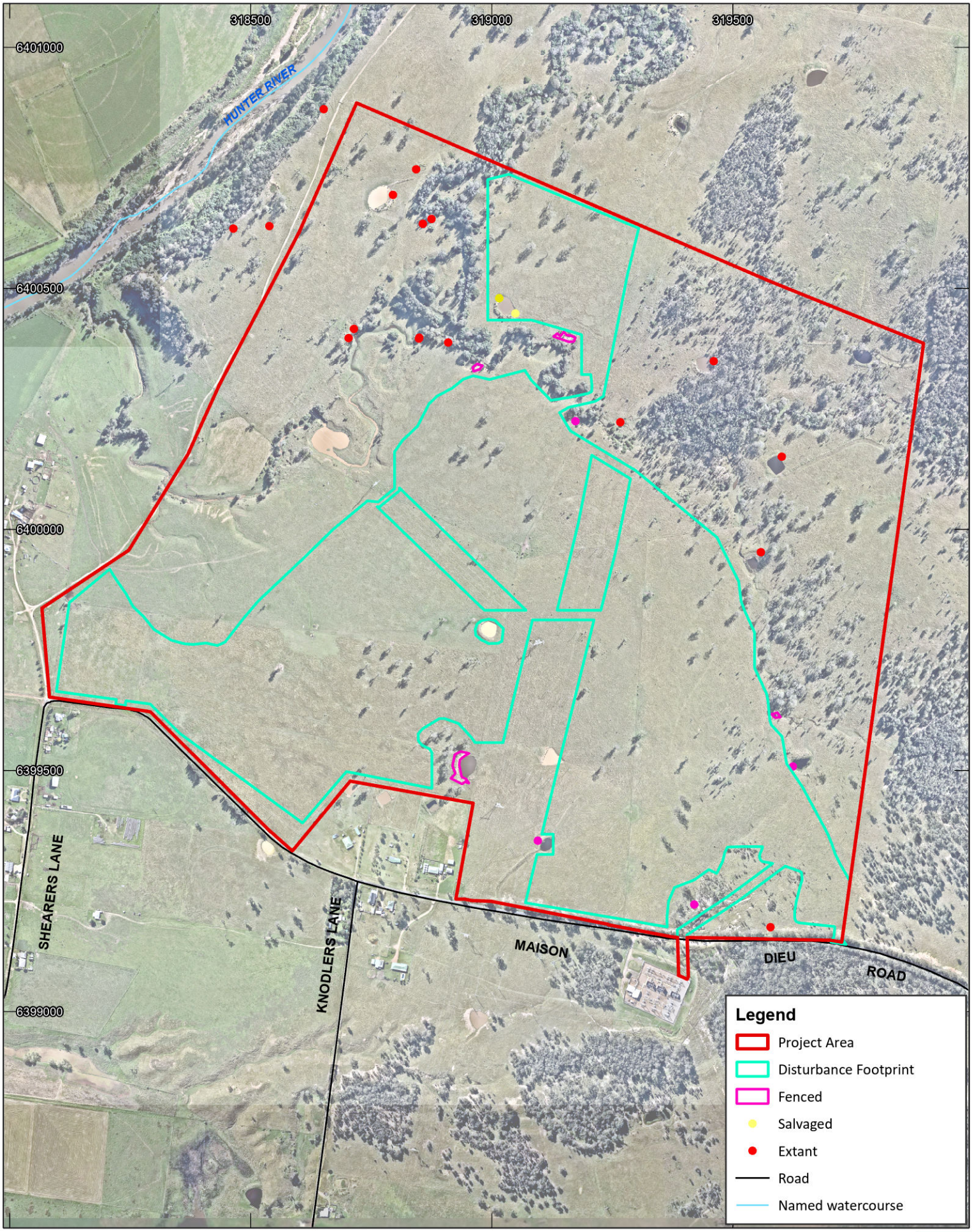
6.2.4 Mitigation and Management

An Aboriginal Cultural Heritage Management Plan (ACHMP) will be developed in consultation with RAPs and Heritage NSW and approved by the Department of Planning, Housing and Infrastructure. The ACHMP will contain long term management actions for Aboriginal objects, an unexpected finds protocol to be followed if new Aboriginal artefacts are discovered and an unanticipated skeletal remains protocol to be followed if skeletal remains are discovered during construction and / or operation of the Project.

The following mitigation measures will be incorporated into the ACHMP to minimise impacts to Aboriginal sites, objects and places:

- Within the Disturbance Footprint, two sites will be salvaged. surface artefacts from ID 37-6-4314 (MD011) and ID 33-6-0046 (MD012) will be collected prior to construction of the Project and moved to a safe location in consultation with the RAPs. The procedures for the surface artefact collection and a strategy to provide for the long-term curation of the artefacts will also be prepared;
- Sites within the 50 m of the Disturbance Footprint - the four isolated finds (MD002, MD003, MD069, and MD009) and four artefact scatters (MD004, MD010, MD013 and MD070) will be temporarily demarcated;
- During operation of the Project, the sites within 50 m of the Disturbance Footprint will be shown on all applicable site plans to ensure they are not harmed;
- All land disturbing activities will be confined to the Disturbance Footprint except as described in **Section 3**;
- Inductions for work crews will include a cultural heritage awareness procedure to ensure they recognise Aboriginal artefacts. Consultation with the Wanaruah LALC regarding the Aboriginal cultural heritage induction materials will be considered; and
- Consultation with the Aboriginal community regarding the Project will be ongoing throughout the life of the Project. All RAPs will continue to be consulted in accordance with the Consultation Guidelines and any future ACHMP. The RAPs will be involved in any cultural heritage works conducted under the ACHMP; and
- Project updates will be sent to the RAPs at six-monthly intervals until the finalisation of the ACHMP to ensure that the consultation remains current.

Figure 6-4 illustrates the management measures which apply to the Aboriginal heritage sites.



ABORIGINAL HERITAGE SITES BY MANAGEMENT MEASURE

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Heritage by Management
VERSION: A
DATE EXPORTED: 8/05/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-4:

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6.3 Historic Heritage

6.3.1 Background

An Historic Heritage Assessment Report (HHAR) was prepared for the Project by Ozark Environment and Heritage Management Pty Ltd (Ozark) and is provided in **Appendix G.**

The HHAR considers the revised SEARs in **Appendix B**, stakeholder engagement detailed in **Section 5** and the relevant legislation and guidelines set out in **Section 4**.

The assessment followed the four goals for historical heritage assessment presented in 'Investigating Heritage Significance. A guide to identifying and examining heritage items in NSW':

- To identify whether historical heritage items or areas are, or are likely to be, present within the Project Area;
- To assess the significance of any recorded historical heritage items or areas;
- Determine whether the proposal is likely to cause harm to recorded historical heritage items or areas; and
- Provide management recommendations and options for mitigating impacts.

6.3.2 Methodology

The historic heritage survey was undertaken from 8 May to 11 May 2023.

A review of historical documentation and data was performed by Ozark and the following databases were searched for previously recorded heritage significance within and around the Project Area:

- National and Commonwealth Heritage Listings: no items were listed within 5 km of the Project Area;
- State Heritage Listings: the closest State Heritage Listed item, Singleton Railway Station group is 9 km south-east of the Project Area;
- Singleton Local Environmental Plan 2013: there are three items are listed within 5 km of the Project Area, none of which will be impacted by the Project:
- Archerfield and outbuildings (I141), opposite the Project Area on the Hunter River, over 400 m north-west from the nearest boundary of the Project Area, originally owned by George Bowman. The homestead that comprises the heritage listing is 1.6 km north-west of the Project Area (Archerfield);
- Stafford and Clifford homestead ruins, 2.4 km to the south (I142), which were owned by George and Samuel Dight, local pioneers linked to notable explorers John Howe and Hamilton Hume; and
- Rixs Creek Coke Ovens (I45) 5 km east of the Project Area. This item consists of remnant coke ovens and associated works and was built in the 1880s (AECOM, 2015).

Standard archaeological field survey and recording methods (Burke & Smith, 2004) were employed in the HHAR. The HHAR was constrained by limited exposure, with dense weed and grass cover however was not considered to have been hindered by low ground surface visibility.

An assessment of significance was carried out under The Burra Charter, to understand historic, aesthetic, scientific and social significance of heritage items.

6.3.3 Impact Assessment

Based on the review of historical documentation, the Project Area is likely to have been used for farming and agricultural purposes since European settlement in the 1820s. There is a low potential for archaeological deposits within the Project Area. The Aboriginal test excavation program carried out for the ACHAR found no historic items or deposits.

One heritage feature was noted greater than 1 km north-east of the Project Area but no historic heritage items were recorded within the Project Area. The recorded feature is a constructed vehicle track made from bricks and cross-hatched concrete. The track is used for vehicle traction over a creek crossing and the adjacent slope. The item is not within the Project Area, will not be impacted by the Project and was not found to have heritage significance.

No impacts to Archerfield are predicted. An assessment of visual impacts is provided at **Section 6.5**

Background research resulted in the discovery that the Project Area was historically associated with pioneering Hunter Valley families, although there is no evidence that any structures have existed within the Project Area. The Project Area has associative significance only with early British settlement of the Hunter region but contains no items or archaeological deposits. The Project will not impact historic heritage.

6.3.4 Mitigation and Management

The following mitigation and management measures will be adopted to ensure minimal impacts on historic heritage:

- An Historic Heritage Unanticipated Finds Protocol (HHUFP) will be developed. The HHUFP will be implemented during construction and operation of the Project. If items of historic heritage significance are discovered during the Project, then the Historic Heritage Unanticipated Finds Protocol will be enacted; and
- All land-disturbing activities will be confined within the Project Area.

6.4 Noise and Vibration

6.4.1 Background

An NVIA has been prepared for the Project by Muller Acoustic Consulting Pty Ltd and is provided in **Appendix H.** The NVIA considers the revised SEARs in **Appendix B,** stakeholder engagement detailed in **Section 5** and the relevant legislation and guidelines set out in **Section 4**. There are 34 potentially sensitive residential receivers and one potentially sensitive industrial receiver within 2 km of the Project Area. Five of the potentially sensitive residential receivers are Project-related.

As shown on **Figure 2-3** all of the remaining 28 receivers are in ZOM for Hunter Valley Operations or Rix's Creek mines due to predicted noise and/or air quality exceedances of relevant criteria. HVO is responsible for providing management measures to reduce mining impacts at receivers in ZOM in accordance with its development consent.

Given the Project's rural / industrial setting, its background environment is characterised by noise and vibration associated with the surrounding actual and approved mining and agricultural activities.

6.4.2 Methodology

6.4.2.1 Construction Criteria

The Quantitative Assessment Method outlined in Section 4 of the ICNG was applied to the NVIA due to its suitability for major construction projects with typical durations of more than three weeks.

The Quantitative Assessment Method requires identification of potentially sensitive receivers, derivation of construction noise management levels, quantification of potential noise impacts at receivers through predictive modelling.

The conservative and minimum assumed Rating Background Levels (RBL) of 35 dBA for the daytime period and 30 dBA for the evening and night-time periods have been adopted in accordance with NPI methodology.

The NSW Road Noise Policy (DECCW, 2011) was applied to assess road noise impacts. For residential receivers, the upper noise limit of 55 dB LAeq(1hr) was determined for daytime hours and 50 dB LAeq(1hr) for night time hours.

6.4.2.2 Receivers

Potentially sensitive receivers of Project-related construction and operational noise and vibration were identified using aerial photography, geospatial information systems, Project design information and a site visit by the Project Team. Receivers located greater than 2 km from the Project Area are not anticipated to be impacted by Project noise and were excluded from the NVIA.

6.4.3 Impact Assessment

6.4.3.1 Construction Noise

The construction Noise Management Level (NML) adopted for rural residential receivers is the Rating Background Level +10 dB, or LAeq,15min 45 dB for standard daytime construction hours. The external NML for industrial receivers is 75 dB.

Predicted noise levels were assessed using 3D noise modelling for comparison against the relevant NMLs. Construction noise was assessed in accordance with the noise assessment in **Section 3.5**. scenarios were:

- Month 1 – Site establishment, mobilisation, clearing and earthworks;
- Month 2 – 3: Clearing, bulk earthworks, fencing and foundations;
- Month 4 – 8: Clearing, bulk earthworks, fencing and foundations, construction of solar farm, BESS and grid connection;
- Month 8 – 15: Construction of solar farm, BESS, grid connection and rehabilitation; and
- Month 15 – 18: Commissioning, final rehabilitation and demobilisation.

11 non-associated receivers and three associated receivers are predicted to experience construction noise between 1 dB and 21 dB LAeq (15 min) beyond the NMLs. All are within HVO's ZOM. Exceedances are predicted to occur where works are at the closest proximity to receivers.

The predicted noise levels are considered conservative, as best practice assessment was conducted under the 'Noise Policy for Industry' (NSW EPA, 2017).

Construction impacts will be temporary and short term. A draft CNMP has been prepared to address potential exceedances at sensitive receptors and is provided in **Appendix H.** Appropriate mitigation and management measures to minimise these impacts are provided in **Section 6.4.4.**

Table 6-13 provides the predicted Project construction noise levels at non-Associated receivers along with an assessment of compliance.

Table 6-13 Predicted Construction Noise Levels at Non-Associated Receivers

Receiver ID	Predicted Noise Level Range (dB LAeq(15min)[1]					NML Standard Hours dB LAeq(15min)	Compliance
	Month 1	Month 2-3	Month 4-8	Month 8-15	Month 15-18		
R9[4]	<30	<30	<30	<30	<30	45	Yes
R10[4]	<30	<30	<30	<30	<30	45	Yes
R11[4]	<30	<30	<30	<30	<30	45	Yes
R17[4]	<30	<30	<30-32	<30	<30	45	Yes
R18[2]	<30-62	31-65	33-66	<30-36	<30-48	45	No
R19[2]	<30-56	31-58	33-60	<30-36	<30-42	45	No
R20[2]	<30-47	<30-49	31-51	<30-35	<30-33	45	No
R21[2]	<30-46	<30-48	<30-50	<30-35	<30-32	45	No
R22[2]	<30-36	<30-38	<30-40	<30-31	<30	45	Yes
R23[2]	<30-36	<30-38	<30-40	<30-35	<30	45	Yes
R24[2]	<30-41	<30-43	<30-45	<30-37	<30	45	Yes

Receiver ID	Predicted Noise Level Range (dB LAeq(15min)[1]					NML Standard Hours dB LAeq(15min)	Compliance
	Month 1	Month 2-3	Month 4-8	Month 8-15	Month 15-18		
R25[4]	30-60	32-62	33-64	<30-36	<30-45	45	No
R26[2]	30-55	32-57	33-59	<30-49	<30-41	45	No
R27[2]	<30-53	31-55	33-56	<30-52	<30-39	45	No
R28[2]	<30-47	30-49	31-51	<30-48	<30-33	45	No
R29[2]	<30-45	<30-48	<30-49	<30-50	<30-32	45	No
R30[2]	<30-45	<30-47	<30-49	<30-47	<30-31	45	No
R31[2]	<30-45	<30-47	<30-49	<30-46	<30-31	45	No
R32[2]	<30-38	<30-40	<30-41	<30-39	<30	45	Yes
R33[2]	<30-37	<30-39	<30-40	<30-38	<30	45	Yes
R34[2]	<30-35	<30-37	<30-38	<30-36	<30	45	Yes
R35[2]	<30-34	<30-36	<30-38	<30-35	<30	45	Yes
R36[4]	<30-32	<30-34	<30-36	<30-32	<30	45	Yes
R37[2]	<30-32	<30-34	<30-36	<30-32	<30	45	Yes
R38[4]	<30	<30	<30-31	<30	<30	45	Yes
R39[4]	<30	<30	<30-31	<30	<30	45	Yes
R40[4]	<30	<30	<30	<30	<30	45	Yes
R41[4]	<30	<30	<30	<30	<30	45	Yes
R42[4]	<30	<30	<30	<30	<30	45	Yes
Inf[3]	<30-52	<30-56	<30-59	<30-51	<30-38	75	Yes

1 = Noise levels from construction activities vary due to their position across the project site with respect to surrounding receivers

2 = in HVO management zone

3 = in Rix's Creek management zone

4 = Mine owned

6.4.3.2 Construction Vibration

The Construction Noise & Vibration Strategy (TfNSW, 2019) (CNVS) provides acceptable working distances to achieve the human response criteria for vibration. The primary vibrating equipment for consideration is a small piling rig used for PV mounting structures and a small vibratory roller used for soil compaction. The CNVS provides a safe working distance of 2 m for a bored piling rig and 40 m for a 6 tonne (t) vibratory roller. No receivers are predicted to receive vibration above negligible levels according to the distances set out in the CNVS.

Where CNVS human response criteria are not exceeded, the structural or cosmetic criteria for sensitive receivers will not be exceeded. Therefore, construction vibration impacts are considered negligible.

6.4.3.3 Construction Road Noise

Construction vehicles will be travelling to the Project Area via the New England Highway, Maison Dieu Road and/or Magpie Street. For the purposes of the assessment, Maison Dieu Road and Magpie Street are considered local roads.

The applicable external noise goal for industrial facilities under the NSW Road Noise Policy (DECCW, 211) was determined to be 70 dB LAeq(period).

Project-related construction traffic noise levels are predicted to comply with the relevant NSW Road Noise Policy criteria for residential receivers on Maison Dieu Road, and AS2107-2016 design sound levels for industrial receivers (Australian Standards, 2016) on Magpie Street.

Table 6-14 provides predicted construction road traffic noise levels with a reference for compliance.

Table 6-14 Predicted Construction Road Traffic Noise Levels

Road Name	Offset Distance to Receiver	Period[1]	Predicted Noise Level	RTN Criteria	Compliance
Maison Dieu Road	15 m	Night	49 dB LAeq(1hr)	50 dB LAeq(1hr)	Yes
	15 m	Day	51 dB LAeq(1hr)	55 dB LAeq(1hr)	Yes
Magpie Street	15 m	All	51 dB LAeq(1hr)	70 dB LAeq(period)	Yes

[1] Day = the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening = the period from 6pm to 10pm; Night = the remaining periods.

6.4.3.4 Operational Noise

Operational noise levels were modelled at all receivers. All predicted noise levels remained below or equal to 31 dB LAeq15 min).

As such, no exceedances were predicted to occur at any receivers during operation. Project Noise Trigger Levels and Project Amenity Noise Levels were satisfied in every case during operation. Therefore, no cumulative impacts are expected to occur.

6.4.4 Mitigation and Management

A draft CNMP has been prepared for the Project and provided in **Appendix H.** The following noise mitigation measures will be implemented to minimise construction noise impacts:

- Where practicable, localised screens (e.g. skid mounted hay bale stacks) will be used around high noise generating stationary activities (e.g. piling rig) to act as a barrier between construction works and receivers, particularly where equipment is close to residential receivers;
- Plant will be operated in a conservative manner (no over-revving), shutdown when not in use, and be parked/started at farthest point from relevant assessment locations;
- The quietest suitable machinery practically available for each activity will be selected for use;
- Noisy plant/machinery working simultaneously will be minimised where practicable;
- Impact noise will be minimised wherever possible;
- A broadband reverse alarm will be utilised in lieu of the traditional high frequency type reverse alarm;
- Toolbox meetings, training and education will be provided to drivers and contractors visiting the Project during construction, so they are aware of the location of noise sensitive receivers and cognisant of any noise generating activities;
- Signage will be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site;
- Relevant residences in proximity to the Project Area will be notified of project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure; and
- Attended monitoring will be undertaken within the community in response to received complaints, if any.

6.5 Visual

6.5.1 Background

An LCVIA has been prepared for the Project by IRIS Visual Planning + Design Pty Ltd (Iris) and is provided in **Appendix I**.

The LCVIA considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

6.5.2 Methodology

The following methodology was used to complete the LCVIA:

- A landscape character assessment to a distance of 5 km;
- Preliminary assessment of visual impacts, from private dwellings within 4 km and public locations including roads and railways within 2.5 km;
- Detailed assessment of visual impacts from locations identified during the preliminary assessment;
- Identification of residential receivers within 4km, roads within 1 km and runways within 5 km of the Project; and
- Assessment of solar glare impact using the categories identified in the Solar Guidelines.

6.5.3 Impact Assessment

6.5.3.1 Landscape Character

The landscape of the Visual Study Area (5 km from the Project Area) contains the following Landscape Character Zones (LCZ):

- Hunter River Rural Valley LCZ;
- Maison Dieu Undulating Rural Hills LCZ;
- Maison Dieu Forested Hills LCZ; and
- Hunter Valley Mining LCZ.

Table 6-15 details the impact of the Project to the landscape character of each zone, using landscape sensitivity and magnitude of change assessments outlined in the Visual Technical Supplement.

Table 6-15 Landscape Character Impact Assessment

LCZ	Landscape Sensitivity	Magnitude of Change	Impact
Hunter River Rural Valley	Moderate • Broad shallow valley. • Partly cleared and cropped areas with some vegetation along river corridor. • Prominent river valley. • Contains local heritage Project Area (Archerfield). • Disbursed yet evident presence of human settlement including villages and small towns.	Negligible Size and scale / Geographical area: • The Project is not located in this LCZ and therefore no direct impacts on the landscape features in this zone. • There is the potential for the Project to be seen from this zone, filtered by the additional vegetation found within this zone.	Negligible

LCZ	Landscape Sensitivity	Magnitude of Change	Impact
Maison Dieu Undulating Rural Hills	Low • Gently undulating terrain. • Extensively cleared and pastoral areas with some vegetation. • Waterbodies include farm dams and creeks. • Contains no heritage Project Areas, places of worship or memorial parks. • Modified landscape with dispersed yet evident presence of human settlement including rural dwellings, outbuildings, roads and electricity infrastructure.	Moderate Size and scale: • The Project includes several groups of solar panel arrays on fields either side of the existing transmission line easement. • Panel arrays have a maximum height of 2.7 metres (when tilted at 60 degrees), which is a relatively low height comparted to other infrastructure and buildings. • The Project will contrast somewhat with the rural qualities and character of this LCZ, which contains some large scale, built infrastructure with the transmission lines and substation. Geographical area: • The Disturbance Footprint would comprise a small to moderate portion of the overall character zone. • Duration and reversibility: • The Project infrastructure is anticipated to have a lifespan of 30years. • The Project is reversible. At the end of the operational life of the solar farm, the infrastructure, including the solar panel arrays in this LCZ, will be removed, returning the use and character of this LCZ to its former conditions.	Low
Maison Dieu Forested Hills	Moderate • Hilly and undulating ranges that are not visually dominant. • Predominantly open forest or woodland vegetation • Disbursed yet evident presence of human settlement such as transport and electricity infrastructure (roads, electricity substation and transmission easements).	Moderate Size and scale: • The Project includes several groups of solar panel arrays on fields either side of the existing transmission line easement. • Panel arrays have a maximum height of 2.7 metres (when tilted at 60 degrees), which is relatively low height compared to other infrastructure and buildings. • The Project will contrast somewhat with the rural qualities and character of this LCZ, which contains some large-scale infrastructure with the transmission lines and substation. Geographical area: • The Disturbance Footprint would comprise a small to moderate portion of the overall character zone. • Duration and reversibility: • The Project infrastructure is anticipated to have a lifespan of 30 years. • The Project is reversible. At the end of the operational life of the solar farm, the infrastructure, including the solar panel arrays in this LCZ, would be removed, returning the use and character of this LCZ to its former conditions. Size and scale / Geographical area: • Project not located in this LCZ and therefore no direct impacts on the landscape features in this zone. • There is limited potential for the project to be seen from this zone.	Negligible

LCZ	Landscape Sensitivity	Magnitude of Change	Impact
Hunter Valley Mining	Low • Highly modified landform • Extensively cleared landscape with some areas of revegetation. • Contains artificial waterbodies associated with mining. • Contains no heritage Project Areas, places of worship or memorial parks. • Dominating presence of infrastructure.	Negligible Size and scale / Geographical area: • The Project is not located in this LCZ and therefore no direct impacts on the landscape features in this zone. • There is limited potential for the Project to be seen from this zone.	Negligible

6.5.3.2 Visual Impact Assessment

Visual Catchment

Preliminary visual analysis considered a desktop assessment of 145 potential dwellings within approximately 5 km of the Project Area as shown on **Figure 6-5**. A "visual catchment" was developed, which identified the following areas that will have a direct line of sight to the Project without visual screening:

- Areas to the north and north-west of the Project, including areas across the NEH;
- Areas to the north-east between 1-4 km, depending on where landform intervenes, including a small section of the NEH;
- Areas to the south-east up to about 2 km;
- Areas to the south and south-west (extending over 5 km) depending on intervening landform; and
- Areas about 3 km west of the Project Area to the hills around Warkworth, west of the Hunter River.

Private Dwellings

80 dwellings were identified within 4 km of the Project Area, and the Preliminary Assessment Tool in the Visual Technical Supplement was used to confirm 23 dwellings require detailed visual assessment. Dwellings R18, R19, R25, R26 and R27 are in close proximity to the southern boundary of the Project Area and were identified to have a higher potential for visual impact.

Although dwellings R9, R10, R11 have an increased visual sensitivity because they are local heritage listed under the SLEP, they do not require further consideration based on the limited potential visibility of the Project. Each dwelling is numbered on **Figure 6-5**.

Further Visibility Analysis

Further visibility analysis considered the screening effect of existing vegetation and included verification of viewpoints during a Project Area inspection. Viewpoint refinement confirmed 11 dwellings require detailed assessment. The Project Area inspection confirmed dwelling IDs R17, R20, R24, R38 and R39 will have little or no view of the Project, excluding each from further assessment.

Detailed Visual Assessment

Dwellings

Detailed visual assessment considering the magnitude of change and viewpoint sensitivity was undertaken, assuming no additional screening vegetation.

Dwellings with an impact level of "moderate" were carried on for further assessment. These are listed in **Table 6-16** and include:

- R18;
- R25; and
- R27.

R26 was also carried through for further assessment due to being a direct neighbour of the Project Area.

The "Visual Performance Objectives" from the Visual Technical Supplement were applied to these dwellings and mitigation measures were developed.

Visual impact reduction mitigation measures (inclusive of vegetation screening) are detailed in the Draft Visual and Landscape Plan (VLP) included at **Appendix I** and outlined in **Section 6.5.4.**

Following the implementation of the mitigation measures in **Section 6.5.4**, **Table 6-16** provides a summary of residual impacts at the three dwellings – all are predicted to experience "low" impacts.

Table 6-16 Residual Visual Impact

	Impact without screening vegetation				Impact with screening vegetation		
Dwelling ID	Occupied cells	Magnitude level	Visual sensitivity	Visual impact level	Occupied cells	Magnitude level	Residual impact
R18	24	High	Moderate	Moderate	5	Very Low	Low
R25	23	High	Moderate	Moderate	12	Low	Low
R26	14	Low	Low	Low	9	Low	Low
R27	22	High	Moderate	Moderate	10	Low	Low

Public Viewpoints

Visual public viewpoints for assessment were identified including:

- Maison Dieu Road;
- Knodlers Lane; and
- Shearers Lane.

Table 6-17 details the preliminary assessment results on public viewpoints. **Table 6-18** shows the detailed visual impact results on public viewpoints requiring detailed assessment.

Table 6-17 Preliminary Visual Impact Assessment on Public Viewpoints

	Preliminary Assessment Result		Further Visibility Analysis	
Viewpoint	Within Visual Catchment	Detailed Visual Assessment Requirement	Within Visual Catchment	Detailed Visual Assessment Requirement
Maison Dieu Road	Y	Y	Y	Y
Knodlers Lane	Y	Y	N	N
Shearers Lane	Y	Y	Y	N

Table 6-18 Detailed Visual Impact Assessment on Public Viewpoints

Viewpoint	Magnitude of Changes		Viewpoint Sensitivity				
	Occupied Cells	Magnitude Levels	Viewpoint Type	Viewpoint Sensitivity	Scenic Quality	Visual Sensitivity	Visual Impact Level
Maison Dieu Road, view north	<12	Low	Local sealed road	Very low	Low	Low	Low
Maison Dieu Road, view northwest	12	Low	Local sealed road	Very low	Low	Low	Low

6.5.3.3 Night Lighting

The Project Area and surrounds is an area of "A2: Low district brightness" under 'AS4282:2019 Control of the obtrusive effects of lighting' (Standards Australia, 2019). Security lighting associated with the BESS and O&M will be consistent with the lighting associated with dwellings scattered across the rural landscape. The distance between the Project Area and dwellings is adequate to avoid light spill to neighbouring residences.

6.5.3.4 Solar Glare

Surrounding Dwellings

The Solar Glare Hazard Analysis Tool "GlareGauge" was used to identify glare risk at sensitive receivers. With mitigation in place, dwelling R18 will be the only impacted dwelling, receiving less than 10 minutes of glare per day. This level of glare exposure is considered a low impact under the Solar Guidelines and is likely mitigated by intervening landforms.

Aircraft Approach Paths

The Hunter Valley Gliding Club was considered during the glare assessment and sent the relevant results from assessment of aircraft approach paths. Aircraft approaching Warkworth Airstrip, which is the base of the Hunter Valley Gliding Club, is expected to receive 1.4 hours per year of glare risk.

Surrounding Roads

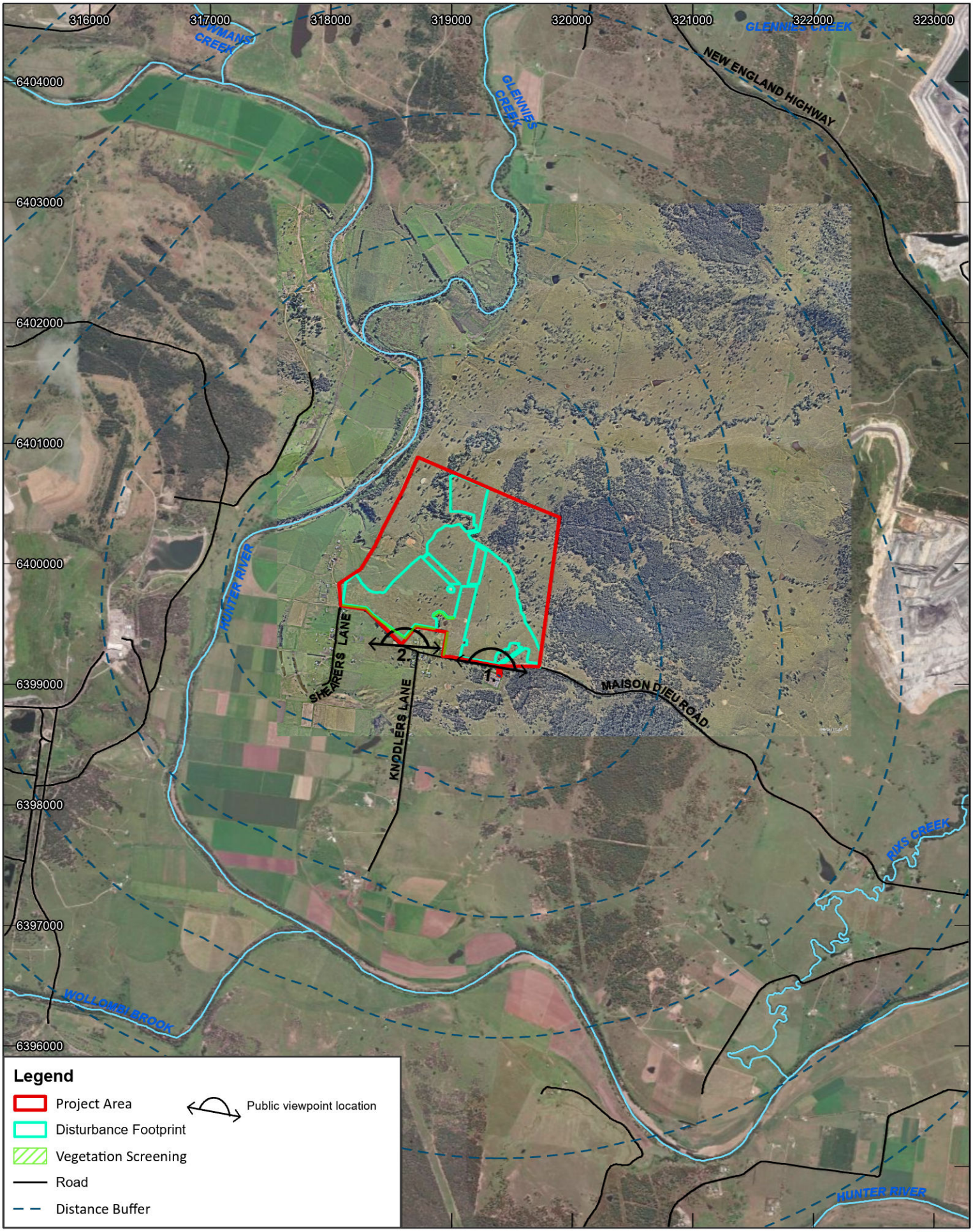
Maison Dieu Road, Shearers Lane and Knodlers Lane were assessed with GlareGauge. With restricted backtracking mitigation in place, parts of Maison Dieu Road may experience 175 hours per year of glare. Further mitigation measures are proposed to obstruct the view which will substantially reduce and potentially eliminate the risk of glare. This includes attaching shadecloth to the solar farm fence in the short term and screening vegetation in the long term. Shearers Lane and Knodlers Lane are not expected to experience any glare.

6.5.3.5 Cumulative Visual Impacts

The projects listed in **Table 6-19** were considered within 5 km of the Project that may have a cumulative effect on landscape character and views.

Table 6-19 Cumulative Visual Impacts

Project	Cumulative Visual Impact
Hunter Valley Operations South	Small cumulative landscape character and visual impact due to the presence of mining activity influencing the landform and visibility of projects together from some locations.
Rix's Creek South	Small cumulative effect on landscape character and visual impact due to sequential views of both projects when travelling through the area.
Hunter Transmission Project	Potential for cumulative impacts. The exact location of the HTP is unknown but the projects are likely to be visible together.



VISUAL IMPACT ASSESSMENT VIEWPOINTS

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Visual Impact
VERSION: A
DATE EXPORTED: 13/06/2024
TECHNICIAN: NATALIE.WOOD

0 500 1,000 1,500 m

SCALE 1:40,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-5 :

IMPORTANT NOTE
1. This plan was prepared for the sole purposes of the client for the specific purpose of producing a photographic overlay plan. This plan is strictly limited to the Purpose and does not apply directly or indirectly and will not be used for any other application, purpose, use or matter. The plan is presented without the assumption of a duty of care to any other person (other than the Client) ("Third Party") and may not be relied on by Third Party.
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PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

6.5.4 Mitigation and Management

6.5.4.1 Lighting and Visual

The following mitigation measures will minimise the visual impacts of the Project:

- The Landscape Concept Plan (LCP) (**Appendix I**) has been prepared in consultation with affected landowners that provides screening vegetation to reduce the visibility and magnitude of change at R18, R25, R26 and R27;
- Vegetation screening will be implemented as conceptually shown on **Figure 3-1**;
- Planting will occur after construction is complete to ensure optimal planting conditions and no risk of damage from machinery;
- The substation, BESS, and O&M facility will be located to the north of Maison Dieu Road where there is existing roadside vegetation to minimise the visibility to each;
- The panel arrays will be single portrait (up to 2.7 m high);
- Lighting during construction will be designed and operated in accordance with 'AS/NZS 4282:2019 Control of the obtrusive effects of outdoor lighting' (Standards Australia, 2019);
- The temporary compound and laydown area will be kept as compact as possible to reduce visual impacts; and
- PCUs, switch rooms, battery enclosures, O&M and water tanks will be a neutral colour to reduce prominence in views from surrounding dwellings.
- To ensure glare impacts from the solar array are kept to a minimum selected areas will be restricted to 2 degree resting angle during backtracking in operation until vegetation screening is established.
- Shade cloth will be implemented along the sections of the southern security fence where vegetation screening is to be planted to reduce glare from the solar arrays until vegetation screening is established.

6.6 Soils, Land and Agriculture

6.6.1 Background

A Soil and Agricultural Impact Assessment (SAIA) including a Land Use Conflict Risk Assessment (LUCRA) was prepared by Minesoils Pty Ltd and is contained in **Appendix J**.

The SAIA considers the revised SEARs in **Appendix B,** stakeholder engagement detailed in **Section 5** and the relevant legislation and guidelines set out in **Section 4**.

The Project Area has a history of agricultural land use, showing evidence of native vegetation modification from extensive clearing and agricultural practices. The current land use within the Project Area is generally consistent with the surrounding area, consisting of low intensity livestock grazing. The Project Area has been highly disturbed, with 90-100% cover in pasture and isolated areas of native trees.

Current agricultural practices in the Singleton LGA include irrigated agriculture, dairy, dryland / broadacre farming, and livestock enterprises. At the time of the 2020-21 Agricultural Census, the Singleton LGA's agricultural industry was valued at $48 M.

The Singleton LGA was generally cropped during early European settlement with wheat, barley and lucerne. As wheat production began to decline due to disease, the dairy industry began to grow. Dairy farming operations continued to grow until a rapid decline in the 1970s.

Coal mining expanded in the 20th century with the establishment of large, open-cut coal mines throughout the Hunter and adjacent to the Project Area. The Project Area is surrounded by mining operations with HVO to the west, Ashton Coal Mine to the north, Rix's Creek to the east and Mount Thorley Warkworth to the south.

The Project Area experiences a variable climate year to year and decade to decade. Generally, the Upper Hunter region's climate is suitable for a range of agricultural activities.

6.6.2 Methodology

The SAIA was undertaken in accordance with the following:

- LSSE Guidelines (NSW DPIE, 2022);
- 'Land and Soil Capability Assessment Scheme' (LSC Scheme) (EOH 2012); and
- 'Agricultural Assessment Requirement Pathway' (NSW DPIE, 2022).

Under the Agricultural Assessment Requirement Pathway, a Level 3 detailed assessment was required for the Project due to the Project Area's RU1 Primary Production land zoning and Class 1-3 Land and Soils Capability mapping occurring within the Project Area.

6.6.2.1 Soil Survey and Site Verification

A desktop investigation of soil landscapes, soil types, inherent soil fertility and 'Land and Soil Capability' (LSC) was undertaken and verified by physical site verification.

Soil Types

A review of NSW regional soil mapping revealed the dominant soil types within the Project Area are Sodosols and Dermosols, as per Australian Soil Classification (ASC).

Sodosols are soils with a clear or abrupt textural B horizon and with the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) being sodic and not strongly acid. Dermosols are soils other than Vertosols, Hydrosols, Calcarosols and Ferrosols which have B2 horizons that have a grade of pedality greater than weak throughout the major part of the horizon and do not have clear or abrupt textural B horizon.

A physical soil survey was undertaken at 10 locations within the Project Area (nine of these are within the Disturbance Footprint after Project refinement) as shown on **Figure 6-6**. The results from the soil survey indicate that Sodosols cover 181 ha of the Project Area, with Dermosols covering the remaining 22 ha.

Inherent Soil Fertility

NSW regional soil mapping was also reviewed to determine the inherent soil fertility of the Project Area. The dominant soil fertility classes were found to be Moderately Low (Class 2) and Moderately High (Class 4).

Moderately Low (Class 2) fertility soils can generally only support plants suited to grazing with large inputs of fertiliser required to make the soil suitable for arable purposes. Moderately High (Class 4) fertility soils generally have a high level of fertility in their virgin state which is significantly reduced after a few years of cultivation.

Land and Soils Capability

The LSC Scheme defines land capability as the inherent physical capacity of land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. The LSC scheme considers the biophysical features of the land and the management of hazards to provide a rating from 1-8.

Site verification assessment of the Project Area under 'The Land and Soil Capability Assessment Scheme Second Approximation – A general rural land evaluation system for New South Wales' (NSW OEH, 2012) determined the Project Area contains 108 ha of verified Class 4 moderate capability land, 73 ha of verified Class 6 moderate capability land and 22 ha of verified Class 3 high capability land as shown on **Figure 6-6**.

The verified Class 3 land is along and adjacent to the creek line, is largely avoided and is not viable for agricultural production due to the waterline occurring within as discussed in **Section 6.6.3**.

Soil Erodibility

Soil samples collected during the soil survey underwent the Emerson Aggregate Test to classify the behaviour of soil aggregates on their coherence when immersed in water. Soil with low aggregate stability is likely to be less resilient to mechanical impacts and more likely to be compacted and poorly structured or be susceptible to tunnelling if used for earthworks.

The representative laboratory-tested soils indicated high levels of sodicity consistently in the clay subsoils. Physical site inspection revealed a significant erosion and sedimentation risk associated with the soil types present in the Project Area with evidence of sheet erosion and gullying associated with both soil units. The dispersion risk status of the tested soils is indicative of moderate to high potential risk for dispersion of the topsoils and subsoils of Soil Unit 1 and moderate potential risk for dispersion for the topsoils of Soil Unit 2.

Acid Sulphate Soils

The Project Area does not contain any mapped ASS according to the NSW Acid Sulphate Soil Planning Map. Site inspection confirmed no indicators of ASS presence such as soil gleying, odour, marine sediments or organic materials.

Considering the Project Area's elevation, distance from the coast, lack of physical ASS indicators and lack of ASS mapping for NSW, the potential risk for ASS occurring on site is very low.

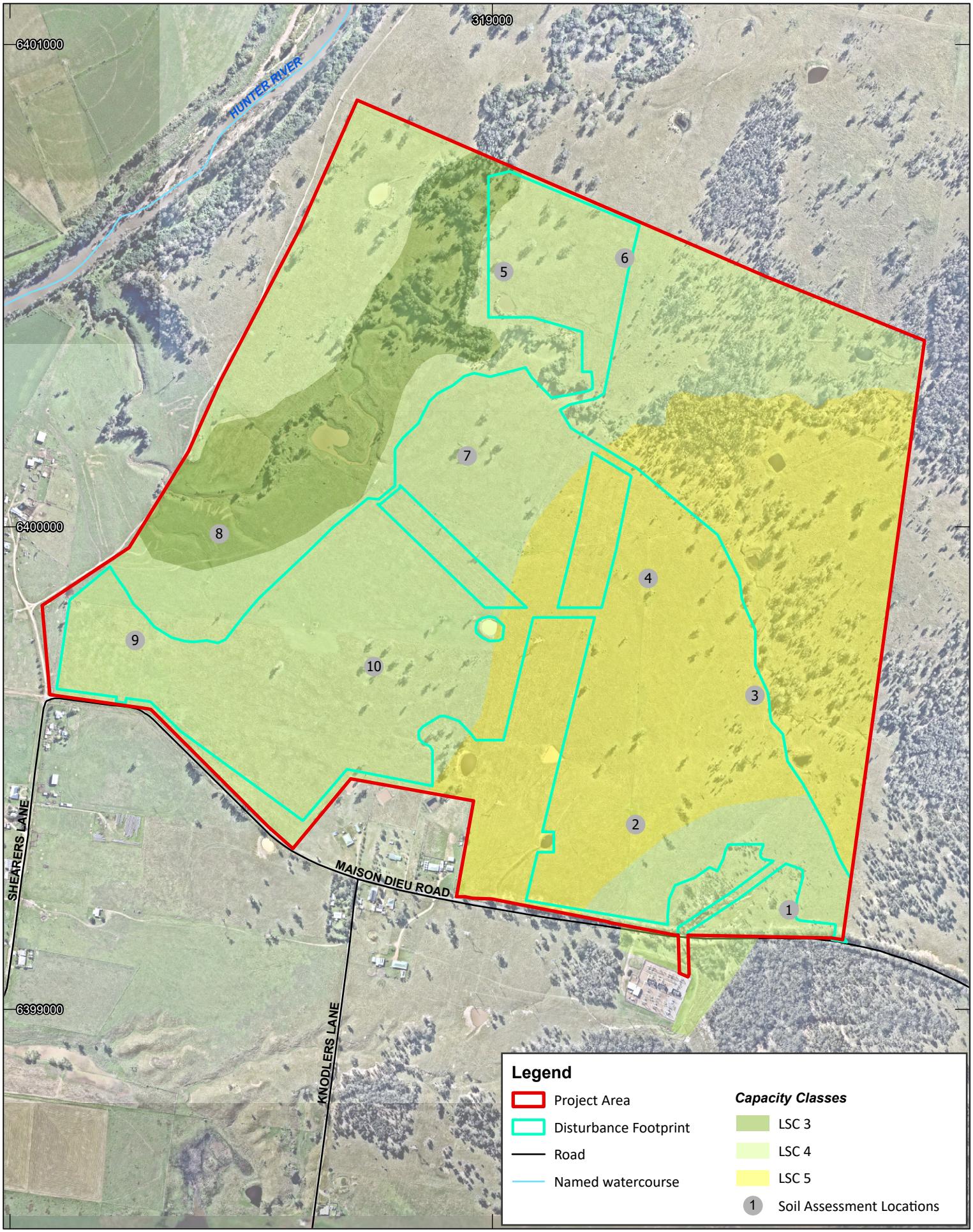
Strategic Regional Land Use Policy Mapping

The 'NSW Government's *Strategic Regional Land Use Policy*' defines and identifies strategic agricultural land across NSW. Strategic agricultural land includes land with unique natural resource characteristics, known as Biophysical Strategic Agricultural Land (BSAL) and clusters of significant agricultural industries known as critical industry clusters (CICs). There is no BSAL or CIC mapped within the Project Area. The nearest BSAL is located approximately 100 m west of the Project Area in association with GIennies Creek and the Hunter River as shown on **Figure 6-6**.

State Significant Agricultural Land

The NSW DPI is currently undertaking a mapping program to identify State Significant Agricultural Land (SSAL). A map of SSAL is an essential component of agricultural land use planning, enabling clearer local planning with informed prioritisation of future land uses.

There is no SSAL mapped within the Project Area. The nearest SSAL is located approximately 100 m west of the Project Area in association with Glennies Creek and the Hunter River as shown on **Figure 6-6**.



LAND AND SOIL CAPABILITY

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Earthstar Geographics

MAP: Land and Soil
VERSION: A
DATE EXPORTED: 16/04/2024
TECHNICIAN: Natalie.Wood

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-6:

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PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

6.6.3 Impact Assessment

6.6.3.1 Agricultural Productivity and Enterprises

The agricultural productivity loss caused by the Project has been conservatively assessed considering the possibility that agrisolar will not be implemented within the Project Area. This may be implemented, however would be done so in consultation with the landowner and has not been included in the assessment. Therefore, the productivity loss of the Project will be the productivity of the entire Project Area.

The latest NSW DPI Gross Margin Budgets for Livestock were used to provide an estimation of the productivity of the Project Area based on grazing activities. With the application of the DPI cattle enterprise option of 'Feeder Steers' and 'Growing-out Steers (240 – 460 kgs),' the estimated productivity of the Project Area is between $42,082 to $78,520 per annum. The estimated primary productivity loss considering the change in land use within the Disturbance Footprint is $34,812 per year. This is the equivalent of 0.07% of the Singleton LGA agricultural industry's gross value.

The secondary productivity of the Project Area has also been calculated, considering the broader economic activity and employment associated with agricultural trade. Using the relevant economic multiplier of 2.18 provided by the Australian Bureau of Statistics, the value of the agricultural value of the Project Area to the broader economy is between $91,688 to $171,079 per year. The estimated secondary productivity loss as a result of the Project is $75,848.

The Project will not cause any loss of productivity outside the bounds of the Disturbance Footprint. The temporary reduction of livestock sales from the loss of agricultural land within the Project Area will account for less than 0.01% of beef cattle sold in NSW. A loss in productivity at this scale will not have a measurable effect on agricultural support services in the local area. Due to the negligible loss of agricultural productivity, the Project will also have no effect on critical mass thresholds for attracting and maintaining investment in agricultural services and infrastructure.

6.6.3.2 Land Use Conflict Risk Assessment

Land Use Conflict Risk Assessment (LUCRA) identifies and assesses the potential for conflict to occur between neighbouring land uses. Land use conflicts occur when one land user is perceived to infringe upon the rights or impact the values or amenity of another.

When compared against adjoining and surrounding land uses, the Project has 41 risk items which were considered. None of these items are considered high risk potential conflicts. The LUCRA is contained in **Appendix J**.

6.6.3.3 Impacts on Agricultural Land

Solar projects generally present a very low risk of permanent impacts to agricultural land. While the Applicant will consider the implementation of sheep grazing within the Project Area, the agricultural impacts of the Project have been assessed conservatively, under the assumption that agrisolar will not be implemented.

This scenario will result in the temporary loss of 90 ha of land used for agricultural production, making up 0.1% of the agricultural land in the Singleton LGA. The Project will not impact upon adjacent agricultural land uses, nor will it fragment or displace existing agricultural industries. The Project will not have any permanent impact on agricultural land.

6.6.3.4 Impacts on Agricultural Resources

Soils

The Project does not involve major recontouring of existing ground levels. Soils will undergo minor disturbance across the majority of the disturbance footprint due to construction of solar arrays and trenching for electrical cabling. Some small areas will undergo heavier soil disturbance where more intensive excavation works are required for infrastructure construction.

All soil that is disturbed will be stripped, stored and reused or rehabilitated to reduce any long-term effects on soil. Stored soil will be replaced where it was taken from during rehabilitation to reinstate the soil profile to its original condition.

Solar panels generally do not incur considerable impacts to soil composition. The biological balance and nutrient availability of the soil in the disturbance footprint will be maintained by ensuring grass cover is not removed between or underneath PV rows.

The Project will not impact soil resources outside of the disturbance footprint.

Land and Soil Capability

The Project will not have any major effects on LSC due to the minimal, localised and sporadic nature of landform modification required. There will be a temporary loss of 1 ha of LSC Class 3 land but this land is fragmented by a waterline making it unviable for agricultural use. The respreading of disturbed soils in conjunction will return the land to its original LSC class.

Water

The Project has a very low risk of incurring groundwater impacts due to relatively shallow excavation depths. Water use required for the Project will be minimal and brought in by tanker when needed.

Surface water and flooding impacts are discussed in **Section 6.7** to **6.8** and are expected to be minimal as confirmed by the Surface Water Impact Assessment and Flooding Impact Assessment prepared by Northrop Consulting Engineers Pty Ltd and included in **Appendix K** and **Appendix L**.

Erosion and Sedimentation

The Emerson Aggregate Test (EAT) and sodicity analysis results indicated potentially dispersive soils are present across the Project Area. The mitigation measures provided in the SAIA and **Section 6.6.4** target these specific erosion hazards and will manage potential impacts to surface soils and waterways.

Agricultural Infrastructure

Maintenance and potential upgrades to access tracks within the Project Area would be considered a positive impact to agricultural infrastructure. Potential negative impacts to agricultural infrastructure are considered negligible, including minor impacts during construction to the road network that connects agricultural land, markets, services and suppliers.

6.6.3.5 Other Agricultural Impacts

Pest Species

Pest species have the potential to be transported to the Project Area in imported materials or tracked via machinery. The removal / degradation of existing vegetation can increase the likelihood of pest species successfully invading. Vegetation removal within the Project Area will be minimal and the potential for the transport of pest species to the Project Area will be minimised under the Agricultural Biosecurity Management Plan.

Biosecurity

An assessment of the biosecurity risks presented by the Project was undertaken with consideration of the ‘Draft NSW Biosecurity Strategy’ (DPI, 2021). The risk of spreading foot and mouth disease was considered during the development of the EIS. **Section 6.6.4** provides mitigation measures to address the elevated threat of foot and mouth disease. The Project will not have any impact on biosecurity of agricultural resources and enterprises in the local area, considering appropriate weed management will be undertaken and the import of equipment and machinery will follow standard Australian requirements.

Cumulative Impacts

Suitable conditions for grazing and agricultural production create dual land use opportunities in the Hunter-Central Coast for agriculture and renewable energy generation. The opportunity for the implementation of agrisolar will minimise cumulative project impacts in the area. This would be considered in consultation with the landowner.

The cumulative risk to agricultural land and productivity due to large-scale solar development is expected to be very low (DPE, 2022). The Australian Energy Market Operator estimates that NSW will need approximately 20,000 MW of large-scale solar generation by 2050. This will require approximately 40,000 ha of land or only 0.06% of rural land in NSW. Even in the unlikely scenario that all of NSW's solar facilities were to be located on important agricultural land (this land covers around 13.8% of the state and is 6 to 7 times more agriculturally productive than the remaining 86.2% of the state) only 0.4% of this land would be required (DPE, 2022).

6.6.4 Mitigation and Management

The following mitigation and management measures will be implemented to minimise agricultural impacts associated with the Project:

6.6.4.1 Agricultural

- Prior to re-spreading stockpiled topsoil onto the disturbance area, an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and / or "scalping" of weed species prior to topsoil spreading;
- Rehabilitation monitoring programs and routine inspections will be undertaken to identify potential weed infestations;
- There will be an ongoing effort to identify and eliminate (spray) existing weed populations in the Project Area over the life of the Project;
- The implementation of agrisolar at a suitable stocking rate to reduce area of land removed from agricultural service will be considered in consultation with the landowner. Agrisolar would adhere to a Grazing Management Plan if implemented;
- Livestock stocking rates (if potential agrisolar is implemented) will ensure that groundcover is retained at >70% coverage, where practical (long term climate and weather variables, such as drought, may inhibit this);
- Agricultural land use will be re-established over the entire Project Area at the time of decommissioning (unless otherwise agreed with the landowner and/or regulatory authorities);
- The Project Area will be returned to an equivalent agricultural productivity and LSC Class following decommissioning of the Project;
- Stock fences, dams and access tracks will be maintained where possible to accommodate the potential for agrisolar if the Applicant chooses to implement it; and
- An agricultural biosecurity management plan will be developed for the Project to control risks in relation to pests, weeds and diseases during construction and operation. Controls will include adherence to government Foot and Mouth Disease awareness, prevention and preparedness programs and guidance.

6.6.4.2 Land

- The Project will utilise the existing landform and not endeavour to undertake broad-scale re-contouring of the existing ground levels without referring to this soil and land resource assessments and implementing erosion and sediment control accordingly. As a result, the existing vegetative cover and soil structure will remain intact across much of the Disturbance Footprint;
- Solar arrays will be pole mounted, with the poles being supported on a driven or screw pile, so that only minor excavation and levelling would be required, including for electrical cabling and inverter installation;
- Construction areas will be progressively revegetated where possible with grass and pasture species as installation of solar panels proceeds across the Project Area;
- At locations where earthworks are necessary, such as for cable trenching, localised erosion and sediment controls will be placed in accordance with the Landcom (2004) guidelines;
- Preservation and stabilisation of drainageways and minimisation of the extent and duration of any surface disturbance will be prioritised during construction;
- During operation, mounted solar panels will change orientation during the day, with any rainfall runoff being distributed in the area around each panel, and not drained permanently to a single point on the ground;
- Measures to manage any bare areas and erosion that develop beneath the solar arrays over time will be included in a land or groundcover management plan for implementation during ongoing operation of the Project; and
- A detailed Decommissioning and Rehabilitation Plan will be prepared within 18 months of the planned closure of the Project. This plan will detail all aspects of decommissioning and removal of all infrastructure unwanted for post Project land use. Some infrastructure may remain for post Project land use purposes (i.e. constructed internal roads may be kept as part of the agricultural infrastructure), which may require temporary erosion and sediment control measures).

6.6.4.3 Soils

- Where sodic subsoils are exposed for large scale earthworks and excavations associated with site infrastructure, gypsum will be applied as an ameliorant to displace the sodium and provide the soil with a stronger aggregate and hold structure when wet;
- All areas disturbed during construction that are not in active use for over 3 months, will be sown with grass and pasture species with starter fertiliser to provide stabilising ground cover and a healthy topsoil to provide long term protection against erosion;
- Soil disturbance during operation of the Project will be minimal and limited to maintenance activities, involving very small, localised disturbance areas on an infrequent basis;
- Standard erosion and sediment control measures will be implemented to minimise the potential for sediment export within areas to be disturbed during operations. These measures would be developed on a case-by-case basis referring to this soil assessment and are likely to include measures such as sediment fencing, localised sediment traps, and progressive stabilisation with vegetation;
- During decommissioning, where potential erosive impacts have been identified due to the disturbance of sodic subsoils in locations of significant disturbance, soil amelioration should be undertaken as part of remediation earthworks. Standard temporary erosion and sediment control measures are to be put in place for high disturbance areas;
- Disturbed soil will be stripped and re-used in construction and/or rehabilitation efforts in order to mitigate long term effects on the land and soil capability of the disturbance footprint;
- Soil stripping will adhere to the Soil Stripping Strategy in **Appendix J**; and
- Channelised drainage patterns will be minimised and the Project will avoid hard engineering solutions for erosion control and preference soft, vegetated structures.

6.7 Hydrology and Flooding

6.7.1 Background

A Flooding Assessment was prepared for the Project and included at **Appendix L.**

The Flooding Assessment considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B,** stakeholder engagement detailed in **Section 5** and the Singleton Flood Study.

The Project layout was iteratively amended based on the best available flooding information at the time as described in **Section 7.1** and shown on **Figure 6-7.**

6.7.2 Methodology

The Flooding Assessment was undertaken using the following methodology:

- Desktop review of available background information including terrain data, aerial imagery, design plans and the Singleton Flood Study;
- Two-dimensional 'TUFLOW' hydraulic model was set up;
- The existing case 'TUFLOW' model for the 10%, 1%, 1 in 200, 1 in 500 AEP (with 1 in 200, 1 in 500 AEP as a climate change proxy) and Probable Maximum Flood (PMF) events was run; and
- The 'TUFLOW' model was amended to represent the Project in its operational state. The model was run and results were compared with the existing case to review the potential impact the Project has on the existing flood conditions on-site, in adjacent properties and across the catchment and floodplain. This informed the recommendation of mitigation measures.

The SR Project was informed by SC's mapping of the "1955 Flood Inundation Extent". The Singleton Flood Study became available during EIS preparation and the Project layout was further refined to accommodate the 1% AEP modelled using this data as described in **Section 7.1**.

Detailed information on the setup and parameters of the flood modelling is contained in **Appendix L**.

6.7.3 Impact Assessment

The Project Area is impacted by two flooding mechanisms, local catchment runoff and Hunter River flooding. The study extent of 2 km upstream and 500 m downstream of the Project Area along the Hunter River considers both mechanisms.

6.7.3.1 Critical Storm Durations

Maps showing the critical storm duration for the 10% AEP, 1% AEP, 1 in 200 AEP, 1 in 500 AEP and PMF flood events are in Figures A4 to A8 of Appendix A of the Flooding Assessment. **Table 6-20** details the critical storm durations predicted by the TUFLOW modelling for existing flood behaviour in the local catchment.

Table 6-20 Critical Storm Durations

AEP event	Temporal pattern	Storm duration (hours)
10% AEP	TP03	1
	TP04	3
1% AEP	TP06	0.75
	TP09	2
1 in 200 AEP	TP03	0.25
	TP09	0.75
1 in 500 AEP	TP03	0.25

AEP event	Temporal pattern	Storm duration (hours)
	TP09	0.75
PMF	GSDM	0.25
	GSDM	1

**TP = temporal pattern*
GDSM = Generalised Short Duration Method (BoM, 2003)

6.7.3.2 Climate Change Sensitivity

The 1 in 200 AEP and 1 in 500 AEP flood events were modelled to simulate climate change scenarios. These events scale rainfall compared to the 1% AEP by approximately 10 % and 30 % respectively. The climate change sensitivity modelling suggests that flood depth and velocity will increase under the climate change scenarios within the Project Area and across the study catchment.

6.7.3.3 Flooding Probabilities

The local catchment modelling with a 10% AEP downstream boundary condition for the Hunter River was used to represent the Project's impact on flood behaviour. High Hunter River water levels will attenuate potential impact from the upstream local catchment flooding. It is highly unlikely that a 1% AEP flooding event will occur for the Hunter River at the same time as the local catchment.

6.7.3.4 Existing and Developed Flood Behaviour

Maps of the modelled flood depth, velocity, hazard, and hydraulic categories for each AEP and PMF under existing flood behaviour are presented in Figures B1-1 to B5-4 of Appendix B. These figures show an envelope of the Hunter River and local catchment flooding.

Developed case flooding was also modelled to show the impact of the Project. These flood maps are in Figures C1-1 to C5-4 of Appendix B. Figures DL1-1 to DL1-5 of Appendix D show the impact of the Project during the full range of local flood events considered.

Existing local catchment flooding in the 10% AEP, 1% AEP, 1 in 200 AEP and 1 in 500 AEP is predicted to largely contained within the gullies between the solar arrays. There are some areas in the southern array adjacent to Maison Dieu Road where the flood depth reaches 0.6 m within the existing gully.

The flood hazard across the solar array is low in the 10% AEP, 1% AEP, 1 in 200 AEP and 1 in 500 AEP. Mapped flood hazards are mostly H1 (generally safe for people, vehicles and buildings). The solar array is generally unaffected in events up to and including the 1% AEP. Velocities in the area are low, with generally less than 0.1 m/s in all events up to the 1 in 500 AEP, and less than 0.5m/s in the PMF.

Impacts on flood behaviour within the Project Area will be caused by Project-related changes to terrain and vegetation. Minor increases will occur on the southern boundary of the Project due to vegetation screening slowing the flow of water. Filling of the temporary compound and laydown area will increase the wet area upstream where water will be detained.

Minor increases in flooding will occur outside of the Project Area to the west due to changes in roughness, and hydraulic losses under panels and at perimeter access roads. Small decreases will occur east of the Project Area due to topographic changes for the hardstand area.

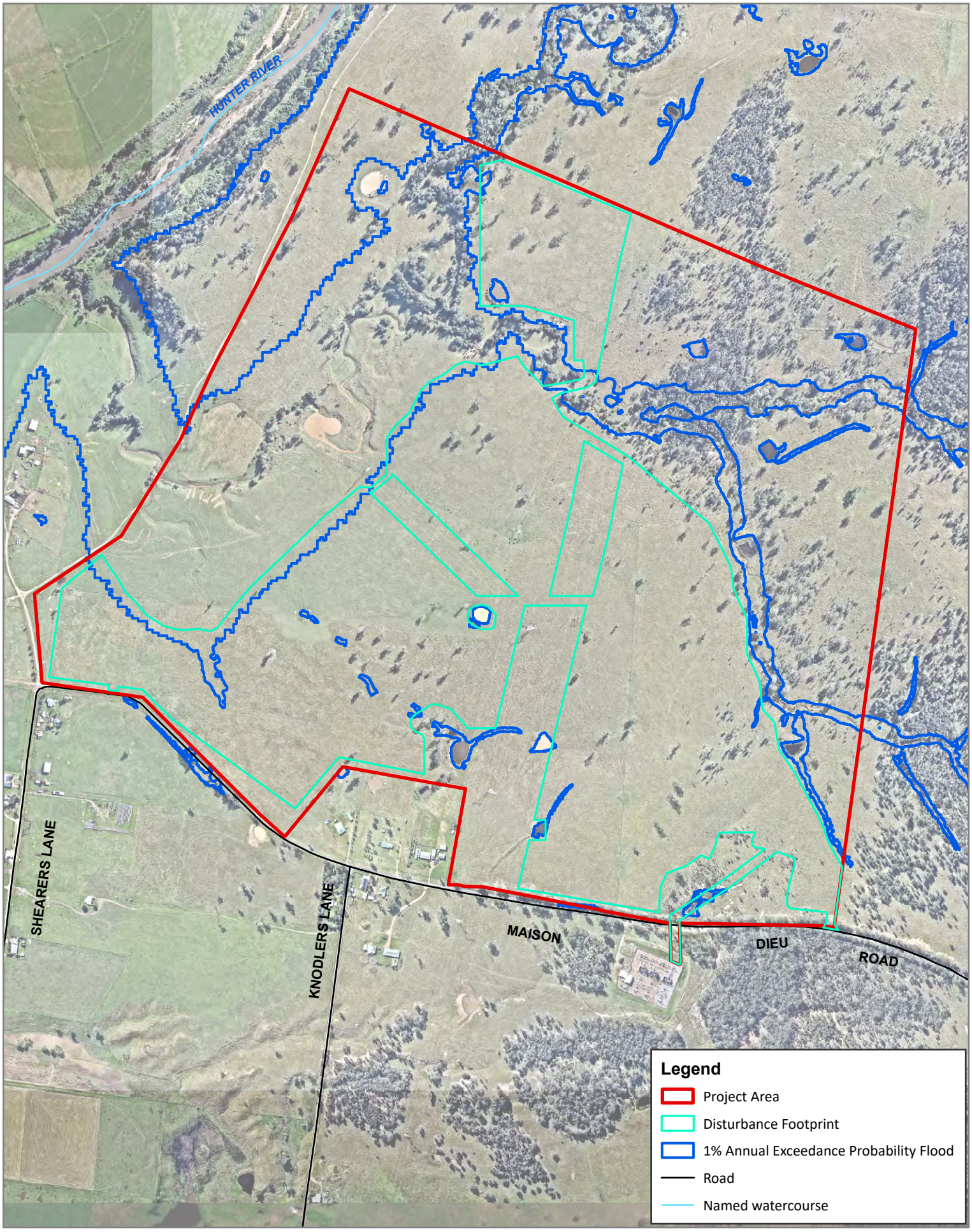
With no fill proposed across the array, the array being located outside the 1% AEP and not occupying a significant amount of flood storage in rarer flood events, and the velocity in affected areas being low, the Project is not predicted to result in significant adverse flood impacts within or outside of the Project Area.

Figure 6-7 shows the 1% AEP in relation to the Project layout.

6.7.4 Mitigation and Management

The CEMP and OEMP will contain the following mitigation measures:

- Where possible, at least 100 mm of grass cover will be maintained in the solar array area to reduce the likelihood of erosion in rainfall events;
- Detailed design will consider appropriate location of the panels and supporting infrastructure;
- The finished floor level for all habitable buildings within the Project Area such as office and control rooms will be at least 1% AEP flood level + 500 mm freeboard. The finished floor level for non-habitable facilities will be 1% AEP flood level + 300 mm freeboard;
- Detailed design will consider flood protection measures such as terrain adjustments, culvert designs, and flood protection walls; and
- The emergency response strategy will include:
  - Early evacuation of the Project Area if significant rainfall is predicted;
  - Consideration will be given to advising staff and visitors not to attend site until the hazard has passed if outside work hours; and
  - Potable water and non-perishable food items will be stored within the O&M building as a last resort in case refuge within the Project Area is required.



FLOOD PRONE LAND

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Flood Prone Land
VERSION: A
DATE EXPORTED: 23/05/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-7:

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6.8 Water Resources

6.8.1 Background

A Water Impact Assessment (WIA) was prepared by Northrop Consulting Engineers Pty Ltd and is contained in **Appendix K**. This section summarises the key findings of the WIA. The WIA was undertaken in accordance with the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B,** stakeholder engagement detailed in **Section 5**.

6.8.1.1 Hydrology

Several ephemeral, first, second, third and fourth order watercourses under the Strahler Stream Classification System run through and around the Project Area as shown on **Figure 6-8.** The Hunter River runs in a NE to SW direction, over 400 m west of the Project Area. The key receiving watercourse in the Project Area is classified as an uncontrolled stream in the 'Hunter River Catchment' (OEH, 2023).

Existing farm dams within the Project Area are shown on **Figure 6-8.** These dams collect stormwater during rainfall events. Collected stormwater then travels through the watercourses and intermittent concentrated overland flow paths into the Hunter River. The drainage lines have generally been degraded by cattle.

6.8.1.2 Riparian Corridors

The watercourses in the Project Area have a Riparian Corridor (RC), a transition zone between the land and watercourse which is important for ecosystem protection, water quality and bank stability. The RC incorporates the watercourse channel width and the VRZ. The VRZ and RC widths in **Table 6-21** were prepared in accordance with the 'Guidelines for Controlled Activities on Waterfront Land – Riparian Corridors' (DoI, 2018).

Table 6-21 VRZ and RC Widths for Watercourses

Stream Order (Strahler)	Channel Width (m)	VRZ width (m)	Total RC Width (m)
1st	5	10	25
2nd	10	20	50
3rd	15	30	75
4th	20	40	100

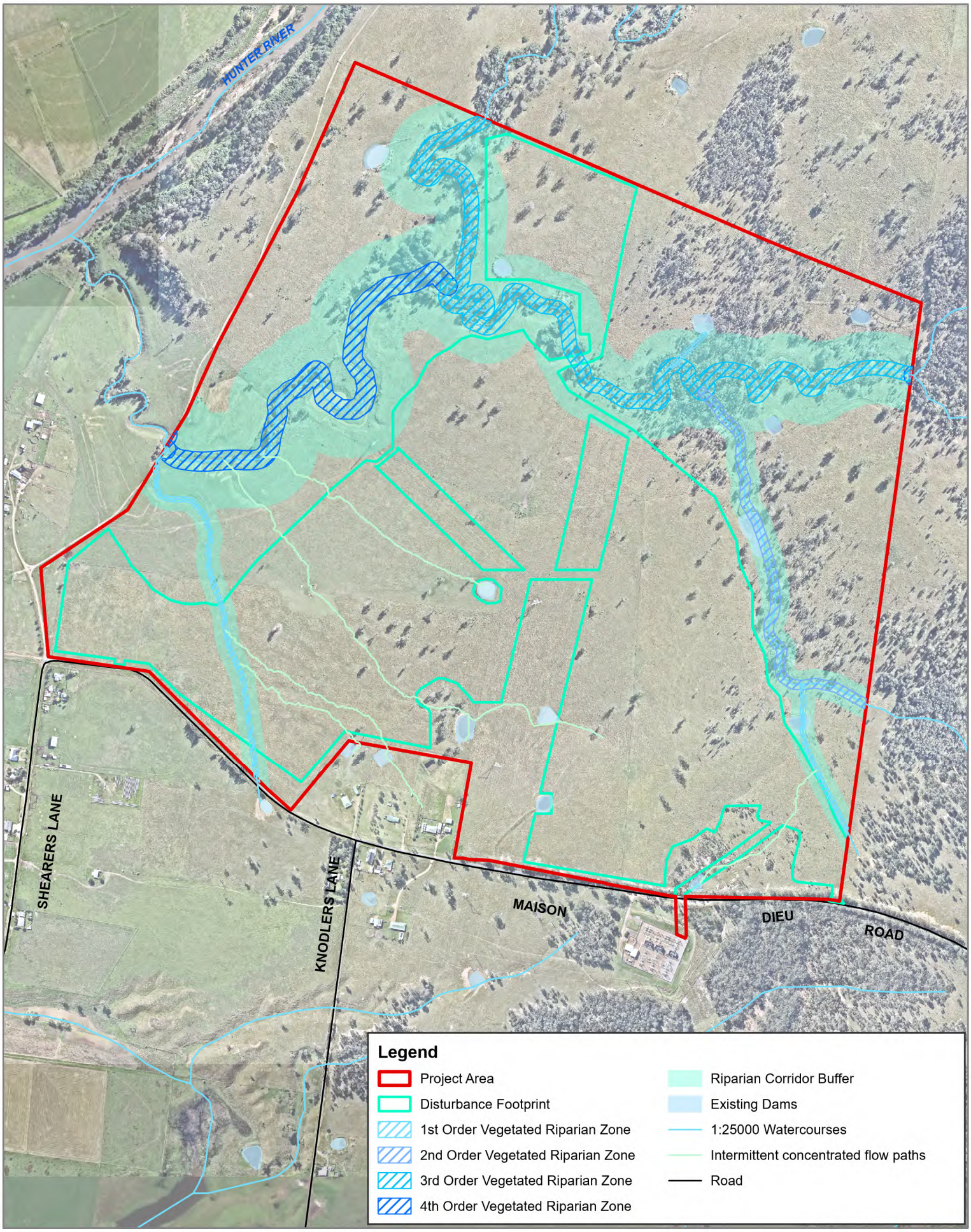
6.8.1.3 Background Water Quality

No known water quality monitoring data has been recorded in the Project Area. The water quality of watercourses in the Project Area is impacted by its historic agricultural use. A review of available satellite imagery for the last 10 years revealed the dams and watercourse are often completely dry or semi dry with isolated pooling. If water is present, it is generally turbid.

The Hunter River has been impacted by the open cut mines, agricultural land use and other industry near the Project Area. A review of publicly available surface water monitoring data was conducted. The closest monitoring location is H1, located in the Hunter River adjacent to the Project Area (HVO, 2022):

- pH ranged from approximately 7.7 to 8.4 between 2017 and 2022;
- EC ranged from approximately 300 to 1,250 µS/cm between 2017 and 2022;
- Total Suspended Solids generally ranged from approximately 0 to 100 mg/L between 2017 and 2022, however there have been a few spikes during the reported period attributed to periods of high rainfall.

A search of the WaterNSW database showed no boreholes within the Project Area or the nearby vicinity. The nearest boreholes are over 1.5 km from the Project Area. **Figure 6-8** shows the water resources and RC constraints relevant to the Project. There are no wetlands in the Project Area and the Project is not located within a Hunter Water Drinking Catchment area.



WATER RESOURCES

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Water Resources
VERSION: B
DATE EXPORTED: 17/07/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 m

SCALE 1:10,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-8:

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6.8.2 Impact Assessment

6.8.2.1 Construction

Erosion and Sedimentation

The construction of the Project will increase potential rates of erosion and transport of sediment from the Project Area due to the disturbance of surfaces, removal of vegetation, tracking of heavy vehicles across unsealed access tracks, earthworks, trenching and stockpiling of materials.

If unmanaged, construction activities will cause soil loss from the Project Area, dust production, and sedimentation of downstream waterways. This risk is temporary and typical of construction projects.

Chemicals

Chemicals, fuels and other hazardous materials used in construction activities may be picked up and transported in surface water, potentially entering downstream waterways. These impacts can result from spills, fuel leaks and use of pesticides in vegetation management. Chemical storage practices to be implemented for the Project are detailed in **Section 6.10**.

Wastewater

Construction employees will use water and produce wastewater, which can impact water quality if not appropriately controlled. There is no existing water and sewer network servicing the Project Area or surrounding properties. Wastewater impacts will be negligible when managed under appropriate controls.

The dams in the Project Area are likely to provide minor retention of stormwater which will not be impacted by the Project.

Watercourses

Construction risk on watercourses is heightened when earthworks are occurring. Risk inducing activities include the potential construction of a culvert crossing or level crossing (causeway) where access roads cross a third and first order watercourse, trenching works, construction of the solar array across a first order watercourse (this watercourse was assessed as poorly defined with no riparian vegetation in the WIA), and disturbance activities located immediately upstream of watercourses. These activities require construction work on waterfront land (within 40m from the top of bank).

Groundwater

There will be no significant impact to groundwater during construction. Excavations for construction of footings, infrastructure areas and roads will be shallow, temporary and will not reach the depth of groundwater. There will be negligible change to surface water runoff patterns for construction, with construction being short-term. Groundwater will not be used to meet construction water demands.

6.8.2.2 Operation

Erosion and Sedimentation

Operational erosion and sedimentation risk is related to ground cover stabilisation works undertaken during the end of the construction phase, if ground cover is not properly established or maintained for long-term stabilisation. Loss of vegetation cover due to drought or modified ground conditions, including increased shade and loss of topsoil presents an ongoing risk. Erosion and sedimentation will be appropriately managed through controls outlined in **Section 6.8.3**, minimising this risk.

Chemical Spills

Chemical spill risk to water quality is relatively low during operation. However, storage of chemicals and Dangerous goods (DGs) will be required for the BESS and infrastructure compound. Hazards and DG storage are discussed in **Section 6.10**.

Wastewater

Wastewater risk is significantly lower during operation with only five FTEs producing wastewater during operation.

A formal wastewater management system will be established during operation, in the form of on-site treatment due to the lack of sewer mains in the vicinity of the Project Area. On-site treatment systems are common in remote regional areas. Wastewater impacts during operation will be negligible.

Watercourses

The watercourses in and around the Project Area are regulated by the WM Act. Early planning for the Project considered the location of mapped watercourses and RCs, guided by the SR (EMM, 2022). The arrangement of the PV array and infrastructure compound were planned to largely avoid watercourses and riparian corridors. One first order stream exists within the PV array area, but the watercourse is poorly defined with no defined bed or banks and no riparian vegetation due to historical clearing and grazing.

Access tracks in the Project Area will cross a first order stream and a third order stream as shown on **Figure 6-8**. Both streams are ephemeral at the crossing points. At the road crossing locations, the streams are ‘unlikely fish habitat’ according to the relevant fish passage requirements outlined in the WIA. The third and fourth order watercourses in the Project Area are mapped as Key Fish Habitat (DPI, 2024). The road crossings will be designed so that there is no permanent obstruction to the waterway.

Waterways in the Project Area are not mapped as potential habitat for any FM Act listed species; however the Hunter River is. Water quality impacts from the Project on downstream watercourses will be appropriately mitigated according to the measures in **Section 6.8.3** to avoid impacts to the Hunter River.

The intermittent concentrated flow paths within the Project Area may be modified during construction. CAA approval is not required as these are not defined watercourses.

Water Resources

The Project will have a negligible impact on watercourses with minor water demands which will be met by importing water. Water demands are detailed in **Section 6.8.2.6**. The Project will not have a significant impact on water availability or resources.

Pollution

The presence of workers and vehicles in the Project Area will cause a minor increase in pollutants, posing the risk of decreasing water quality. These pollutants will include gross pollutants, suspended solids, phosphorous, nitrogen and hydrocarbons. The infrastructure compound will be the main area of pollution.

The ceasing of agricultural activities in the Project Area (if agrisolar is not implemented) and removal of livestock will reduce effluent and ground disturbance of the watercourses, positively impacting water quality runoff.

Groundwater

Groundwater in the Project Area and its surrounds will not be impacted during operation with no significant excavation to occur. The impervious surface in the infrastructure compound will not significantly impact stormwater infiltration due to its relatively small area. The PV array will allow rainfall to continue to infiltrate into the ground surface below the elevated panels.

6.8.2.3 Decommissioning

The decommissioning phase has similar risks to the construction phase, being a period of redevelopment with similar activities occurring in the Project Area. There are no additional foreseen water quality risks.

6.8.2.4 Water Quality Objectives

Table 6-22 provides an assessment of the Project against the NSW Water Quality and River Flow Objectives for the Hunter River catchment (OEH, 2006). The assessment found that the Project generally complies with the water quality and river flow objectives as there will be no significant impact on water quantity, quality, flow rate or aquatic ecosystems.

Table 6-22 Water Quality Objectives Assessment

Value	Applicability	Potential Impact with Mitigation Measures Implemented
Water Quality Objectives		
Aquatic Ecosystems	With predominantly ephemeral streams, there is unlikely to be a significant aquatic ecosystem in the Project Area. Downstream, the Hunter River would support large aquatic ecosystem.	The Project will not have a significant impact on water quantity, quality, flow rate or aquatic ecosystems.
Visual Amenity	Watercourses within the Project Area have limited accessibility from public land. The Hunter River is visible from many properties downstream.	The Project will not have a significant impact on water quality and therefore is unlikely to decrease visual amenity of the Hunter River. The removal of grazing activities will enhance vegetation establishment throughout and adjacent to the watercourses in the Project Area.
Secondary Contact Recreation	There is currently no public access to the watercourses in the Project Area as it is privately owned. There is no recreational use of watercourses within the Project Area, however the Hunter River is used for secondary recreation downstream.	The Project will not significantly impact water quality or quantity. Therefore, the Project will not impact recreation.
Primary Contact Recreation	There is currently no public access to the watercourses in the Project Area as it is privately owned. There is no recreational use of watercourses within the Project Area, however the Hunter River may be used for primary recreation downstream.	The Project will not impact water quality or quantity. Therefore, the Project will not impact recreation.
Livestock Water Supply	The Applicant will consider agrisolar, however this assessment assumed no livestock will access the Project Area. There are agricultural land uses downstream.	Water demands will not impact water availability or quality.
Irrigation Water Supply	Agricultural land use requires irrigation in the locality and downstream.	Water demands will not impact water availability in the locality. Assessment of water quality indicates no major risk to water quality from the Project.
Homestead Water Supply	The Project has minor water demands and may use run off through tanks in the Project Area.	Water demands will not impact water availability in the locality. Project demand will be met.
Drinking Water at Point of Supply – Disinfection only, clarification and disinfection, and groundwater	The Project is not connected to drinking water mains nor will it take groundwater.	Assessment of water quality indicates no major risk to water quality from the Project. The Hunter River is not a direct drinking water supply.
Aquatic Foods (cooked)	Recreational fishing does not occur within the Project Area, however it does occur downstream in the Hunter River.	Assessment of water quality indicates no major risk to water quality from the Project.

Value	Applicability	Potential Impact with Mitigation Measures Implemented
River Flow Objectives		
Protect Pools in Dry Times	Some surface stormwater runoff is retained in dams in the Project Area. Rainwater tanks will be installed to capture runoff from roof area.	Water from dams will not be used to meet demand. Volume for rainwater collection from roofs for reuse will be negligible.
Protect Natural Low Flows	The Project will have a minor impact to water quantity within the Project Area from introduction of impervious surfaces.	Water quantity impact from the Project will not have a significant impact on flows.
Protect Important Rises in Water Levels	The Project will have a minor impact on water quantity within the Project Area from introduction of impervious surfaces.	Water quantity impact from the Project will not have a significant impact on flows.
Maintain Wetland and Floodplain Inundation	The Project will have a minor impact on water quantity within the Project Area from introduction of impervious surfaces. No wetlands exist within the vicinity of the Project Area.	Water quantity impact from the Project will not have a significant impact on flows.
Maintain Natural Flow Variability	The Project will have a minor impact on water quantity within the Project Area from introduction of impervious surfaces.	Water quantity impact from the Project will not have a significant impact on flows.
Manage Groundwater for Ecosystems	The Project will not have significant impact on groundwater	The Project will not have any significant impacts on groundwater. The water demands will not be met by supply from groundwater.
Minimise Effects of Weirs and Other Structures	Watercourse crossings will be constructed for access around the Project Area.	Water crossings will be designed to be suitable for the receiving flowrates.

6.8.2.5 Cumulative Impacts

Cumulative Projects considered in this EIS are detailed in **Section 2.5.**

There are seven large, open-cut coal mining operations within 10 km of the Project Area, as well as various industrial developments.

The Project will have negligible surface water and groundwater quantity / quality impacts in comparison to the scale of the existing and future projects in the locality. A large-scale solar farm generally presents a much lower risk to water resources compared to the large, open-cut coal mines surrounding it. Therefore, the Project will not have a significant cumulative effect on surface water or groundwater.

6.8.2.6 Water Demand and Supply

Water usage has the potential to impact water resource availability. This section details the project's water demands and sources during construction and operation.

Construction water demand will be satisfied by licensed truck delivery. The operational water demand will be supplied by rainwater tanks and reused where possible for non-potable demands. Water for operations will be trucked into the Project Area for potable water supply and if demand exceeds rainwater tank capacity. This water demand will not significantly impact water availability.

Table 6-23 outlines the Project's water demands during construction and operation.

Table 6-23 Indicative Project Water Demand

Activity	Water Demand (ML / annum)
Construction	
Dust suppression	21.7
Amenities for workers	1.7
Total	**23.4**
Operation	
Cleaning of solar panels	3.2
Amenities for workers	0.07
Landscape watering	2.4
Firefighting supply	Infrequent manual filling as required
Total	**5.7**

6.8.3 Mitigation and Management

6.8.3.1 Construction

Erosion and sediment control for construction will be implemented in accordance with the best practice guidance provided in The Blue Book. As part of the CEMP, a Soil and Water Management Plan (SWMP) will include the following mitigation measures:

- Detailed design will consider limiting the amount of regrading required to minimise the extent of earthworks and disturbance of soil;
- A hazardous material management procedure will be developed in accordance with best practice guidelines including:
  - Directions for maintaining a spill kit during construction;
  - A hazardous material storage procedure;
  - Safety Data Sheets for all substances;
  - Refuelling in a nominated area with bunding;
- All wastewater will be collected and appropriately disposed of to a licensed facility;
- Detailed design of the watercourse crossing, service trenches and solar panel footings will take into account design requirements of NRAR when located on waterfront land;
- Fish passage will be considered during detailed design and if necessary, a fish passage appropriate road crossing would be designed. This scope will be included in a CAA application, if required;
- Water crossings will be designed to limit impact to watercourse flow and with consideration to any aquatic ecosystem requirements. Water crossings will only be constructed where necessary to facilitate access;
- Stormwater flows will be managed through new or realigned drainage swales to avoid footings of the solar array;
- Detailed design will consider vegetation filtration through vegetated swales or buffer areas, a rainwater tank with reuse of roof water, and if necessary further water sensitive urban design devices to manage general water quality;
- Access will be stabilised to prevent sediment being tracked off site by construction vehicles. Sandbags will be placed across the access at the end of work days and before rain events to prevent sediment leaving the Project Area in stormwater runoff;

- Dust will be suppressed on access tracks through water cart application to prevent dust leaving the Project Area and reduce risk of erosion from access tracks;
- A sediment fence will be implemented around the downstream edge of disturbance areas to prevent soil being carried away with stormwater flows. Other measures such as bunds, coir logs, rock checks etc. will be used where appropriate as an alternative edge control;
- Exposed areas of soil will be minimised by only disturbing the surface in areas necessary for completion of construction. Staging of disturbance and progressive rehabilitation will be implemented to limit the total disturbed area at any one time with stabilisation of all disturbed surfaces occurring as soon as practicable. Mulching, planting, binders or blankets will be considered for surface stabilisation;
- Sediment filters will be placed around pits to prevent erosion being washed into the stormwater network and either tracking out of the Project Area or depositing into the stormwater network;
- Dams in any diversion drains or concentrated flow paths will be checked at regular intervals to reduce velocity of the flow and allow any collected sediment to deposit;
- Sediment fencing and drainage diversion will be implemented around stockpiles. Sediment fencing will restrict soil carried off stockpiles from leaving the stockpile area. Drainage diversion will limit flow of stormwater through the stockpile area to reduce the erosion of stockpiles;
- Any excavated topsoil will be stockpiled for re-use to establish revegetation through the Project Area.
- Sediment laden runoff will be directed to sediment dams for treatment. The requirement for basins will be determined at the construction phase by the contractor or designer undertaking soil loss calculations for the average annual soil loss from the area of land disturbance under the Revised Universal Soil Loss Equation (RUSLE) method. The RUSLE method will be undertaken in line with The Blue Book.
- Diversion of clean water catchments around areas of disturbance will occur where possible to limit the volume of surface water through disturbed areas; and
- A CAA will be sought from NRAR prior to works being undertaken on waterfront land as defined by the WM Act. The works on waterfront land will be designed and installed in accordance with the Guidelines for Controlled Activity Approvals (DPE, 2022) to protect the watercourses and avoid / minimise harm. Likely disturbance activities that will require CAA include watercourse road crossings, service trenches, the filling of the dam in the northern array and solar panel footing installation where on waterfront land.

6.8.3.2 Operation

As part of the OEMP, a SWMP will include the following mitigation measures:

- Vegetation and ground cover will be maintained, monitored for any exposed soils and further treatment will be applied as necessary to encourage ground cover to prevent erosion and sediment issues;
- Chemical storage and spills management practices will be documented and implemented in accordance with the regulatory requirements and **Section 6.10**;
- Undertake visual inspections of water quality in accordance with the 'Australian and New Zealand Guidelines for Fresh and Marine Water Quality' (ANZECC, 2000) (ANZECC guidelines). If visual inspections indicate potential water quality impacts from the Project, a monitoring plan will be developed by an experienced professional for implementation in accordance with the ANZECC guidelines;
- Surface areas will be monitored to confirm they remain stable and for signs of erosion. If areas of vegetation are becoming bare, restoration of the vegetation or application of an alternative permanent surface stabilisation technique will be undertaken as necessary;
- Regular monitoring inspections will take place after rainfall events to confirm the Project is not degrading the existing water quality of watercourses within the Project Area;
- Qualitative monitoring will take place at the junction of the fourth order and first order stream at the western extent of the Project Area, where runoff from the Project watercourses leave the Project Area;
- Records of visual inspections will be kept, to identify any need for monitoring frequency or type to be re-evaluated depending on results;

- Unsealed access roads will be maintained regularly during operation. The permanent grading design will consider potential for erosion by limiting the amount of cut and fill, providing appropriate crossfall and drainage to the road and providing rollover banks to direct runoff off the road where the road is steep and perpendicular to contours;
- Changes to the natural drainage regime will be minimised to limit the potential for long term erosion;
- Rainwater reuse will be adopted where feasible to meet water demands, to limit increase in flow from impervious surfaces and reduce dependency on imported water. This will require the installation of rainwater tank/s to collect roof runoff from within the infrastructure compound area and reuse in irrigation and/or toilet flushing. Three 45,000L water tanks will be installed;
- Requirement for how wastewater is to be managed to avoid pollution. Wastewater will be treated by an appropriately designed and maintained onsite sewerage disposal system or disposed of at a suitably licenced facility to accept the waste; and
- Erosion and sediment control requirements and information on appropriate management of chemicals and hydrocarbons during operation, including maintaining a spill kit and best practice storage protocols.

A Decommissioning Soil and Water Management Plan will be developed for the Project.

6.9 Traffic and Transport

6.9.1 Background

A Traffic Impact Assessment (TIA) has been prepared for the Project by Intersect Traffic Pty Ltd (Intersect) and is provided in **Appendix M**. This section summarises the key findings of the TIA. The TIA was undertaken in accordance with the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

6.9.1.1 Site Access

Primary access (Access A) to the Project Area for vehicles will be through a new access track directly off Maison Dieu Road, 1 km east of Knodlers Lane and 5.3 km west of Dights Crossing Road. This will have a turnaround area and car parking space. There will also be an optional secondary access for light vehicles only, off Maison Dieu Road 70 m east of Shearer's Lane (Access B).

In accordance with the requirements of Australian Standard 'AS2890.1- 2004 Parking Facilities – Part 1 Off-street car parking' and 'Australian Standard AS2890.2-2002 Parking Facilities – Part 2 Off-street commercial vehicle facilities', Access A will be greater than 12.5 m wide to cater for the swept turning paths of delivery vehicles. Construction deliveries will be conducted under traffic management as required and the access point will be converted into a rural property access pursuant to relevant Australian Standards upon the completion of the Project. This is considered appropriate as operational traffic at a peak of eight vehicles trips per hour (vtph) will be similar to that experienced by standard agricultural operations.

Access B will only be used by light vehicles as an optional access point for some construction employees. Access B will experience traffic volumes of up to 2 vtph, which is comparable to that of a standard rural dwelling. A rural property access crossing under Australian Standards and SC requirements will be constructed at Access B.

6.9.1.2 Road Network

All plant and materials will be delivered to the Project Area from the NEH (from Newcastle or Sydney) via either Maison Dieu Road or Magpie Street (at McDougall's Hill), then via Maison Dieu Road to Access A.

All outbound traffic from the Project Area will travel along Maison Dieu Road to Magpie Street, then exit Magpie Street to the NEH via the traffic signals. The indicative delivery route for the Project is shown in **Figure 6-9.**



DELIVERY ROUTE

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Google

MAP: Delivery Route
VERSION: A
DATE EXPORTED: 16/04/2024
TECHNICIAN: Natalie.Wood

0 5 10 15 20 25 Km

SCALE 1:700,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-9:

IMPORTANT NOTE
1. This plan was prepared for the sole purposes of the client for the specific purpose of producing a photographic overlay plan. This plan is strictly limited to the Purpose and does not apply directly or indirectly and will not be used for any other application, purpose, use or matter. The plan is presented without the assumption of a duty of care to any other person (other than the Client) ("Third Party") and may not be relied on by Third Party.
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4. The aerial photography used in this plan has not been rectified. This image has been overlaid as a best fit on the boundaries shown and position is approximate only.

PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

An overview of key roads is provided below:

New England Highway

The NEH is a sealed, rural arterial road and a classified state highway (SH9). It connects the Pacific Highway at Newcastle to the major towns of the Upper Hunter and New England to the Queensland border.

Near the Project Area, the NEH is a two-lane, two-way, sealed rural road with a 13 m wide sealed carriageway consisting of 3.5 m wide travel lanes and 3 m wide sealed shoulders / breakdown lane. There are additional turning lanes at major intersections, including the Magpie Street intersection. A westbound overtaking lane is provided on the McDougall's Hill ascent east of Magpie Street. The speed zoning is 80 km/h near the Magpie Street intersection, 60 km/h through Singleton and 100 km/h west of Magpie Street.

Magpie Street

Magpie Street is a local, sealed, industrial collector road and designated B-double route, running between the NEH and Maison Dieu Road. Magpie Street collects and distributes traffic from the McDougall's Hill industrial area to the NEH and provides access to rural properties off the Street.

The length of Magpie Street is two-lane and two-way with a sealed pavement width of 13 m between upright kerb and gutter. This allows two lanes of traffic flow, with parking lanes on both sides of the road. Magpie Street experiences a large amount of heavy vehicle use as it services an industrial estate. The entirety of Magpie Street is centre line marked and the speed limit is 60 km/h.

Maison Dieu Road

Located off the NEH and Magpie Street, Maison Dieu Road is a local, rural collector road that collects and distributes traffic from Maison Dieu to the NEH and provides access to rural properties. 50 km/h speed zoning applies from the NEH to 500 m west of St David's Close, after which a 100 km/h speed zoning applies through to the Project Area. Between the NEH and Enterprise Crescent, Maison Dieu Road has a 9 m sealed carriageway with centre line and edge line marking. Although Maison Dieu Road is not a designated B-double route west of Enterprise Crescent, SC has been consulted in relation to B-double delivery to the Project Area as described in **Section 5**.

6.9.1.3 Traffic Volumes

A traffic classifier was installed on Maison Dieu Road, west of Dights Crossing Road for a 1-week period from 22 February 2023 to 28 February 2023. An intersection traffic count was also completed at the NEH / Magpie Street signalised intersection on 23 February 2023 during the AM and PM peak periods.

A further intersection traffic count was completed at the Magpie Street / Maison Dieu Road intersection on 16 May 2023 during the AM and PM peak hour periods.

The data recorded from traffic classifier installation showed the peak hour traffic periods for the local road network as 8 am to 9 am and 4 pm to 5 pm. The NEH / Magpie Street intersection traffic count showed peak hour flows through the intersection between 7am to 8 am and 4:30 pm to 5:30pm.

The two-way mid-block traffic volumes for the state and local road networks were extrapolated from this data and used as the base existing traffic volumes in the TIA. The two-way mid-block volumes for indicative modelling scenarios are shown in **Table 6-24.**

Table 6-24 Road Traffic Volumes Road

Road	Section	2023 AM vtph	2023 PM vtph	2025 AM vtph	2025 PM vtph
NEH	South of Magpie Street	1,289	1,818	1,341	1,891
NEH	North of Magpie Street	1,130	1,577	1,176	1,641
Magpie Street	West of NEH	337	447	351	465
Magpie Street	North of Maison Dieu Road	148	144	154	150
Maison Dieu Road	West of Magpie Street	104	164	108	171
Maison Dieu Road	West of Dights Crossing Road	32	35	33	36

6.9.2 Impact Assessment

6.9.2.1 Construction

Traffic Generation

The majority of traffic impacts will occur during construction from the workforce of up to 150 FTE and delivery of materials for approximately 18 months. Plant will also be required to be delivered to the Project Area.

Deliveries will be from rigid and articulated vehicles including B-Doubles. The major traffic impacts from the Project will be limited to construction and as such, a conservative 2-year horizon assessment was undertaken. The peak hour traffic generation during construction will be:

- AM peak = 76 inbound vehicles (75 cars, 1 shuttle bus) + 3 x 2 roadworks and other plant + 1 x 2 deliveries

  = 84 vtph (80 inbound and 4 outbound); and
- PM peak = 76 outbound vehicles (75 cars, 1 shuttle bus) + 3 x 2 roadworks and other plant + 1 x 2 deliveries

  = 84 vtph (80 outbound and 4 inbound).

75% of employees are anticipated to travel from Singleton and Lower Hunter (Newcastle and Maitland) with the remaining 25% from Muswellbrook. All deliveries are anticipated to be from Singleton and the Lower Hunter.

The transport route for construction vehicles is shown on **Figure 6-9**.

The trip distribution during the AM and PM peak hours between 7am to 8 am and 4:30 pm to 5:30pm for the Maison Dieu Road / Magpie Street intersection and the New England Highway / Magpie Street intersection is shown on **Figure 6-10**.

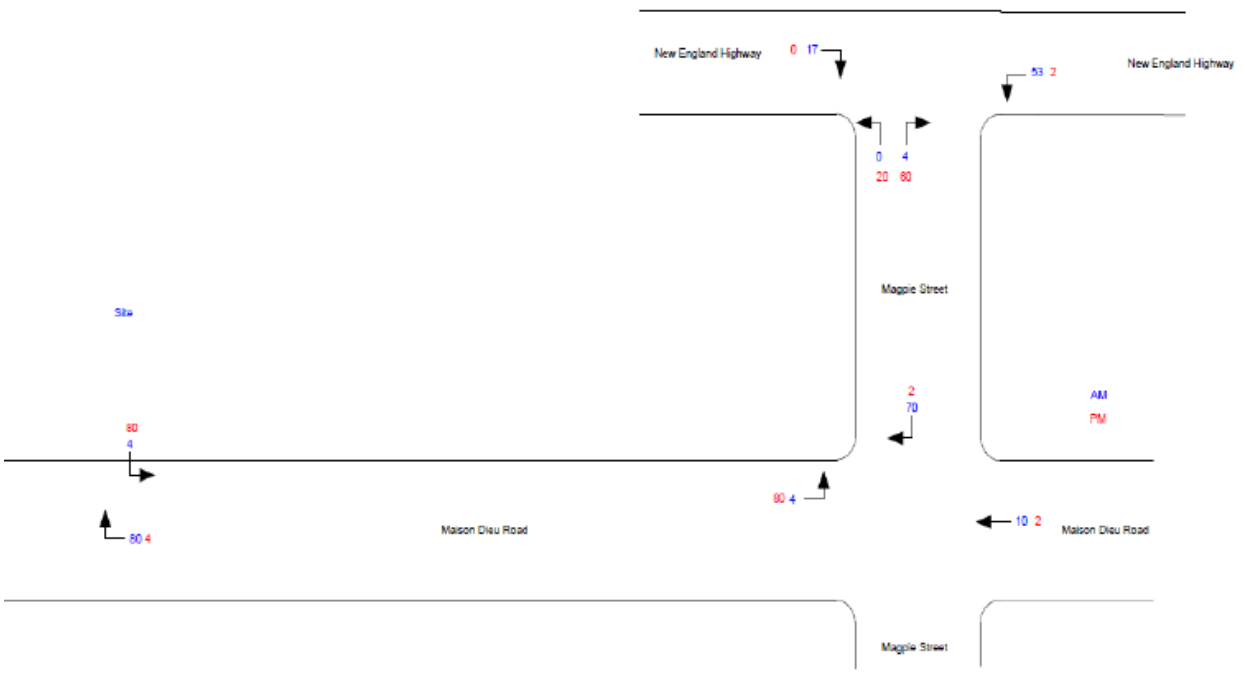


Figure 6-10 Construction Traffic Peak Hour Trip Distribution

Road Capacity

A road capacity assessment was carried out under the 'Guide to Traffic Generating Developments' (RTA, 2002). The mid-block road capacity thresholds for the roads on the transport route are:

- NEH – 2,200 vtph;
- Magpie Street – 1,800 vtph;
- Maison Dieu Road, west of Magpie Street – 1,800 vtph; and
- Maison Dieu Road, west of Dights Crossing – 1,140 vtph.

The addition of the Project's AM and PM peak hour traffic generation of 84 vtph will not cause any exceedances of road capacities and will not have a considerable effect on any mid-block efficiency.

The two-way mid-block road capacity impacts are quantified in **Table 6-25**.

Table 6-25 Mid-block Road Capacity Assessment

Road	Section	Capacity (vtph)	2023 AM (vtph)	2023 PM (vtph)	2025 AM (vtph)	2025 PM (vtph)	Project traffic AM (vtph)	Project traffic PM (vtph)
NEH	South of Magpie Street	2,200	1,312	1,841	1,364	1,914	57	62
NEH	North of Magpie Street	2,200	1,135	1,582	1,181	1,646	17	20
Magpie Street	West of NEH	1,800	365	475	379	493	74	82
Magpie Street	North of Maison Dieu Road	1,800	176	172	182	178	74	82
Maison Dieu Road	West of Magpie Street	1,800	132	192	136	199	84	84
Maison Dieu Road	West of Dights Crossing Road	1,140	60	63	61	64	84	84

Intersection Capacity

A SIDRA (microanalytical intersection assessment software) intersection capacity assessment was undertaken for the NEH / Magpie Road signalised intersection and the NEH / Maison Dieu Road CHR (Channelised Right Turn) / AUL (Auxiliary Left Turn) priority-controlled intersection.

The results of the SIDRA modelling are summarised for the 'all vehicles' case with average delay and Level of Service (LoS) in **Table 6-26.** Full SIDRA movement summary tables are provided in **Appendix M**.

Table 6-26 NEH / Magpie Street SIDRA Summary

Model	Degrees of saturation (v/c)	Average delay (s)	Worst LoS	95% back of queue length (cars)
2023 AM	0.373	14.8	B	8.1
2023 PM	0.498	19.1	B	12.0
2023 AM + construction traffic	0.408	15.5	B	8.9
2023 PM + construction traffic	0.514	20.7	B	12.6
2025 AM + construction traffic	0.425	15.6	B	9.4
2025 PM + construction traffic	0.535	21.0	B	13.3

The SIDRA modelling results show that the intersection operates satisfactorily through the peak of construction with the additional traffic generated by the Project. The additional delay and queue length resulting from Project construction traffic is less than 2 seconds and less than 2 vehicles, with no overall deterioration in LoS.

The traffic volumes at the Magpie Street / Maison Dieu Road intersection and the Project access off Maison Dieu Road during construction and operation are well below the thresholds for uninterrupted flow conditions described in 'Guide to Traffic Management – Part 6 – Intersections, Interchanges & Crossings' (Austroads, 2009).

Access Assessment

In accordance with 'Australian Standard AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking' and 'Australian Standard AS2890.2-2002 Parking Facilities – Part 2 Off-street commercial vehicle facilities', Access A will be a minimum of 12.5 m wide to cater for the swept turning paths for delivery vehicles during the construction stage and to provide access to a user class 1 (long term) car parking facility with less than 25 car spaces fronting a local road.

Considering the temporarily heavier use of Access A for construction, access to the Project through this point will be conducted under a Traffic Management Plan (TMP) with a Traffic Control Plan (TCP) as opposed to constructing a BAR / BAL intersection.

Access A will be converted to a rural property access to SC requirements on completion of the Project as predicted peak operational traffic generation of eight vtph is in line with an average agricultural operation.

Access B will be a light vehicle only access, used only by specific construction employees. Peak traffic volumes will be up to 2 vtph, similar to traffic generation from a rural dwelling. Therefore, Access B will be constructed as a normal rural property access crossing in line with SC requirements.

Sight distances from Access A were determined compliant with 'Australian Standard AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking' (Standards Australia, 2004), which provides a minimum of 160 m for SSD in 100 km/h zones, as well as the requirements of' 'Guide to Road Design – Part 4A – Unsignalised and signalised intersections' (Austroads, 2021) which provides a minimum of 260 m for 100 km/h zones.

Road Safety

Traffic accident mapping for the transport route between the NEH and the Project Area was sourced from the NSW Road Safety Centre website. There have been two accidents on the transport route to the Project in the last five years, both of which occurred at intersections on Magpie Street, south of the NEH. The accidents resulted in multiple serious and moderate injuries. However, a record of two accidents in a five-year period represents a relatively safe road network. There is no accident blackspot along the transport route.

Onsite Car Parking

An onsite car parking assessment was carried out in the TIA using the guidance of the SDCP. The industrial development car parking rates in the SDCP require one space per 75 m². However, due to the lack of permanent infrastructure on site, there is no official requirement for onsite car parking under the SDCP.

Construction employee car parking will be provided on the grassed areas adjacent to the construction lay down area. This area is sufficient to cater for the provision of at least 75 on-site car parks plus a shuttle bus laydown area, which is the expected peak parking demand for 150 construction employees.

It is assumed that during the peak of construction there will be significant ride sharing. There is significant overflow parking to cater for employee traffic and any specialised maintenance work that may be required during operations.

The car parking area will comply with ‘AS2890.1-2004 Parking Facilities – Part 1 Off-street car parking’ (Standards Australia, 2004) with parking bay sizes of at least 2.4 m x 5.4 m and aisle widths of 5.8 m’’--.

OSOM Route

Up to three OSOM deliveries will be required due to the relatively large size of some components. A vehicle up to 30 m in length, 5 m in width and 5.2 m in height will be utilised for this purpose.

A main transformer will also be transported but its weight and dimensions mean that it can be transported on a low loader trailer under gazette notice.

The transport routes were assessed in the ‘Maison Dieu Solar Farm OSOM Route Study’ (Ares, 2024) as included in **Appendix N** and will be used by RAVs for OSOM deliveries:

- Port Botany – via Bumborah Point Road, Botany Road, Beauchamp Road, Denison Street, Wentworth Avenue, Botany Road, Gardeners Road, Kent Road /Canal Road, Princes Highway, Forest Road, Stoney Creek Road, King Georges Road, M5, M7, M2, M11, Pennant Hills Road (if over height), M1, Hunter Expressway, NEH and Maison Dieu Road; or
- Port of Newcastle – via Quayside Close, Selwyn Street, George Street, Industrial Drive, Pacific Highway, John Renshaw Drive, Hunter Expressway, NEH and Maison Dieu Road.

An alternate route through Magpie Road off the NEH may also be taken to enter the Project. All heavy and OSOM vehicles exiting the Project Area will use this route. The transport routes were determined by Intersect to be safe with no requirement for upgrades.

Public / Alternate Transport

The Project Area is not serviced by any forms of public transport. There is one school bus service running from Singleton to Maison Dieu via McDougall’s Hill. The Applicant will liaise with the bus service provider to avoid interference with bus schedules during construction.

There are no pedestrian footpaths or cycleways within the local road network surrounding the Project Area. Pedestrians would have to use the grassed verges and road shoulders around the Project Area and cyclists would have to use the road shoulders and share the general traffic lanes.

Therefore, the Project will not impact public transport.

6.9.2.2 Operation

Operational traffic will involve one staff light vehicle movement associated with maintenance inspections as required and short term, infrequent maintenance work. A conservative peak hour traffic generation of 10 vtph has been assumed based on five personnel in five vehicles with one visit each per day. Occasionally specific maintenance tasks will be required. Maintenance works will be infrequent, short-term and controlled by TMP.

6.9.2.3 Cumulative Impacts

The Singleton Bypass is a planned major road network improvement, running around the western side of Singleton and connecting to the existing NEH north of Magpie Street. The bypass will reduce traffic volumes on the old highway through Singleton and increase the capacity within the existing NEH / Magpie Street signalised intersection.

At the time of composing this EIS, the bypass is still under environmental assessment and is unlikely to be open prior to 2026. However, should the bypass be in place by the time the Project enters its construction stage, traffic volumes on the NEH at the Magpie Street intersection will be significantly reduced. The Project will have less impact on the local and state road network with major redirection of other traffic through the Singleton Bypass. The Singleton Bypass project is currently scheduled to be open to traffic in 2026. Maison Dieu Solar Farm is expected to be operational in 2026, before the Singleton Bypass is open. Due to the operational generation of traffic from the Project being so low, it is not expected to materially contribute to cumulative impacts. Engagement with TfNSW will occur during construction of the Project in relation to the Singleton Bypass and any other relevant cumulative impacts that actually occur during Project construction.

6.9.2.4 Decommissioning

Once the Project reaches the decommissioning phase, additional traffic will be generated. Decommissioning traffic generation will be similar to that of construction traffic and will be addressed through a Decommissioning TMP. This phase will not be reached for a minimum of 30 years.

6.9.3 Mitigation and Management

- A TMP will be prepared for the Project including:
  - A map of the primary transport route/s highlighting critical locations;
  - An induction process for vehicle operators and regular toolbox meetings;
  - Procedures for travel through residential areas, school zones and/or bus route/s;
  - Any proposed temporary measures such a Traffic Guidance Scheme (TGS);
  - A Driver Code of Conduct for heavy vehicle operators;
  - A complaint resolution and disciplinary procedure; and
  - A requirement for all outbound traffic to use the Magpie Street traffic signals to access the NEH.
- A TCP will be prepared for the Project under which all access during construction will be conducted; and
- A dilapidation report will be prepared for Maison Dieu Road, west of Enterprise Crescent, in consultation with SC to identify pavement damage caused by the construction of the Project and ensure the road network is repaired as required after construction is completed;
- Site inspections of the transport route along Maison Dieu Road, west of Enterprise Crescent will be conducted pre and post construction to inform the dilapidation report;
- A Decommissioning TMP will be prepared prior to decommissioning and will address traffic impacts at the decommissioning phase, which will not be reached for a minimum of 30 years; and
- A Road Safety Audit of the transport route to the Project will be undertaken if required prior to the commencement of construction.

6.10 Preliminary Hazards

6.10.1 Background

A PHA of the Project was conducted by Riskcon Engineering Pty Ltd and provided in **Appendix O**.

The PHA considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

6.10.2 Methodology

6.10.2.1 Multi-Level Risk Assessment

The PHA utilises the NSW DPHI Multi-Level Risk Assessment approach as the foundation to determine the appropriate level of risk assessment for the Project. The key factors considered include the location of the Project, the amount and type of DGs and the technical and safety management control. The Multi-Level Risk Assessment approach assists consultants and consent authorities to perform risk assessments at appropriate levels for different types of projects.

A Level 2 Assessment was selected under the Multi-Level Risk Assessment guideline. This approach provides a semi quantitative DG assessment. Each consequential step of the PHA is outlined below.

6.10.2.2 Hazard Analysis

This preliminary stage of the PHA identifies hazards for the facilities and operations associated with the Project. Hazard analysis details type, causes, consequences and safeguards for any potential onsite or offsite impacts, in accordance with 'Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis' (NSW Department of Planning, 2011) (HIPAP No 6). **Table 6-27** represents the Hazard Identification Table prepared by Riskcon during hazard analysis. The following hazardous scenarios were considered based on the hazard identification table developed during the PHA:

- Lithium-ion battery fault, thermal runaway and fire;
- Victorian Big Battery fire review;
- Lithium-ion battery fire and toxic gas dispersion;
- Electrical equipment failure and fire;
- Transformer internal arcing, oil spill, ignition and bund fire;
- Transformer electrical surge protection failure and explosion; and
- Electromagnetic field (EMF) impacts.

6.10.2.3 Further Analysis

The consequence analysis stage focuses on modelling offsite impacts identified during hazard analysis and comparing results to criteria listed in 'Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning' (DPIE, 2011) (HIPAP No 4). Consequence analysis provides solutions for onsite impacts and identifies offsite impacts requiring frequency analysis.

This stage of PHA considers possible events that would have offsite impacts and the likelihood of safeguards failing to prevent harm. These results are then used to calculate risk and perform the risk assessment and reduction phase. The results from consequence and frequency analyses' are combined for potential offsite impacts without immediately apparent solutions. The results are then compared to criteria from HIPAP No. 4.

Where any criteria are exceeded, major risk factors are reviewed and the risks are reassessed, incorporating the recommended risk reduction measures. Recommendations are made from the results of this stage of the PHA.

6.10.3 Impact Assessment

Table 6-27 represents the Hazard Identification Table prepared by Riskcon as part of the PHA.

Table 6-27 Hazard Identification Summary

Area	Cause of Hazard	Consequence of Hazard	Safeguards
Battery storage	Failure of Lithium-ion battery protection systems.	• Thermal runaway resulting in fire or explosion. • Incident propagation through battery cells. • Toxic smoke dispersion.	• Batteries are tested by manufacturer prior to sale / installation. • Overcharging and electrical circuit protection • Battery monitoring systems. • Batteries composed of subcomponents (i.e. Battery Backup Unit (BBU) cells) reducing risk of substantial component failure). • Batteries are not located in areas where damage could easily occur (i.e. are within fenced areas). • Electrical systems designed per AS/NZS 3000:2007 • 'UL9540A Test Method' (UL9540A) testing.
Switch rooms, communications, etc.	Arcing, overheating, sparking, etc. of electrical systems.	Ignition of processors and other combustible material within servers and subsequent fire.	• Fires tend to smoulder rather than burn • Isolated location. • Switch room separation from other sources of fire.
Substation	Arcing within transformer, vaporisation of oil and rupture of oil reservoir.	Transformer oil spill into bund and bund fire.	• Bunding. • Isolated location.
Substation	Power surge to transformers (e.g. from lightning).	Major failure of surge protection in transformer, vapourisation of mineral oil, ignition and explosion.	• Transformers have surge protection system to shut down upon detection of extreme energy input. • Lightning protection to prevent lightning strikes impacting transformers. • Control of ignition sources – no smoking / open flames around the transformers.
EMF	Electric and magnetic equipment.	Generation of ELF (Extremely low frequency) EMF and injury / nuisance to surrounding area.	• Large separation distances allow for attenuation of EMFs. • Cumulative impacts from equipment below acceptable thresholds. • Low occupancy density within vicinity of the development.

6.10.3.1 Dangerous Goods

A preliminary risk screening was carried out in consideration of the quantities of DGs stored within the Project Area. **Table 6-28** details maximum DG quantities anticipated to be stored at the Project with reference to relevant SEPP thresholds. None of the proposed DG quantities reach the relevant *SEPP (Resilience and Hazards) 2011* threshold requiring further assessment.

Table 6-28 Maximum Quantities of DGs Stored and Preliminary Risk Screening

Area	Item	Description	Material	Class	Quantity (L)	SEPP Threshold
Solar farm substation	Main power transformer	1x Tx. 70MVA, 25,000 L	Transformer mineral oil	C1	25,000	N/A
Solar farm substation	Backup generator	Diesel genset with 300 L tank	Diesel	C1	300	N/A
AC BESS	Inverter skids	7 x 40 ft, 25 t, 3,500 L inverter skids	Transformer ester oil	C1	24,500	N/A
AC BESS	Battery containers	24 x lithium-ion batteries in 20 ft containers	Batteries	9	-	N/A
PV Array	Inverter skids	11 x 40 ft, 25 t, 3,500 L inverter skids	Transformer ester oil	C1	38,500	N/A

N/A = Exempt or non-applicable to Applying SEPP 33 (DPIE, 2011).

6.10.3.2 Lithium-ion Battery Fault, Thermal Runaway and Fire

Despite upholding a reputation as one of the safest chemical battery types, lithium-ion batteries carry some degradation risks that can result in thermal runaway. The mechanisms that cause degradation of lithium-ion batteries are generally a result of high discharge, overcharging or water ingress into the battery, resulting in the formation of byproducts inside the battery.

To address these risks, lithium-ion batteries are fitted with standard safety features such as shut-down separators, tear-away tabs, vents and thermal interrupts, making the risk of thermal runaway during normal operation very low.

The Project will use lithium-ion phosphate batteries, which have a maximum thermal rise of 1.5°C/min. This means the temperature of the battery rises slowly compared to typical lithium-ions, negating the risk of fire and incident propagation to other batteries. Lithium-ion phosphate batteries are also protected against shock damage, as puncturing these batteries does not result in ignition. If a lithium-ion phosphate battery is to catch fire by artificial means, carbon dioxide is released, supressing the combustion rate by reducing the oxygen concentration in the stainless-steel enclosure, which would be fitted with fire protection devices. The batteries are also fitted with a fire suppression system.

6.10.3.3 Victorian Big Battery Fire Review

A case study was performed considering the recent large-scale BESS fire at Victorian Big Battery (VBB), to determine whether a similar incident could occur with the Project.

The primary contributor to fire propagation at VBB was strong wind blowing flames from one Megapack into the unprotected vent atop of an adjacent Megapack, igniting a plastic fan and consequently impacting the battery modules directly beneath the fan.

The Project has incorporated findings from the investigation of the VBB fire, including:

- The vent covers of the BESS will be constructed of non-combustible material; and
- The vents will not be located above battery packs within the BESS container.

A similar fire propagation event at the Project is considered unlikely.

6.10.3.4 Lithium-ion Battery Fire and Toxic Gas Dispersion

In the unlikely event of BESS failure resulting in a fire, toxic by-products of combustion would be produced. The following gases may form from BESS fire:

- Carbon dioxide;
- Carbon monoxide; and
- Fluorine gases.

The PHA determined that in the event of a BESS fire, carbon dioxide and carbon monoxide would not be produced in a quantity that could produce downwind consequences. The chance of the initiating event for fluoride gases of concern to form and be dispersed were considered negligible.

6.10.3.5 Electrical Equipment Failure and Fire

If electrical equipment in the switch room overheats or arcs, a fire may occur. Due to the nature of electrical equipment fires tending to smoulder before burning, fire is be considered to be relatively slow in growth and would be unlikely to result in substantial impacts.

6.10.3.6 Transformer Internal Arcing, Oil spill, Ignition and Bund Fire

Arcing can occur in transformers if the oil level is insufficient. In the unlikely event that arcing causes pressurisation above the level the structural integrity and protection systems fitted on the transformer can handle, a rupture is possible. This rupture could potentially release oil into the bund and oxygen into the reservoir, ultimately causing an oil fire in the bund.

The PHA considered the separation distance to other infrastructure and the Project Area, along with the low potential for failure of transformers and determined potential impacts to be unlikely.

6.10.3.7 Transformer Electrical Surge Protection Failure and Explosion

If a transformer was to receive a massive surge of energy, such as that from a lightning strike, and electrical protection measures were to fail, mineral oil may vaporise and ignite. This would subsequently cause explosion as the transformer ruptures. The PHA determined that although an explosion may have the potential for impacts outside the Project Area, the transformer units used in the Project are ubiquitous and have a low potential for failure.

6.10.3.8 Electromagnetic Field Impacts

Generally, BESS' create EMF at an ELF, between 30 and 300 Hz. There are currently no standards in Australia for exposure limits to ELF EMFs.

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) created guidelines suggesting exposure should be limited to 2,000 milligauss (mG) for members of the public in a 24-hour period. EMFs around devices are generally close to zero due to the shielding provided around the equipment. In addition, EMF levels drop away quickly with distance.

The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) advises that the strength of radiation decreases exponentially with distance from the source and that it becomes indistinguishable from background radiation within 5-10 m of a substation.

With the closest non-associated residential receptor being 650m from the proposed BESS location, there will be no exceedance of the recommended 2,000 mG.

6.10.3.9 Conclusion

The PHA concluded that the Project does not carry any risk of potential offsite impacts and will not exceed any relevant risk criteria.

6.10.4 Mitigation and Management

The following mitigation measures will be undertaken:

- The BESS will be tested in accordance with UL9540A, the standard Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems. This testing will demonstrate clearances are appropriate to prevent propagation of fires between separated units;
- The BESS will be designed and installed to ensure appropriate clearances between units in accordance with manufacturer data sheets and UL9540A testing;
- The BESS design and installation will incorporate fire protection systems specified by the manufacturer and UL9540A; and
- UL testing information will be made available to the certifying authority (DPHI) upon request, under a confidentiality agreement if required.

6.11 Bushfire

6.11.1 Background

A BAR was prepared for the Project by Bushfire Planning Australia (BPA) and provided in **Appendix P**. The BAR was prepared considering the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

Bushfire season in the Singleton LGA generally occurs between September and March. Prominent north-west to westerly winds along with high day-time temperatures and low humidity levels contribute to fire risk in the area during bush fire season.

A review of historical bushfire data for the Project Area and surrounds revealed previous bushfires have been relatively small in both size and impact.

Under the ‘Singleton Bush Fire Risk Management Plan’ (Singleton Bushfire Management Committee, 2011) (SBFRMP), the Ausgrid Singleton Substation is Priority 4 (medium) risk and is considered unlikely to be affected by fire as shown on **Figure 6-11.** However, if the substation were to be affected by bushfire, the consequences would be major. Transformers within the substation contain transformer oil, which is highly flammable. Transformers can explode when exposed to heat and flame. The exposure of the substation to fire has a potential to cause infrastructure loss, which would need to be replaced.

The Project involves Class 5-8 and 10 buildings under the National Construction Code. The following objectives from Section 8.3 of PBP 2019 are relevant to the Project:

- To provide safe access to/from the public road system for firefighters providing property protection during a bush fire and for occupant egress for evacuation;
- To provide suitable emergency and evacuation (and relocation) arrangements for occupants of the Project;
- To provide adequate services of water for the protection of buildings during and after the passage of bush fire, and to locate gas and electricity so as not to contribute to the risk of fire to a building; and
- Consideration of storage and hazardous materials away from the hazard wherever possible.

6.11.2 Methodology

A bushfire hazard assessment was undertaken in accordance with the submission requirements of Appendix 2 of PBP 2019. Buffers as described below are shown on **Figure 6-11.**

6.11.2.1 Vegetation Assessment

Vegetation classification throughout the Project Area and up to the required 140 m from the boundaries of the Project Area under PBP 2019 was performed with the following steps:

- Aerial photograph interpretation to map the vegetation classification and extent;
- Reference to NSW State Vegetation Type (DPIE, 2021); and
- Site inspection on 11 October 2023.

As an additional precaution, vegetation was assessed for potential bushfire risk to 5 km from the Project Area. The vegetation classification is based on the revised Table 2.3 in AS3959- 2018 and Appendix 1 of PBP 2019. Any inconsistencies between the maps were inspected and quantified during the site inspection, then compared to the recognised vegetation formations described in 'Ocean Shores to Desert Dunes: The Native Vegetation of New South Wales and the ACT' (Keith, 2004) (Keith Vegetation Types). Hunter Macleay Dry Sclerophyll Forest and Coastal Floodplain Wetlands were the two prominent vegetation types identified within the Project Area and the 5 km buffer zone.

6.11.2.2 Slope Assessment

The following steps were undertaken to carry out a slope assessment with a buffer zone of 140 m around the Project Area:

- Review of LiDAR point cloud data including Digital Elevation Model (NSW LPI) (DEM);
- Slope analysis (5-degree increments); and
- Detailed survey of existing contours.

The effective slope was then calculated under vegetation where a fire run greater than 50 m was determined to occur. The topography of the Project Area was assessed to determine the average slope and maximum slope. These values determine gradients in the area that would significantly increase fire activity.

6.11.2.3 Bushfire Protection Measures

To comply with PBP 2019, the Project must:

- Note the range of available Bush Fire Protection Measures (BPMs);
- Satisfy the aims and objectives of PBP 2019;
- Consider any matters listed for the specific purpose; and
- Propose an appropriate combination of BPMs.

Recommendations were devised and assessed in line with PBP 2019. These recommendations are presented in **Section 6.11.4**.

6.11.2.4 Asset Protection Zones

An APZ is a setback around a development that is applied to reduce the bushfire risk to life and property. Management of APZs involves the removal and continual management of vegetation to create a buffer around the Project, reducing potential flame contact and radiant heat exposure in a fire event, while providing access for firefighting if needed. Requirements for APZ width depend on slope and the types of hazards present.

The intensity of the potential radiant heat exposure during a bushfire event was calculated at several locations within the Project Area using the bushfire assessment tool 'NBC Bushfire Attack Assessor V4.1'. The following factors were used to determine the APZs for the Project:

- The nominated fuel loads for the respective vegetation classifications published by the RFS in March 2019;
- The site characteristics identified during desktop assessment and site inspection; and
- The effective slopes obtained from the DEM.

6.11.3 Impact Assessment

6.11.3.1 Bushfire Prone Land

According to NSW RFS BPL mapping, the majority of the Project Area is located within Category 3 BPL, with small sections of Category 1 BPL throughout. Considering a buffer of 140 m around the Project Area, Vegetation Category 3 BPL is prominent, with some Category 1 BPL along the Hunter River and to the north and east of the Project Area. The primary bushfire risk to the Project in terms of BPL is the Category 1 BPL to the south-west of the Project Area as shown on **Figure 6-11.**

6.11.3.2 Vegetation and Slope Assessment

The vegetation located towards the north and north-western sections of the Project Area contain forested wetlands (Coastal Floodplain Wetlands) and forest (Hunter Macleay Dry Sclerophyll Forest) formations. Hunter Macleay Dry Sclerophyll Forest extending to the eastern section of the Project Area and beyond is the primary bushfire hazard in terms of vegetation. Most of the other vegetation within and around the Project Area is considered low-threat vegetation.

Land within 20 m of the BESS and substation has been highly disturbed by clearing and grazing and is considered low-threat vegetation, not required to be considered under PBP 2019. Due to the historical clearing and disturbance of the Project Area, there are no environmental features of significance to be considered.

The results of the slope and vegetation assessments were then used to determine the relevant APZs. The results alongside the recommended APZs are detailed in **Table 6-29.**Asset Protection

PBP 2019 requires site accesses to be designed in a way that allows safe operational access to structures and water supply, along with provision for effective emergency and operational response. The Project's access track design was cross referenced against PBP2019 and was found to satisfy the requirements for property access roads. Access track design is shown on **Figure 3-1**.

The BESS has a relatively low fire potential with no flammable material stored, handled or produced. Generally, a BESS is designed by manufacturers with a high degree of fire control built in. Mitigation measures are provided in **Section 6.11.4** to minimise the chance of fire affecting the BESS.

The location of gas services within the Project Area will be determined during detailed design. Appropriate mitigation measures are provided in **Section 6.11.4** to ensure gas service placement will not lead to ignition of surrounding vegetation or buildings. The Project will not be connected to a reticulated water supply, so a static water supply is required for firefighting purposes. Water supply is addressed in **Section 6.8**.

The BAR determined an APZ of 10 m around all solar farm and BESS infrastructure is required, through calculation using the NBC Bushfire Attack Assessor V4.1. In the unlikely event that emergency services are needed, the NSW Fire and Rescue station is located 11 km south-east of the Project Area at 1A Pitt St, Singleton NSW 2330. **Table 6-29** details the recommended APZs in relation to each vegetation type within the Project Area.

Table 6-29 Vegetation and Slope Assessment Results and APZs

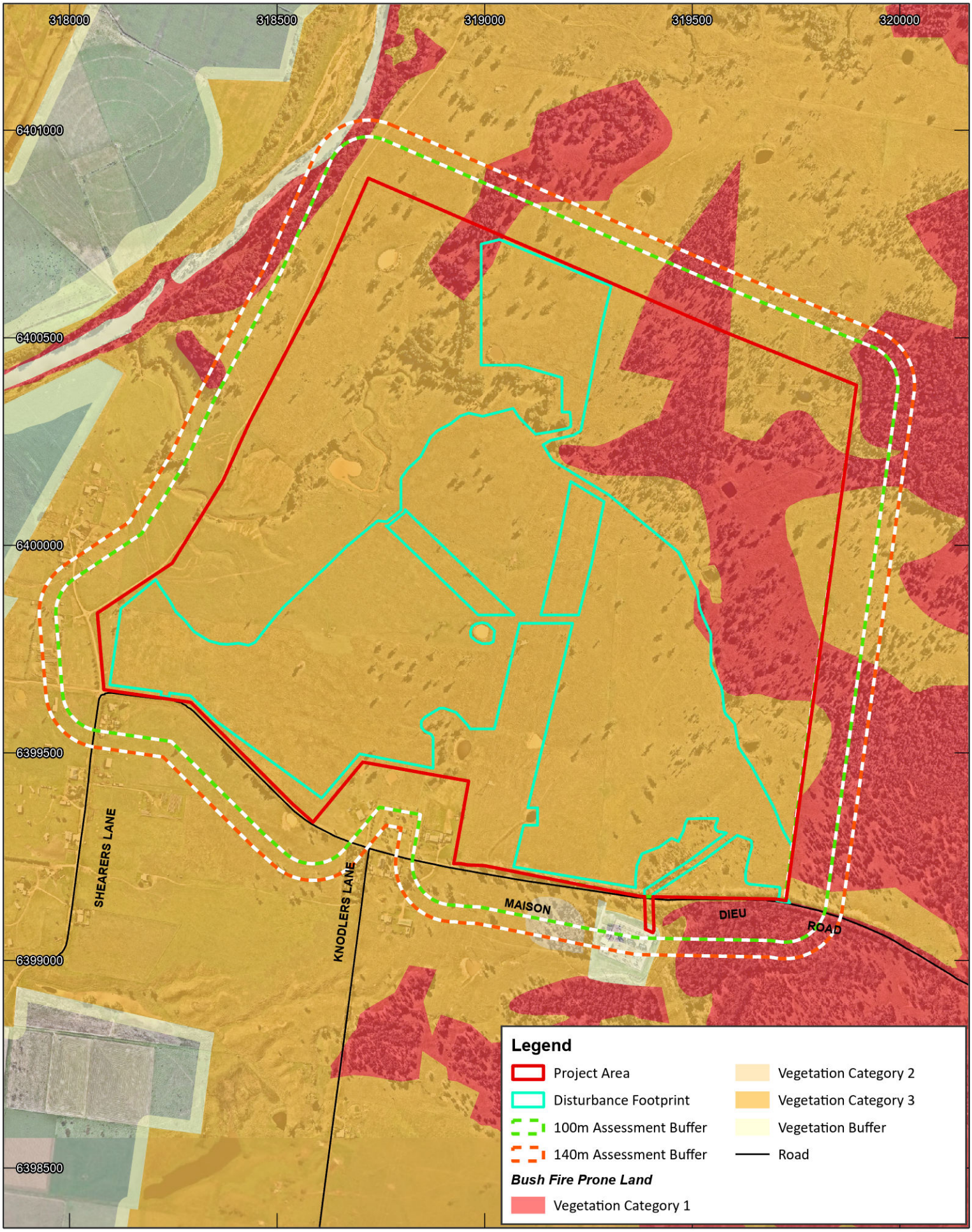
Direction	Vegetation Classification PBP 2019	Slope	APZ
North	Excluded (disturbed land)	4.2° downslope	NA
East	Forest (Hunter Macleay Fry Sclerophyll Forest)	-1.3° upslope	10 m
East	Forest (Hunter Macleay Fry Sclerophyll Forest)	-0.4° upslope	10 m
South	Excluded (disturbed land)	-3.5° upslope	NA
South	Forest (Hunter Macleay Fry Sclerophyll Forest)	-2.5° upslope	10 m
South	Forested Wetlands (Coastal Floodplain Wetlands)	3.7° downslope	10 m
West	Excluded (disturbed land)	-1.3° upslope	NA
North-west	Excluded (disturbed land)	4.5° downslope	NA
North-west	Excluded (disturbed land)	-0.3° upslope	NA
North	Excluded (disturbed land)	4.0° downslope	NA
North	Excluded (disturbed land)	2.9° downslope	NA
All land that does not fall under a PBP 2019 Veg Class	Grassland	<5.0° downslope	<10 m

6.11.4 Mitigation and Management

A Bushfire Emergency Management and Operations Plan (BEMOP) will be prepared for the Project in consultation with relevant regulators. The Project will incorporate the following measures:

- The Disturbance Footprint will be managed as an Inner Protection Area (IPA) as outlined within Appendix 4 of PBP 2019 and the 'Standards for asset protection zones' (RFS, 2019);
- A firebreak of 10 m around all solar farm and BESS infrastructure will be maintained as an APZ;
- No part of the BESS (including any ancillary structures, buildings, containers or equipment) will be installed within the APZ;
- Access tracks will be constructed in accordance with Table 5.3b and Chapter 7.4a of PBP 2019;
- A minimum of three separate water tanks with 45,000L capacity each must be provided, dedicated for firefighting purposes. The water storage tanks will be located adjacent to internal access roads within 120 m of infrastructure. One of the water storage tanks will be placed at the main entrance to the facility;
- The water tanks will be installed in accordance with the requirements outlined in the BAR;
- Consideration will be given to landscaping and fuel loads within the Project Area to decrease potential fire hazards;
- All hazardous materials to be stored on land within 100 m of any designated BPL will be stored in a secure enclosure away from the bushfire hazard;
- The BESS section of the Project Area will be managed as an APZ, with vegetation clearance to any connecting transmission lines complying with the 'Guideline for Managing Vegetation Near Power Lines' (Industry Safety Steering Committee, 2016) (ISSC3 Guidelines) and any applicable local network provider operating procedures;
- Any reticulated or bottled gas will be installed and maintained according to the requirements of the relevant authorities and AS 1596-2002; and
- Vegetation clearance to any connecting transmission lines will comply with the ISSC3 Guidelines' and any applicable local network provider operating procedures.

Relevant fire regulatory will be consulted and given the opportunity to review and provide comment regarding the proposed fire and life safety systems during the detailed design phase of the Project.



BUSHFIRE PRONE LAND

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CLIENT, RPS, NSWSS, Nearmaps 6/05/2022, Maxar

MAP: Bushfire Prone Land
VERSION: A
DATE EXPORTED: 9/05/2024
TECHNICIAN: NATALIE.WOOD

0 100 200 300 400 m

SCALE 1:11,614
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-11:

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PROJECT PATH: C:\OnedrivePortal\OneDrive - RPS Group\MaisonDieuSF\03_Projects\AU213007278_EISFigures.aprx

6.12 Air Quality

This section discusses the potential impacts to air quality from the Project's activities during construction, operation and decommissioning. Appropriate mitigation measures are identified to ensure air quality impacts from the Project are avoided and / or minimised.

The air quality impact assessment considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

6.12.1 Background

Background air quality is generally characterised by climatic conditions and strongly influenced by the land uses and nature of the locality.

Rainfall is variable in the area from season to season and from year to year, however other climatic conditions are relatively stable. The most commonly occurring wind directions experienced in the area are from south-east and west to north-west.

The mining and agriculture industries are prominent in the vicinity of Maison Dieu, each of which generate dust emissions from ground-disturbance activities. A description of the Project's locality and climate is provided in **Section 2.2**.

Although receptors in the area are currently influenced by dust produced as a result of coal mine operations, the background air quality at the Maison Dieu Air Quality Monitoring Station generally sits in the "good" and "fair" AU-NSW Air Quality Categories, with days in the "poor" category, based on a review of NSW Government PM10 monitoring data.

6.12.2 Methodology

A qualitative impact assessment was undertaken to determine the air quality impacts to both human and ecological sensitive receptors within the vicinity of the project. There is currently no standard methodology for qualitative air quality impact assessment in Australia. Solar farm developments generally produce negligible air quality impacts in operation. The primary air quality concern from solar farm developments is construction dust emissions. 'Guidance on the Assessment of Dust from Demolition and Construction' (Institute of Air Quality Management, 2014) (GADDC), was elected as the most appropriate guideline for assessing the air quality impacts of the Project.

GADDC details the potential impacts of construction dust to receptors and factors that can increase or decrease the risk of encountering these impacts. There are four construction activities that can cause air quality impacts: demolition; earthworks; construction and track out. The following methodology was used to determine potential air quality impacts resulting from the construction, operation and decommissioning of the Project considering Section 5 of GADDC:

- Screen the requirement for specialist assessment;
- Assess the risk of dust impacts for earthworks, construction and track out (no demolition required for the Project); and
- Determine appropriate, site-specific mitigation measures.

The GADDC represents an appropriate approach to assessing the particulate matter impact risk associated with short-term construction and demolition projects.

6.12.3 Impact Assessment

The below sections discuss potential air quality impacts that may be generated by the Project during construction, operation and decommissioning. Minor GHG emissions associated with construction equipment will also be generated. The Project was determined to require assessment generally in accordance with GADDC due to the existence of human receptors within 350 m of the Project Area.

6.12.3.1 Construction

Air quality impacts will mostly be associated with temporary and limited construction sources:

- Localised dust emissions from land disturbance; and
- Exhaust emissions from civil works and associated machinery and plant.

Construction of the Project will continue for up to 18 months. During this phase, dust particles and other air quality emissions will be released from the following activities.

- Upgrading existing access tracks and construction of new access tracks;
- Grading, levelling and earthworks;
- Grading for the implementation of sediment/erosion controls and water management structures;
- Minor earthworks including security fencing holes;
- Minor trenching and land forming including localised cut and fill;
- Driven, predrilled or screw piles;
- Installation of mounting structures and tracker torque tubes;
- Excavation of trenches and laying of power and instrumentation cables;
- Installation of site signage;
- Installation of concrete foundations;
- Installation of PCUs, BESS, maintenance compound, O&M facility and associated infrastructure; and
- Vehicle / machinery track out.

Dust generation is expected to be localised and will be mitigated through implementation of standard management measures.

6.12.3.2 Operations

No significant dust generation is expected during operation. Exposed areas and roads will be treated or rehabilitated. With up to 5 FTE employees during operations and maintenance, vehicle impacts will be significantly less than during construction.

6.12.3.3 Decommissioning

Minor levels of dust will be generated during decommissioning and rehabilitation as a result of structures being removed and areas being temporarily exposed. This will only occur for a short duration before rehabilitation vegetation is established on exposed areas.

Air quality impacts during decommissioning will be less than those during construction and mitigated through standard management measures. The Applicant will consider best available technologies to avoid and minimise air quality impacts, which may include the potential for decommissioning to be undertaken using future technologies, where practical.

6.12.3.4 Greenhouse Gas Emissions

Direct GHG emissions (Scope 1) include those that result from:

- Combustion of fossil fuels required for the construction and maintenance of the Project;
- The manufacture of cement / raw materials required for the Project; and
- Intentional or unintentional releases including equipment leaks or during the use of refrigeration equipment, or methane leakages from gas transport.

Continued use of heavy machinery, equipment and heavy vehicles will be limited to the construction and decommissioning phases and emissions will be localised.

The Project will generate electricity without directly emitting air pollutants that are known to affect the climate and human health during operations. Ongoing maintenance of the Project and the land within the Project Area will require minor, localised vehicle and machinery emissions.

The Project will contribute to the general improvement of air quality locally and broadly through the displacement of GHG emissions that would otherwise be generated by fossil fuels combustion to generate electricity through coal power stations. The Project will contribute to the reduction of Australia's dependence on CO^2 emitting power sources going forward.

The Project will not produce or permit offensive odours pursuant to section 129 of the POEO Act.

6.12.4 Mitigation and Management

Specific mitigation measures will ensure that the Project does not generate significant air quality impacts during construction, operation or decommissioning and temporarily generated dust is minimised.

The Applicant will implement the following mitigation measures which will be incorporated into the CEMP:

- Water or prepare roadways with coarse gravel (or equivalent) where feasible to minimise wheel-generated offsite dust emissions / tracking;
- Stabilise and/or cover material loads which have a potential to generate dust (e.g. construction aggregates during transport to the site);
- Minimise vegetation clearing;
- Manage soil stockpiles through stabilisation, light watering and/or the use of covers;
- Manage vehicle speed when travelling on unsealed roads;
- Use variable dumping speeds from tip trucks in consideration of weather conditions;
- Minimise vehicle movements, where practicable;
- Regularly clean and wash vehicles, plant and equipment;
- Revegetate and stabilise disturbed areas which are inactive for extended periods of time or no longer required;
- Regular inspection and maintenance of all vehicles, plant and equipment to ensure operational efficiency; and
- Regular monitoring of environmental conditions (e.g. wind and existing dust environment) during construction, that may result in increased dust generation and implementation of control measures as specified above.

No additional GHG mitigation measures are required for the Project.

6.13 Waste Management

A detailed desktop waste assessment was conducted to assess and classify waste streams, opportunities for reuse and the impact upon the environment and local waste management facilities. The waste assessment considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

The following sub-sections present the findings of the detailed waste impact analysis along with management measures to be employed during the construction, operation and decommissioning phases to minimise waste associated with the Project and its impact on landfill and maximise the reuse and recycling of associated materials.

6.13.1 Background

The Project will produce a variety of waste streams throughout construction, operation and decommissioning. The waste produced will be typical of a smaller scale SSD solar farm, with minimal to negligible waste production during operation and a peak during decommissioning.

The amount of waste generated from solar energy projects hitting landfill is expected to have increased considerably by the decommissioning phase of the Project. However, the NSW Government has created a $10M Circular Solar Fund to support new technology development and adoption to manage solar project waste at decommissioning and assist with the transition to a circular economy. This waste assessment has been designed conservatively with worst-case scenario in mind. It is likely that the realised waste impacts of the Project will be less than those predicted in this EIS.

This waste assessment addresses a range of statutory obligations. The POEO Act and the *Protection of the Environment Operations (Waste) Regulation 2014* govern waste management requirements and offences in NSW. It is an offence under Section 143 of the POEO Act to unlawfully transport or dispose of waste.

Waste management objectives and management measures are derived from the legislation and guidelines mentioned below. The primary goals of the waste management mitigation measures below are to avoid unnecessary resource consumption, prioritise resource recovery and minimise unnecessary disposal.

The existing waste management environment of the Project Area is characterised by the current uses of the land. The land within the Project Area is used primarily for agricultural grazing. Therefore, waste management action and prioritisation currently lie with the landholder.

This assessment has been prepared to quantify the waste streams likely to be generated from the construction, operation and decommissioning of the Project and to define appropriate and effective management measures.

The Project Area is characterised by grazing activities. The continued management of waste generated from by these existing activities will continue to reside with the landholder.

6.13.2 Methodology

The waste assessment addresses the requirements of the SEARs including:

- Identify, quantify and classify the likely waste streams to be generated throughout all stages of the project, and describe the measures to be implemented to reduce waste generation, manage, reuse, recycle and safely dispose of this waste; and
- Provide a Waste Management Plan (WMP) prepared in accordance with the Solar Guideline.

The requirements of the following legislation and guidelines have been considered for the Project, to ensure the effective management of wastes on-site:

- POEO Act;
- *Protection of the Environment Operations (Waste) Regulation 2014*;
- *Waste Avoidance and Resource Recovery Act 2001* (WARR Act);
- NSW Waste Avoidance and Resource Recovery Strategy (NSW EPA, 2014);
- Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities (NSW EPA, 2012);
- Waste Classification Guidelines (NSW EPA, 2014); and
- Section 5.4 of the ‘Large Scale Solar Energy Guideline’ (DPE, 2022)

The EPA’s waste hierarchy was used to guide management measures and action prioritisation, in accordance with the principles of ESD.

The qualitative desktop assessment included the following tasks:

- Review of waste legislation and policy to ensure compliance and manage mitigations towards the development of appropriate management strategies;
- Determination of potential waste streams generated during construction, operation and decommissioning of the Project; and
- Establishment of waste mitigation and management options.

Best practice for waste management was considered in this assessment to implement the waste hierarchy principles in accordance with the WARR Act and the principles of ESD:

- Avoidance of unnecessary resource consumption;
- Resource recovery (including reuse, reprocessing, recycling and energy recovery); and
- Disposal.

6.13.3 Impact Assessment

6.13.3.1 Construction

The construction phase of the Project will generate a relatively moderate amount of waste in comparison with other phases. Primary types of waste generated will include vegetation waste from site clearing, excess soil from preparatory earthworks, packaging waste and excess, faulty or damaged construction materials. Packaging waste associated with solar farms includes plastic, wooden pallets, polystyrene and cardboard. Excess construction materials (if any) will likely include electrical cabling, lithium-ion batteries and metal.

Construction waste will be avoided where possible, as the highest priority action on the NSW EPA Waste Hierarchy. Where avoidance is not feasible, reuse and recycling will be employed. Some types of hazardous waste cannot be reused or recycled, making treatment and disposal the safest options.

Estimated quantities of each waste type produced during the construction, operation and decommissioning of the Project would not be accurate until the detailed design stage of the Project is complete. Quantification of waste produced annually will be included in the WMP for the Project.

Table 6-30 lists the waste streams that are expected to be generated during construction, along with the official classifications under the POEO Act.

Table 6-30 Indicative Construction Waste Streams

Waste Type	Waste Stream	Source	Classification
Vegetation waste	Reuse	Clearing and site establishment	General solid waste (non-putrescible)
Excess soil	Reuse	General earthworks	General solid waste (non-putrescible)
General Solid Waste (Non-Putrescible) - Mixed	Recycle / general waste	Multiple	General solid waste (non-putrescible)
General Solid Waste (Non-Putrescible) - Office	Recycle / general waste	Office	General solid waste (non-putrescible)
Timber	Reuse / general waste	Packaging and construction	General solid waste (non-putrescible)
Cardboard and paper packaging	Recyclable	Packaging and construction	General solid waste (non-putrescible)
Polystyrene packaging	Recyclable	Packaging	General solid waste (non-putrescible)
Plastic packaging	Recyclable	Packaging	General solid waste (non-putrescible)

Waste Type	Waste Stream	Source	Classification
Cable	Majority recyclable / some general solid waste	Offcuts and potentially faulty or damaged equipment	General solid waste (non-putrescible)
Metal	Recyclable	Offcuts and potentially damaged items	General solid waste (non-putrescible)
Electronics	Reuse, recyclable and general solid waste	Offcuts and unused items	General solid waste (non-putrescible)
Recyclable domestic	Recyclable	Construction workers	General solid waste (non-putrescible)
Other domestic waste	General solid waste	Construction workers	General solid waste (putrescible)
Amenity waste	Sewage	Onsite amenity facilities	Liquid waste
Oil spill clean-up material	Hazardous waste	Construction incidents	Hazardous waste

6.13.3.2 Operation

The operational phase of the Project is expected to produce minimal to negligible waste. The only waste produced will be a result of site maintenance and general O&M activities.

Occasionally, lubricants, oils and faulty or damaged equipment may require replacement. There may be some wastewater produced from washdown of PV modules, required to maintain efficiency of panels when environmental conditions are conducive to dust settlement. The amount of wastewater produced from washdown is negligible and would be evaporated, absorbed into soil and any runoff will be directed via earthworks/landscaping.

Some vegetation waste may be produced due to weed management and site maintenance if potential grazing on site is not keeping grass at a safe working level.

Other waste would be general worker waste and sewage waste from onsite amenities.

Refurbishment of PVs and associated infrastructure will be undertaken during maintenance when required. The PVs would then be reused or recycled to the greatest extent possible at the time.

Table 6-31 details indicative waste streams anticipated to be generated during operation.

Table 6-31 Indicative Operational Waste Streams

Waste Type	Waste Stream	Source	Classification
Vegetation waste	Reuse	Site maintenance	General solid waste (non-putrescible)
Electronics	Recyclable, reuse and general solid	Maintenance and repairs	General solid waste (non-putrescible)
Recyclable domestic	Recyclable	Workers	General solid waste (non-putrescible)
Cardboard	Recyclable	Packaging	General solid waste (non-putrescible)
Timber	Reuse, Recyclable, General solid	Packaging	General solid waste (non-putrescible)
Other domestic	General solid	Workers	General solid waste (putrescible)
Oil spill clean-up material	Hazardous waste	Maintenance and clean-up activities	Hazardous waste
Oils and lubricants	Hazardous waste / reuse	Maintenance	Hazardous waste

Waste Type	Waste Stream	Source	Classification
Metal	Recyclable	Damaged items	General solid waste (non-putrescible)
DGs	Hazardous waste, recyclable	Damaged or faulty lithium-ion batteries	General solid waste (non-putrescible)
General solid mixed (non-putrescible)	General solid / recycle	Multiple	General solid waste (non-putrescible)
General solid office (non-putrescible)	Recycle / general solid	Office	General solid waste (non-putrescible)
Amenity waste	Sewage	Onsite amenity facilities	Liquid waste

6.13.3.3 Decommissioning

The majority of waste produced during the lifetime of the Project will occur during the decommissioning phase. There is a small amount of unpredictability of management measures and waste streams due to the recency of the emergence of large-scale solar technology and uncertainty around emerging waste management technology. It is expected that by the end of the 30-year predicted lifespan of the Project, technology will have advanced to allow for significantly greater scales of reuse and recycling PVs and other associated materials.

The Project's solar array will consist of approximately 110,000 bifacial single axis tracking units. Assuming a weight of up to 36 kg per module, based on solar panel supplier product information sheets, the Project will produce approximately 3,960 t of solar PV waste at decommissioning.

The Applicant will decommission and remove all above ground infrastructure related to the Project in consultation with the landholder. Any items which cannot be reused or recycled at Project decommissioning will be disposed of at suitable licensed waste disposal facilities. Lithium-ion batteries will be disposed of under the relevant hazardous waste disposal requirements at the time.

Rehabilitation of Project Area will be undertaken progressively.

Table 6-32 identifies indicative waste streams generated in the decommissioning phase of the Project.

Table 6-32 Indicative Decommissioning Waste Streams

Waste Type	Waste Stream	Source	Classification
Vegetation waste	Reuse	Rehabilitation of site	General solid waste (non-putrescible)
Solar PV and mounts	Recyclable, general solid	Decommissioning of solar farm	General solid waste (non-putrescible)
Gravel	Reuse	Removal of access tracks and hardstand areas	General solid waste (non-putrescible)
Concrete	Recyclable	Demolition of infrastructure	General solid waste (non-putrescible)
Cable	Majority recyclable, some general solid	Decommissioning of underground cabling	General solid waste (non-putrescible)
Metal	Reuse, recyclable	Disassembly of transformers, tracker piles, inverters and other related equipment	General solid waste (non-putrescible)
DGs	Hazardous waste, recyclable, reuse	Decommissioning of lithium-ion batteries	Hazardous waste
General solid office (non-putrescible)	Recycle / general solid	Office	General solid waste (non-putrescible)

Waste Type	Waste Stream	Source	Classification
Oils and lubricants	Hazardous waste / reuse	Removal of insulating oil from transformers	Hazardous waste
Recyclable domestic	Recyclable	Workers	General solid waste (non-putrescible)
Other domestic	General solid	Workers	General solid waste (putrescible)
Amenity waste	Sewage	Onsite amenity facilities	Liquid waste

6.13.3.4 Waste Disposal Facilities

Table 6-33 details the existing nearby waste management facilities and the waste streams that can be disposed of at each. The Project Area does not have access to sewage services. To manage septic waste, an onsite tank (or similar treatment system) will be constructed and pumped out.

Table 6-33 provides licensing details for existing waste facilities in the Project's surrounding area.

Table 6-33 Existing Waste Management Facilities and Accepted Waste Streams

Waste Management Facility	Waste Streams Accepted	Address	Distance to Project (km)
Singleton Waste Management Facility	Any general solid waste, special waste, some hazardous waste including batteries.	Dyrring Road, Fern Gully NSW	14.5
Central Waste Station	Any general solid waste such as builder's waste, demolition waste and dry commercial and industrial waste including scrap metal.	8 Styles Street, Kurri Kurri NSW	52
Cleanaway Rutherford Waste Oil Collection Facility	Waste oil, pit sludge and grease waste.	99 Kyle Street, Rutherford NSW	50
Muswellbrook Waste and Recycling Facility	• Asbestos, bulky cardboard, polystyrene or soft plastics, car bodies, concrete or rubble (clean), dead animals, green waste, household problem wastes (domestic quantities only) including gas bottles, fire extinguishers, paint (water or oil based), waste motor or cooking oil, fluorescent tubes and globes, aerosol cans, electronic items (e-waste), household batteries, smoke detectors and automotive batteries • Mattress or base • Mixed waste • Recyclables – including plastic bottles and food containers, glass bottles, paper and cardboard, aluminium cans and steel cans • Scrap metal recycling • Soil (clean) • Steel reinforced concrete • Timber and timber pallets • Tyres (truck, light truck, four wheel drive (4WD), passenger tyres or smaller) • Whitegoods – including refrigerators, freezers and air conditioners	252 Coal Road, Muswellbrook NSW	54

Table 6-34 Licensed Facilities in Surrounding Area

EPL Number	Facility	Scheduled Activity	Fee Based Activity	Scale
5927	Singleton Waste Management Facility	Waste disposal (application to land)	Waste disposal by application to land	Any capacity
13013	Central Waste Station	Resource recovery	Recovery of general waste	Any general waste recovered
		Waste storage	Waste storage – other types of waste	Any other types of waste stored
11383	Cleanaway Rutherford	Waste storage	Waste storage – hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	Any listed waste type stored
5980	Muswellbrook Waste Management Facility	Waste disposal (application to land)	Waste disposal by application to land	Any annual capacity
		Waste storage	Waste storage – hazardous, restricted solid, liquid, clinical and related waste and asbestos waste	>0 T stored
			Waste storage – other types of waste	>0 T stored

6.13.4 Mitigation and Management

Table 6-35 lists mitigation measures designed to reduce the impact of the Project on any one waste disposal facility and the environment in accordance with relevant guidelines.

The management measures will be included in the WMP.

Table 6-35 Indicative Waste Management Strategies

Mitigation	Phase(s) for employment	Waste types applicable
Create, adopt and review programs to implement the waste hierarchy, prioritising reuse and minimising environmental harm.	Construction, operation, decommissioning	All waste
Create, adopt and review purchasing protocols for implementation in component selection for the Project, in order to avoid or minimise potential waste related to product failure, packaging, etc.	Construction, operation	Electronics, photovoltaic panels, plastic, polystyrene, cardboard, metal
Classify waste under the NSW EPA Waste Classification Guidelines – Part 1: Classifying waste and Addendum.	Construction, operation, decommissioning	All waste
Ensure recyclable and non-recyclable waste is sorted and separated on site, prior to transportation to waste management facilities.	Construction, operation, decommissioning	All waste
Specify waste storage areas within the Project Area, with designated storage for different types of sorted waste.	Construction, operation, decommissioning	All waste
Investigate potential for reuse and recycling prior to transporting waste off site.	Construction, operation, decommissioning	All waste
Ensure any waste to be disposed of is done so at a licenced waste management facility.	Construction, operation, decommissioning	All waste
Engage with Singleton Council regarding waste streams generated by the Project, options for reuse and disposal and the impact upon local landfills, other waste management facilities, the community and the environment.	Construction, decommissioning	All waste
Consider the New Energy Tech Consumer Code for solar panel manufacturers. Approved companies will provide high quality panels that meet Australian and International standards.	Construction	Photovoltaic panels

Mitigation	Phase(s) for employment	Waste types applicable
Ensure any waste placed in bins that are serviced by Council's waste collection service or contractors on a regular basis is sorted properly.	Construction, operation, decommissioning	Recyclable domestic waste, other domestic waste
Ensure site workers are inducted and aware of waste management protocols and the waste hierarchy.	Construction, operation, decommissioning	All waste
Create, adopt and review a battery disposal protocol outlining methods of packaging and transporting used batteries to recycling facilities.	Construction, operation, decommissioning	DGs (lithium-ion batteries)
Provide amenity/toilet facilities for site workers with an appropriate disposal protocol for transport to local sewage treatment facility.	Construction, operation, decommissioning	Amenity waste
Onsite reuse if possible. Offsite reuse where onsite reuse is not possible, in line with The Mulch Order 2016, The Mulch Exemption 2016 and Guidance on the resource recovery order and exemption for mulch (NSW EPA, 2016).	Construction, operation	Vegetation waste
Onsite reuse where possible. Offsite reuse under the Resource Recovery Order and Exemption for Virgin Excavated Natural Material and Excavated Natural Material.	Construction	Soil
Store in dedicated and separate storage area for incremental transportation to suitable offsite recycling facilities.	Construction, operation, decommissioning	Metal
Sort and transport offsite to suitable recycling facility if not feasible to reuse on site. Offsite reuse must be in accordance with the Resource Recovery Order and Exemption for Recovered Aggregate (NSW EPA, 2014).	Decommissioning	Concrete
Sort, separate and store in appropriate waste bins for offsite transport to suitable recycling facility.	Construction, operation, decommissioning	Plastic, polystyrene, glass, cardboard
Faulty, damaged and end of life photovoltaic panels will be transported to the most suitable waste management facility at the time. It is expected that as technology progresses, more specialised processes for recycling panels will be developed. Reuse and recycling options are to be extensively investigated at the time of decommissioning.	Construction, operation, decommissioning	Photovoltaic panels
Wood pallets will be reused on site where possible or returned to supplier if accepted. Damaged or unusable wooden items are to be sold for wood chipping or similar.	Construction, operation	Timber
Used oils and lubricants are to be stored in a bunded area in lidded containers, to be transported to a licensed waste facility such as the Cleanaway Rutherford Waste Oil Collection Facility.	Operation, decommissioning	Oils and lubricants
Return to contractor if reuse onsite is undesirable. If contractor does not have capacity to accept, investigate options for reuse or recycle at a suitable facility.	Construction, operation, decommissioning	Chemical drums
Sort, separate and store in a dedicated area. Investigate options for reuse onsite. If reuse or repair is not possible, waste will be transported to a suitable disposal facility in line with The NSW EPA Waste Classification Guidelines 2024.	Construction, operation, decommissioning	Electronics, cable
Sort, separate and store in dedicated recycling waste bins for offsite transport to suitable recycling facility.	Construction, operation, decommissioning	Recyclable domestic waste
Store in an appropriate waste bin to be transported off site and disposed of at a suitable waste management facility according to the NSW EPA Waste Classification Guidelines 2014.	Construction, operation, decommissioning	Other domestic waste
Engage with Council on the matter of septic waste disposal prior to construction. Collected waste is to be transported to a licensed regulated treatment facility by a licenced waste transporter.	Construction, operation, decommissioning	Amenity waste

6.14 Economics

6.14.1 Background

An assessment of the local and state economic impacts and benefits of the Project was undertaken. The economic impacts assessment considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

6.14.2 Impact Assessment

6.14.2.1 Economic Costs Assessment

The economic costs of the Project are generally limited to those associated with the temporary removal of the agricultural land use of the disturbance footprint.

Due to the complete removal of the disturbance footprint as agricultural land, there will be a temporary loss of 90 ha of agricultural land. The SAIA in **Appendix J** determined the primary productivity loss will be $34,812 per annum, making the secondary productivity loss on the broader economy $75,848 per annum.

The gross value of agriculture for the Singleton LGA for the last agricultural census year of 2020 – 2021 is estimated as $48,382,626 (ABS, 2022b). Therefore, the loss of agricultural output equates to a percentage loss of total agricultural output of less than 0.01% from the Singleton LGA. This loss is temporary and the land will be restored to its original condition upon the decommissioning of the Project. Sheep grazing will be considered as an option during operation, which would offset the loss of agricultural productivity.

Due to the relatively small area of agricultural land being removed and the private nature of the land, no jobs will be lost as a result of the Project. The workforce will be sourced locally where feasible, with the majority assumed to reside in Singleton and the Lower Hunter, and the remaining from Muswellbrook.

Due to the technical nature of some of the work, there may be a need to call in a small number of specialists. Due to the number of specialist positions required being so low, this is not expected to significantly impact accommodation in the local area.

6.14.2.2 Economic Benefits Assessment

Project Investment

The EDC Report estimates the total cost of the Project's development to be $127 M. This assessment has been provided separately to DPHI.

A large portion of the investment cost is associated with the purchase of approximately 110,000 PV panels, batteries and associated electrical infrastructure. A significant amount of the EDC is also allowed for civil, electrical and grid connection works.

Up to 10% of the investment will remain in the local economy through retail expenditure, contracts and wages (i.e. hiring contractors and equipment within the Singleton LGA). As such, the Singleton LGA's economy will experience an influx of up to $12.7 M as a direct result of the Project.

Project Employment

Up to 150 FTE jobs will be supported during the 18-month construction phase of the Project. The industry, business and occupational structure of the Singleton LGA is well-suited to a project of this scale and nature, with many skilled labour professionals currently working in local mines and other industries. At the time of the 2021 census, the Singleton LGA had 2,183 technicians and trade workers, 1,936 machinery operators and drivers and 1,182 labourers (ABS, 2021).

The small number of specialists required for construction that cannot be sourced locally and need to be accommodated in the local area will not contribute a significant strain on local services.

Up to 150 FTE jobs will be supported during construction and up to five FTE jobs will be supported for greater than 30 years during the operational life of the Project. Additional contractor work will be required, including landscaping/vegetation management, module cleaning, internal access track maintenance and pest management. Contractors will be procured locally where feasible.

Once the operational life of the Project is complete, the decommissioning phase will provide a similar level of employment to the construction phase.

The Project will have a positive employment impact on Singleton, Muswellbrook and the Lower Hunter by providing opportunities for local workers to upskill in the renewable energy industry, in turn growing the renewable energy workforce. Additionally, the Project offers the potential for a number of the 467 unemployed local people in the Singleton LGA to find work (ABS, 2021).

Local Business Participation

Local business participation will provide opportunities in terms of cost efficiencies in result in mutually beneficial business relationships. Local businesses will be used where possible for equipment purchases, transport, machinery hire, labour costs, etc. The Singleton LGA and the broader region including Muswellbrook and the Lower Hunter has sufficient construction firms and associated businesses to support the Project and compete for contracts.

The Applicant may partner with available industry or government bodies to identify and source local contractors and suppliers, maximising local business participation.

Housing and Commercial Accommodation Impacts

The Project is not expected to have a considerable impact on housing, nor commercial accommodation in the region. The vast majority of workers are anticipated to be based in the local area. The LGA is expected to have enough accommodation to support the small number of specialist workers that will need to be sourced from outside the Project Area. Further details on accommodation are available in **Section 3.5.7**.

Additional Retail Expenditure

The specialist workers that are brought into the area to support the Project will contribute to the local economy through retail expenditure which would otherwise not have occurred. These specialists will be paid wages that will be partially spent in the local area on supermarket items, restaurants, cafes, recreation, personal items, medical services, pubs, clubs, etc.

Ongoing Economic Stimulus and Community Benefits

The economic stimulus provided through local wages will be one of the largest tangible economic benefits of the Project. The Project will contribute to 155 FTE wages throughout its construction and operational lifespan.

The Applicant will make annual payments to the owners of the land on which the Project Area lies, as previously negotiated. These figures are personal and confidential and have been withheld from this EIS. However, a percentage of these payments will contribute to the local economy.

Council and Community Returns

A VPA with SC will be provided as detailed in **Section 3.10**. Although the structure is not yet confirmed, VPA payments can be used to support local projects and programs, which may include community, educational and environmental initiatives.

The Project will provide training and upskilling opportunities for local workers in the growing renewable energy industry. Employees will be able to transfer knowledge and experience gained on the Project to other future renewable energy projects, contributing to the development of a specialist and skilled workforce.

The Project will also contribute to Council and community in the form of rates payments.

National Energy Market Transition and Environmental Benefits

The Project will boost Australia's capacity for generation of renewable energy by 60 MWac once operational. This boost of clean, renewable energy is enough to power the equivalent of approximately 19,000 homes, aligning with the NSW Government's target of a 70% reduction in emissions by 2035 and net zero emissions by 2050. The additional renewable energy generated by the Project will contribute to the overall reduction and stabilisation of electricity prices in the market, while contributing to GHG emissions avoidance.

6.14.3 Mitigation and Management

The following mitigation and management measures will be employed by the Applicant to ensure the local economy experiences the maximum possible benefit from the Project and any negative economic impacts are avoided or minimised:

- Engage with local representatives regarding accommodation options for any specialist staff from outside the area, to minimise adverse impacts on local services;
- Engage with local tourism industry representatives to manage potential timing conflicts with local events;
- An Accommodation Strategy will be developed prior to commencement of construction as detailed in **Section 3.5.7**; and
- Engage with local employment agencies and commit to supporting training and apprenticeships (where feasible).

6.15 Social

6.15.1 Background

A Social Impact Assessment (SIA) was prepared by RPS and is provided in full in **Appendix Q**.

The SIA considers the SEARs, supplementary SEARs and regulatory guidelines in **Appendix B** and stakeholder engagement detailed in **Section 5**.

A scoping and literature review was undertaken to determine the demographics relevant to this EIS.

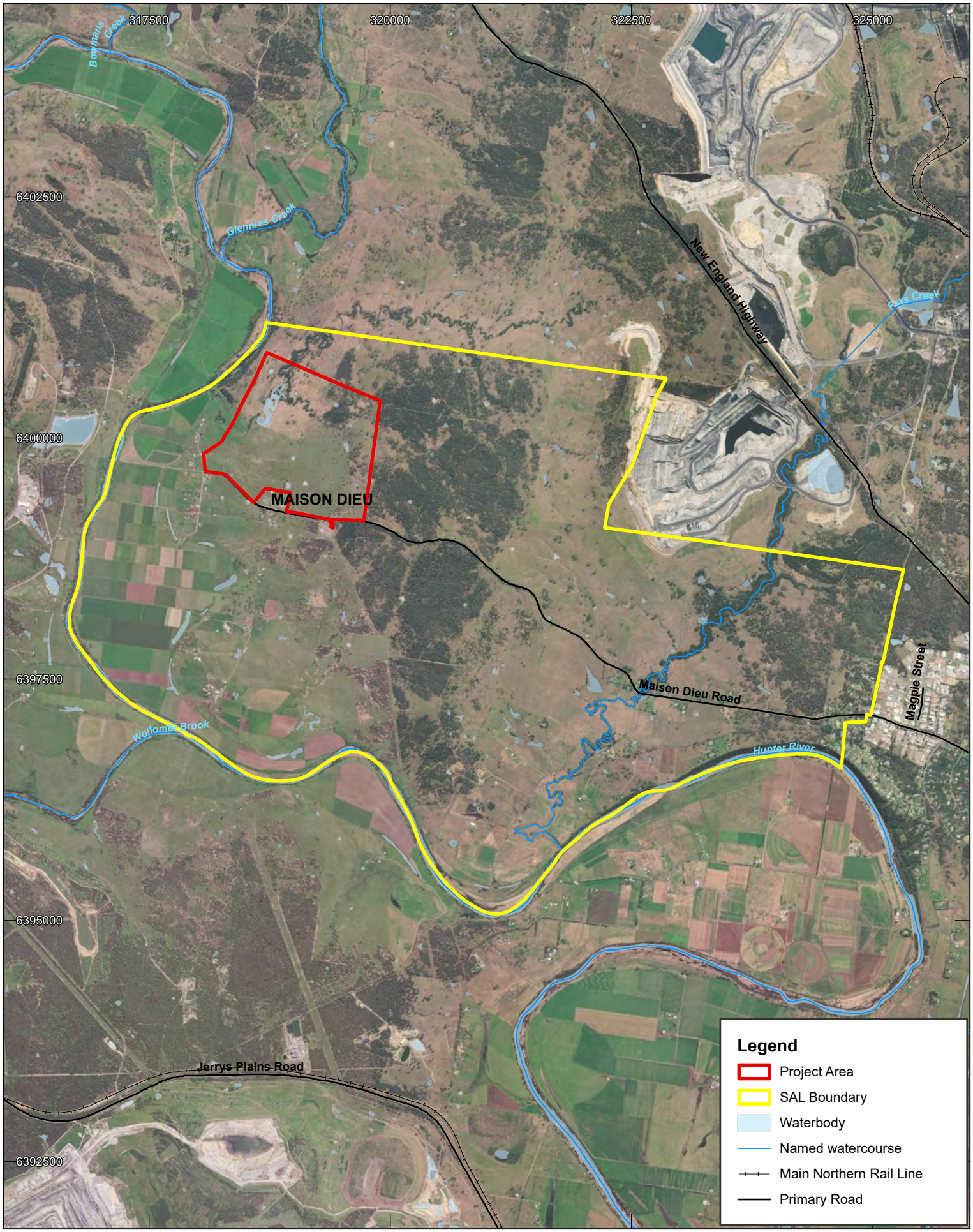
Maison Dieu is a relatively small, rural social locality predominantly surrounded by agricultural and mining land uses. The population of 175 has been slightly declining since 2016. A relatively low percentage (61.4%) of the population is at working age. Machinery operators and drivers make up the largest occupation group, closely followed by technicians and tradespeople. The mining industry contributes greatly to employment in the locality, with dairy and beef cattle farming being the next most prominent industries of employment (ABS, 2021).

Maison Dieu has a tertiary level education of 15% at the time of the 2021 census, with none holding university qualifications. Although 15% of residents were born overseas, languages other than English are not spoken in any households. First Nations Australians make up 3.4% of the population.

The Suburb and Locality (SAL) scores 979 on the SEIFA Index of Relative Socio-Economic Disadvantage (IRSD) an indicator to measure relative disadvantage, derived from Census variables like low income, low educational attainment, unemployment, and dwellings without motor vehicles. This is slightly lower than the Singleton LGA's score of 998. A higher score indicates a higher advantage level.

The employment landscape in Maison Dieu is expected to change with the transition to renewable energy underway, as the need for skilled workers in the renewable energy industry grows.

The SAL of Masion Dieu was used as the social locality for the purpose of the SIA. The SAL is shown on **Figure 6-12.**



SOCIAL LOCALITY

CLIENT: Terrain Solar Pty Ltd
PROJ: AU213007278
LOCATION: Maison Dieu

DATA SOURCES
CI, RPS, NSWSS, Maxar

MAP: Social
VERSION: B
DATE EXPORTED: 23/05/2024
TECHNICIAN: NATALIE.WOOD

0 0.5 1 1.5 2 km

SCALE 1:50,000
A4 SIZE / Projection: GDA2020 MGA Zone 56

N

FIGURE 6-12:

IMPORTANT NOTE

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6.15.2 Methodology

Social impacts are the consequences that people experience when a new project brings change. The social impact categories in the SIA Guideline were used to ensure the Project was assessed from the perspectives of people to deliver socially sustainable outcomes. The social impact categories are:

- Way of life;
- Community;
- Accessibility;
- Culture;
- Health and wellbeing;
- Surroundings;
- Livelihoods; and
- Decision making systems.

The SIA was prepared in the following stages.

6.15.2.1 Scoping

The SR was reviewed to determine previous identification of social impacts. Potential social impacts identified within the SR were both positive and negative. Key positive impacts identified include increased opportunities for employment and occupational training and increased economic flow into the local community. Key impacts that have the potential to have a negative effect include changes to accessibility for local properties due to construction traffic and traffic management, impacts on the availability of social infrastructure and changes to the amenity of the rural landscape from impacts including increased noise and visual change.

6.15.2.2 Literature Review

Review of Local and State Government strategies, policies and plans applicable to the SIA informed the strategic context and the visions and aspirations for people and places within the social locality of Maison Dieu, the Suburb of Camberwell, the Singleton LGA, and the Hunter Statistical Area 3 (SA3).

6.15.2.3 Social Baseline Research

A community profile was developed for Maison Dieu to gain an appreciation of the diversity, dynamics, and social constructs within the social locality. This profiled was then compared to the Suburb of Camberwell, the Singleton LGA and the Hunter Regional SA3. The SAL scores 979 on the SEIFA IRSD, lower than the Singleton LGA's score of 998.

6.15.2.4 Community and Stakeholder Consultation

A comprehensive stakeholder engagement program was undertaken as detailed in **Section 5**. This stakeholder engagement program informed community perspectives and concerns, which contribute to social impacts.

6.15.2.5 Impact Assessment and Comparative Analysis

All relevant technical studies appendices were reviewed to inform the potential social impacts arising from changes to the environment. The previous stages of the SIA including literature review, social baseline research and review of community and stakeholder consultation also contributed to the assessment of social impacts. The Social Impact Significant Matrix, Dimensions of Social Impact Magnitude, definitions of magnitude levels of social impacts and definitions of likelihoods of social impacts were adopted from the Technical Supplement. Comparative analysis of similar solar farm developments was undertaken to deepen understanding of the social impacts associated with solar farm / BESS projects and inform the recommended mitigation and management measures.

6.15.2.6 Mitigation, Management, Enhancement Measures and Residual Impact

After potential cumulative impacts were identified, appropriate mitigations measures and management strategies were developed accordingly. The residual impact after mitigation, management and enhancement measures was then calculated. This factored in the overall extent, type, and form of mitigation and management measures, and how they interacted with reducing or enhancing either one or both of the likelihood and magnitude levels of each impact.

6.15.2.7 Ongoing Monitoring and Management Frameworks

Appropriate mitigation measures and management strategies were identified as an outcome of the assessment of potential impacts and benefits, including the significance of these impacts and benefits.

The development of mitigation measures was also informed by lessons learnt from the development of measures for other Solar Farm / BESS projects.

6.15.3 Impact Assessment

6.15.3.1 Construction

There are a number of environmental risks associated with solar farm projects. Research suggests that environmental degradation has tangible consequences on human health (Donohoe, 2003). Environmental impacts will be avoided or minimised through effective mitigation measures, devised from numerous technical studies by qualified experts.

The environmental risks assessed in **Table 6-36** could have social impacts during construction.

Overall, the impacts incurred by construction activities including noise, air quality, sedimentation, cultural and visual have a potential to affect people's quality of life, daily routines, health, and livelihoods. Some receivers are more susceptible to amenity reducing impacts, such as proximate residents / landholders, Aboriginal groups and the wider community within the social locality.

Construction social impacts are temporary and will be appropriately mitigated through the measures in **Section 6.15.4**. The residual social impacts are considered acceptable by the SIA.

Table 6-36 Construction Social Risks

Aspect	Discussion	Section
Biodiversity loss	The Project requires the land within the Disturbance Footprint to be cleared and excavated for infrastructure to be built. Community engagement identified the community's concern for fauna and flora that use the site for grazing and the level of surveying for wildlife presence. Biodiversity loss could have a negative impact on the health and wellbeing of the social locality. BAM accredited ecologists were employed to assess the Project and develop the BDAR, while creating the best possible strategies to avoid and minimise biodiversity impacts. The Project layout was originally informed by ecologist's field investigations and has been further reduced as a result of ongoing surveys during the development of the BDAR and EIS. The final layout avoids the majority of the highest condition native vegetation and important habitat.	**6.1**
Hazards / bushfire	Large-scale BESS's can present ignition risks if risk-based design is not implemented. Ignition of the Project would have negative social implications, such as loss of infrastructure / electricity supply, damage to homes and property if the fire were to spread beyond the Project Area and risks to life. The landholders closest to the Project Area would be at the highest risk of being negatively impacted. The Project layout has been designed considering fire prevention, with the Applicant adopting recommendations from an Accredited Bushfire Practitioner who compiled the Bushfire Assessment Report for the Project. The Project complies with PBP 2019 and the bushfire risk of the Project is considered acceptable.	**6.10** **6.11**
Air quality	Health impacts could occur from the generation and presence of dust and other pollutants associated with earthmoving and construction. The landholders closest to the Project Area would generally experience the greatest potential impacts to their health and wellbeing and way of life. Relevant guidelines and standards were used to inform air quality impact assessment and mitigation measures. The dust generation from the Project's construction is not expected to have a significant social impact due to the existing environment's long-term affectation by mining dust. Once the Project is operational, there will be no dust or GHG emissions associate with the Project.	**6.12**
Water usage and sediment runoff	The construction of the Project will increase potential rates of erosion and transport of sediment from the Project Area. The risk of water pollution from erosion and sediment runoff will be managed in accordance with The Blue Book. A SWMP will be prepared containing the mitigation measures provided in the EIS. The risk of social impacts related to erosion and sediment runoff is expected to be relatively low with management measures in place. Water usage for Project-related activities will peak during construction, with an average total demand of 23.4 ML per year. This will reduce to 5.7 ML per year during operation.	**6.8**
Visual and lighting	Solar farm projects inherently affect the landscape character and visual amenity of the site they are constructed on and the surrounding visual catchment. The key visual impacts during construction will be the presence of machinery, construction fencing and earthworks. All of the relevant landscapes surrounding the Project Area were assessed to be impacted at a low or negligible level. With appropriate mitigation measures such as planting, the visual impact to all sensitive receivers was also determined as low.	**6.5**
Noise	The locality will experience an increase in noise as a result of the Project, with months 4-8 of construction generally being the loudest. Works will generally occur between standard hours under the ICNG, from 7am to 6pm weekdays and from 8am to 1pm Saturdays, with no work to occur on Sundays or public holidays. Increased noise may impact on people's daily routines, reduce quality of life in the short-term, cause nearby residents to feel the need to close their windows and stay inside, reduce people's motivation to perform certain recreational	**6.4**

Aspect	Discussion	Section
	activities and reduce motivation to use certain modes of transport such as walking and cycling. Increased noise may also impact people's routines, especially shift workers who are attempting to sleep during daytime hours. The mining industry is the most prominent industry of employment in the Maison Dieu social locality, so some nearby residents are likely to be shift workers. Noise modelling predicted 11 potential exceedances at non-associated receivers and three potential exceedances at associated receivers during construction are expected, assuming no mitigation measures are in place and works will occur at the nearest point of the Project Area to each receptor. This is a worst-case scenario and a CNMP will be in place to minimise noise impacts.	
Aboriginal heritage	The Project will impact the amenity of the locality for Aboriginal groups and individuals. The ACHAR, alongside a test excavation program with the assistance of RAPs, discovered and recorded numerous previously unrecorded Aboriginal sites. The reduction of the Project Area and solar array resulted in the avoidance of culturally significant Aboriginal heritage sites from the Project Area. Eight sites within 50 m of the Disturbance Footprint will be directly impacted. These sites will be fenced during construction and included on all relevant site plans during operation to avoid potential harm.	**6.2**
Traffic and access	There will be a maximum of 76 additional light vehicle trips in peak hours and a maximum of eight heavy vehicle trips per day during peak construction times. Road users in the local area and the wider community of Maison Dieu will be subject to levels of traffic that are unfamiliar to the local network. This will minorly increase trip times and potentially increase the risk of accidents for local road users in peak hours. A TMP will be developed to provide appropriate traffic control measures, provide a delivery schedule and manage traffic and deliveries entering the Project Area. The TMP will manage the increase in traffic, and the delivery schedule will ensure that heavy vehicle deliveries are staggered throughout the day where practical, to avoid adverse social impacts as a result of increased noise and traffic.	**6.9**
Accommodation	The mining projects in the vicinity already have an established workforce and the majority of the construction workforce will be sourced locally with the skills required similar to those in the mining industry for the majority of the workforce. The Project's impact on local accommodation is expected to be minimal with the commitment to preparing of a relevant Accommodation Strategy.	**6.15**
Employment	The Singleton LGA and the Hunter Statistical Area are expected to benefit from increased construction employment and training opportunities, with up to 150 FTE required at peak construction. The current available labour pool in Maison Dieu is limited with only 3.4% of people unemployed, though members of the community expressed a desire to see youth have improved access to learning specialised skills and find job opportunities in the local area. An internal PPWDS will be developed to encourage the hiring and upskilling of workers sourced from the local community during construction and operation, with training regimes for working on renewable energy infrastructure. This will positively impact livelihoods in the local area.	**6.15**

6.15.3.2 Operation

The following issues were considered key risks and benefits for social impacts during operation:

- VPA
  - The Applicant is in the process of negotiating the VPA with SC. Although the structure is not yet confirmed, payments can be used to support local projects and programs, which may include community, educational and environmental initiatives. The Applicant advises a written offer of terms was provided by the Applicant to SC in May 2024.
  - The Project will also contribute to Council and community in the form of rates payments. This will positively impact the way of life of the community.
- Economic
  - Once operational, the Project will provide 60 MWac of clean, renewable energy to the grid, assisting in reduction and stabilisation of energy prices and availability in the NEM.
  - Up to five FTE will be supported by the operation of the Project. This will have a positive impact on livelihoods in the region.
- Future agricultural land condition and production
  - The community raised concerns for the state and agricultural viability of the land after the Project's end of life. A Soil and Agricultural Impact Assessment and determined the land would be returned to its pre-development state assuming appropriate management measures are carried out, including a soil stripping and respreading strategy.
  - The Project will result in a primary agricultural productivity loss of $34,812 per annum, and a secondary productivity loss from the broader economy of $75,848 per annum. This is not considered a significant loss in terms of the broader agricultural industry, nor the positive economic impacts of the Project supplying the grid with renewable electricity and providing jobs and investment in the area.
  - In consultation with the landowner, the Applicant will consider running sheep within the Project Area, grazing under and around the PV array, which would offset some of the productivity loss.
- Visual change and glare
  - Impacts to visual amenity were investigated as part of the LCVIA. With mitigation, all visual impacts were predicted to be low under the Visual Technical Supplement and the Solar Guidelines.
  - The Applicant has committed to vegetation planting and screening around the southern edge of the Project Area to mitigate visual impacts at sensitive receivers and reduce the glare associated with solar panels.
- Aboriginal heritage
  - Aboriginal groups and individuals may experience a perceived loss of amenity in the locality, due to alteration of the landscape.

6.15.3.3 Design Refinements

The Project's design has been refined extensively over the course of scoping and EIS preparation as a result of technical environmental studies and community engagement. Project refinements and the related social benefits are addressed in **Section 7.1**.

6.15.3.4 Cumulative Impacts

While new developments will have cumulative construction and operational social impacts, major projects are also closing and entering decommissioning in the area. With Liddell Power Station closed and the four other coal power stations in NSW scheduled for closure by 2040, renewable energy projects will be required to mitigate the cumulative social impacts of these closures. Energy supply and storage is needed to replace that of the power stations and additional employment and investment is required to attenuate the forthcoming loss. Renewable energy facilities like this Project will provide opportunities required to mitigate these impacts.

6.15.3.5 Comparison to Other Solar Farm Projects

Social Impacts resulting from the six similar, recent solar farms analysed were both positive and negative. Common concerns of stakeholders include traffic, access, pressure on local services and loss of agricultural land. These impacts are generally temporary in nature.

6.15.4 Mitigation and Management

The Applicant will develop and implement an internal Community Communications Strategy (CCS), an internal Community Engagement Plan (CEP), an internal Social Licence Commitments Plan (SLCP) and an internal PPWDS to avoid / minimise negative social impacts and maximise positive social impacts.

The CCS will contain process for:

- Appropriately informing stakeholders with accurate and accessible information;
- Giving responses in a timely fashion to concerns and issues; and
- Providing opportunities for input and feedback.

The CEP will contain provisions for:

- Continued engagement with regulator to address issues raised during construction, as needed;
- Ongoing consultation with the Maison Dieu community, including Project updates;
- Maintaining of the Project's communication methods for engagement, including phoneline, voicemail and email inbox;
- Maintaining of the Project website to provide easy to access Project updates to the community; and
- Implementation of a complaints mechanism system to ensure there is a procedure for the proper actioning of any complaints received.

The SLCP will:

- Provide directions and responsibilities to build and maintain trust and social acceptance with the people that will experience the greatest impacts of the Project;
- Provide guidance for community engagement to build trust over time and understand how people's views and values change over time in response to Project-related events; and
- Give directions for monitoring social acceptance and management of the 'social licence'.

The PPWDS will:

- Include targets for local sourcing of materials and employees, where possible to be procured; and
- Provide training regimes to develop skills for working on renewable energy infrastructure.

The CEMP and OEMP will provide effective mitigation measures informed by specialist technical assessments to minimise environmental impacts that would in turn have negative impacts on human health and wellbeing.

A VPA will be established with SC.

6.16 Cumulative Impacts

6.16.1 Background

Cumulative impacts are a result of incremental, sustained and combined effects of human action and natural variations over time and can be both positive and negative. They can be caused by the compounding effects of a single project or multiple projects in an area, and by the accumulation of effects from past, current and future activities as they arise (DPE, 2021).

In adherence to the EIS guidelines, this EIS considers the Cumulative Guidelines. Thereby the EIS has considered impacts from the Project combined with past, present and reasonably foreseeable future SSDs.

6.16.2 Methodology

The Cumulative Guidelines were used as a framework for assessing project-level cumulative impacts. **Table 2-5** addresses the six key questions from the Cumulative Guidelines.

Projects with a potential for cumulative impacts identified through the NSW Planning Portal and through engagement with relevant regulators with the Project are described in **Table 2-6.** This assessment of cumulative impacts is focused on the Project's interaction with other developments in the vicinity, where construction and/or operational timeframes could be concurrent.

6.16.2.1.1 Strategic Framework

Section 2 of this EIS discusses the strategic context of the Project with reference to relevant strategic planning publications. In considering the Project and relevant future developments, these align with the relevant objectives of the:

- UN Sustainable Development Goals;
- UN Frameworks Convention on Climate Change COP21;
- Federal Government Renewable Energy Targets;
- *Climate Change Act 2022*;
- NEM; and
- NSW Government Commitments.

Most relevant future developments that have been identified are renewable energy developments that will provide affordable, reliable and sustainable energy. No negative cumulative impacts have been identified at the strategic level.

6.16.2.1.2 Project-level CIA

The Project-level cumulative impact risks exist where the Project may interact with other large development and thereby exacerbate the impacts of both projects. Being located in the Hunter-Central Coast REZ, local cumulative impacts could be relevant for nearby utility scale renewable facilities. Key environmental considerations in this chapter include:

- Biodiversity;
- Noise and vibration;
- Traffic;
- Land use and property; and
- Visual impacts.

This section collates cumulative assessments of individual technical studies described in the preceding sections. Only cumulative impacts with the potential to affect beyond the Project Area have been assessed in detail. Cumulative impact assessment focuses on the key matters immediately proximate to the Project Area.

6.16.3 Impact Assessment

Table 2-6 shows the potential concurrent projects in proximity to the Project, with reference to their relative timings, potential overlap and key matters that could cause cumulative impacts. The thematic cumulative impact is increased traffic during construction, which could be exacerbated by traffic control measures in place for concurrent road upgrade projects. However, the Project's traffic generation is temporary and minor, as detailed in **Section 6.9**.

Some cumulative biodiversity impacts are expected due to the clearing of vegetation across concurrent proximate projects. The Project has avoided and minimised clearing of native vegetation as far as feasible by planning the disturbance footprint to occupy largely historically disturbed land. Therefore, the Project's contribution to cumulative biodiversity impacts will be minimal.

Project Noise Trigger Levels and Project Amenity Noise Levels were satisfied in every modelled case during operation. Therefore, no cumulative operational noise impacts are expected to occur. Any cumulative construction noise would be temporary and minimised by the noise management measures included in the CEMP.

Small cumulative visual impacts may occur with HVO South and Rix's Creek South. Hunter Transmission Project is likely to be visible from some viewpoints with the Project. Visual impact mitigation measures and the Landscape Plan will manage cumulative visual impacts.

The cumulative risk to agricultural land and productivity due to large-scale solar development is expected to be very low (DPE, 2022). The Australian Energy Market Operator estimates that NSW will need approximately 20,000 MW of large-scale solar generation by 2050. This will require approximately 40,000 ha of land or only 0.06% of rural land in NSW. The opportunity for the implementation of agrisolar will minimise cumulative project impacts in the area. This would be considered in consultation with the landowner.

The cumulative environmental impacts of the Project will culminate into negative cumulative social impacts if not managed adequately. The implementation of mitigation measures in the CEMP will manage any potential cumulative social impacts. However, with Liddell Power Station closed and the four other coal power stations in NSW scheduled for closure by 2040, renewable energy projects will be required to mitigate the cumulative social impacts of these closures. Energy supply and storage is needed to replace that of the power stations and additional employment and investment is required to attenuate the forthcoming loss. Renewable energy facilities like the Project will provide opportunities required to mitigate negative cumulative social impacts from power station closures.

6.16.4 Mitigation and Management

The potential cumulative impacts associated with the Project will be manageable through the Applicant's commitment to implementing the mitigation and management measures presented in this EIS.

These plans will consider, reflect and respond to actual regional conditions at the time of development, especially in relation to concurrent Projects which will be serviced around Maison Dieu and Singleton. The Applicant will engage with relevant developers and SC during construction to assist in minimising cumulative impacts. An Accommodation Strategy will detail cumulative impacts from other projects and minimise cumulative impacts on accommodation in the locality.

Appendix D provides a consolidated summary of the Project's management and mitigation measures.

7 PROJECT JUSTIFICATION

The Section provides a justification and evaluation of the Project as a whole with regard to the economic, environmental and social impacts and the principles of ESD. It integrates the findings of each previous EIS section and objectively weights the positive and negative impacts of the Project.

This Section also considers the intersection between these different findings and whether the Project will comply with the standards and performance measures of government legislation, plans, policies and guidelines.

7.1 Action Taken to Avoid or Minimise Impacts

The initial consideration of site suitability contributed to environmental savings by selecting a Project Area that has been previously disturbed and has a low potential for irreversible environmental impacts to occur. The Project Area was originally selected based on the following factors:

- Low, relatively flat terrain for cost-effective construction;
- Good solar resource;
- Generally located away from towns and urbanised areas;
- Proximity to the regional centre of Singleton, and other Hunter Valley locations, which should allow for optimal sourcing of labour from the local community;
- Suitable land use zoning;
- Optimal access to existing electricity infrastructure, transmission and distribution network;
- Good access to a major road (New England Highway); and
- High level of available capacity on the grid transmission and distribution system.

The design of the Project has been carefully considered and multiple optimisations and refinements have been made to minimise environmental, social and economic impacts. Informed by specialist technical reports, environmental studies and stakeholder engagement, the Project Area has been reduced from 500 ha to 203 ha and the Disturbance Footprint has been refined from 352 ha at scoping to 90 ha in total. The current layout and disturbance footprint represents the most appropriate location for infrastructure.

Project layout refinement between the SR Layout and conceptual Project layout for which approval is sought has resulted in environmental impacts being avoided or minimised or benefits gained. **Table 7-1** summarises actions taken and the reduced impacts and/or impacts in key technical study areas.

The placement of infrastructure and extent of construction activities may be further refined for environmental impact avoidance and minimisation during detailed design within the limits of the activities described in this EIS.

Table 7-1 Project Impact Minimisation and Benefits through Layout Refinement

Aspect	Action Taken	Impact Reduction / Benefit
Biodiversity	• Reduction from 352 ha SR Project Site to 90 ha disturbance in specific areas to avoid areas of high biodiversity value. • Commitment to a Biodiversity Management Plan.	• The results of field investigation in 2022 and 2023 were used to determine the locations of highest biodiversity value (such as TECs and high-density hollow-bearing trees. • The Disturbance Footprint was adjusted based on these results to be placed in areas better suited to development, reducing impacts to biodiversity. Project layout refinement occurred in two main stages, April 2023 and July 2023, removing 251 ha of disturbance.

Aspect	Action Taken	Impact Reduction / Benefit
		• The refinement resulted in avoidance of nearly all of PCT 3431_High and the vast majority of 3431_Regen. These areas of vegetation are the highest condition areas of PCT 3431 and associated TECs and the highest quality habitat for Brushed-tailed Phascogale. • Avoidance of 330.4 ha of potential Striped Legless Lizard habitat.
Hazards	Selection of BESS technology and location.	• Lithium-ion phosphate batteries with safety and fire protection features such as shut-down separator, tear-away tab, vent and thermal interrupt to be used to minimise chance of thermal runaway and fire. • Vent covers of BESS constructed of non-combustible material and not located above battery packs to minimise chance of fire propagation.
Aboriginal heritage	• Reduction from 352 ha to 90 ha Disturbance Footprint reducing impacts to Aboriginal sites. • PV array layout designed around watercourses and 1% AEP flood zone. • Demarcation of Aboriginal heritage sites in proximity of Disturbance Footprint. • Commitment to an ACHMP.	• The reduction allowed for the avoidance of 67 Aboriginal sites that were within the SR Project Site (two sites to be directly impacted). • All dams were retained excepting one after project refinements, avoided areas where Aboriginal sites were commonly identified. • Ensure Aboriginal sites are not harmed during construction. • The distribution of cultural heritage sites found during the ACHAR was particularly prevalent along watercourses and areas of exposure, where the ground surface has been subject to disturbance.
Historic heritage	Site selection away from listed historic heritage sites.	• The nearest heritage listed item ‘Archerfield and Outbuildings’ is located 1.6 km northwest of the Project Area. No impact is expected. • No historic heritage sites to be directly impacted.
Bushfire	• Reduction from 352 ha SR Project Site to 90 ha disturbance in specific areas avoided 53.21 ha of Category 1 BPL. • 10m APZs included in Project design. • Three 45,000 L water tanks to be provided. • Management of the Project Area as an IPA. • Commitment to a Bushfire Management Plan.	• Minimise the risk of bushfire affecting the Project and provide mechanisms for action should a fire threatens the Project Area and in any risk to private receivers.
Flooding	• Reduction from 352 ha SR Project Site to 90 ha Disturbance Footprint. • Commitment to design aspects including designated floor levels. • PV array redesign based on Singleton Flood Study to avoid majority of 1% AEP.	• Avoided 79.5 ha of land within the 1% AEP. • Minimised impact to local catchment flood behaviour.
Economics	• Engagement with local representatives regarding accommodation, tourism and training / apprenticeships.	• Maximised economic benefit for the local community. • Potential avoidance of strain on local services where advised by local representatives.
Soils	• Reduction from 352 ha SR Project Site to 90 ha Disturbance Footprint.	• Avoided impacts to all but 1 ha of LSC Class 3 land, which is unviable due to fragmentation by creek

Aspect	Action Taken	Impact Reduction / Benefit
	• Further reduced solar array design to avoid 75% of LSC Class 3	
Agriculture	• Reduction from 352 ha SR Project Site to 90 ha Disturbance Footprint.	• 262 ha of productive agricultural land retained for continued use as grazing.
Traffic	• Commitment to a TMP with a TCP.	• Management of all access to the site to avoid negative safety impacts of increased traffic flow.
Social	• Commitment to Accommodation Strategy in consideration of actual cumulative impacts at that time. • Commitment to CCS, CEP, SLCP and PPWDS.	• Maximisation of positive social benefits such as increased livelihoods through local workforce procurement. • Minimisation of negative social impacts including reduced health and wellbeing.
Visual	• Reduction of panel size from double portrait (5 m) (2P) to single portrait (2.7m) (1P). • Vegetation screening along sections of the southern boundary of the Project Area.	• Reduction in visual impact from moderate to low at dwellings R18, R25 and R27.
Noise	• Preliminary noise modelling undertaken to identify and investigate potential unacceptable impacts with minor infrastructure changes made. • Commitment to a CNMP.	• Draft management plan developed for potential noise at receivers expected to be impacts by construction noise. • No receivers expected to be impacted during operation above criteria. • No receivers expected to be impacted by vibration above criteria.

7.2 Consistency with Strategic Context

The Project aligns with all applicable Commonwealth, State, regional and local plans and policies. In particular, the Project supports the Commonwealth and State governments in the transition to renewable energy, the goal of achieving net zero emissions by 2050 and the growth and development of the Hunter Central Coast REZ.

The following key aspects of the Project contribute to its consistency with the applicable strategic context:

- Contribution to the reduction of GHG emissions by generating clean, renewable energy that would otherwise have been generated by burning coal / fossil fuels;
- Assistance in the Federal and State transition from fossil fuel-based energy generation to renewable energy generation;
- Assistance in reducing pollution to the atmosphere, water and land by reducing GHG emissions and coal-based electricity generation, thereby positively contributing to human health;
- Positive contribution to slowing the effects of climate change, benefitting human health and future generations;
- Contribution to the development of the Hunter-Central Coast REZ, in terms of renewable energy generation capacity and training and re-skilling of local workers in the industry;
- Economic stimulus in the local area, support of 150 FTE during construction and five FTE during operation and significant capital investment;
- Payments through a VPA;
- Payments to host landowners provides a diversified income and contribution to the resilience of farms through adverse climatic conditions; and
- Management and mitigation measures to avoid / minimise environmental impacts.

The consistency of the Project with each applicable plan and policy is discussed in detail in **Section 2**.

7.3 Compliance with Statutory Requirements

The Project is permissible under Part 4 Section 4.7 of the EP&A Act and is consistent with all relevant Federal and State government strategies, plans and policies to achieve net zero emissions by 2050. These goals are legislated in NSW under the Climate Change Act. The Project satisfies the goals detailed in Section 1.2 of the SLEP. Compliance with the SLEP is detailed in **Table 2-2.** SEARs were issued on 4 October 2022 and supplementary SEARs on 12 February 2024. All have been addressed in this EIS as demonstrated in **Appendix B**.

Additional engagement was offered to regulators (at least) as required by the SEARs and is summarised in **Section 5**. Issues raised have been addressed in this EIS.

The Project's permissibility and compliance with all applicable legislation is detailed in **Appendix C**. Mandatory matters for consideration are also included at **Appendix C**.

7.4 Consistency with Community Views

A comprehensive stakeholder engagement program was initiated in accordance with the Project SEP. During the preparation of the EIS, the Applicant consulted with the relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners, exploration licence and/or mineral title holders potentially impacted by the Project. Engagement activities involved various methods such as face to face discussions, briefings and meetings, a community newsletter, a dedicated project email and 1800 info line, stakeholder briefings, doorknocking, an online feedback survey, distribution of a Kitchen Table Discussion Guide, and hosting an online Community Information Session.

A range of differing community views and opinions were observed during consultation with stakeholders. Stakeholders that were engaged with include but are not limited to neighbours within a 4 km radius, neighbouring industry, SC, landholders, regional communities, elected representatives, RAPs and community groups.

Community members raised concerns including but were not limited to the following topics:

- Glare and reflection;
- Reduction of visual amenity;
- Biosecurity;
- Recycling;
- Wildlife presence;
- Condition and use of land at Project completion;
- Suitability of the bridge and condition of roads for construction vehicles;
- Livestock management; and
- Potential fire hazards.

Specifically, the Project design was updated to address visual impacts, glare, biodiversity, flooding, Aboriginal heritage and fire hazards. Each of these issues is addressed in the impact assessment section of this EIS in **Section 6**.

Community members also shared positive opinions and recognised the benefits of the Project, such as:

- Eased cost of living pressures as a result of renewable energy generation;
- Creation of local jobs; and
- Economic benefits for the community.

Stakeholder requests and concerns were responded to and have been considered during the design of the Project and in this EIS. A full description of the community consultation and stakeholder engagement program and outcomes is contained in **Section 5**.

7.5 Ecologically Sustainable Development

The principles of ESD are detailed in Part 8 Division 5 Section 193 of the EP&A Regulation.

Table 7-2 provides an overview of the Project's conformance with ESD.

Table 7-2 Project Alignment with Principles of ESD

Principle	Detail	Project Alignment
Precautionary principle	The precautionary principle is that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In applying the precautionary principle, public and private decisions should be guided by— (a) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and (b) an assessment of the risk-weighted consequences of various options.	• Technical specialists have been engaged during the design and EIS phases to inform the Applicant of potential environmental impacts and strategies to avoid / minimise these impacts, with a high level of certainty. • The Project layout was designed with regard to the relevant guidelines and has been refined regarding the outcomes of technical environmental studies. This design process has ensured that the Project does not pose any unacceptable risk to the environment or human health. • Appropriate mitigation and management measures have been identified where environmental impacts have been assessed in **Section 6.** • With the suitable management measures in place, the Project will not cause foreseeable, serious or irreversible damage to the environment.
Intergenerational equity	The principle of inter-generational equity is that the present generation should ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.	• The Project will provide clean, renewable energy to the grid, replacing energy that would otherwise have been generated by burning coal. The Project's energy generation will be emission free once operating and will contribute to the stability of energy prices in the future. • Once the Project reaches end of life, the land within the development footprint can be rehabilitated to its existing condition for agricultural land use. There is also the option to renew the infrastructure and continue the Project, allowing for sustained production of renewable energy or return to agricultural production. Either option would provide benefits for future generations. • Mitigation measures proposed in this EIS will minimise environmental impacts throughout construction and during future operations.
Conservation of biological diversity and ecological integrity	The principle of the conservation of biological diversity and ecological integrity is that the conservation of biological diversity and ecological integrity should be a fundamental consideration.	• Extensive biodiversity / ecological studies have been performed throughout the design phase of the Project over 2022 and 2023. • The Project has undergone major refinements to avoid nearly all of PCT 3431_High and the vast majority of 3431_Regen. These areas of vegetation are the highest condition areas of PCT 3431 and associated TECs and the highest quality habitat for Brushed-tailed Phascogale. • The Project impact was reduced to avoid 330.4 ha of potential Striped Legless Lizard habitat. • EPBC species and BC Act listed species were surveyed and habitat was avoided where possible. • Avoidance of 134.85 ha of Foraging and general habitat for Grey-headed Flying-fox, Brush-tailed Phascogale, Powerful Owl and threatened microbats. • Avoidance of 20 dams out of 21 that may provide foraging habitat for Southern Myotis.

Principle	Detail	Project Alignment
		• Site selection on cleared, grazed farmland means biodiversity values on site are low and minimal clearing is required. • An offset strategy will be in place under the NSW BOS, informed by the BDAR's assessment of the Project's ecological impacts. The BDAR also informed a number of management and mitigation measures.
Improved valuation, pricing and incentive mechanisms	The principle of improved valuation, pricing and incentive mechanisms is that environmental factors should be included in the valuation of assets and services, such as— (a) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement, and (b) the users of goods and services should pay prices based on the full life cycle of the costs of providing the goods and services, including the use of natural resources and assets and the ultimate disposal of waste, and (c) established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.	• The Project will assist in NSW's transition to renewable energy, reduce GHG emissions and contribute to the stabilisation of energy prices. • The Project will bring economic stimulus to the region and support 150 FTE during instruction and five FTE during operations. • The Applicant is aware that they hold responsibility for all financial costs of environmental management and mitigation measures to avoid / minimise Project impacts.

7.6 Compliance Monitoring and Communication

An EMS will be developed to ensure any potential impacts and the effectiveness of management and mitigation measures are monitored and appropriately managed.

The environmental monitoring and management framework will be designed to:

- Record the effectiveness of mitigation and management strategies;
- Compare the predicted impacts to realised impacts;
- Provide for information capture and reporting to stakeholders such as neighbouring landholders, the local and surrounding communities and government bodies;
- Outline targets and key performance indicators;
- Clearly define responsibilities and the holders of these responsibilities for environmental management;
- Identify continuous improvement opportunities; and
- Detail adaptation strategies and measures.

7.7 Remaining Uncertainties

The renewable energy industry is growing and evolving and some uncertainties remain. The Applicant has experience developing a number of solar farms in Australia and is aware of relevant standards, best practice and current technology. Technology is progressing rapidly and future technology and availability is difficult to predict. It is anticipated that solar PV technology will advance and more efficient panels, batteries and other infrastructure may replace the best technology that is currently available.

Better reuse and recycling opportunities are expected to be available at the end of project components' approximately 30-year life than at the time of composing the EIS. This EIS has been composed considering the best available science and technology available at the time.

The Applicant will select appropriate suppliers of equipment and infrastructure based on detailed reviews of product information, safety data sheets and the best available science.

7.8 Conclusion

The Project involves the construction, operation and decommissioning of an approximately 60 MWac PV solar facility, with an associated 40 MW / 80 MWh BESS behind the same connection point, and associated infrastructure.

Should approval be granted, the Project will supply clean electricity to the national electricity grid via the existing electricity transmission network to power approximately 19,000 homes. The additional renewable energy generation and consequential reduction of GHG emissions will contribute to state and Federal emission reduction goals. The Project supports local, state and Federal plans, policies, strategies and is permissible under all relevant legislation.

With consideration of the management and mitigation measures summarised in **Appendix D**, the outcomes of technical specialist reports and stakeholder consultation, the Project will not have significant or permanent negative impacts on the environment.

The Project represents an avenue for positive economic stimulation and an opportunity to grow the renewable energy generation capacity of the Hunter-Central Coast REZ. The Project is in the best interest of the public and the environment and is therefore open to the Minister for positive determination.

8 TERMINOLOGY AND ACRONYMS

Term	Definition
KEY TERMINOLOGIES	
Project	A solar farm as described in **Section 3** to which this Application applies
Project Area	Red boundary shown on key figures to which the Application largely applies (unless otherwise stipulated)
Applicant	Terrain Solar Pty Ltd
Application	Application for Development Consent under Part 4.7 of the EP&A Act; and Determination under Part 9 of the EPBC Act
Associated dwelling	Habitable dwelling which does have any agreement with the Project
Non-associated dwelling	Habitable dwelling which does not have an agreement with the Project
Receiver	Assessment location
Due Diligence	Environmental assessment process by which minor Project components may be located within the Project Area but external to the Survey Area as stipulated in Section 3 of the EIS.
Survey Area	Area surveyed within the Project Area within which detailed assessment have been consistently undertaken for all field studies. The Project components may be moved and/or micro-sited within this boundary during detailed design.
Disturbance Footprint	Direct total Project-related disturbance hectares. Largely within the Project Area except where detailed in Section 3 of the EIS.

OTHER TERMINOLOGIES	
°C	Degrees Celsius
ABN	Australian Business Number
ABS	Australian Bureau of Statistics
ACHAR	Aboriginal Cultural Heritage Assessment Report
ACHCRs	Aboriginal Cultural Heritage Consultation Requirements
ACHMP	Aboriginal Cultural Heritage Management Plan
ASC	Australian Soil Classification
ASS	Acid Sulphate Soils
AD	Associated dwelling
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
AL	Assessment Lease
AL Act	*Aboriginal Land Rights Act 1983*
ANZECC	Australian and New Zealand Environment and Conservation Council
APZ	Asset Protection Zone
ASC	Australian Soil Classification
AUL	Auxiliary left turn
BAM	Biodiversity Assessment Method
BAR	Bushfire Assessment Report

Term	Definition
BC Act	*Biodiversity Conservation Act 2016*
BCD	Biodiversity Conservation Division
BCS	The Biodiversity Conservation and Science division of DCCEEW
BCT	Biodiversity Conservation Trust
BDAR	Biodiversity Development Assessment Report
BEMOP	Bushfire Emergency Management and Operations Plan
BESS	Battery and Energy Storage System
The Blue Book	Managing Urban Stormwater: Soils and Construction - Volume 1
BMP	Biodiversity Management Plan
BOM	Bureau of Meteorology
BOS	Biodiversity Offset Strategy
BPL	Bushfire Prone Land
BPM	Bushfire Protection Measure
BSAL	Biophysical Strategic Agricultural Land
CAA	Controlled Activity Approval
CCS	Community Communications Strategy
CEMP	Construction Environmental Management Plan
CEP	Community Engagement Plan
CHR	Channelised right turn
CIV	Capital Investment Value
CIC	Critical Industry Cluster
CL Act	*Crown Land Management Act 2016*
Climate Change Act	*Climate Change Act 2022*
CMS Act	*Coal Mine Subsidence Compensation Act 2017*
CNMP	Construction Noise Management Plan
CNVS	Construction Noise & Vibration Strategy
Conveyancing Act	*Conveyancing Act 1919*
COP	Conference of the Parties
CRM	Customer Relationship Manager
CSP	Community Strategic Plan
Cwlth	Commonwealth
DA	Development Application
dB	Decibels
DCCEEW	Federal Department of Climate Change, Energy, the Environment and Water
DCP	Development Control Plans
DEM	Digital Elevation Model
DGs	Dangerous Goods
DP	Deposited plan
DPI	NSW Department of Primary Industries (former)
DPHI	Department of Planning, Housing and Infrastructure (formerly DPE and DPI)
EAT	Emerson Aggregate Test

Term	Definition
EC	Electrical Conductivity
EDC	Estimated Development Cost
EIS	Environmental Impact Statement
ELF	Extremely Low Frequency
EMF	Electromagnetic Field
EMS	Environmental Management System
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
FM Act	*Fisheries Management Act 1994*
FPL	Flood Prone Land
FTE	Full Time Equivalent
GADDC	Guidance on the Assessment of Dust from Demolition and Construction' (Institute of Air Quality Management, 2014)
GDE	Groundwater dependent ecosystem
GHG	Greenhouse gas
GW	Gigawatt
GWh	Gigawatt Hour
Ha	Hectares
Hazards SEPP	*State Environmental Planning Policy (Resilience and Hazards) 2021*
Heritage Act	*Heritage Act 1977*
HHAR	Historic Heritage Assessment Report
HHUFP	Historic Heritage Unanticipated Finds Protocol
HIPAP	Hazardous Industry Planning Advisory Paper
HLLS	Hunter Local Land Services
HRP	Hunter Regional Plan 2041
HTP	Hunter Transmission Project
HV	High Voltage
HVO	Hunter Valley Operations
IAP2	International Association of Public Participation
ICNG	Interim Construction Noise Guideline
IPA	Inner Protection Area
IRSD	Index of Relative Socio-Economic Disadvantage
ISSC3 Guideline	Guideline for Managing Vegetation Near Power Lines' (Industry Safety Steering Committee, 2016)
km	Kilometre
kV	Kilovolt
L	Liters
LALC	Local Aboriginal Land Council
LCVIA	Landscape Character and Visual Impact Assessment

Term	Definition
LCZ	Landscape Character Zone
LEC	Land and Environment Court
LEP	Local Environmental Plan
LGA	Local Government Area
LiDAR	Light Detection and Ranging
LLS	Local Land Services
LLS Act	*Local Land Services Act 2013*
LRET	Large-scale Renewable Energy Target
LSC	Land and Soil Capability
LSPS	Local Strategic Planning Statements
LUCRA	Land Use Conflict Risk Assessment
LVMP	Landscape and Visual Management Plan
M	Million
m	metres
m/s	Metres per second
ML	Megaliters
Mm	Millimetres
MNES	Matters of National Environmental Significance
MP	Member of Parliament
Mtpa	Metric tonnes per annum
MW	Megawatt
MWAC	Megawatt (alternating current)
NEH	New England Highway
NEM	National Energy Market
Net Zero Plan	Net Zero Plan Stage 1: 2020-2030
NIA	Noise Impact Assessment
NML	Noise Management Levels
NNTT	National Native Title Tribunal
NPW Act	*National Parks and Wildlife Act 1974*
NSW	New South Wales
NSW RFS	NSW Rural Fire Service
NSW Strategy	NSW Electricity Strategy
NT Act	*Native Title Act 1993*
NVIA	Noise and Vibration Impact Assessment
OEMP	Operations Environmental Management Plan
O&M	Operations and Maintenance Facility
OSOM	Oversize and Overmass
Paris Agreement	UN Framework Convention on Climate Change COP – COP21
PCU	Power Conversion Units
Planning Systems SEPP	*State Environmental Planning Policy (Planning Systems) 2021*
PCT	Plant Community Types

Term	Definition
PM	Particulate Matter
POEO Act	*Protection of the Environment Operations Act 1997*
PPWDS	Project Procurement and Workforce Development Strategy
PV	Photovoltaic
QLD	Queensland
RAAF	Royal Australian Air Force
RAPs	Registered Aboriginal Parties
RAV	Restricted Access Vehicle
RBL	Rating Background Level
RC	Riparian Corridor
Regional Plan	Hunter Regional Plan 2041
RET	Renewable Energy Target
REZ	South West Renewable Energy Zone
RF Act	*Rural Fires Act 1997*
RNP	Road Noise Policy
Roadmap	NSW Electricity Roadmap
Roads Act	*Roads Act 1993*
RPS	RPS Group AAP Consulting Pty Ltd
RTS	Response to Submissions
RUSLE	Revised Universal Soil Loss Equation
SA3	Statistical Area 3
SAIA	Soils and Agricultural Impact Assessment
SAL	Suburb and Locality
SDGs	Sustainable Development Goals
SEARs	Secretary's Environmental Assessment Requirements SSD-48160216 issued on 4 October 2022
SC	Singleton Council
SCADA	Supervisory control and data acquisition
SEP	Stakeholder Engagement Plan
SEPP	State Environmental Planning Policy
SHR	State Heritage Register
SIA	Social Impact Assessment
SIDRA	Microanalytical intersection assessment software
Singleton Flood Study	Draft Singleton Floodplain Risk Management Study and Plan
SLCP	Social Licence Commitments Plan
SLEP	*Singleton Local Environment Plan 2013*
SLSPS	Singleton Local Strategic Planning Statement 2041
Solar Guidelines	Large Scale Solar Energy Guideline (DPIE, 2022)
SR	Scoping Report
SR Project Site	The original 352 ha project site that was surveyed in the Maison Dieu Solar Farm Scoping Report (EMM, 2022). Also referred to in technical reports as the 'Survey Area'.

Term	Definition
SSAL	State Significant Agricultural Land
SSD	State Significant Development
Supplementary SEARs	Supplementary SEARS issued on 12 February 2024
SWMP	Soil and Water Management Plan
t	Tonnes
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened Ecological Communities
TfNSW	Transport for New South Wales
TIA	Traffic Impact Assessment
TS	Threatened Species
TUFLOW	Hydraulic modelling software
UN	United Nations
VBB	Victorian Big Battery
VLP	Visual and Landscape Plan
VPA	Voluntary Planning Agreement
VRZ	Vegetated Riparian Zone
VTPH	Vehicle Trips Per Hour
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*
WHO	World Health Organization
WIA	Water Impact Assessment
WM Act	*Water Management Act 2000*
WMP	Waste Management Plan
ZOA	Zone of Affectation
ZOM	Zone of Management

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Appendix A
Project Team

Table A1 contains the Project Team for the Maison Dieu EIS.

Table A1 Project Team

Section	EIS Component / Role	Team Member and Company	
Client Project Management			
	General Manager	Craig Peters	Terrain Solar
	Development Manager	Tom Allen	Terrain Solar
	Projects and Planning Manager	Matilda Wachsmann	Terrain Solar
EIS Management			
	Project Director and REAP Reviewer	Dianne Munro	RPS
	Project Coordinator	Luke Wiggins	RPS
Stakeholder Engagement			
	Development Manager	Tom Allen	Terrain Solar
	Projects and Planning Manager	Matilda Wachsmann	Terrain Solar
	Project Director	Dianne Munro	RPS
	Principal – Engagement and Social	Nicola Adams	BD Infrastructure
	Graduate Consultant	Lachlan Nicholson	BD Infrastructure
EIS Sections			
	Senior Principal Environmental Approvals	Dianne Munro	RPS
	Graduate Environmental Scientist	Luke Wiggins	RPS
Appendices			
APP A	Project Team		RPS
APP B	SEARs and Regulatory Requirements		RPS
APP C	Statutory Compliance		RPS
APP D	Management and Mitigation Summary	Dianne Munro	RPS
APP E	Biodiversity Development Assessment Report	Mitchell Palmer	Biosis
APP F	Aboriginal Cultural Heritage Assessment Report	Ben Churcher	Ozark
APP G	Historic Heritage Assessment Report	Ben Churcher	Ozark
APP H	Noise Impact Assessment	Dale Redwood	Muller Acoustic Consulting
APP I	Visual Impact Assessment	Suzie Rawlinson	Iris Visual
APP J	Soils and Agriculture Assessment	Matt Hemingway	Minesoils
APP K	Surface Water Impact Assessment	Rachel Stevenson	Northrop
APP L	Flooding Assessment	Angus Brien	Northrop
APP M	Traffic Impact Assessment	Jeff Garry	Intersect
APP N	OSOM Route Study	Ares Project Services	Ares Project Services
APP O	Preliminary Hazard Analysis	Renton Parker	Riskcon
APP P	Bushfire Impact Assessment	Stuart Greville	Bushfire Planning Australia
APP Q	Social Impact Assessment	Luke Wiggins	RPS
Drafting	Senior Spatial Analyst	Robert Suansri and Natalie Wood	RPS

Appendix B
SEARs and Regulatory Requirements

Table B1 lists the SEARs for the Project and where addressed in this EIS. **Table B2** contains regulator submissions and where addressed in this EIS. **Table B3** lists supplementary SEARs for the Project and where addressed in this EIS.

Table B1 SEARs for SSD-48160216 and Where Addressed

Issue	SEAR	Section
General requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements as prescribed by Part 8, Division 5 of the *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) and must have regard to the State Significant Development Guidelines and the Large-Scale Solar Energy Guideline (2022) (Solar Guideline). In particular, the EIS must include:	**This EIS**
	Stand alone executive summary	**ES**
	A full description of the development, including: - details of construction, operation and decommissioning including any staging of the development; - a high quality site plan at an adequate scale showing all infrastructure and facilities (including any infrastructure that would be required for the development, but the subject of a separate approvals process); - a high quality detailed constraints map identifying the key environmental and other land use constraints that have informed the final design of the development;	**3**
	A strategic justification of the development focusing on site selection and the suitability of the proposed site with respect to potential land use conflicts with existing and future surrounding land uses (including existing land use, other proposed or approved solar and major projects, rural/residential development, Crown lands within and adjacent to the project site and subdivision potential) having regard to the Solar Guideline;	**7**
	An assessment of the likely impacts of the development on the environment, focusing on the specific issues identified below, including: - a description of the existing environment likely to be affected by the development using sufficient baseline data;	**2**
	- an assessment of the likely impacts of all stages of the development (which is commensurate with the level of impact), including any cumulative impacts of the site and existing or proposed developments in the region, taking into consideration any relevant legislation, environmental planning instruments, guidelines, policies, plans and industry codes of practice including the Solar Guideline and Cumulative Impact Assessment Guideline (DPIE, 2021);	**3**
	- a description of the measures that would be implemented to avoid, mitigate and/or offset the impacts of the development (including draft management plans for specific issues as identified below); and	**6**
	- a description of the measures that would be implemented to monitor and report on the environmental performance of the development;	**3**
	A consolidated summary of all the proposed environmental management and monitoring measures, identifying all the commitments in the EIS;	**Appendix D**
	A detailed evaluation of the merits of the project as a whole having regard to:	
	The requirements in Section 4.15 of the *Environmental Planning and Assessment Act 1979*, including the objects of the Act and how the principles of ecologically sustainable development have been incorporated in the design, construction and ongoing operations of the development;	**Appendix C**
	The suitability of the site with respect to potential land use conflicts with existing and future surrounding land uses; and	**2**
	Feasible alternatives to the development and its key components, and the consequences of not carrying out the development;	**2**
	A detailed consideration of the capability of the project to contribute to the security and reliability of the electricity system in the National Electricity Market, having regard to local system conditions and the Department's guidance on the matter;	**2**
	A signed statement from the author of the EIS, certifying that the information contained within the document is neither false nor misleading.	**REAP Declaration**

Issue	SEAR	Section
	The EIS must also be accompanied by: A report from a AIQS Certified Quantity Surveyor or Chartered Quantity Surveyor providing a detailed calculation of the capital investment value (CIV) (as defined in Schedule 7 of the EP&A Regulation) of the proposal, including details of all assumptions and components from which the CIV calculation is derived. The report shall be prepared on company letterhead and indicate applicable GST component of the CIV and include certification that the information provided is accurate for the development at the time of application; and	**Provided separately to DPHI. EDC method since replaced CIV.**
	An estimate of the jobs that will be created during the construction and operational phases of the proposed development	**3**
	The development application must be accompanied by the consent of the owner/s of the land (as required in Section 23(1) of the EP&A Regulation).	**Applicant to provide**
Biodiversity	An assessment of the biodiversity values and the likely biodiversity impacts of the project in accordance with Section 7.9 of the Biodiversity Conservation Act 2016 (NSW) (BC Act), the Biodiversity Assessment Method (BAM) 2020 and documented in a Biodiversity Development Assessment Report (BDAR), including a detailed description of the proposed regime for avoiding, minimising, managing and reporting on the biodiversity impacts (including on grasslands) of the development over time, and a strategy to offset any residual impacts of the development in accordance with the BC Act;	**6.1** **Appendix E**
	an assessment of the likely impacts on listed aquatic threatened species, populations or ecological communities, scheduled under the Fisheries Management Act 1994, and a description of the measures to minimise and rehabilitate impacts, including impacts to the Hunter River and unnamed watercourses flowing across the site; and	
	if an offset is required, details of the measures proposed to address the offset obligations.	
Heritage	An assessment of the impact to Aboriginal cultural heritage items (cultural and archaeological) in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011) and the Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW (DECCW, 2010), including results of archaeological test excavations (if required);	**6.2**
	Evidence of consultation with Aboriginal communities in determining and assessing impacts, developing options and selecting options and mitigation measures (including the final proposed measures), having regard to the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW, 2010); and	**6.2**
	Assess the impact to historic heritage having regard to the NSW Heritage Manual.	**6.3**
Land	A detailed justification of the suitability of the site and that the site can accommodate the proposed development having regard to its potential environmental impacts, permissibility, strategic context and existing site constraints, having regard to the Solar Guideline;	**2.6.2**
	An assessment of the potential impacts of the development on existing land uses on the site and adjacent land, including: - flood prone land, Crown lands, mining, quarries, mineral or petroleum rights and	**6.6.3.2**
	- A soil survey to determine the soil characteristics and consider the potential for erosion to occur;	**6.6**
	- A cumulative impact assessment of nearby developments;	**6.6.3.5**
	An assessment of the compatibility of the development with existing land uses, during construction, operation and after decommissioning, including - including subdivision (if required); and	**6.6.3.3**
	An assessment of the agricultural impacts in accordance with the Solar Guideline.	**6.6**
Landscape and Visual	A landscape and visual impact assessment, prepared in accordance with the Solar Guideline and the Technical Supplement – Landscape and Visual Impact Assessment;	**Appendix I**
	A detailed assessment of the likely visual impacts (including night lighting) of all components of the project on surrounding residences (including approved developments, lodged development applications and dwelling entitlements), and key locations, scenic or significant vistas and road corridors in the public domain; and	**6.5**

Issue	SEAR	Section
	Details of measures to mitigate and/or manage potential impacts (including a draft landscaping plan for on-site perimeter planting, with evidence it has been developed in consultation with affected landowners);	**6.5**
Glint and Glare	Provide a glint and glare assessment prepared in accordance with the Solar Guideline;	**Appendix I** **6.5**
Noise	Including an assessment of the construction noise impacts of the development in accordance with the Interim Construction Noise Guideline (ICNG), operational noise impacts in accordance with the NSW Noise Policy for Industry (2017), cumulative noise impacts (considering other developments in the area), and a draft noise management plan if the assessment shows construction noise is likely to exceed applicable criteria;	**6.4** **Appendix H**
Transport	An assessment of the peak and average traffic generation, including over-dimensional vehicles/heavy vehicles requiring escort and construction worker transportation;	**6.9** **Appendix M** **Appendix N**
	An assessment of the likely transport impacts to the site access route(s), site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance;	**6.9**
	A cumulative impact assessment of traffic from nearby developments; and	**6.9**
	Provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authorities;	**6.9**
Water	An assessment of the likely impacts of the development (including flooding) on surrounding watercourses (including their Strahler Stream Order) and groundwater resources and measures proposed to monitor, reduce and mitigate these impacts;	**6.7** **6.8**
	Details of water requirements and supply arrangements for construction and operation;	**6.8**
	Where the project involves works within 40 metres of any river, lake or wetlands (collectively waterfront land), identify likely impacts to the waterfront land, and how the activities are to be designed and implemented in accordance with the DPI Guidelines for Controlled Activities on Waterfront Land (2018) and (if necessary) Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (DPI 2003), and Policy & Guidelines for Fish Habitat Conservation & Management (DPE, 2013); and	**6.7**
	a description of the erosion and sediment control measures that would be implemented to mitigate any impacts in accordance with Managing Urban Stormwater: Soils & Construction (Landcom, 2004);	**6.8**
Hazards	A preliminary risk screening completed in accordance with the State Environmental Planning Policy (Resilience and Hazards);	**6.10**
	A Preliminary Hazard Analysis (PHA) prepared in accordance with Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011) and Multi-Level Risk Assessment (DoP, 2011). The PHA must consider all recent standards and codes and verify separation distances to on-site and off-site receptors to prevent fire propagation and compliance with Hazardous Industry Advisory Paper No. 4, 'Risk Criteria for Land Use Safety Planning (DoP, 2011);	**6.10** **Appendix O**
	An assessment of potential hazards and risks including but not limited to fires, spontaneous ignition, electromagnetic fields or the proposed grid connection infrastructure against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields;	**6.10** **Appendix O**
	Identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a solar farm would cause bush fire and demonstrate compliance with Planning for Bush Fire Protection 2019;	**6.10** **6.11**
Social Impact	Including an assessment of the social impacts in accordance with Social Impact Assessment Guideline (DPIE, 2021) and consideration of construction workforce accommodation;	**6.15** **Appendix Q**

Issue	SEAR	Section
Economic	Including an assessment of the economic impacts or benefits of the project for the region and the State as a whole, and	**6.14**
Waste	Identify, quantify and classify the likely waste streams to be generated throughout all stages of the project, and describe the measures to be implemented to reduce waste generation, manage, reuse, recycle and safely dispose of this waste; and	**6.13**
	Provide a waste management plan prepared in accordance with the Solar Guideline.	**6.13**
Plans and Documents	The EIS must include all relevant plans, diagrams and relevant documentation required under Part 3 of the EP&A Regulation. Provide these as part of the EIS rather than as separate documents.	**This EIS**
	In addition, the EIS must include high quality files of maps and figures of the subject site and proposal.	**This EIS**
Legislation, Policies and Guidelines	The assessment of the key issues listed above must take into account relevant guidelines, policies, and plans as identified. A list of some of the legislation, policies and guidelines that may be relevant to the assessment of the project can be found at: https://www.planning.nsw.gov.au/Policy-and-Legislation/Planning-reforms/Rapi d-Assessment-Framework/Improving-assessment-guidance, https://www.planningportal.nsw.gov.au/major-projects/assessment/policies-an d-guidelines; and http://www.environment.gov.au/epbc/publications#assessments	**2**
Consultation	During the preparation of the EIS, you should consult with the relevant local, State or Commonwealth Government authorities, infrastructure and service providers, community groups, affected landowners and any exploration licence and/or mineral title holders. In particular, you must undertake detailed consultation with affected landowners surrounding the development, Singleton Council, and relevant government agencies.	**5**
	The EIS must: detail how engagement undertaken was consistent with the Undertaking Engagement Guidelines for State Significant Projects (DPIE, 2021); and	**5**
	Describe the consultation process and the issues raised and identify where the design of the development has been amended in response to these issues. Where amendments have not been made to address an issue, an explanation should be provided.	**5**
Expiry Date	If you do not lodge a Development Application and EIS for the development within 2 years of the issue date of these SEARs, your SEARs will expire. If an extension to these SEARs will be required, please consult with the Planning Secretary 3 months prior to the expiry date.	**Prior to 04/10/2024**

Table B2 Regulator Submission to SEARs and Where Addressed

Regulator	Issue	Requirement	Section
Crown Lands	No issues	NA	**NA**
Biodiversity Conservation Division	Biodiversity	Biodiversity impacts related to the proposed development (SSD-48160216) are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method 2020.	**Appendix E**
	Biodiversity	The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method 2020.	
	Biodiversity	Documentation within the BDAR of measures proposed to address the offset obligation including: a. The total number and classes of biodiversity credits required to be retired for the development/project; b. The number and classes of like-for-like biodiversity credits proposed to be retired; c. The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules; d. Any proposal to fund a biodiversity conservation action; e. Any proposal to conduct ecological rehabilitation (if a mining project); f. Any proposal to make a payment to the Biodiversity Conservation Fund.	
	Biodiversity	The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the *Biodiversity Conservation Act 2016*.	
	Water and soils	The EIS must map the following features relevant to water and soils including: a. Acid sulphate soils (Class 1, 2, 3 or 4 on the Acid Sulphate Soil Planning Map). b. Rivers, streams, wetlands, estuaries (as described in s4.2 of the Biodiversity Assessment Method) c. Wetlands as described in s4.2 of the Biodiversity Assessment Method d. Groundwater e. Groundwater dependent ecosystems f. Proposed intake and discharge locations.	**Figure 6-6, Figure 6-8**
	Water and soils	The EIS must describe background conditions for any water resource likely to be affected by the development, including: a. Existing surface and groundwater. b. Hydrology, including volume, frequency and quality of discharges at proposed intake and discharge locations. c. Water Quality Objectives (as endorsed by the NSW Government http://www.environment.nsw.gov.au/ieo/index.htm) including groundwater as appropriate that represent the community's uses and values for the receiving waters. d. Indicators and trigger values/criteria for the environmental values identified at (c) in accordance with the ANZECC (2000) Guidelines for Fresh and Marine Water Quality and/or local objectives, criteria or targets endorsed by the NSW Government.	**2.2.4**
	Water and soils	The EIS must assess the impacts of the development on water quality, including: a. The nature and degree of impact on receiving waters for both surface and groundwater, demonstrating how the development protects the Water Quality Objectives where they are currently being achieved, and contributes towards achievement of the Water Quality Objectives over time where they are currently not	**6.6** **6.7** **6.8**

Regulator	Issue	Requirement	Section
		being achieved. This should include an assessment of the mitigating effects of proposed stormwater and wastewater management during and after construction. b. Identification of proposed monitoring of water quality.	
	Water and soils	The EIS must assess the impact of the development on hydrology, including: a. Water balance including quantity, quality and source. b. Effects to downstream rivers, wetlands, estuaries, marine waters and floodplain areas. c. Effects to downstream water-dependent fauna and flora including groundwater dependent ecosystems. d. Impacts to natural processes and functions within rivers, wetlands, estuaries and floodplains that affect river system and landscape health such as nutrient flow, aquatic connectivity and access to habitat for spawning and refuge (e.g., river benches). e. Changes to environmental water availability, both regulated/licensed and unregulated/rules-based sources of such water. f. Mitigating effects of proposed stormwater and wastewater management during and after construction on hydrological attributes such as volumes, flow rates, management methods and reuse options. g. Identification of proposed monitoring of hydrological attributes.	**6.7**
	Flooding and coastal erosion	The EIS must map the following features relevant to flooding as described in the Floodplain Development Manual 2005 (NSW GOVERNMENT 2005) including: a. Flood prone land. b. Flood planning area, the area below the flood planning level. c. Hydraulic categorisation (floodways and flood storage areas).	**6.7**
	Flooding and coastal erosion	The EIS must describe flood assessment and modelling undertaken in determining the design flood levels for events, including a minimum of the 1 in 10 year, 1 in 100 year flood levels and the probable maximum flood, or an equivalent extreme event.	**6.7**
	Flooding and coastal erosion	The EIS must model the effect of the proposed development (including fill) on the flood behaviour under the following scenarios: a. Current flood behaviour for a range of design events as identified in 11 above. This includes the 1 in 200 and 1 in 500-year flood events as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change.	**6.7**
	Flooding and coastal erosion	Modelling in the EIS must consider and document: a. The impact on existing flood behaviour for a full range of flood events including up to the probable maximum flood. b. Impacts of the development on flood behaviour resulting in detrimental changes in potential flood c. affection of other developments or land. This may include redirection of flow, flow velocities, flood levels, hazards and hydraulic categories. d. Relevant provisions of the NSW Floodplain Development Manual 2005.	**6.7**
	Flooding and coastal erosion	The EIS must assess the impacts on the proposed development on flood behaviour, including: a. Whether there will be detrimental increases in the potential flood affectation of other properties, assets and infrastructure. b. Consistency with Council floodplain risk management plans. c. Compatibility with the flood hazard of the land. d. Compatibility with the hydraulic functions of flow conveyance in floodways and storage in flood storage areas of the land. e. Whether there will be adverse effect to beneficial inundation of the floodplain environment, on, adjacent to or downstream of the site.	**6.7**

Regulator	Issue	Requirement	Section
		f. Whether there will be direct or indirect increase in erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses. g. Any impacts the development may have upon existing community emergency management arrangements for flooding. These matters are to be discussed with the SES and Council. h. Whether the proposal incorporates specific measures to manage risk to life from flood. These matters are to be discussed with the SES and Council. i. Emergency management, evacuation and access, and contingency measures for the development j. considering the full range or flood risk (based upon the probable maximum flood or an equivalent extreme flood event). These matters are to be discussed with and have the support of Council and the SES. k. Any impacts the development may have on the social and economic costs to the community as consequence of flooding.	
	Flooding and coastal erosion	The [EIS/EA] must describe the potential effects of coastal processes and hazards (within the meaning of the Coastal Management Act 2016), including sea level rise and climate change: a. On the proposed development b. Arising from the proposed development.	**6.7**
	Flooding and coastal erosion	The [EIS/EA] must have regard to any certified Coastal Management Program (or Coastal Zone Management Plan) and be consistent with the management objectives described in the Coastal Management Act 2016 and development controls for coastal management areas mapped under the State Environmental Planning Policy (Coastal Management) 2018.	**6.7**
DPE Water	Local watercourses	A description of the watercourses located within the vicinity of the development, including Strahler Stream Order as mapped by Spatial Services NS, and appropriate riparian setbacks in accordance with the Guidelines for riparian corridors on waterfront land. (https://www.dpie.nsw.gov.au/__data/assets/pdf_file/0008/386207/licensing_approvals_controlled_activities_riparian_corridors.pdf).	**6.8**
	Water supply	Details of water supply requirements and arrangements for the life of the project (both construction and operation).	**6.8**
	Impacts on surface water and groundwater resources	An assessment of the likely impacts (including flooding) on surface water and groundwater resources* and measures proposed to monitor, reduce and mitigate these impacts. *These water resources may include local streams/creeks, drainage channels, wetlands, riparian land, farm dams, floodplains, key fish habitat, groundwater dependent ecosystems and acid sulfate soils), related infrastructure, adjacent licensed water users and basic landholder rights.	**6.7**
	Erosion and sediment control	A description of erosion and sediment control measures to mitigate any impacts in accordance with Managing Urban Stormwater: Soils & Construction (Landcom 2004);	**6.8**
	Erosion and sediment control	The proponent documents and addresses any sedimentation issues, through the development of an Erosion and Sediment Control Plan, in consultation with DPE Water.	**6.8**
	Legislation, guidelines and policies	Consideration of any relevant legislation, policies and guidelines, including the NSW Aquifer Interference Policy (2012), the Guidelines for Controlled Activities on Waterfront Land (2018) and the relevant Water Sharing Plans (available at https://water.dpie.nsw.gov.au/home).	**6.8**
NSW Fire and Rescue	Fire safety and emergency response	There is currently insufficient information available regarding the fire safety and emergency response management aspects of the project. FRNSW requests to be consulted and given the opportunity to review and provide comment regarding the proposed fire and life safety systems at the preliminary and final design phases of the project.	**6.11.4**
DPI Agriculture	Agricultural land sharing	The identification of agricultural land sharing opportunities for the operation, including groundcover management.	**Appendix J**

Regulator	Issue	Requirement	Section
	Rehabilitation for agricultural use	The inclusion of a description of the final land use and landform, indicators which may be used to guide the return of the land back to agricultural production, along with the expected timeline for the rehabilitation program.	
	Rehabilitation	The soil survey to include baseline information to support the determination of rehabilitation goals.	
	Biosecurity	An agricultural biosecurity management plan detailing construction and operational risks and controls in relation to pests, weeds, and diseases should be required.	
Heritage NSW	No issues	NA	-
Department of Regional NSW – Mining, Exploration & Geoscience (MEG)	Resource sterilisation	…concerns were raised by HVO in relation to the potential sterilisation of future coal resources. MEG-GSNSW holds similar concerns in regard to the project and potential resource sterilisation and encourages the applicant to continue further engagement with HVO.	**Appendix M**
NSW Rural Fire Service	Bushfire assessment	The New South Wales Rural Fire Service (NSW RFS) has reviewed the information provided and advises that a bush fire assessment report shall be prepared which identifies the extent to which the proposed development conforms with or deviates from the relevant provisions of *Planning for Bush Fire Protection 2019*.	**Appendix P**
Transport for NSW	Traffic impact assessment	TfNSW requests that a Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments. The TIA is to identify the impacts of the development and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The TIA must explain and justify all inputs informing the proposed mitigation measures and TIA conclusions. The TIA should be tailored to the scope of the proposed development and include, but not necessarily be limited to, consideration of the following;	**Appendix M**
		A map of the surrounding road network identifying the site access, nearby accesses, intersections and transport related facilities.	
		A map of the proposed transport route/s identifying all public roads proposed to obtain access from the classified (State) road/s to the development site.	
		The total impact of existing and proposed development on the road network with consideration for a 10 year horizon. This should include;	
		Identify Annual Average Daily Traffic (AADT) volumes with percentage heavy vehicles along the transport route/s and diagrammatically demonstrate AM and PM peak hour movements at key intersections.	
		Background traffic data from published sources and/or recent survey data. The source of data and any assumptions are to be clearly explained and justified, including the growth rate applied to the future horizon. Due to the impact of COVID19 on travel patterns, traffic counts undertaken at this time may not be representative of normal volumes. Alternative approaches to understanding the impact of COVID-19 on traffic patterns should be discussed with TfNSW.	
		The volume and distribution of existing and proposed trips to be generated by the construction, operational and decommission phases of the development. This should identify the maximum daily and hourly demands generated by the development, particularly where they coincide with the network peak hour.	
		The type and frequency of design vehicles accessing the development site.	

Regulator	Issue	Requirement	Section
		Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, intersection treatments and any identified hazards. This should include:	
		• Available sight distances at the site access and nearby intersections and any constraint to achieving the required sight distance for the posted speed limit.	
		• Available sight distances at intersections along the proposed transport routes and any constraint to achieving the required sight distance for the posted speed limit.	
		• An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for • intersections along the identified transport route/s, identifying the existence of the minimum basic turn treatments and addressing the need for any warranted higher order treatments.	
		Swept path analysis demonstrating the largest design vehicle entering and leaving the development, and moving in each direction through intersections along the proposed transport route/s.	
		Capacity analysis using SIDRA or other relevant application, to identify an acceptable Level of Service (LOS) at intersections with the classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.	
		A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.	
		Strategic (2D) design drawings of all proposed road works and the site access demonstrating scope, estimated cost and constructability of works required to mitigate the impacts of the development on road safety, traffic efficiency and the integrity of transport infrastructure. Works must be appropriately designed for the existing posted speed limit.	
		Site plan demonstrating site access, internal manoeuvring, servicing and parking areas consistent with the relevant parts of AS2890 and Council requirements.	
		Details of measures to address impacts and/or provide connections for public transport services and active transport modes, such as, public and school bus services, walking and cycling.	
		Details of measures to ameliorate the impacts of road traffic noise, dust, and/or glare generated along the proposed transport route/s.	
		Details of any Traffic Management Plan (TMP) proposed to address the construction and operation phases of the proposed development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. It is recommended that any TMP include, but not necessarily limited to, the following;	
		A map of the primary transport route/s highlighting critical locations.	
		An induction process for vehicle operators and regular toolbox meetings.	
		Procedures for travel through residential areas, school zones and/or bus route/s.	
		any proposed temporary measures such a Traffic Guidance Scheme (TGS)	
		A Driver Code of Conduct for heavy vehicle operators.	
		A complaint resolution and disciplinary procedure.	
		Community consultation measures proposed for peak periods.	
		Where road safety concerns are identified at a specific location along the proposed haulage routes, TfNSW suggests that the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with the Austroads Guidelines.	

Regulator	Issue	Requirement	Section
		Any roadwork on classified (State/Regional) road/s is to be designed and constructed in accordance with the current Austroads Guidelines, Australian Standards and TfNSW Supplements.	
		The developer will be required to enter into a Works Authorisation Deed (WAD) with TfNSW for any roadwork deemed necessary on the classified (State) road. The developer will be responsible for all costs associated with the roadwork and administration for the WAD. It is recommended that developers familiarise themselves with the requirements of the WAD process. Further information can be obtained from the TfNSW website.	
Singleton Council	T&I SEPP	State Environmental Planning Policy (Transport and Infrastructure) 2021. AusGrid will need to be consulted.	**4**
	Resilience and Hazards SEPP	State Environmental Planning Policy (Resilience and Hazards) 2021 Potential contaminated land, being farmland and proximity to the mine sites. Lithium battery storage and potential contamination with regards to this type of development must be addressed.	**4** and **5**
	Primary Production SEPP	State Environmental Planning Policy (Primary Production) 2021 Draft State Significant Agricultural Land Map to be considered.	**4**
	(Draft) Hunter Strategic Plan 2041	This document is currently in the draft stage and addresses the need to diversify. This will need to be considered.	
	Singleton Sustainability Strategy 2019-2027	This focusses on the United Nations sustainable Development Goals. The proposed development should show how it drives Singleton to a sustainable future.	
	Net zero and Federal requirements	Address how the project will be in line with the NSW and Federal Governments guidelines and policies (also any draft policy) towards net zero emissions and climate change.	
	Flooding	The site is partially located in an historical flooding area, namely the 1949 & 1955 floods.	**6.7**
	Bushfire	Site is bushfire prone. Development as per Planning for Bushfire Protection 2019.	**6.11**
	Biodiversity	The site contains a number of Threatened Ecological Communities. A Season BDAR will be required. Updated NSW State Vegetation Map from June 2022 to be used. Koala Study	**6.1**
	Biodiversity values	Singleton Council is currently creating High Biodiversity Values mapping, which could impact certain areas on the site.	**6.1**
	88b Instrument	There are a number of easements relating to transmissions lines, water, and right of carriage ways. The appropriate authority must be contacted for potential impacts and variation to these covenants.	**2.3.6**
	Traffic	Management during the construction, noting there are to be over 300 workers on site Carparking, access, management during the life of the project (up to 8 staff) Potential impacts on the Maison Dieu and New England Highway intersection that needs to be addressed, particularly during construction phase	**6.9**
	Accessibility	Potential accessibility requirements under Australian Standards and Singleton Development Control Plan 2014.	**4**
	Heritage	The site is located opposite a Heritage Item located on Lot 2 DP 876447. This is a local heritage item listed as “I141 -Archerfield and outbuildings” under the Singleton Local Environmental Plan.	**6.5 and 6.3**
	Aboriginal Heritage	Highly likely there is Aboriginal Heritage on site. AHIMS and Aboriginal Heritage Study required. It is recommended that an Archaeologist or Aboriginal knowledge holder observe the initial removal of the A horizon soils at the construction site to identify if there are Aboriginal objects at risk of harm.	**6.2**
	Riparian land and other watercourses	There is Riparian Land and Watercourse mapped land on site. Further to this these are a number of lower order stream all which go to the Hunter River. This will need to be addressed, including potential extra run off due to large hard surface areas.	**2.2**
	Earthworks and drainage	Under the Local Environmental Plan and Development Control Plan both of these items will need to be addressed	**5**

Regulator	Issue	Requirement	Section
	Community engagement	All neighbours should be suitably engaged. There are a number of stakeholders such as the neighbouring mines and the Wanaruah Aboriginal Land Council who should be consulted with. The proposed development has the potential to disrupt short term accommodation during the construction phase and the EIS should address this and seek to engage the community around timeframes etc	**5**
	Air and noise	Acoustic and Air Quality impacts to be addressed, this includes potential impacts the Heritage listed neighbouring property	**6.12**
	Waste management	Waste Management Report detailing the waste produced during construction and during the life of the project, what is to be recycled/reused and where is it sent.	**6.13**
	End of life decommissioning	The process of decommissioning and the management plan to remediate the site (including revegetation). How the waste will be processed. This includes the shorter battery life.	**6.13**
	Mine subsidence	The lots are located in the Patrick Plains Mine Subsidence District this must be addressed.	**2.4**
	Council engagement	Council would like to see the applicant actively engage Council particularly with regards to the traffic impacts and the impacts of short-term housing.	**5**
Transgrid	No issues	NA	**-**

Table B3 Supplementary SEARs and Where Addressed

Issue	Supplementary SEAR	Section
General Requirements	The EIS must address all matters outlined in Schedule 4 of the EPBC Regulations and all matters outlined below in relation to the controlling provisions.	**Appendix E**
Project Description	The title of the action, background to the action and current status.	**1**
Project Description	The precise location and description of all works to be undertaken (including associated offsite works and infrastructure), structures to be built or elements of the action that may have impacts on Matters of National Environmental Significance (MNES).	**3**
Project Description	How the action relates to any other actions that have been, or are being taken in the region affected by the action.	**2.5**
Project Description	How the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts on MNES.	**4.3**
Impacts	The EIS must include an assessment of the relevant impacts of the action on the matters protected by the controlling provisions, including: i. a description and detailed assessment of the nature and extent of the likely direct, indirect and consequential impacts, including short term and long term relevant impacts; ii. a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible; iii. analysis of the significance of the relevant impacts; and iv. any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	**6**
Avoidance, mitigation and offsetting	For each of the relevant matters protected that are likely to be significantly impacted by the action, the EIS must provide information on proposed avoidance and mitigation measures to manage the relevant impacts of the action including: i. a description, and an assessment of the expected or predicted effectiveness of the mitigation measures, ii. any statutory policy basis for the mitigation measures; iii. the cost of the mitigation measures; iv. an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing; v. the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program.	**6**

Issue	Supplementary SEAR	Section
Avoidance, mitigation and offsetting	Where a significant residual adverse impact to a relevant protected matter is considered likely, the EIS must provide information on the proposed offset strategy, including discussion of the conservation benefit associated with the proposed offset strategy.	**6**
Avoidance, mitigation and offsetting	For each of the relevant matters likely to be impacted by the action the EIS must provide reference to, and consideration of, relevant Commonwealth guidelines and policy statements including any: i. conservation advice or recovery plan for the species or community; ii. relevant threat abatement plan for the species or community; iii. wildlife conservation plan for the species; and iv. any strategic assessment.	**2.1.2**
Avoidance, Mitigation and Offsetting	In addition to the general requirements described above, specific information is required with respect to each of the determined controlling provisions. These requirements are outlined in paragraphs 15-17.	**2.1.2**
Biodiversity	The EIS must identify each EPBC Act listed threatened species and community likely to be impacted by the action. For any species and communities that are likely to be impacted, the proponent must provide a description of the nature, quantum and consequences of the impacts. For species and communities potentially located in the project area or in the vicinity that are not likely to be impacted, provide evidence why they are not likely to be impacted.	**6.1**
Biodiversity	For each of the EPBC Act listed threatened species and communities likely to be impacted by the action the EIS must provide a separate: i. description of the habitat (including identification and mapping of suitable breeding habitat, suitable foraging habitat, important populations and habitat critical for survival), with consideration of, and reference to, any relevant Commonwealth guidelines and policy statements including listing advice, conservation advice and recovery plans; ii. details of the scope, timing and methodology for studies or surveys used and how they are consistent with (or justification for divergence from) published Australian Government guidelines and policy statements; iii. description of the relevant impacts of the action having regard to the full national extent of the species or community's range; iv. description of the specific proposed avoidance and mitigation measures to deal with relevant impacts of the action; v. identification of significant residual adverse impacts likely to occur after the proposed activities to avoid and mitigate all impacts are taken into account; vi. a description of any offsets proposed to address residual adverse significant impacts and how these offsets will be established; vii. details of how the current published NSW Biodiversity Assessment Method (BAM) has been applied in accordance with the objects of the EPBC Act to offset significant residual adverse impacts; and viii. details of the offset package to compensate for significant residual impacts including details of the credit profiles required to offset the action in accordance with the BAM and/or mapping and descriptions of the extent and condition of the relevant habitat and/or threatened communities occurring on proposed offset sites.	**6.1**
Biodiversity	Any significant residual impacts not addressed by the BAM may need to be addressed in accordance with the EPBC Act 1999 Environmental Offset Policy. https://www.dcceew.gov.au/environment/epbc/publications/epbc-act-environmental-offsets-policy.	**6.1**
Other approvals and conditions	Information in relation to any other approvals or conditions required must include the information prescribed in Schedule 4 Clause 5 (a) (b) (c) and (d) of the EPBC Regulations.	**6.1**
Environmental Record of person	Information in relation to the environmental record of a person proposing to take the action must include details as prescribed in Schedule 4 Clause 6 of the EPBC Regulations.	**Appendix E**
Information Sources	For information given in an EIS, the EIS must state the source of the information, how recent the information is, how the reliability of the information was tested; and what uncertainties (if any) are in the information.	**9**

Appendix C
Statutory Compliance

Table C1 contains mandatory considerations under the EP&A Acts and Regulation and the Project's response. **Table C2** lists clauses within the EPBC Regulation Schedule 4 and where addressed in this EIS.

Table C1 Mandatory Considerations

Statutory Reference	Mandatory Considerations	Response
Considerations under the EP&A Acts and Regulation		
Section 1.3 - Objects of the Act Pursuant to Section 1.3 of the EP&A Act, the Objects of the Act are:	a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,	The Project will promote the social and economic welfare of the community and contribute to a better environment through the provision of a renewable energy source. It will have lower GHG emissions compared to fossil-fuel electricity generation and will contribute to reducing climate change impacts to the community and the environment. The Project will also promote the social and economic welfare of the Singleton area and greater region with additional jobs during the Project's construction period, ensuring better job stability for contract labourers in the local construction industry. Resources within the Project Area include land that is being used for agricultural purposes and land which has biodiversity and Aboriginal cultural heritage values. This constitutes the 'natural resources' which will be properly managed, developed or conserved. Consultation with landholders will be undertaken to maintain agricultural utilisation within the Project Area wherever possible during construction, operation and decommissioning. The design and layout refinement process has reduced impacts on biodiversity values and Aboriginal cultural heritage resources. The implementation of management and mitigation measures will further reduce potential impacts. Residual impacts to biodiversity values will be offset; and recovery, relocation, documentation and analysis of potentially impacted Aboriginal sites will be undertaken in consultation with the local Aboriginal community and stakeholders.
	b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,	The economic, environmental and social context of the Project, and the potential impacts to facilitate an informed consideration of these aspects in the decision-making process is outlined in Section 7.
	c) to promote the orderly and economic use and development of land,	The orderly and economic use of land is best served by development that is permissible under the relevant planning regime and in accordance with the prevailing planning controls. The Project is permissible with consent, is consistent with statutory and strategic planning controls and is adjacent to significant proposed energy transmission infrastructure. As detailed in this EIS, the Project will promote economic use and development of the Project Area and will result in positive economic impacts, with appropriate mitigation measures and management strategies to reduce adverse environmental and social impacts.
	d) to promote the delivery and maintenance of affordable housing,	There is potential for the construction workforce to indirectly affect affordable housing in the region by increasing demand. To mitigate this, a Project 'Accommodation Strategy' will be prepared.

Statutory Reference	Mandatory Considerations	Response
	e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,	The Project footprint and design have been subject to design refinements to avoid areas of environmental importance and of high biodiversity value land. In the case where impacts are unavoidable, mitigation and management measures to protect and conserve the environment have been provided in this EIS. The Project will contribute to reducing GHG emissions as part of Australia's climate change impact reduction objectives, including impacts on threatened and other species of native animals and plants, ecological communities and their habitats.
	f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),	Avoidance of Aboriginal cultural heritage values has been a key consideration in the Project design refinement process. The Disturbance Footprint has been optimised to avoid as best as practicable impacts on Aboriginal Heritage present within the Project Area. Mitigation and management measures have been provided where impact could not be avoided. The Project will not impact any historic heritage sites.
	g) to promote good design and amenity of the built environment,	The Project infrastructure will not be accessible to the public and therefore the design and amenity is not directly applicable. However, Project's design has been conducted according to relevant design standards and the visual impact of the built components has been considered and minimised as part of design development.
	h) to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,	The design refinement process will continue to consider the separation distances of any buildings with respect to the potential hazards and risks. Project infrastructure will be maintained or upgraded over the Project's life to ensure it's safe and efficient operations. Project construction will be compliant with the Building Code of Australia and all relevant statutory requirements.
	i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,	As summarised in Section 5, a wide range of local and State government agencies have been consulted regarding the Project, including SC and DPHI.
	j) to provide increased opportunity for community participation in environmental planning and assessment.	As described in Section 5, engagement with the community has informed community members about the Project and has provided an opportunity to participate in the planning and assessment phase of the Project. This EIS provides further detailed information regarding the Project and its potential impacts. It will be placed on public exhibition by DPHI, and community members will be able to make formal submissions. A report responding to these submissions will be prepared and exhibited by DPHI.
Section 4.15 – Evaluation	The consent authority is required to take the following matters into consideration in determining a development application: a) the provisions of – (i) any environmental planning instrument. Relevant environmental planning instruments including *State Environmental Planning Policy (Transport and Infrastructure) 2021*	The relevant provisions of the applicable EPIs to the Project are listed.

Statutory Reference	Mandatory Considerations	Response
	State Environmental Planning Policy (Resilience and Hazards) 2021 *State Environmental Planning Policy (Biodiversity and Conservation) 2021* Singleton Local Environmental Plan 2013	
	a) the provisions of – (ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved).	There are no proposed EPIs that are relevant to the Project.
	a) the provisions of – (iii) any development control plan.	In accordance with s2.10 of the *Planning Systems SEPP 2021*, development control plans are not applicable to SSD applications.
	a) the provisions of – (iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement the developer has offered to enter under section 7.4.	A VPA is being negotiated with Singleton Council.
	a) the provisions of – (iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph.	All provisions of the *Environmental Planning & Assessment Regulation 2021* (EP&A Regs) and their relevance to the Project have been addressed within this EIS. Additionally, Clause 61 of the EP&A Regs describes additional matters that the consent authority must consider in the determination of any development application. None of these matters have been deemed to be relevant to the Project.
	b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality.	This EIS has assessed the likely impacts of the Project, including environmental and socio-economic impacts.
	c) the suitability of the site for the development.	The Project Area was selected based on its: • Low, relatively flat terrain for cost-effective construction; • Good solar resource; • Location away from towns and urbanised areas; • Proximity to the regional centre of Singleton, and other Hunter Valley locations, which should allow for optimal sourcing of labour from the local community; • Suitable land use zoning; • Good access to existing electricity infrastructure, transmission and distribution network; • Good access to a major road (New England Highway and the Golden Highway); and

Statutory Reference	Mandatory Considerations	Response
		• High level of available capacity on the grid transmission and distribution system. Alongside preliminary planning assessment, this EIS has deemed the site suitable for the Project based upon the expected environmental impacts and the planning requirements.
	d) any submissions made in accordance with the Act or the regulations.	The preparation of the EIS has occurred in consideration of the SEARs requirements and issued agency advice.
	e) the public interest.	The Project will provide a number of key public benefits to not only the local area, but the Hunter region as a whole, which include the following: • Increased renewable energy resources within the NEM, with the aim to reduce likelihood of blackouts and brownouts, alongside price; • Alignment with International, Federal, and State government objectives for renewable energy targets and zero emissions, alongside state and local objectives for encouraging investment in the Hunter region and Singleton LGA within a declared REZ; • Additional construction jobs for the region's economy, stimulating economic activity through increased employee spending power and VPA. ESD principles are a key part of development occurring within the public interest, especially around energy generation projects. Intergenerational equity is a key part of this, where the "…present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations". In relation to energy generation, the concept of intergeneration equity requires that there is: increasing replacement of energy sources that produce more GHG emissions with energy sources that produce lower GHG emissions. Based on this, it is considered that the Project is deemed to be is the public interest.
Considerations under other legislation		
Biodiversity Conservation Act 2016 – Section 7.14	The Minister for Planning and Homes is required to take into account the impact of the Project on biodiversity.	A BDAR pursuant to section 7.14 of the BC Act has been undertaken for the Project.
Relevant EPIs		
T&I SEPP	T&I SEPP provides greater consistency and flexibility in the development of key transport and infrastructure works. Relevantly, Section 2.36(1) provides that the development of electricity generating works may be carried out with consent in a prescribed rural zone, which includes the RU1 – Primary Production Zone.	The Project Area is entirely zoned as RU1 Primary Production land, and consequently the Project is permissible with consent under Section 2.36 of the T&I SEPP.
State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and	Chapter 3 of Resilience and Hazards SEPP assesses the potential hazards associated with the Project by providing definitions and guidelines for hazardous	To comply with Section 3.7 of the Hazards SEPP, this EIS has given consideration to current circulars and guidelines published by DPHI that relate to hazardous or offensive development, including the following:

Statutory Reference	Mandatory Considerations	Response
Hazards SEPP) Chapter 3 Hazardous and offensive development & Chapter 4 Remediation of Land	industry, offensive industry, hazardous storage establishments, and offensive storage establishments. Chapter 4 of Resilience and Hazards SEPP promotes the remediation of contaminated land for the purpose of reducing the risk of harm to human health or any other aspect of the environment.	• Hazardous Industry Planning Advisory Paper No 4 – Risk Criteria for Land Use Safety Planning (HIPAP No.4) (DPIE 2011); • Hazardous Industry Planning Advisory Paper No 6 – Guidelines for Hazard Analysis (HIPAP No.6) (DPIE 2011); • Multi-level Risk Assessment Guideline (DPI 2011). • ICNIRP Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields (International Commission on Non-Ionizing Radiation Protection, 1998); • Planning for Bush Fire Protection 2019 (NSW RFS, 2019) A Preliminary Hazard Analysis (PHA) has been prepared for the Project. Under Clause 4.6, a consent authority is required to consider whether a proposed development site is affected by soil or other contaminants before granting consent. A SAIS provides a further discussion on the potential impacts on soil and agriculture resources associated with the Project.
State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP)	Chapter 4 Koala Habitat Protection 2021 of the Biodiversity and Conservation SEPP provides a framework for councils to prepare a strategic koala plan of management that would apply to the whole or part of an LGA.	*State Environmental Planning Policy (Koala Habitat Protection) 2021* (Koala SEPP 2021) applies to identified LGAs in areas not zoned as RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry. Within zones RU1 Primary Production, RU2 Rural Landscape or RU3 Forestry, the former State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020) continues to apply. Both SEPPs only apply to development applications whereby Council is the consenting authority, which is not the case for the Project since it is designated SSD. Therefore, neither SEPP is applicable to the Project. Notwithstanding, Koalas have been considered during the preparation of this EIS, BDAR and EPBC Act Referral.
State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems SEPP)	The Planning Systems SEPP classifies a Project as SSD if it requires development consent and is a development for the purpose of electricity generating works that has a capital investment value of more than $30 million	The Project is classified as SSD as its purpose is to generate electricity and has a capital investment value over $30 million.
State Environmental Planning Policy (Primary Production) 2021 (Primary Production SEPP)	The primary Production SEPP contains planning provisions to manage primary production and rural development, including supporting sustainable agriculture for the protection of prime agricultural land of state and regional significance, as well as regionally significant mining and extractive resources.	The Project will not permanently impede agricultural use of the land.

Statutory Reference	Mandatory Considerations	Response
Singleton Local Environmental Plan 2013 (SLEP)	Relevant components of the SLEP include Section 1.2 – Aims of Plan: a. *to promote the use of rural resources for agriculture and primary production, including forestry and open cut mining, and major infrastructure providers,*	The Project satisfies this Aim of the SLEP as the proposed layout for the Project continues to promote the use of existing rural resources within the Project Area for grazing. The Applicant will consider the implementation of agrisolar with sheep, in consultation with the landowner, in the Project Area during operations.
	b. *to encourage the sustainable management, development and conservation of natural resources,*	The Project has been refined to the most reasonable extent regarding environmental impacts informed by all relevant technical studies. Refinements have minimised negative impacts to environmental and socio-economic resources and avoided Aboriginal heritage sites, significant agricultural land, biodiversity values where feasible. This has been conducted in line with the principles of the avoid, minimise, mitigate, and offset detailed in the BC Act.
	f. *to promote and coordinate the orderly and economic use and development of land in Singleton,*	The Project's impact on agricultural activities will be minimal, temporary and limited to the Project Area. The agricultural productivity of the Project Area will be restored to its original condition once the end-of-life for the Project has been reached. There are also a series of additional socio-economic benefits of the Project, including additional construction jobs for the region's economy, stimulating economic activity through increased worker spending power, along with VPA that will benefit the local community.
	Relevant parts of the Land Use Table – Zone RU1 Primary Production – Objectives of Zone include: *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*	The Project has taken appropriate technical investigations to inform, avoid, and mitigate the negative impact that are associated with the Project, while simultaneously enhancing the positive impacts. Mitigation and management measures will be adhered to in order to ensure the existing natural resources within the Project Area are protected or enhanced.
	To encourage diversity in primary industry enterprises and systems appropriate for the area.	The Project offers further diversification in primary industry production, utilising solar energy to provide greater power supply to the regional grid and NEM, adding to the existing diverse uses within the Singleton LGA.
	To minimise the fragmentation and alienation of resource lands.	The Project will not permanently transform the existing agricultural land within the Project Area. Grazing activities will be considered as an option in the Project Area, minimising the fragmentation of agricultural land.
Development Control Plans (DCP)	Under Section 2.10 of the Planning Systems SEPP, DCPs do not apply to SSD projects as: *"Exclusion of application of the development control plans Development control plans (whether made before or after the commencement of this policy) do not apply to- a) State significant development, or b) development for which a relevant council is the consent authority under section 4.37 of the Act."*	DCPs do not apply to the Project Area.

Table C2 EBPC Regulation Schedule 4

Requirement	Section
1. General information	
1.01 The background of the action including:	
(a) The title of the action	**Appendix E**
(b) The full name and postal address of the designated Applicant	
(c) A clear outline of the objective of the action	
(d) The location of the action	
(e) The background to the development of the action	
(f) How the action relates to any other actions (of which the Applicant should reasonably be aware) that have been, or are being, taken or that have been approved in the region affected by the action;	
(g) the current status of the action;	
(h) the consequences of not proceeding with the action.	
2. Description	
2.01 A description of the action including:	
(a) all the components of the action	**Appendix E**
(b) the precise location of any works to be undertaken, structures to be built or elements of the action that may have relevant impacts;	
(c) how the works are to be undertaken and design parameters for those aspects of the structures or elements of the action that may have relevant impacts;	
(d) relevant impacts of the action;	
(e) proposed safeguards and mitigation measures to deal with relevant impacts of the action;	
(f) any other requirements for approval or conditions that apply, or that the Applicant reasonably believes are likely to apply, to the proposed action;	
(g) to the extent reasonably practicable, any feasible alternatives to the action, including: i. if relevant, the alternative of taking no action; ii. a comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action; iii. sufficient detail to make clear why any alternative is preferred to another;	
(h) any consultation about the action, including: i. any consultation that has already taken place; ii. proposed consultation about relevant impacts of the action; iii. if there has been consultation about the proposed action—any documented response to, or result of, the consultation; iv. identification of affected parties, including a statement mentioning any communities that may be affected and describing their views	
3. Relevant impacts	
3.01 information given under paragraph 2.01(d) must include:	
(a) a description of the relevant impacts of the action;	
(b) a detailed assessment of the nature and extent of the likely short term and long term relevant impacts;	**Appendix E**
(c) a statement whether any relevant impacts are likely to be unknown, unpredictable or irreversible;	
(d) analysis of the significance of the relevant impacts;	
(e) any technical data and other information used or needed to make a detailed assessment of the relevant impacts.	
4. Proposed safeguards and mitigation measures	
4.01 Information given under paragraph 2.01(e) must include:	
(a) a description, and an assessment of the expected or predicted effectiveness of, the mitigation measures;	**Appendix E**

Requirement	Section
(b) any statutory or policy basis for the mitigation measures;	
(c) the cost of the mitigation measures;	
(d) an outline of an environmental management plan that sets out the framework for continuing management, mitigation and monitoring programs for the relevant impacts of the action, including any provisions for independent environmental auditing;	
(e) the name of the agency responsible for endorsing or approving each mitigation measure or monitoring program;	
(f) a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the Applicant.	
5. Other approvals and conditions	
5.01 Information given under paragraph 2.01(f) must include:	
(a) details of any local or State government planning scheme, or plan or policy under any local or State government planning system that deals with the proposed action, including:	**Appendix E**
i. what environmental assessment of the proposed action has been, or is being, carried out under the scheme, plan or policy;	
ii. how the scheme provides for the prevention, minimisation and management of any relevant impacts;	
(b) a description of any approval that has been obtained from a State, Territory or Commonwealth agency or authority (other than an approval under the Act), including any conditions that apply to the action;	
(c) a statement identifying any additional approval that is required;	
(d) a description of the monitoring, enforcement and review procedures that apply, or are proposed to apply, to the action.	
6. Environmental record of person proposing to take the action	
6.01 Details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:	**Appendix E**
(a) the person proposing to take the action; and	
(b) for an action for which a person has applied for a permit, the person making the application.	
6.02 If the person proposing to take the action is a corporation—details of the corporation's environmental policy and planning framework.	
7. Information sources	
7.01 For information given in a draft public environment report or environmental impact statement, the draft must state:	
(a) the source of the information; and	**Appendix E**
(b) how recent the information is; and	
(c) how the reliability of the information was tested; and	
(d) what uncertainties (if any) are in the information.	

Appendix D
Management and Mitigation Summary

Table D1 contains a summary of all specific management and mitigation measures from the EIS that the Applicant commits to. Each is based on specialist recommendations to minimise and avoid environmental impacts and enhance benefits from construction, operation and decommissioning of the Project.

Table D1 Management and Mitigation Summary

Aspect	ID	Mitigation Measure	Section
Project Description	1.	Construct, operate, maintain and decommission the project generally in accordance with the Project Description.	**3**
Project Description	2.	All heavy and OSOM vehicles will exit the site via Magpie Street (i.e. not via Maison Dieu Road/New England Highway intersection).	**3**
Project Description	3.	All disturbance will be within the Disturbance Footprint except as defined in **Section 3.3**.	**3**
Project Description	4.	Maintain and utilise an EMS.	**3.9**
Project Description	5.	The EMS shall include at least a CEMP, OEMP and other documentation as stated in this Table or required by relevant legislation.	**3.9**
Project Description	6.	The EMS shall include training relevant to all personnel's job description on the commitments in this Table.	**3.9**
Project Description	7.	Finalise and implement the Voluntary Planning Agreement with Singleton Shire Council.	**3.10**
Statutory Context	8.	Seek other approvals as stipulated in **Table 4-1.**	**4**
Statutory Context	9.	Ensure notifications and legislative requirements in relation to the known restrictions and covenants are met.	**4**
Stakeholder Engagement	10.	Continue stakeholder engagement in accordance with a Stakeholder Engagement Plan during the assessment, construction and operations phases.	**5**
Project Description	11.	Prepare a Project Accommodation Strategy during the detailed design phase in consideration of the known cumulative impacts at the time of construction.	**5**
Biodiversity	12.	Prepare and implement a Biosecurity Management Plan inclusive of EIS commitments.	**6.1**
Biodiversity	13.	Prepare and implement a Biodiversity Management Plan.	**6.1**
Biodiversity	14.	Detailed design will consider shading and minimising artificial light impacts, ancillary works to be located withing the Disturbance Footprint.	**6.1**
Biodiversity	15.	Implement the Biodiversity Offset Strategy (unless otherwise agreed with DPHI).	**6.1**
Aboriginal Heritage	16.	Prepare and implement an Aboriginal Cultural Heritage Management Plan (ACHMP) in consultation with Registered Aboriginal Parties and Heritage NSW, to be approved by DPHI.	**6.2**
Aboriginal Heritage	17.	• Demarcate sites: MD002, MD003, MD069, MD009, MD004, MD010, MD013 and MD070. • Show sites adjacent the Disturbance Footprint on project plans: MD002, MD003, MD069, MD009, MD004, MD010, MD013, and MD070. • Surface collection of sites MD011 and MD012 (and as otherwise approved in the ACHMP). • Ongoing consultation with RAPs.	**6.2**
Historic heritage	18.	Develop and implement the Historic Heritage Unanticipated Finds Protocol.	**6.3**
Noise	19.	Develop and implement a Noise Management Plan inclusive of EIS commitments.	**6.4Appe**

Aspect	ID	Mitigation Measure	Section
Noise	20.	Where possible, localised screening will be implemented around high noise generating stationary activities to act as a barrier between construction works and receivers, particularly where equipment is close to residential receivers.	**6.4**
Noise	21.	Plant and machinery will be selected and operated as stated in **Section 3.5.2.**	**6.4**
Noise	22.	Signage will be placed at the front entrance advising truck drivers of their requirement to minimise noise.	**6.4**
Noise	23.	• Residences within proximity of the Project Area will be notified of project progress. • Attended monitoring will be undertaken within the community in response to any received complaints.	**6.4**
Visual	24.	The Landscape and Visual Management Plan will be updated in consultation with affected landowners to provide screening vegetation to reduce the visibility and magnitude of change at R18, R25 and R27.	**6.5**
Visual	25.	Unless otherwise agreed with adjacent receivers, screening will be implemented as conceptually shown on **Figure 3-1** and planting will occur after construction is complete to ensure optimal planting conditions and no risk of damage from machinery.	**6.5**
Visual	26.	PCUs, switch rooms, battery enclosures, O&M and water tanks will be a neutral colour to reduce prominence in views from surrounding dwellings.	**6.5**
Visual	27.	A 2-degree resting angle during backtracking will be set to select areas of the PV array to minimise glare risk until vegetation screening is established.	**6.5**
Visual - Glint and Glare	28.	Shade cloth will be implemented along the sections of the southern security fence where vegetation screening is to be planted to reduce glare from the solar arrays until vegetation screening is established.	**6.5**
Soils	29.	Soil mitigation measures will be undertaken during construction phase: • Prepare a site-specific erosion and sediment control plan in accordance with the Blue Book. • Establish erosion and sediment control measures. • Establish an unexpected finds procedure of contaminated land. • Rehabilitate ground cover following any activities as soon as practical after	**6.6**
Soils	30.	A Decommissioning and Rehabilitation Plan (DRP) will be prepared prior to closure.	**6.6**
Agriculture	31.	An agricultural Biosecurity Management Plan will be developed inclusive of EIS	**6.6**
Agriculture	32.	Management of topsoil stockpiles, monitoring programs, and inspections will be undertaken.	**6.6**
Agriculture	33.	• The implementation of agrisolar at a suitable stocking rate to reduce area of land removed from agricultural service will be considered in consultation with the landowner. Agrisolar would adhere to a Grazing Management Plan if implemented. • Livestock stocking rates (if potential agrisolar is implemented) will ensure that groundcover is retained at >70% coverage, where practical (considering long term climate and weather variables).	**6.6**
Agriculture	34.	• Agricultural land use will be re-established over the entire Project Area the time of decommissioning (unless otherwise agreed with the landholder). • The Project Area will be returned to an equivalent agricultural productivity and land suitability class. • Stock fences, dams and access tracks will be maintained where possible to accommodate the potential for agrisolar if the Applicant chooses to implement.	**6.6**

Aspect	ID	Mitigation Measure	Section
Flooding	35.	Where possible, at least 100 mm of grass cover will be maintained in the solar array area to reduce the likelihood of erosion in rainfall events.	**6.7**
Flooding	36.	Detailed design will consider appropriate location of the panels, flood protection measures, and supporting infrastructure in relation to flooding predictions and the finished floor level for all habitable buildings within the Project Area will be at least 1% AEP flood level + 500 mm freeboard.	**6.7**
Flooding	37.	An Emergency Response Strategy will be implemented.	**6.7**
Water	38.	A Soil and Water Management plan will be prepared inclusive of EIS commitments.	**6.8**
Water	39.	Detailed design will consider limiting re-grading, rainwater reuse, water watercourse crossings in relation to waterfront land, fish passage, use of swales, minimisation of natural drainage regime changes, and vegetation filtration.	**6.8**
Water	40.	Vegetation and ground cover will be maintained, monitored for any exposed soils and further treatment will be applied as necessary to encourage ground cover, which prevents ongoing operational erosion and sediment issues.	**6.8**
Water	41.	A CAA will be sought from NRAR prior to works being undertaken on waterfront land as defined by the WM Act.	**6.8**
Water	42.	A hazardous material management procedure will be developed in accordance with best practice guidelines.	**6.8**
Water	43.	Sediment control will include access to present tracking offsite, dust suppression, sedimentation fencing, minimisation of exposed areas, sediment filters, dam inspections and documentation, water monitoring, stockpile of topsoils, direction of sediment-laden water to appropriate dams, diversion of clean catchments around disturbed areas.	**6.8**
Water	44.	Wastewater will be disposed of to an appropriately licensed facility.	**6.8**
Traffic	45.	A TMP will be prepared will be prepared and implemented in consultation with relevant regulators inclusive of EIS commitments including figures, inductions, Code of Conduct, complaint resolution and TCP.	**6.9**
Traffic	46.	• A dilapidation report will be prepared for Maison Dieu Road, west of Enterprise Crescent, in consultation with Singleton Council to identify pavement damage caused by the construction of the Project and ensure the road network is repaired after construction. • Site inspections of the transport route along Maison Dieu Road, west of Enterprise Crescent will be conducted pre and post construction to inform the dilapidation report.	**6.9**
Traffic	47.	A Decomissioning TMP will address traffic impacts at the decommissioning phase, which will not be reached for a minimum of 30 years.	**6.9**
Traffic	48.	A Road Safety Audit of the transport route to the Project will be undertaken prior to the commencement of construction.	**6.9**
PHA	49.	• BESS tested in accordance with UL9540A. • Testing to demonstrate clearances required to prevent propagation of fires between separated units. • BESS installed in accordance with manufacturer and UL9540A report recommended clearances based on testing. • BESS installed with fire protection systems specified by the manufacturer and UL9540A report. • Before construction, detailed design to validate that the system can be installed in the Project Area whilst meeting the recommended clearances. • UL testing information made available to the certifying authority upon request, under a confidentiality agreement if required.	**6.10**

Aspect	ID	Mitigation Measure	Section
Bushfire	50.	A Fire Management Plan and Bushfire Emergency Management and Operations Plan will be prepared in consultation with relevant regulators. Mitigation measures around APZs, water storage, landscaping and hazardous materials storage will be implemented.	**6.11**
Bushfire	51.	Vegetation clearance to any connecting transmission lines will comply with the ISSC3 Guidelines' and any applicable local network provider operating procedures.	**6.11**
Air Quality	52.	The CEMP and OEMP will include air quality management measures.	**6.12**
Waste	53.	A Waste Management Plan will be developed for the Project following detailed design incorporating EIS mitigation measures.	**6.13**
Economics	54.	The Applicant will engage with local representatives regarding accommodation options for any specialist staff from outside the area, to minimise adverse impacts on local services.	**6.14**
Economics	55.	The Applicant will engage with local employment agencies and commit to supporting training and apprenticeships (where feasible).	**6.14**
Social	56.	The Applicant will develop and implement an internal CCS, CEP, SLCP and PPWDS to avoid / minimise negative social impacts and maximise positive social impacts.	**6.15**

Appendix E
Biodiversity Development Assessment Report

Appendix F
Aboriginal Cultural Heritage Assessment Report

Appendix G
Historic Heritage Assessment

Appendix H
Noise and Vibration Impact Assessment

Appendix I
Visual Impact Assessment

Appendix J
Soils and Agricultural Impact Assessment

Appendix K
Surface Water Impact Assessment

Appendix L
Flooding Assessment

Appendix M
Traffic Impact Assessment

Appendix N
OSOM Route Study

Appendix O
Preliminary Hazard Analysis

Appendix P
Bushfire Assessment Report

Appendix Q
Social Impact Assessment