Maison Dieu Solar Farm

Scoping Report

Prepared for Terrain Solar Pty Ltd

August 2022

Maison Dieu Solar Farm

Scoping Report

Terrain Solar Pty Ltd

E220101 RP1

August 2022

Version	Date	Prepared by	Approved by	Comments
1	15 August 2022	Nena Lane-Kirwan	James Wearne	
2	31 August 2022	Nena Lane-Kirwan	James Wearne	

Approved by

James Wearne
Associate, Approvals and Environment
31 August 2022

Level 3 175 Scott Street
Newcastle NSW 2300

Executive Summary

Terrain Solar Pty Ltd (Terrain Solar) proposes to develop the Maison Dieu Solar Farm, a large-scale solar photovoltaic (PV) generation facility along with an integrated battery energy storage system (BESS), a high-voltage electricity substation, and associated infrastructure (the project). The project is in Maison Dieu, approximately 10 kilometres (km) north-west of Singleton in the Singleton local government area and is anticipated to be within the proposed Hunter-Central Coast Renewable Energy Zone (REZ).

The proposed solar farm will have a generation capacity of up to 150 megawatts (MW) which will generate enough electricity to power approximately 40,000 homes. The proposed BESS will have a capacity of between 50 MW alternating current (AC) two-hour energy storage and 150 MW (AC) four-hour energy storage. The project will connect to Ausgrid's 66 kV/132 kV Singleton Substation located on the southern side of Maison Dieu Road.

The project aligns with the NSW and Commonwealth Government's objectives for energy security and reliability and emissions reductions. Once operational, the project will contribute towards meeting Australia's Large-scale Renewable Energy Target in future years and the continued growth of renewable energy generation and storage capacity in the proposed Hunter-Central Coast REZ.

The project will be developed within a project site of approximately 500 hectares. The exact land area to be covered by the project components will be refined as the project design develops and will be informed by the outcomes of community and stakeholder engagement and the findings of the environmental, social, and economic assessments.

The project site has been selected with consideration of several alternatives to ensure the project is viable as a solar generation and battery storage development and that it will result in maximum benefits for the locality and region in the long term, while minimising impacts to the environment. Key factors in selection of the project site include its position adjacent to existing transmission infrastructure and its high solar exposure and physical conditions suitable for large-scale solar energy generation.

The project is State significant development pursuant to Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021*. Accordingly, approval for the project is required under Part 4 of the NSW *Environmental Planning and Assessment Act 1979*.

This Scoping Report has been prepared to support a request for the Secretary's Environmental Assessment Requirements for the project. A preliminary environmental assessment has been carried out and is documented in this report to assist in the identification of matters that will require further assessment in the Environmental Impact Statement (EIS), and the level of assessment that should be carried out for each matter.

This Scoping Report has been prepared in accordance with *State significant development guidelines - preparing a scoping report: Appendix A to the State significant development guidelines* (DPIE 2021a). The aspects identified as requiring detailed assessment in the EIS include visual, biodiversity, traffic, noise, Aboriginal heritage and social. Aspects requiring standard assessment include historic heritage, hazards, water, land, and air quality.

TABLE OF CONTENTS

Executive Summary **ES.1**

1 Introduction **1**

1.1 Purpose of this report 1

1.2 The applicant 1

1.3 Project overview 3

2 Strategic context **5**

2.1 Site and surrounds 5

2.2 Strategic planning framework 8

2.3 Need for the project 9

2.4 Site selection 10

2.5 Key constraints 10

2.6 Relevant future development 11

3 Project description **12**

3.1 Overview 12

3.2 Project components 12

3.3 Activities and uses 17

3.4 Timing 18

3.5 Alternatives considered 18

4 Statutory context **20**

5 Engagement **24**

5.1 Overview 24

5.2 Scoping phase consultation 24

5.3 EIS phase consultation 28

6 Proposed assessment of impacts **30**

6.1 Introduction 30

6.2 Visual amenity 30

6.3 Biodiversity 31

6.4 Aboriginal heritage 39

6.5 Traffic and transport 43

6.6 Noise and vibration 44

6.7 Surface water 45

6.8 Land and soils 46

6.9 Air quality 49
6.10 Historic heritage 49
6.11 Social 50
6.12 Land contamination 52
6.13 Waste 53
6.14 Hazard and risk 53
6.15 Cumulative impacts 54
6.16 Matters requiring no further assessment 54
Abbreviations **56**
References **58**

Appendices

Appendix A Scoping summary table
Appendix B Social Impact Assessment Scoping Report
Appendix C EPBC Act Protected Matters Report
Appendix D Surface water constraints analysis

Tables

Table 1.1 Applicant details 1
Table 1.2 Lots within the project site 3
Table 2.1 Alignment with key strategic planning frameworks 8
Table 2.2 Major projects with potential for cumulative impacts 11
Table 3.1 Summary of project components 12
Table 4.1 Statutory context 20
Table 5.1 Summary of community consultation 24
Table 6.1 Predicted PCTs in the project site 32
Table 6.2 Potential candidate species 33
Table 6.3 AHIMS sites within and surrounding the project site 40
Table 6.4 Listed historic heritage items within 5 km of the project site 50
Table 6.5 Matter requiring no further assessment in the EIS 54

Figures

Figure 1.1 Project location 2
Figure 2.1 Regional context 6
Figure 2.2 Local context 7
Figure 3.1 Indicative project layout 16
Figure 6.1 Vegetation communities and threatened species recorded within the project site 38
Figure 6.2 AHIMS sites within and surrounding the project site 42

Figure 6.3 Land class capability and BSAL 48
Figure 6.4 SIA methodology 52

Photographs

Photograph 3.1 Example of solar PV modules mounted to single axis tracking structures 13
Photograph 3.2 Example of individual battery modules installed in racks and connected via cabling 14

1 Introduction

1.1 Purpose of this report

Terrain Solar Pty Ltd (Terrain Solar) proposes to develop the Maison Dieu Solar Farm, a large-scale solar photovoltaic (PV) generation facility along with an integrated battery energy storage system (BESS), a high-voltage electricity substation, and associated infrastructure (the project). The project is proposed in Maison Dieu, approximately 10 kilometres (km) north-west of Singleton in the Singleton local government area (LGA) of New South Wales (NSW) (Figure 1.1).

The project is State significant development (SSD) pursuant to Schedule 1 of the *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and approval for the project is required under Part 4, Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). An SSD application for the project is to be accompanied by an Environmental Impact Statement (EIS).

This Scoping Report has been prepared by EMM Consulting Pty Limited (EMM) on behalf of Terrain Solar to support a request to the NSW Department of Planning and Environment (DPE) for Secretary's Environmental Assessment Requirements (SEARs) for the project. The SEARs will identify the matters to be assessed in the EIS and the level of assessment required.

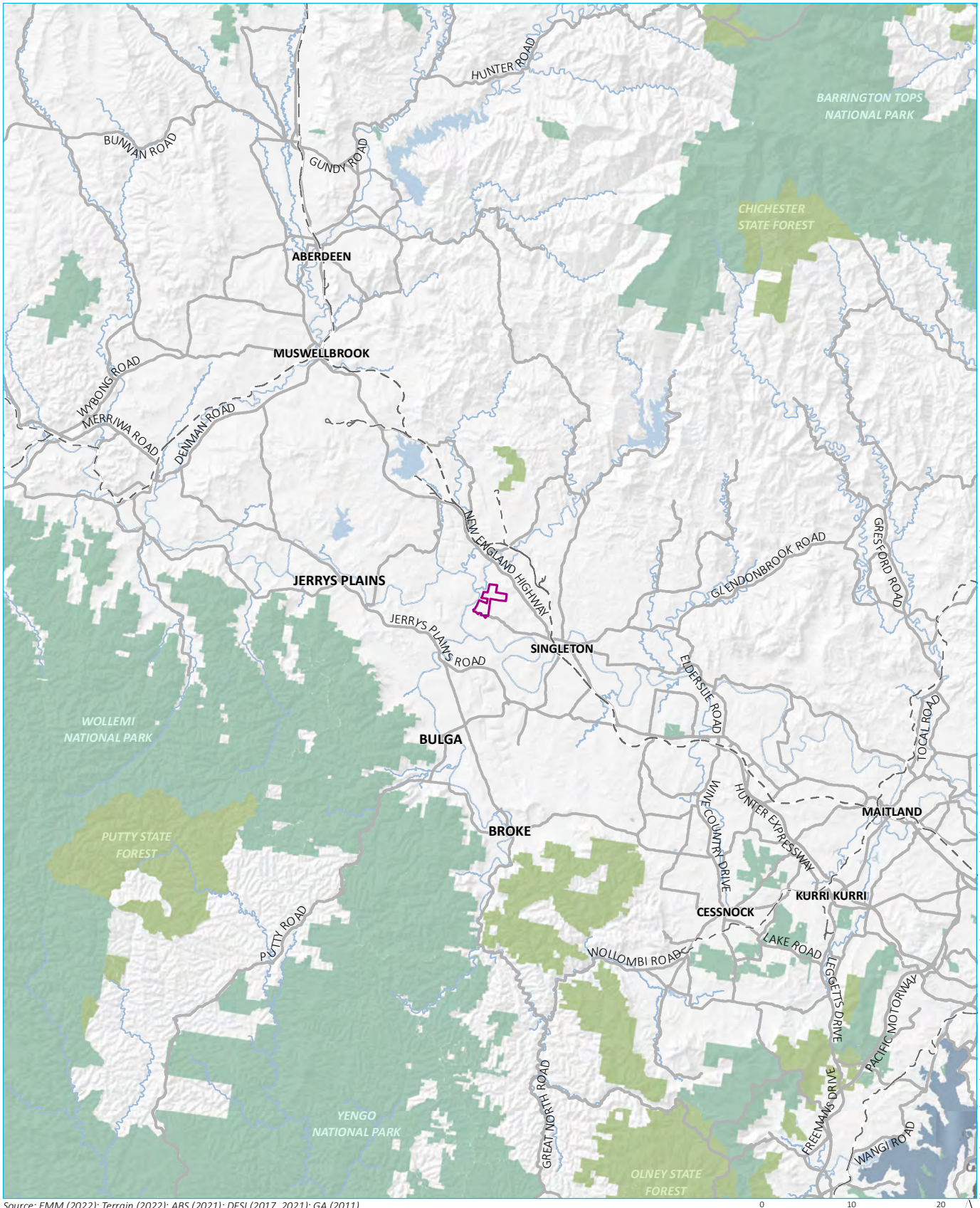
This Scoping Report has been prepared in accordance with the *State significant development guidelines – preparing a scoping report: Appendix A to the state significant development guidelines* (DPIE, 2021a*)* (Scoping Report Guideline).

1.2 The applicant

The applicant for the project is Terrain Solar, an Australian-owned and operated business established in 2016. Terrain Solar aims to develop innovative solar farms that are strategically located across regional Australia. Relevant details for Terrain Solar are provided below in Table 1.1.

Table 1.1 Applicant details

Requirement	Details
Applicant	Terrain Solar Pty Ltd
ABN	13 616 856 172
Applicant address	PO BOX 634 North Sydney NSW 2059
Contact	Tom Allen
Contact details	tom@terrainsolar.com



Source: EMM (2022); Terrain (2022); ABS (2021); DFSI (2017, 2021); GA (2011)

KEY

- Project site
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

INSET KEY

- Major road
- NPWS reserve
- State forest

0 10 20 km

GDA2020 MGA Zone 56

N

Project location

Maison Dieu Solar Farm
Scoping report
Figure 1.1

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR007_ProjectLocation_20220523_01.mxd 31/08/2022

1.3 Project overview

The project involves the development, construction, and operation of a solar farm and BESS, within a project site that covers approximately 500 hectares (ha) (Figure 2.2). The project will have an indicative capacity of up to 150 megawatts (MW) and include a BESS with a capacity of between 50 MW alternating current (AC) two-hour energy storage and 150 MW (AC) four-hour energy storage. The project will connect to Ausgrid's 66 kV/132 kV Singleton Substation located on the southern side of Maison Dieu Road adjacent to the project site. Construction works will therefore be required within the Maison Dieu Road reserve to facilitate the project's grid connection. The disturbance footprint within the site is approximately 356 ha comprising 352 ha for solar panels and up to 4 ha for the installation of a BESS and substation.

The project will be designed to avoid and minimise impacts where possible. During the preparation of the EIS, the development footprint within the project site will be refined based on environmental constraints identification, stakeholder engagement, community consultation and consideration of project infrastructure layout with the objective of developing an efficient project that avoids and minimises environmental impacts.

The capital investment value (CIV) of the project is estimated to be a maximum of $320 million. This CIV is considered to be at the upper end of the range for both a BESS and PV facility of this scale and will be refined during detailed design and the EIS process. A detailed project description is provided in Section 3.

1.3.1 Project site

The project site is in the Singleton LGA and is anticipated to be within the proposed Hunter-Central Coast Renewable Energy Zone (REZ). The project site covers an area of approximately 500 ha and extends across six parcels of privately-owned land leased by Terrain Solar. The project will connect to Ausgrid's Singleton Substation on Lot 1 of DP 616940.

Table 1.2 Lots within the project site

Lot	Deposited plan
75	1124347
3	252505
51	1133756
1	121623
1	1133341
104	817010
1	616940

1.3.2 Project objectives

The objectives of the project will be to:

- generate electricity for approximately 40,000 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 proposed 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 and 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.

2 Strategic context

2.1 Site and surrounds

2.1.1 Regional context

The project site is within Mason Dieu, approximately 10 km north-west of Singleton, and is within the Singleton LGA. The Singleton LGA encompasses a total land area of over 4,500 square kilometres (km^2) and forms part of the NSW Upper Hunter region. The Singleton region has a long history of cropping and grazing and supports a diverse range of agricultural industries. Singleton also has a strong association with coal mining and electricity generation with a number of significant open cut coal mining operations including Hunter Valley Operations (HVO), Ravensworth Operations, Ashton Coal Mine, Rix's Creek and Mount Thorley Warkworth located within 6 km of the project site. Liddell and Bayswater power stations are to the north-west of the project site. The Liddell and Bayswater power stations will be shut down in 2023 and 2035, respectively. These closures will facilitate new opportunities for expansions in the renewable energy market. The project site is anticipated to fall within the proposed Hunter-Central Coast REZ, which aims to leverage off the region's extensive electricity network infrastructure, skilled workforce and suitable land areas for renewable energy generation, storage and distribution.

Key natural features within the locality include the Hunter River, approximately 100 m west of the project site. The regional context of the project site is shown in Figure 2.1.

2.1.2 Local context

The project site is zoned RU1 Primary Production under the *Singleton Local Environmental Plan 2013* (Singleton LEP). The project site is currently used for grazing and 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.

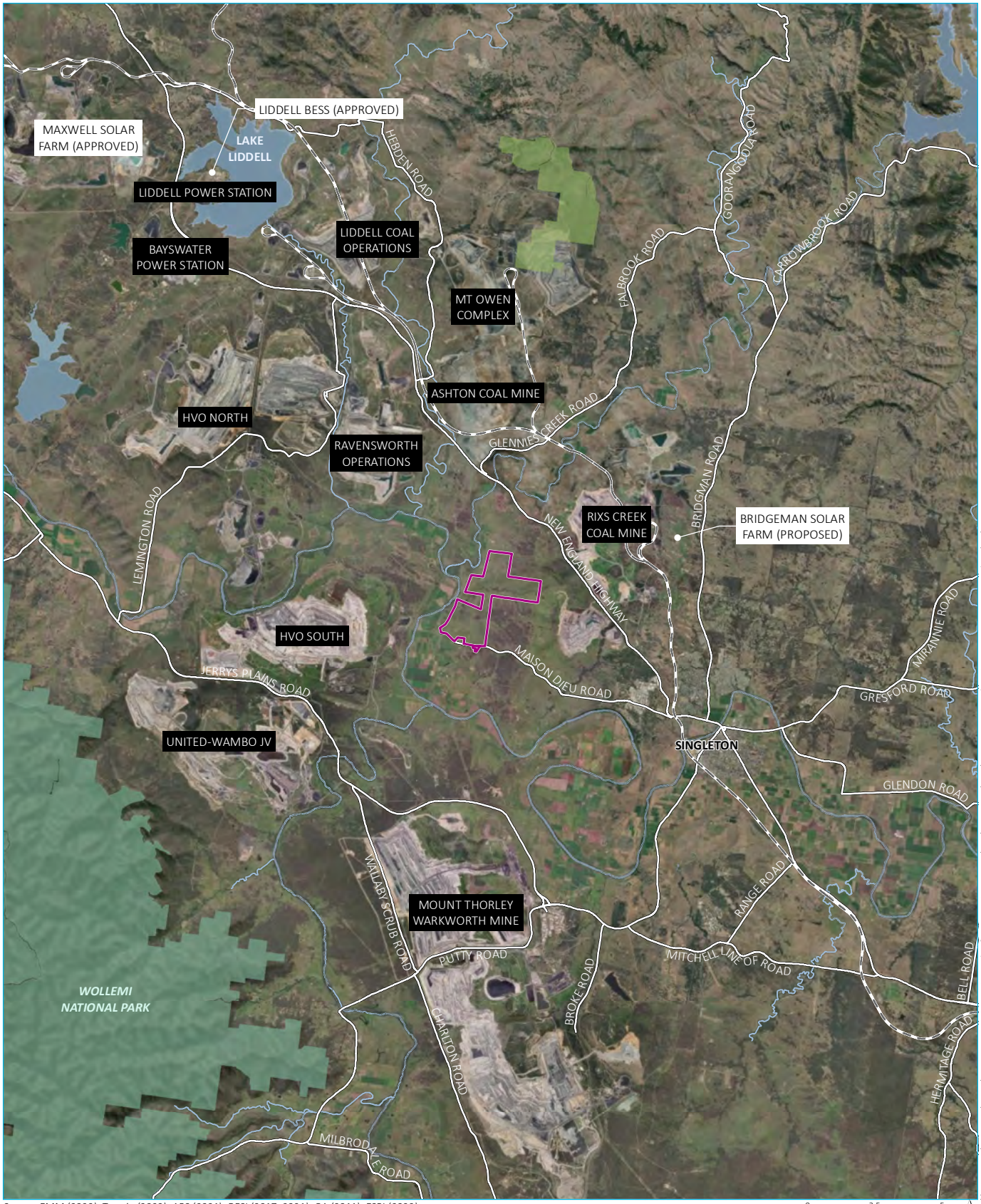
Other land uses within proximity of the project site includes rural residential and agriculture. Sensitive receivers are shown in Figure 2.2 and include rural residential properties. The closet residential receiver is located approximately 40 metres (m) from the project site boundary.

The key transport route is Maison Dieu Road on the southern perimeter of the project site which extends for approximately 10.4 km to connect directly to the New England Highway in the east. It is noted that the Singleton bypass is proposed to commence construction in 2023 and will involve the construction of a new roundabout and upgrades to the intersection of Maison Dieu Road and the New England Highway.

Ausgrid's 66 kV/132 kV Singleton Substation is adjacent to the project site's southern boundary, south of Maison Dieu Road. Existing electricity transmission lines traverse the project site, including:

- 330 kV transmission line from Liddell to Tomago;
- 132 kV transmission line from Singleton to Mitchell; and
- 132 kV transmission line from Singleton to Muswellbrook.

First, second, third and fourth order drainage lines within the project site flow into the Hunter River, directly west of the project site (Figure 2.2).



Source: EMM (2022); Terrain (2022); ABS (2021); DFSI (2017, 2021); GA (2011); ESRI (2022)

0 2.5 5 km

GDA2020 MGA Zone 56

N

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR008_RegionalSetting_20220831_02.mxd 31/08/2022

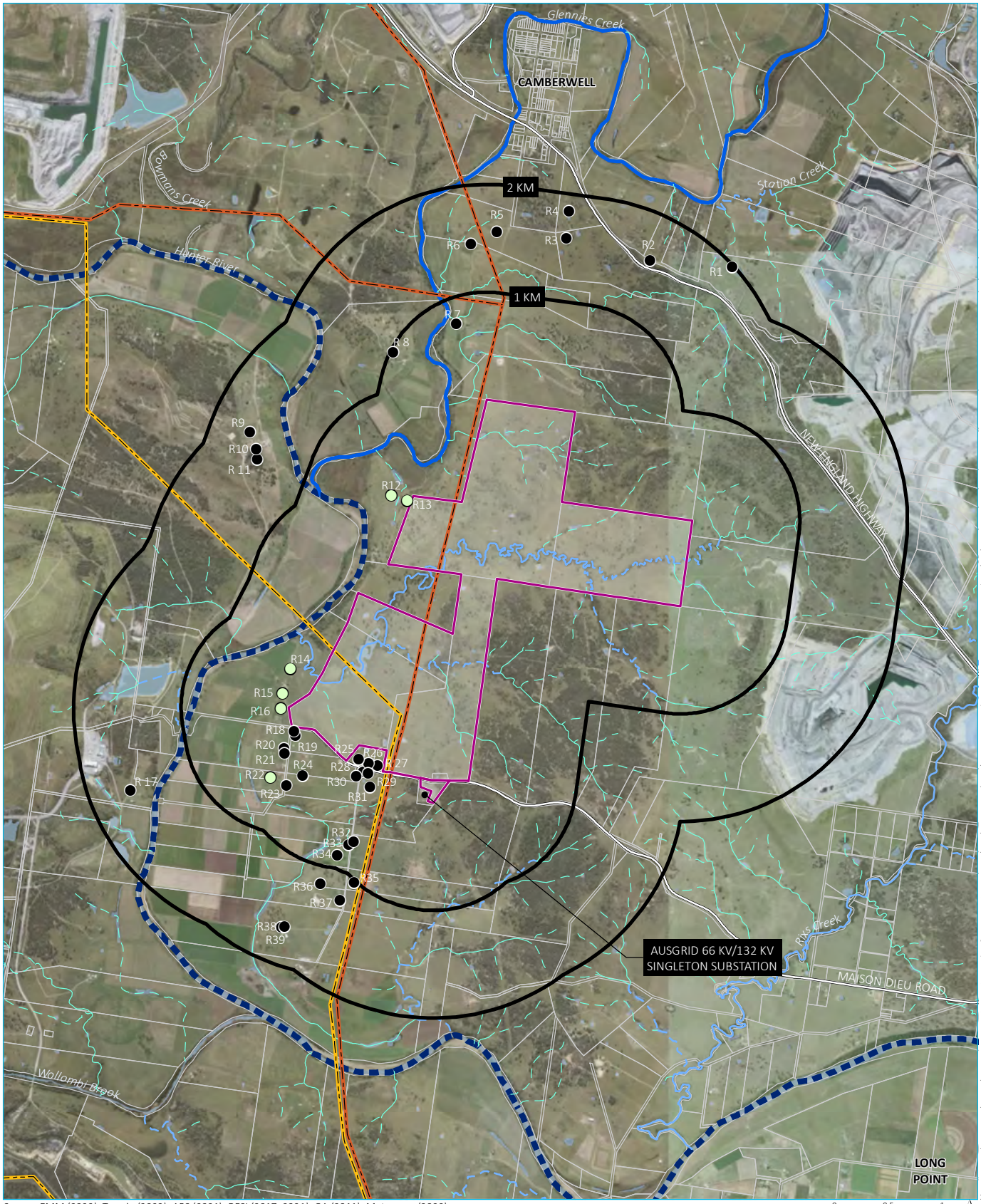
KEY

- Project site
- Rail line
- Major road
- Named watercourse
- Named waterbody
- NPWS reserve
- State forest

Regional context

Maison Dieu Solar Farm
Scoping report
Figure 2.1

EMM creating opportunities



Source: EMM (2022); Terrain (2022); ABS (2021); DFSI (2017, 2021); GA (2011); Metromap (2022)

0 0.5 1 km

GDA2020 MGA Zone 56

N

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR009_LocalContext_20220831_0.mxd 31/08/2022

KEY

- Project site
- Receptor (associated)
- Receptor (non-associated)
- Project buffer
- Major road
- Named waterbody
- Cadastral boundary

Transmission line

- 132 kV
- 330 kV

Strahler stream order

- 1st oder
- 2nd order
- 3rd order
- 4th order
- 7th order
- 9th order

Local context

Maison Dieu Solar Farm
Scoping report
Figure 2.2

EMM
creating opportunities

2.2 Strategic planning framework

An overview of relevant key policies, plans and strategies, and how the project aligns with these, is provided in Table 2.1.

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy, or strategy	Description	Alignment with strategic framework
International context		
The Paris Agreement	The Paris Agreement is a legally binding international treaty on climate change adopted by 196 parties in 2015. As a signatory to the agreement, the Australian Government has committed to reduce GHG emissions by 26-28% on 2005 levels by 2030.	The project will contribute to meeting Australia's commitments under the Paris Agreement by reducing the National Electricity Market's annual GHG emissions.
National context		
Large-scale Renewable Energy Target	The Australian Government Clean Energy Regulator administers the Large-scale Renewable Energy Target which incentivises investment in renewable energy power stations such as wind and solar farms. The Large-scale Renewable Energy Target of 33,000 GW hours of additional renewable electricity generation was met at the end of January 2021 (Clean Energy Regulator 2021). The annual target will remain at 33,000 GW hours until the scheme ends in 2030.	Once operational, the project will contribute towards meeting the Large-scale Renewable Energy Target in future years. The incorporation of a BESS into the project will enable the storage of renewable energy to increase market efficiency and enable greater penetration of renewables in the electricity grid.
State context		
Net Zero Plan Stage 1: 2020–2030	The *Net Zero Plan Stage 1 2020–2030* (DPIE, 2020) outlines the NSW Government's plan to grow the economy and create jobs while helping the state to deliver a 35% cut in emissions compared to 2005 levels.	The project contributes to Priority 1 of the Net Zero Plan: "Drive uptake of proven emissions reduction technologies that grow the economy, create new jobs or reduce the cost of living." The project is anticipated to fall within the Hunter-Central Coast REZ, which is expected to be formally declared in 2022. The region has been identified as an ideal location to play a key role in a renewable energy future for NSW due to its good renewable energy resources and opportunity to utilise electricity network infrastructure and a skilled workforce. The project will utilise these benefits to contribute to the NSW Net Zero Plan.
NSW Electricity Infrastructure Investment Roadmap 2020	The Electricity Infrastructure Roadmap coordinates investment in transmission, generation, storage and firming infrastructure as ageing coal-fired generation plants retire. The roadmap includes actions that will deliver "whole-of system" benefits. The roadmap sets out a plan to deliver the state's first five REZs in the Central-West Orana, New England, South-West, Hunter-Central Coast, and Illawarra regions.	The project is anticipated to be within the proposed Hunter-Central Coast REZ and is ideally placed to contribute to the success of the roadmap.

Table 2.1 Alignment with key strategic planning frameworks

Plan, policy, or strategy	Description	Alignment with strategic framework
Draft Large-Scale Solar Energy Guideline 2021	It is noted that a draft guideline was publicly exhibited in February 2022 and is currently under review by NSW Government.	Site selection and impact assessment considerations detailed in the draft guideline have been and will continue to be used to inform the project and will be considered in the EIS.
Local and regional context		
Draft Hunter Regional Plan 2041	The *Draft Hunter Regional Plan 2041* (DPIE, 2021b) (the Draft Regional Plan) is currently being reviewed after being on exhibition. Objective 1 of the Draft Regional Plan is to diversify the Hunter's mining, energy and industrial capacity. The Draft Regional Plan acknowledges that the Hunter 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 directly contributes to Objective 1 of the draft Regional Plan by: • contributing to the national renewable energy target; • promoting energy security through a more diverse energy mix; • reducing coal dependence; • increasing energy efficiency; and moving to lower emission energy sources.
Singleton Sustainability Strategy 2019–2027	Singleton Council released the *Singleton Sustainability Strategy 2019-2027* (Singleton Council, 2019) (Singleton Council, 2019) which provides a framework to provide an integrated and coordinated approach to advancing social, economic and environmental sustainability. The strategy 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 progress, more progress is required in regard to 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* through reducing reliance on coal fired power stations in the region.

2.3 Need for the project

The project is anticipated to be within the proposed Hunter-Central Coast REZ and will form an important part of Australia's response to climate change and Commonwealth and NSW Government commitments in 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 is expected to generate up to 150 MW supplying clean energy to approximately 40,000 homes. In addition, the project will contribute to capacity gaps in the electricity market following the closure of 7,000–8,000 MW worth of coal-fired power generators within NSW by 2035 (DPIE, 2019), thereby enhancing reliability and security of the electricity supply in NSW.

The project is consistent with the principles of Ecologically Sustainable Development, as defined by Clause 193 of the *Environmental Planning and Assessment Regulation 2021*, particularly in relation to climate change reduction and intergenerational equity. The project can be seen as being in the public interest as it meets a demonstrated need and provides public benefits.

2.4 Site selection

Terrain Solar 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 site is anticipated to be located within the proposed Hunter-Central Coast REZ and 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.

2.5 Key constraints

Potential constraints within and adjacent to the project site include:

- Utilities identified within the site include 330 kV and 132 kV overhead lines. Setbacks from overhead transmission line easements in accordance with relevant guidelines and in consultation with infrastructure owners will be required and determined during the detailed design as part of the EIS.
- The project site contains mapped native vegetation, including a Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) listed critically endangered ecological community (CEEC), White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland.
- The project site is in the floodplain of the Hunter River with unnamed first, second, third and fourth order watercourses flowing west across the project site into the Hunter River.
- Three Aboriginal heritage sites (as listed on the Aboriginal Heritage Information Management System (AHIMS)) have been recorded within the project site.
- The project site contains land mapped as Class I land and soil capability (LSC); however, the majority of land is mapped as Class IV, V and VI. Avoidance of Class 1 mapped land will be taken into consideration during the detailed design and detailed within the EIS.
- There are 39 residential receivers within 2 km of the project site with the closest within 40 m of the project site boundary.

In addition, the following is noted:

- There are no Native Title claims or Indigenous Land Use Agreements relevant to the project site.
- A search of the Australian Government's Protected Matters Search Tool shows that there are no Ramsar or Nationally Important Wetlands within the project site.
- The project site does not contain any Biophysical Strategic Agricultural Land (BSAL).

2.6 Relevant future development

As discussed in Section 1.3.2, the project site is surrounded by significant open cut coal mining operations including:

- HVO to the east;
- Ashton Coal Mine to the north;
- Rix's Creek to the east; and
- Mount Thorley Warkworth to the south.

As required by the *Cumulative Impact Assessment Guideline for State Significant Projects* (DPIE, 2021c) (CIA Guideline), relevant future projects that may potentially generate cumulative impacts with the project have been identified through a search of the NSW Planning Portal, the Regional Planning Panel website, and through engagement with DPE and Singleton Council.

Major projects that were identified are detailed in Table 2.2 with consideration of whether they are relevant future projects requiring cumulative assessment with the project.

Table 2.2 Major projects with potential for cumulative impacts

Project	Application type	Status	Relevant future project for EIS
HVO Continuation Project	SSD	SEARs issued 11 March 2021	Yes
Bridgman Solar Farm	SSD	SEARs issued 29 September 2020	Yes
Singleton bypass	Part 5	Construction anticipated to commence in 2023	Yes

3 Project description

3.1 Overview

The project comprises a large-scale solar PV generation facility with capacity of up to 150 MW. Additional infrastructure will also be required to support the project including:

- 33 kV/66 kV on-site substation;
- BESS with a capacity of between 50 MW (AC) two-hour energy storage and 150 MW (AC) four-hour energy storage; and
- grid connection infrastructure to connect the on-site substation to the Singleton Substation.

A summary of the project components provided in Table 3.1 and detailed in the sections below.

Table 3.1 Summary of project components

Project component	Description
Project site	• ~500 ha
PV Modules	• 150 MW • Fixed tilt or single axis • ~5 m in height • Solar investigation area ~352 ha
BESS	• Capacity of between 50 MW (AC) two-hour energy storage and 150 MW (AC) four-hour energy storage • Development footprint ~1-2 ha
Sub-station	• 33 kV/66 kV • 66 kv/132 kv connection to Ausgrid substation • Development footprint ~1–2 ha
Supporting infrastructure	• Temporary administration buildings • Amenities • Car parking • Lay down areas • Security fencing
Workforce	• Construction – up to 350 FTE • Operation – 5–8 FTE

3.2 Project components

3.2.1 Solar farm

The solar farm will comprise rows of PV solar modules (ie solar panels) mounted on wither a fixed tilt or single axis tracking structures. The modules will be installed in parallel rows, with an indicative spacing of 4–10 m between each row and a height of approximately 5 m. The rows of PV modules will be aligned in a north-south direction, allowing the panels to rotate from east to west during the day, tracking the sun's movement.

Groups of solar modules will be linked together to collect the total energy being produced. Example photographs of solar PV modules are provided in Photograph 3.1. The area being considered for solar panels within the site is shown on Figure 3.1. The solar panel investigation area is approximately 352 ha.

Photograph 3.1 Example of solar PV modules mounted to single axis tracking structures

3.2.2 Battery energy storage system

A BESS with a capacity of between 50 MW (AC) two-hour energy storage and 150 MW (AC) four-hour energy storage will be constructed within the project site. On-site storage will provide the capacity to deliver electricity to the transmission network on demand and more closely follow price fluctuations as well as providing much needed flexibility of supply and generation time shifting to help facilitate the rapid and reliable transition to renewables. This will ensure the electricity is most valuable to the market, and the stability and reliability of the electricity grid.

The major components of the BESS will comprise:

- **batteries** – most likely a lithium-ion technology;
- **inverters** – bi-directional inverters to convert DC current to AC current (when exporting electricity) and vice versa (when importing electricity); and
- **transformers** – skid-mounted transformers will be installed adjacent to each inverter to step up the voltage to the internal reticulation voltage of the plant.

The batteries could be containerised in self-contained steel enclosures resembling shipping containers. Battery modules are the key building block in a utility-scale BESS and are capable of both storing and discharging energy at a rapid rate. Battery modules are installed in racks, then the racks are wired together in strings, and strings of batteries are connected to the inverter stations. A group of battery racks is similar in appearance to a large server room or a data centre, as shown in Photograph 3.2.

Photograph 3.2 Example of individual battery modules installed in racks and connected via cabling

The BESS is likely to be located near the on-site substation and will be connected via underground or overhead cables. Indicative locations for the BESS are shown on Figure 3.1. Final locations will be determined based on the outcomes of technical assessments (including consideration of operational noise, visual amenity impacts and hazards and risks) and stakeholder engagement and will be confirmed in the EIS.

3.2.3 On-site substation

The project will include the establishment of a 33 kV/66 kV on-site substation within the project site. Voltage will be stepped up at the on-site substation via one or more transformers to match the voltage of the transmission network. Indicative locations for the on-site substation are shown on Figure 3.1. Final locations will be determined based on the outcomes of technical assessments (including consideration of operational noise, visual amenity impacts and hazards and risks) and stakeholder engagement and will be confirmed in the EIS.

3.2.4 Grid connection

The project will connect to Ausgrid's Singleton Substation adjacent to the project site's southern boundary (Figure 3.1). The connection from the on-site substation to Ausgrid's Singleton Substation will be 66 kv/132 kv made via overhead or underground high voltage cables and may require work within the Maison Dieu Road reserve.

3.2.5 Supporting infrastructure

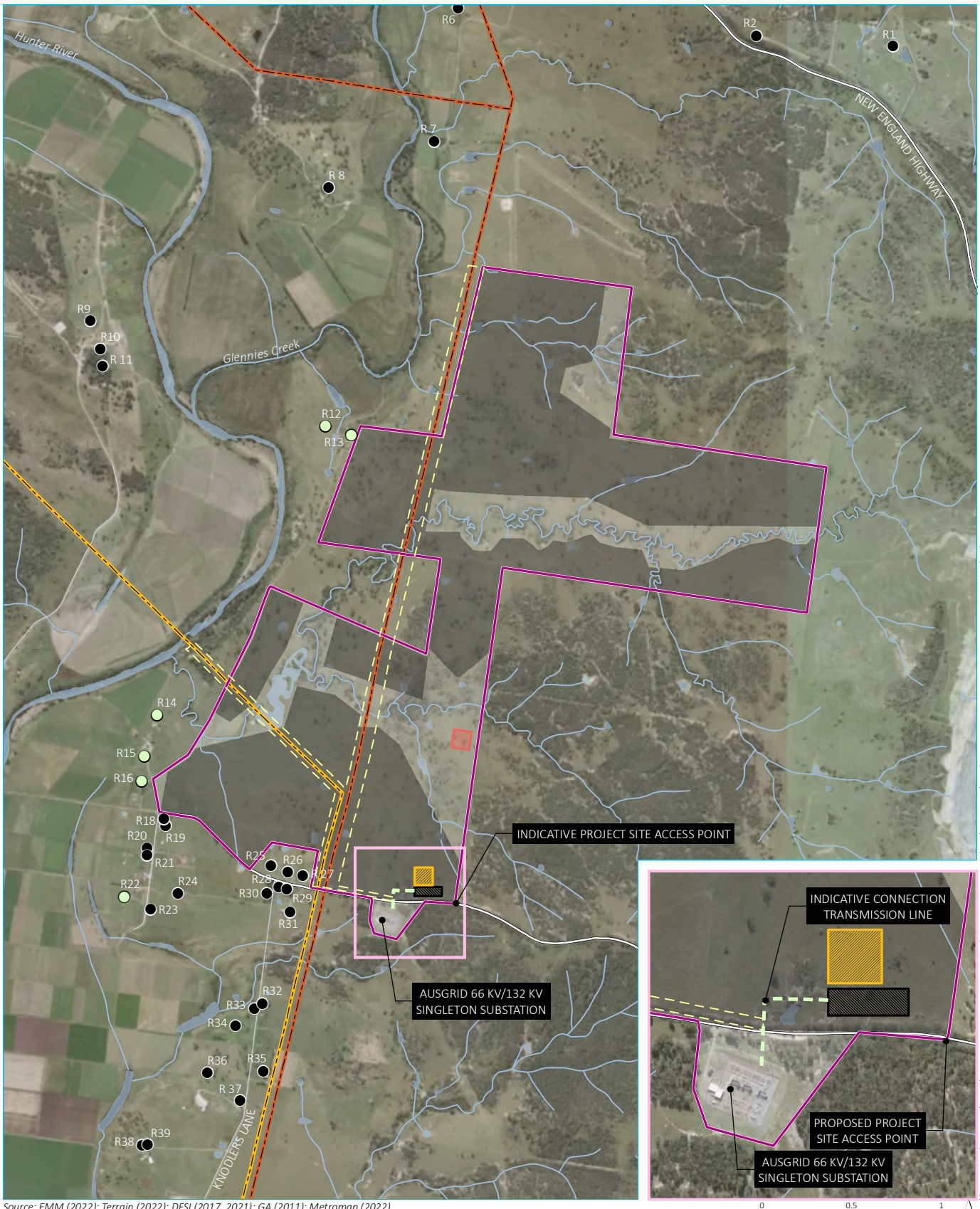
Temporary administration buildings with amenities, car parking sufficient for employees and contractors and lay down areas will be established within the project site and will be detailed within the EIS.

As part of the construction process, security fencing will be erected around the perimeter of the development footprint (once defined) and high voltage electrical equipment such as the BESS facility and on-site substation. Signage will be clearly displayed identifying hazards present within the project.

3.2.6 Site access

Primary access to the project site will be via Maison Dieu Road, as shown in Figure 3.1. Upgrades to Maison Dieu Road may be required to facilitate site access. Site access location, intersection design and any road upgrades will be confirmed as part of the EIS.

Internal access tracks will also be established. All internal access tracks will be unsealed. The internal tracks will serve both as access for servicing and maintaining the facility as well as fire trails and buffers.



Source: EMM (2022); Terrain (2022); DFSI (2017, 2021); GA (2011); Metromap (2022)

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR010_ProjectLayout_20220831_02.mxd 2/09/2022

KEY

- Project site
- Major road
- Minor road
- Named watercourse
- Named waterbody
- Solar investigation area
- Receptor (associated)
- Receptor (non-associated)

Transmission line

- 132 kV
- 330 kV

Infrastructure locations

- Indicative substation connection
- Existing transmission line easement
- Indicative BESS
- Indicative BESS (alternative location)
- Indicative substation

Indicative project layout

Maison Dieu Solar Farm
Scoping report
Figure 3.1

EMM
creating opportunities

3.3 Activities and uses

3.3.1 Construction

Site establishment work is expected to include:

- construction of a site access intersection to allow safe access from Maison Dieu Road;
- construction of a primary access road and access tracks;
- establishment of on-site security fencing;
- vegetation clearing, scrubbing, grading and minor cut/fill as required to prepare the surface;
- establishment of a temporary construction site compound (including site office, laydown areas and parking);
- site survey to confirm infrastructure positioning and placement; and
- additional geotechnical investigations specific to the selected foundations and tracking system as necessary.

Construction will require the use of bulldozers, water trucks, graders, flatbed trucks, skid steers, front end loaders, pile drivers, roller compactors, trenchers, backhoes, gravel trucks, water tankers and cranes.

Deliveries of PV modules and other equipment will be made via heavy vehicle (B-doubles and 19 m arrangements) on the approved route and site entrance. Oversize deliveries will likely be required for construction of the on-site substation.

3.3.2 Workforce

During peak construction workforce numbers could be up to 350 employees and contractors. Local councils and business owners will be consulted through the development and assessment of the project regarding managing potential impacts and opportunities for accommodation of the construction workforce.

Accommodation for non-local construction staff is expected to be sourced through the use of available rental and motel accommodation in surrounding townships and regional centres. Potential cumulative impacts on accommodation, infrastructure, and services will be considered in the EIS as part of the social impact assessment (SIA).

3.3.3 Operation

The key activities during operation of the project will be energy generation and energy storage. The project is expected to employ 5–8 full-time staff throughout operations. Regular maintenance will be required throughout the operational life of the project. Site maintenance activities will include management of internal roads, drainage, fencing, and vegetation. Additional maintenance of the key infrastructure will also be required which could include service, repair or replacement of PV modules, inverters, transformers or components of the BESS or on-site substation. Light vehicle access will be required across the project site throughout operations and occasional heavy vehicles may also be required.

3.3.4 Decommissioning

When decommissioning occurs, all above ground and subsurface infrastructure associated with the various project elements would be removed for sale, recycling, or disposal. Access tracks and hardstand areas would be remediated to prepare a suitable soil profile for subsequent sowing with an appropriate ground cover mix. As each element is decommissioned the project site would be made suitable for returning to its pre-development agricultural land use.

3.4 Timing

The project timing will be determined through detailed design and will be influenced by market demand for the energy generation and storage aspects of the project, as well as the development consent and grid connection processes that projects of this nature must successfully pass through prior to commencement of construction.

The construction staging and timing will be dependent on market demand with the solar farm and BESS having potential to be developed either concurrently or sequentially. Accordingly, the construction phase of the project could take between 12–18 months from site establishment to commissioning.

The expected operating life for the solar farm is 30 years before any major replacements or refurbishments would be required. For the BESS, the expected operating life is 20 years before the battery cells would require replacement or refurbishment.

At a point in time relevant to the project's life span and according to equipment performance, condition, and project viability, consideration will be given whether to either repower or decommission each key project component. Repowering of the project beyond the initial life span will encompass the continuation of the operations and upgrading, replacing, or repairing various components of the project as necessary. The potential of the project to operate past the original life span will depend on the market conditions and technological availability.

Should the repowering of the solar farm and/or BESS not be a viable option, the infrastructure associated with the respective project component would be decommissioned.

3.5 Alternatives considered

3.5.1 Additional land

Terrain Solar has been investigating solar potential in the Maison Dieu area since early 2020 and has been in consultation with various potential host landowners regarding access during this time. Additional land parcels adjacent to the project site were considered as having potential for the installation of solar panels and increasing the generating capacity for the project, however as is typical in the solar industry agreements for access to additional land parcels have not been finalised with all potential landholders for numerous and varying reasons. The current project focusses on maximising the use of the land where access to Terrain Solar has been granted by the landowner.

3.5.2 Alternative project type

While Australia has an abundance of renewable energy sources, alternative power generation options are economically limited from a private investment standpoint, with solar power generation, along with wind, becoming the cheapest forms of new build electricity generating capacity globally, including 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. Replacing retiring coal-fired power plants with a combination of wind farms, solar farms, BESSs and pumped hydro is the most economically viable option for the foreseeable future.

3.5.3 Not proceeding with the project

Were the project not to proceed, electrical supply to approximately 40,000 homes in NSW would be required to be sourced from other existing or proposed electricity generators which includes high greenhouse gas emitting fossil fuel fired power generation and renewable energy.

In addition, socio-economic benefits to the region from local employment and purchase of local materials, where available, would not be realised.

4 Statutory context

The key relevant statutory requirements for the project having regard to the EP&A Act, other NSW and Commonwealth legislation, and environmental planning instruments are summarised in Table 4.1. This table has been set out in accordance with the Scoping Report Guideline (DPIE, 2021a) and *State Significant development preparing an environmental impact statement Appendix B to the state significant development guidelines* (DPIE, 2021f) (EIS Guideline), to cover the following:

- permissibility;
- power to grant approval (ie approval pathway);
- other approvals;
- pre-conditions to exercising the power to grant approval; and
- mandatory matters for consideration.

Detailed consideration of relevant statutory requirements will be provided in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Power to grant approval	
EP&A Act and Planning Systems SEPP	Part 4 of the EP&A Act relates to development assessment and consent; Part 4, Division 4.7 relates to the assessment of development deemed to be significant to the State (or SSD). Section 4.36(2) of the EP&A Act states that a: *...State environmental planning policy may declare any development, or any class or description of development, to be State significant development.* The Planning Systems SEPP identifies development that is SSD. Section 2.6(1) of the Planning Systems SEPP states: *(1) Development is declared to be State significant development for the purposes of the Act if:* *(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and* *(b) the development is specified in Schedule 1 and 2.* The project meets both these requirements; it requires development consent, and is a development specified in Schedule 1 of the Planning Systems SEPP. Schedule 1 of the Planning Systems SEPP defines the following as SSD: *Electricity generating works and heat or co-generation* *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, waste, hydro, wave, solar or wind power) that:* *(a) has a capital investment value of more than $30 million.* The project is development for the purpose of electricity generation and will have a capital investment value of more than $30 million. Consequently, the project is SSD.

Table 4.1 Statutory context

Approval	Requirement
Permissibility	
State Environmental Planning Policy (Transport and Infrastructure) 2021	Section 2.36(9) of *State Environmental Planning Policy (Transport and Infrastructure) 2021* states that: *...development for the purpose of a solar energy system may be carried out by any person with consent on any land.* Therefore, development for the purpose of a solar energy system may be carried out within the project site with development consent.
Consistent approvals	
Overview	Section 4.42 of the EP&A Act outlines that the approvals listed below cannot be refused if necessary for carrying out an approved SSD and are to be consistent with the terms of the development consent for the SSD.
An approval under Section 138 of the NSW *Roads Act 1993*	Under Section 138 or Part 9, Division 3 of the *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either Transport for NSW or local council, depending upon the classification of the road. The interaction of the project with the local and regional road network will be addressed in the EIS. Should road upgrades or works within a designated road corridor be required, approval will be sought from the relevant authority.
Commonwealth approvals	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect matters of national environmental significance (MNES). If an action will, or is likely to, have a significant impact on any MNES, it is deemed to be a 'controlled action' and requires approval from the Commonwealth Environment Minister or the Minister's delegate. A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties or National heritage places within the vicinity of the project site (refer Appendix C). A desktop biodiversity assessment has identified five vegetation communities that have the potential to support a range of BC Act and EPBC Act listed threatened species. One vegetation community (Plant community type (PCT) 796) has part association with White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, which is listed as 'critically endangered' under the EPBC Act. Further biodiversity surveys and assessment will be completed through the preparation of the EIS and will inform whether a referral to the Commonwealth Department of Agriculture, Water and the Environment is required.
Native Title Act 1993	The Commonwealth *Native Title Act 1993* recognises and protects native title rights in Australia. It allows a native title determination application (native title claim) to be made for land or waters where native title has not been validly extinguished, for example, extinguished by the grant of freehold title to land. A search of the NSW Native Title Vision website indicates that no determined or registered Native Title claim or Indigenous Land Use Agreements (ILUAs) exist over the project site.
Approvals not required	
Overview	Section 4.41 of the EP&A outlines the following approvals, permits etc are not required for an approved SSD.
Fisheries Management Act 1994	A permit under the *Fisheries Management Act 1994* to block fish passage or dredge or carry out reclamation work on water land will not be required pursuant to Section 4.41 of the EP&A Act. The project may require work in water land to facilitate the upgrade of road crossings or establish new crossings of mapped watercourses within the project site. These works will be undertaken in accordance with NSW DPI *Policies and Guidelines on Fish-Friendly Waterway Crossings* (undated), *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013), and NSW *Guidelines for Controlled Activities*.

Table 4.1 Statutory context

Approval	Requirement
Heritage Act 1977	An approval under Part 4, or an excavation permit under Section 139, of *the Heritage Act 1977* will not be required pursuant to Section 4.41 of the EP&A Act. Notwithstanding, there are no listed heritage items within the project site.
National Parks and Wildlife Act 1979	An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974* will not be required pursuant to Section 4.41 of the EP&A Act. There is potential for Aboriginal sites to occur within the project site. Any Aboriginal heritage sites identified within the project site will be avoided as far as practicable during the design process.
Rural Fires Act 1997	A bushfire safety authority under Section 100B of the *Rural Fires Act 1997* will not be required pursuant to Section 4.41 of the EP&A Act. A bushfire assessment in accordance with NSW Rural Fire Service (2019) *Planning for Bushfire Protection* will be carried out to inform the EIS.
Water Management Act 2000	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 *Water Management Act 2000* will not be required pursuant to Section 4.41 of the EP&A Act. Construction work near or within watercourses within the project site may be required. These works will be carried out in accordance with DPIE's various guidelines for controlled activities.
Other NSW approvals	
Conveyancing Act 1919	An easement established under Section 88B of the *Conveyancing Act 1919* is likely to be required for the connection to Ausgrid's Singleton Substation.
Mandatory considerations – considerations under EP&A Act and EP&A Regulation	
Section 1.3 of the EP&A Act	Relevant objectives of the EP&A Act are: *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *(c) to promote the orderly and economic use and development of land,* *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *(g) to promote good design and amenity of the built environment,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.* The above will be considered in the EIS.

Table 4.1 Statutory context

Approval	Requirement
Section 4.15 of the EP&A Act	Pursuant to Section 4.15 of the EP&A Act, the consent authority must consider the following relevant matters for consideration: • relevant environmental planning instruments for the project including: – State Environmental Planning Policy (Biodiversity and Conservation) 2021; – State Environmental Planning Policy (Resilience and Hazards) 2021; – State Environmental Planning Policy (Transport and Infrastructure) 2021; and – Singleton LEP; • relevant development control plans; • the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; • the suitability of the site for the development; and • the public interest. The above will be considered in the EIS.
Mandatory considerations – considerations under other legislation	
Biodiversity Conservation Act 2016 (BC Act)	The likely impact of the project on biodiversity values will be assessed in a biodiversity development assessment report (BDAR). The Minister for Planning may (but is not required to) further consider under the NSW *Biodiversity Conservation ACT 2016* the likely impact of the project on biodiversity values.
Mandatory considerations – Environmental planning instruments	
State Environmental Planning Policy (Resilience and Hazards) 2021 – Section 3.7	The EIS will consider the following relevant departmental guidelines: • Applying State Environmental Planning Policy No. 33 Hazardous and Offensive Development; • HIPAP No. 3 – Risk Assessment; and • HIPAP No. 12 – Hazards.
State Environmental Planning Policy (Resilience and Hazards) 2021 – Section 4.6	As the development will involve a change of land use, a report specifying the findings of a preliminary investigation of the land concerned is required to be carried out in accordance with the *Managing Land Contamination Planning Guidelines* (DUAP, 1998).
Singleton LEP	The EIS will consider the relevant objectives and land uses for RU1 zone.
Mandatory considerations Development control plans	
In accordance with Section 2.10 of the Planning Systems SEPP, development control plans do not apply to SSD and are not a relevant consideration for the project.	

5 Engagement

5.1 Overview

Terrain Solar's approach to the engagement undertaken to date, and the engagement principles to be followed during the preparation of the EIS will be undertaken in accordance with the following guidelines:

- *Undertaking Engagement Guidelines for State Significant Project* (DPIE, 2021d);
- *Social Impact Assessment Guideline for State Significant Projects* (DPIE, 2021e) (SIA Guideline); and
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010).

5.2 Scoping phase consultation

5.2.1 Department of Planning & Environment

Correspondence was sent to DPE on 12 April 2022 to introduce the project and request a pre-scoping meeting to discuss the project and understand DPE's requirements for this Scoping Report. A pre-scoping meeting was held with DPE on 27 April 2022.

5.2.2 Community engagement

Terrain Solar has implemented steps thus far to ensure there is the ability for members of the community immediately surrounding the project site to be informed of the project. As the project progresses Terrain Solar will continue to engage with the immediate and broader community. A summary of consultation undertaken with receptors surrounding the project site is provided in Table 5.1.

Table 5.1 Summary of community consultation

Receptor ID	Notes	Type of engagement	Timing	Summary of consultation outcomes	Future engagement proposed
R1 R2	Properties owned by Bloomfield Collieries Pty Ltd.	• Phone conversation. • Project information letter.	• 2 August 2022.	No initial concerns were raised Refer Section 5.2.4.	Ongoing engagement with landowner and property tenants throughout refinement of the project and EIS preparation.
R3 R4 R5 R6 R8	Properties owned by Ashton Coal Mine Pty Ltd.	• Phone conversation. • Project information letter.	• 2 August 2022.	No initial concerns were raised. Refer Section 5.2.5.	Ongoing engagement with landowner and property tenants throughout refinement of the project and EIS preparation.

Table 5.1 Summary of community consultation

Receptor ID	Notes	Type of engagement	Timing	Summary of consultation outcomes	Future engagement proposed
R9 R10 R11 R17 R25 R29 R38 R39	Properties owned by HVO.	• Project information letter. • Face to face meeting.	• Project information letter provided 3 May 2022. • Face to face meeting held 26 May 2022.	Concerns were raised by HVO in relation to the potential sterilisation of future coal resources within the project site. Refer Section 5.2.3.	Ongoing engagement with landowner and property tenants throughout refinement of the project and EIS preparation.
R12 R13 R14 R15 R16 R22	Properties owned by landowners whose land is within the project site.	• Face to face. • Telephone conversations.	• Engagement ongoing since early 2020.	No concerns regarding the project have been raised by these landowners associated with the project to-date and both have been supportive of the project progressing.	Ongoing engagement throughout refinement of the project and EIS preparation. Terrain Solar will be undertaking further engagement with the tenants of these surrounding properties throughout the preparation of the EIS.
R18 R19 R20 R21 R23 R24 R34	Single landowner with various properties tenanted.	• Face to face. • Telephone conversations.	• Engagement ongoing since early 2020.	Discussions regarding use of land for establishment of solar farm. Not supportive of land being used for the project. No concerns regarding the project progressing on adjoining land.	Ongoing engagement throughout refinement of the project and EIS preparation. Terrain Solar will be undertaking further engagement with the tenants of these properties throughout the preparation of the EIS.
R26	-	• Face to face. • Project information letter.	• Face to face meeting held 10 May 2022 with project information letter provided.	Key concerns raised during face-to-face meetings with these adjoining landowners included: • impact on visual amenity; • noise; • impacts from construction traffic; • impacts on property values; and • Impact on ground water from planting of screening vegetation near boundary.	Ongoing engagement throughout refinement of the project and EIS preparation.

Table 5.1 Summary of community consultation

Receptor ID	Notes	Type of engagement	Timing	Summary of consultation outcomes	Future engagement proposed
R27	-	• Face to face. • Project information letter.	• Face to face meeting held 10 May 2022 with project information letter provided.	Key concerns raised during face-to-face meetings with these adjoining landowners included: • impact on visual amenity; • noise; • impacts from construction traffic; • impacts on property values; and • Impact on ground water from planting of screening vegetation near boundary.	Ongoing engagement throughout refinement of the project and EIS preparation.
R28	-	• Project information letter. • Face to face conversations.	• Project information letter left 10 May 2022 and 1 August 2022. • Face to face conversation held 2 August 2022.	Conversation held and project representative contact details provided should they have any questions or concerns regarding the project. No concerns raised. Broadly supportive of the project progressing.	Ongoing engagement throughout refinement of the project and EIS preparation.
R30	-	• Project information letter. • Face to face conversations.	• Project information letter left 10 May 2022 and 1 August 2022. • Face to face conversation held 2 August 2022.	Conversation held and project representative contact details provided should they have any questions or concerns regarding the project. No concerns raised. Broadly supportive of the project progressing.	Ongoing engagement throughout refinement of the project and EIS preparation.
R31	-	• Project information letter. • Face to face conversations.	• Project information letter left 10 May 2022 and 1 August 2022. • Face to face conversation held 2 August 2022.	Conversation held and project representative contact details provided should they have any questions or concerns regarding the project. No concerns raised. Broadly supportive of the project progressing.	Ongoing engagement throughout refinement of the project and EIS preparation.
R32	-	• Project information letter.	• Project information letter left 10 May 2022 and 1 August 2022.	Attempts made to contact landowner in person; however, all attempts for face-to-face discussions were unsuccessful.	Ongoing attempts for engagement throughout refinement of the project and EIS preparation.

Table 5.1 Summary of community consultation

Receptor ID	Notes	Type of engagement	Timing	Summary of consultation outcomes	Future engagement proposed
R33	-	• Project information letter.	• Project information letter left 10 May 2022 and 1 August 2022.	Attempts made to contact landowner in person; however, all attempts for face-to-face discussions were unsuccessful.	Ongoing attempts for engagement throughout refinement of the project and EIS preparation.
R35	-	• Project information letter.	• Project information letter left 10 May 2022 and 1 August 2022.	Attempts made to contact landowner in person; however, all attempts for face-to-face discussions were unsuccessful.	Ongoing attempts for engagement throughout refinement of the project and EIS preparation.
R36	-	• Project information letter. • Face to face conversations.	• Project information letter left 10 May 2022 and 1 August 2022. • Face to face conversation held 2 August 2022.	Conversation held and project representative contact details provided should they have any questions or concerns regarding the project. No concerns raised. Broadly supportive of the project progressing.	Ongoing engagement throughout refinement of the project and EIS preparation.
R37	-	• Project information letter. • Face to face conversations.	• Project information letter left 10 May 2022 and 1 August 2022. • Face to face conversation held 2 August 2022.	Conversation held and project representative contact details provided should they have any questions or concerns regarding the project. No concerns raised. Broadly supportive of the project progressing.	Ongoing engagement throughout refinement of the project and EIS preparation.

5.2.3 Hunter Valley Operations

HVO hold mining assessment lease AL34 which encompasses the project site and own properties surrounding the project site including receptors R9, R10, R11, R17, R25, R29, R38 and R39 that are tenanted. An initial project information letter was sent to HVO on 3 May 2022 to introduce the project and request a meeting to discuss the project further. A meeting with representatives from Terrain Solar and HVO took place on 26 May 2022. Attendees from HVO included:

- general manager;
- environment and community manager;
- approvals manager; and
- general counsel.

Preliminary concerns were raised by HVO in relation to the potential sterilisation of future coal resources within the project site however no further correspondence has been received from HVO since the meeting on 26 May 2022. Terrain Solar will be undertaking further engagement with HVO and the tenants of the HVO properties throughout the preparation of the EIS.

5.2.4 Bloomfield Colliery

Bloomfield Collieries Pty Ltd (Bloomfield Colliery) own properties (receptors R1 and R2) that are within 2 km of the project site. Initial discussions with a representative from Bloomfield were held on 2 August 2022 to introduce the project. A follow up letter was provided to Bloomfield Colliery on 2 August 2022 containing further details of the project proposed by Terrain Solar. No initial concerns were raised by Bloomfield Colliery and no response to correspondence provided has been received to date. Terrain Solar will be undertaking further engagement with Bloomfield Colliery and the tenants of the Bloomfield Colliery properties throughout the preparation of the EIS.

5.2.5 Ashton Coal

Ashton Coal Mine Pty Ltd (Ashton Coal) own properties (receptors R3, R4, R5, R6 and R8) that are within 2 km of the project site. Initial discussions with a representative from Ashton Coal was held on 2 August 2022 to introduce the project. A follow up letter was provided to Ashton Coal on 2 August 2022 containing further details of the project proposed by Terrain Solar. No initial concerns were raised by Ashton Coal and no response to correspondence provided has been received to date. Terrain Solar will be undertaking further engagement with Ashton Coal and the tenants of the Ashton Coal properties throughout the preparation of the EIS.

5.2.6 Singleton Council

A meeting with Singleton Council was held on 9 May 2022 to introduce the project and understand any initial concerns from Singleton Council for consideration during project design and assessment. Key matters discussed during this meeting included:

- potential impacts on biodiversity and Aboriginal heritage values;
- impacts from the project's construction workforce on short term accommodation availability and short-term housing affordability in the region; and
- Singleton Council policy requirements in relation to voluntary planning agreements.

Terrain Solar will provide a copy of the Scoping Report to Singleton Council once submitted to DPE and will continue to engage with Singleton Council throughout the preparation of the EIS.

5.3 EIS phase consultation

During the preparation of the EIS, Terrain Solar will consult with relevant local, State and Commonwealth Government authorities, infrastructure and service providers, community groups and affected landowners. Terrain Solar is committed to genuine and consistent engagement with the local community and stakeholders to support the building of strong relationships with stakeholders, foster existing connections, and establish a socially sustainable project. Therefore, Terrain Solar will continue to engage with the local community and stakeholders throughout the EIS.

Consultation during the development of the EIS will aim to:

- consult proactively with stakeholders using clear and consistent key messages;
- continue to engage with key stakeholders to identify potential issues and opportunities;
- communicate the progress of the project and key findings or outcomes of assessments;
- enable stakeholders to have input into the preparation of the EIS, project planning, investigate opportunities for visual treatment and identify opportunities for benefit sharing; and
- implement response and feedback strategies to address stakeholder concerns and use these to inform the evolution of the project.

State and Commonwealth regulatory authorities who will be consulted during the preparation of the EIS include:

- Commonwealth Department of Climate Change, Energy, the Environment and Water;
- NSW Biodiversity Conservation and Science Directorate;
- NSW Natural Resource Access Regulator;
- NSW Department of Primary Industries;
- Singleton Council and Councillors; and
- Transport for NSW (TfNSW).

Aboriginal stakeholders will be identified and consulted with during the preparation of the EIS in accordance with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010).

Electricity infrastructure owners, including TransGrid and Ausgrid, will be consulted with in relation to activities impacting the transmission network and connection requirements to Ausgrid's 66 kV/132 kV Singleton Substation.

Other stakeholders to be consulted with during the preparation of the EIS will include local interest's groups, HVO, Bloomfield Colliery and Ashton Coal (in relation to impacts to properties and existing mining assessment lease areas) and Energy Co (in relation to the declaration of the Hunter-Central Coast REZ).

6 Proposed assessment of impacts

6.1 Introduction

This section outlines the matters identified as requiring further assessment and the proposed approach to the respective assessments. In accordance with the Scoping Report Guidelines, the following factors were considered in the identification of matters requiring further assessment:

- the scale and nature of the likely impact of the project and the sensitivity of the receiving environment;
- whether the project is likely to generate cumulative impacts with other projects in the area; and
- the ability to avoid, minimise and/or offset the impacts of the project, to the extent known at the scoping phase.

This section has been prepared in accordance with the:

- Scoping Report Guideline (DPIE, 2021a); and
- SIA Guideline (DPIE, 2021e).

A scoping report summary table is provided as Appendix A.

6.2 Visual amenity

6.2.1 Existing environment

The landscape surrounding the project site is dominated by gently undulating, cleared agricultural land. Other prominent features within the landscape include 132 kV and 330 kV overhead electricity transmission lines, remnant vegetation, watercourses, farm dams, agricultural infrastructure and rural residences.

6.2.2 Preliminary impact assessment

The project site is within a rural area with the nearest residences within 40 m of the project site boundary. There are 39 residences within 2 km of the project site (Figure 2.2).

The project has potential to result in visual amenity impacts to residences surrounding the project site.

6.2.3 Proposed assessment approach

A detailed visual impact assessment will be prepared to support the EIS and will include an assessment of the likely visual impacts of the project (including any glare, reflectivity and night lighting) on surrounding residences and scenic or significant vistas.

A comprehensive viewshed analysis will be performed to identify locations and receivers within the local setting that may experience views of project infrastructure. Where relevant, the visual impact assessment will recommend mitigation measures to reduce the project's visual amenity impacts (eg perimeter vegetation screening). Possible mitigation measures will be discussed with relevant stakeholders during the preparation of the assessment.

The assessment will be undertaken with reference to the *Draft Large-Scale Solar Energy Guideline* (DPIE, 2021g) and include:

- a preliminary visual assessment including use of the preliminary viewshed tool and viewshed mapping to inform project design and consultation and identify representative viewpoints for further assessment;
- a detailed visual assessment to assess the magnitude of change, visual sensitivity of the surrounding area and inform the visual impact assessment;
- consideration of visual performance objectives for each viewpoint; and
- identification of appropriate avoidance or mitigation measures to be incorporated into the project design.

Targeted community engagement is proposed with surrounding landholders in relation to visual amenity impacts and negotiated agreements will be considered where mitigation options will not be effective in mitigating impacts.

6.3 Biodiversity

6.3.1 Existing environment

A review of the Upper Hunter State Vegetation Type Map v1.0 VIS_ID_4894 (OEH 2019) predicted five plant community types (PCTs) within the project site as detailed in Table 6.1 and shown on Figure 6.1.

PCT 796 has been mapped along an unnamed third-order stream in the north-east of the project site. PCT 796 can represent White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland, which is listed as 'critically endangered' under the EPBC Act. This derived grassland PCT and listed community are considered unlikely to occur in this area given that the surrounding intact vegetation communities do not contain representative canopy species of these communities (eg White Box, Yellow Box or Blakely's Red Gum). It is more likely that these grasslands are derived from proximal vegetation types (PCT 1601 and/or 1603) or could be exotic-dominated depending on how they are currently managed.

The remainder of predicted PCTs in the project site may represent endangered ecological communities under the NSW *Biodiversity Conservation Act 2016* (BC Act) and endangered or critically endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Detailed, plot-based surveys and vegetation mapping in accordance with the Biodiversity Assessment Method is required to verify and refine the State Vegetation Type Map, and to determine the presence of listed communities in the project site.

Table 6.1 Predicted PCTs in the project site

PCT	Description	BC Act description	BC Act status	EPBC Act description	EPBC Act status
796	Derived grassland of the NSW South Western Slopes	White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	Critically endangered	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically endangered
1601	Spotted Gum – Narrow leaved ironbark-Red Ironbark shrub – grass open forest of the central and lower Hunter	Central Hunter Ironbark – Spotted Gum – Grey Box Forest in the New South Wales North Coast and Sydney Basin Bioregions	Endangered	-	-
1603	Narrow-leaved Ironbark – Bull Oak – Grey Box shrub – grass open forest of the Central and lower Hunter	Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Endangered	Central Hunter Valley Eucalypt Forest and Woodland	Critically endangered
1691	Narrow-leaved Ironbark – Grey Box grassy woodland of the central and upper Hunter	Central Hunter Grey Box – Ironbark Woodland in the New South Wales North Coast and Sydney Basin Bioregions	Endangered	Central Hunter Valley Eucalypt Forest and Woodland	Critically endangered
1731	Swamp Oak – Weeping Grass grassy riparian forest of the Hunter Valley	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Endangered	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered

PCTs predicted to occur in the project site have the potential to support a range of BC Act and EPBC Act listed threatened species. A search of the BioNet Atlas of NSW Wildlife database and mapping tool on 24 April 2022 identified that three threatened species, namely Green and Golden Bell Frog (*Litoria aurea*), Grey-headed Flying-fox (*Pteropus poliocephalus*) and Large-eared Pied Bat (*Chalinolobus dwyeri*), have been recorded within 2 km of the project site (Figure 6.1).

In addition, the predicted PCTs (Table 6.1) are also associated with the species-credit species presented in Table 6.2. These species will require consideration for during the EIS if the predicted PCTs are confirmed to occur in the project site. This list of potential candidate species for assessment and targeted survey would be refined if different PCTs are recorded in the project site.

Table 6.2 Potential candidate species

Scientific name	Common name	Credit type	Associated PCT				
			796	1601	1603	1691	1731
Acacia bynoeana	Bynoe's Wattle	Species		X			
Angophora inopina	Charmhaven Apple	Species			X		
Anthochaera phrygia	Regent Honeyeater	Species/Ecosystem	X	X	X	X	
Aprasia parapulchella	Pink-tailed Legless Lizard	Species			X		
Asperula asthenes	Trailing Woodruff	Species		X	X	X	
Burhinus grallarius	Bush Stone-curlew	Species		X	X	X	X
Callistemon linearifolius	Netted Bottle Brush	Species		X	X	X	
Callocephalon fimbriatum	Gang-gang Cockatoo	Species/Ecosystem		X	X	X	
Calyptorhynchus lathami	Glossy Black-cockatoo	Species/Ecosystem		X			
Chalinolobus dwyeri	Large-eared Pied Bat	Species		X	X		
Cryptostylis hunteriana	Leafless Tongue Orchid	Species		X			
Cynanchum elegans	White-flowered Wax Plant	Species		X	X		
Delma impar	Striped Legless Lizard	Species	X	X	X	X	X
Diuris praecox	Rough Doubletail	Species		X	X	X	X
Diuris tricolor	Pine Donkey Orchid	Species		X	X		
Eucalyptus castrensis	Singleton Mallee	Species		X	X	X	

Table 6.2 Potential candidate species

Scientific name	Common name	Credit type	Associated PCT				
			796	1601	1603	1691	1731
Eucalyptus glaucina	Slaty Red Gum	Species		X	X	X	
Eucalyptus parramattensis subsp. decadens	-	Species		X	X		
Eucalyptus pumila	Pokolbin Mallee	Species		X	X	X	
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	Species		X	X	X	X
Haliaeetus leucogaster	White-bellied Sea-Eagle	Species/Ecosystem		X	X	X	
Hieraaetus morphnoides	Little Eagle	Species/Ecosystem		X	X	X	X
Hoplocephalus bitorquatus	Pale-headed Snake	Species		X	X		
Lathamus discolor	Swift Parrot	Species/Ecosystem		X	X		
Litoria aurea	Green and Golden Bell Frog	Species	X		X		
Litoria brevipalmata	Green-thighed frog	Species		X			
Lophoictinia isura	Square-tailed Kite	Species/Ecosystem		X	X	X	
Miniopterus australis	Little Bentwing Bat	Species/Ecosystem		X	X	X	X
Miniopterus orianae oceanensis	Large Bentwing Bat	Species/Ecosystem		X	X	X	
Monotaxis macrophylla	Large-leafed Monotaxis	Species		X			
Myotis macropus	Large-footed Myotis	Species		X			
Ninox connivens	Barking Owl	Species/Ecosystem			X		

Table 6.2 Potential candidate species

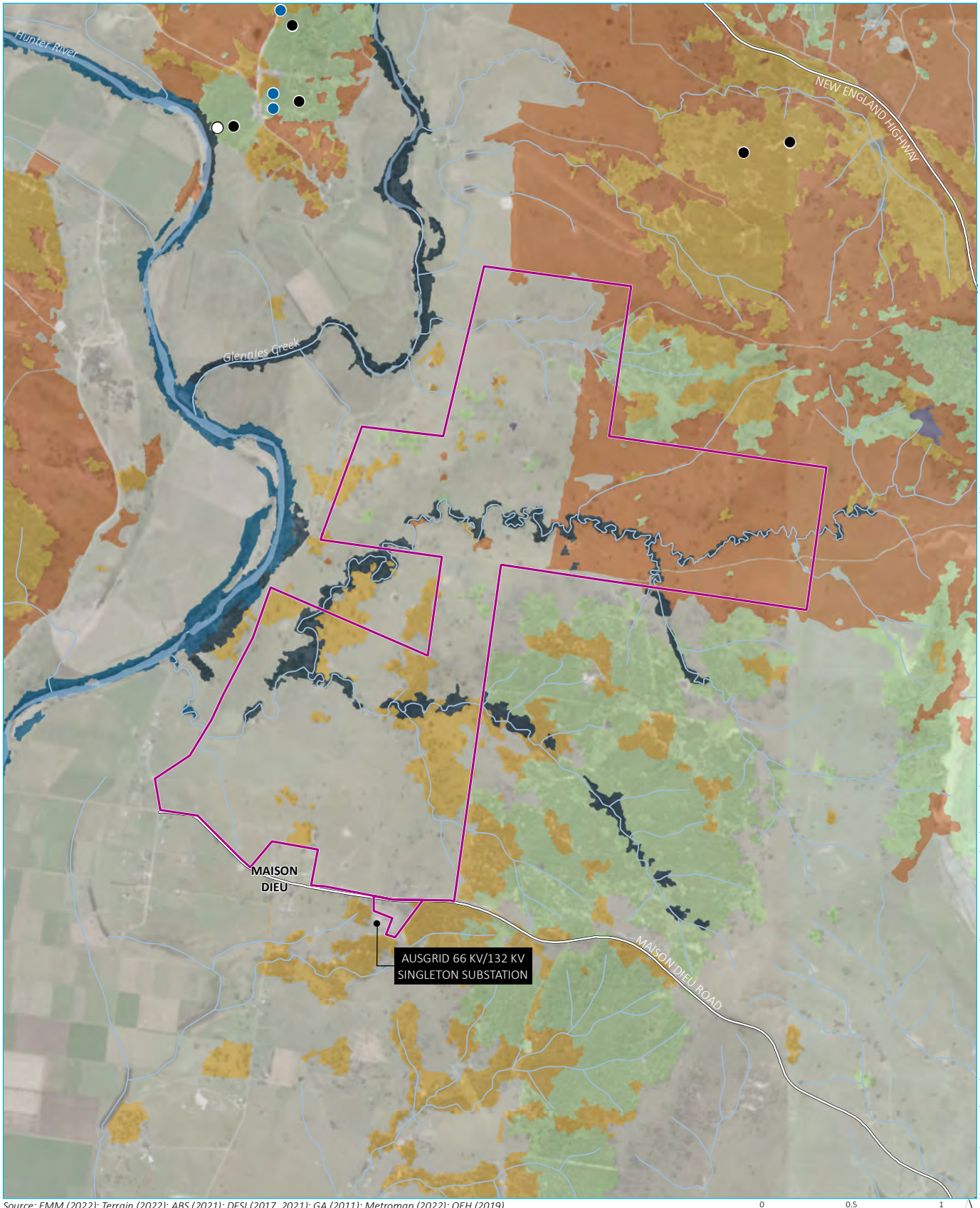
Scientific name	Common name	Credit type	Associated PCT				
			796	1601	1603	1691	1731
Ninox strenua	Powerful Owl	Species/Ecosystem	X	X	X	X	
Ozothamnus tesselatus	-	Species			X		
Persicaria elatior	Tall Knotweed	Species		X	X	X	
Persoonia pauciflora	North Rothbury Persoonia	Species		X	X	X	X
Petauroides volans	Greater Glider	Species		X	X	X	
Petrogale penicillata	Brush-tailed Rock Wallaby	Species		X	X	X	
Phascogale tapoatafa	Brush-tailed Phascogale	Species		X			
Phascolarctos cinereus	Koala	Species		X	X		
Planigale maculata	Common Planigale	Species		X			
Pomaderris queenslandica	Scant Pomaderris	Species		X	X		
Prasophyllum petilum	Tarengo Leek Orchid	Species	X	X	X	X	X
Prasophyllum sp. Wybong	-	Species		X	X	X	X
Prostanthera cineolifera	Singleton Mint Bush	Species		X	X		
Pteropus poliocephalus	Grey-headed Flying Fox	Species/Ecosystem		X	X	X	
Pterostylis chaetophora	-	Species		X	X	X	
Pterostylis gibbosa	Illawarra Greenhood	Species		X	X		

Table 6.2 Potential candidate species

Scientific name	Common name	Credit type	Associated PCT				
			796	1601	1603	1691	1731
Rutidosis heterogama	Heath Wrinklewort	Species		X	X	X	
Thesium australe	Austral Toadflax	Species		X	X	X	X
Tyto novaehollandiae	Masked Owl	Species/Ecosystem		X	X	X	
Vespadelus troughtoni	Eastern Cave Bat	Species		X	X	X	X

6.3.2 Preliminary impact assessment

Subject to detailed design, the project may result in the removal of native vegetation within the project site and may impact on potential habitat for threatened species listed under both the BC Act and EPBC Act. Detailed surveys and assessments will be carried out as part of the EIS which will inform an iterative design process and measures to avoid, mitigate biodiversity impacts.



Source: EMM (2022); Terrain (2022); ABS (2021); DFSI (2017, 2021); GA (2011); Metromap (2022); OEH (2019)

0 0.5 1 km

GDA2020 MGA Zone 56

N

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR001_VegetationCommunities_20220523_02.mxd 31/08/2022

KEY

- Project site
- Major road
- Named watercourse
- Named waterbody

Threatened species

- Green and Golden Bell Frog
- Grey-headed Flying-fox
- Large-eared Pied Bat

- Non-native vegetation

Plant community type

- 42 | River Red Gum / River Oak riparian woodland wetland in the Hunter Valley
- 796 | Derived grassland of the NSW South Western Slopes
- 1601 | Spotted Gum - Narrow-leaved Ironbark-Red Ironbark shrub - grass open forest of the central and lower Hunter
- 1603 | Narrow-leaved Ironbark - Bull Oak - Grey Box shrub - grass open forest of the central and lower Hunter
- 1691 | Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter
- 1731 | Swamp Oak - Weeping Grass grassy riparian forest of the Hunter Valley

Vegetation communities and threatened species recorded within the study area

Maison Dieu Solar Farm
Scoping report
Figure 6.1

EMM
creating opportunities

6.3.3 Proposed assessment approach

Following the implementation of avoidance and minimisation measures, a detailed assessment of the biodiversity values and the residual biodiversity impacts of the project will be undertaken in accordance with the Biodiversity Assessment Method (DPIE, 2020b) and will be documented in a Biodiversity Development Assessment Report (BDAR). The assessment of biodiversity will also consider:

- *Surveying Threatened Plants and their Habitats* (DPIE, 2021c);
- *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance* (DOE, 2013); and
- relevant survey guidelines for threatened species.

The extent of potential impacts on aquatic ecology will be dependent on the location of project infrastructure within the project site. Accordingly, the scope of, and need for, a separate aquatic ecology assessment will be determined prior to EIS. The aquatic ecology assessment will assess potential impacts on key fish habitat in accordance with *Policy and guidelines for fish habitat conservation and management* (DPI 2013). Waterway crossing requirements will be determined in the EIS in accordance with *Why do fish need to cross the road? Fish passage requirements for waterway crossings* (Fairfull and Witheridge 2003).

6.4 Aboriginal heritage

6.4.1 Existing environment

The project site is within the boundary of the Wanaruah Local Aboriginal Land Council. A search of the NSW Native Title Vision website indicates that no determined or registered Native Title claim or Indigenous Land Use Agreements exist over the project site.

An AHIMS search on 29 April 2022 identified 23 registered Aboriginal sites within a 1 km^2 search area centred on the project site. Of the 23 registered sites, all are artefact sites with the exception of one that contains grinding grooves. Three artefact sites are within the project site (refer Table 6.3 and Figure 6.2).

Table 6.3 AHIMS sites within and surrounding the project site

AHIMS Number	Site type	Within project site
37-6-3860	Artefact	No
37-6-3848	Artefact	No
37-6-3849	Artefact	No
37-6-3858	Artefact	No
37-6-3844	Artefact	No
37-6-3843	Artefact	No
37-6-3842	Artefact	No
37-6-3857	Artefact	Yes
37-6-3856	Artefact	No
37-6-2110	Artefact	No
37-3-0809	Artefact Grinding Groove	No
37-3-1601	Artefact	No
37-3-0806	Artefact	No
37-3-0807	Artefact	No
37-3-0808	Artefact	No
37-3-0549	Artefact	No
37-3-0534	Artefact	No
37-6-3280	Artefact	No
37-6-0176	Artefact	Yes
37-6-1822	Artefact	Yes
37-6-0007	Artefact	No

6.4.2 Preliminary impact assessment

Construction of the project has the potential to impact known and currently unidentified Aboriginal heritage sites. The potential for other archaeological site types and intangible cultural sites to occur within the project site will be established through further archaeological investigation and consultation with Registered Aboriginal Parties (RAPs), which will also provide valuable information on the cultural heritage values of the project site and broader region.

Terrain Solar will seek to avoid impacts to Aboriginal heritage sites wherever possible. Any impacts and mitigation and management measures will be defined in the EIS in consultation with the RAPs.

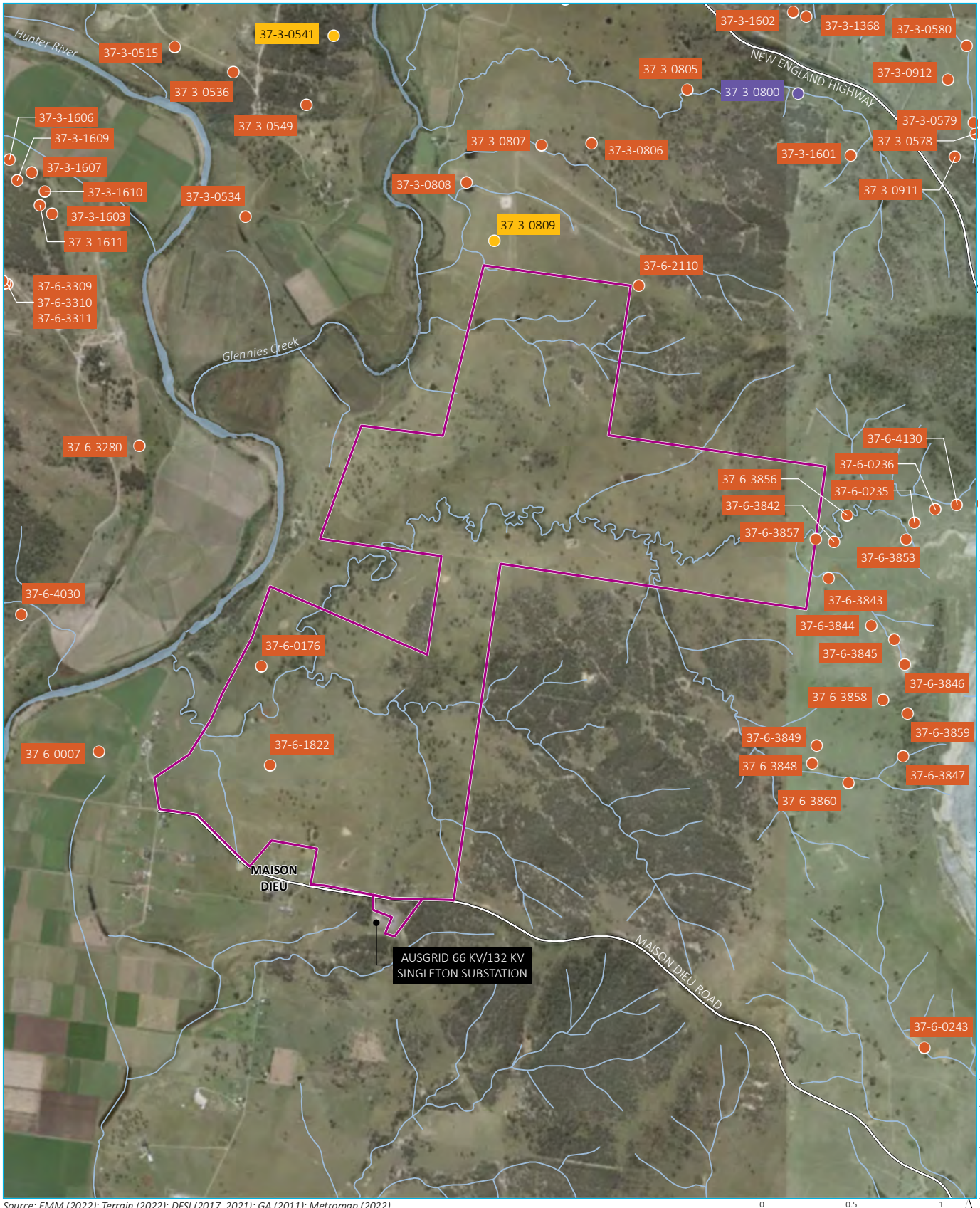
6.4.3 Proposed assessment approach

A detailed Aboriginal cultural heritage assessment (ACHA) will be prepared for the project in accordance with relevant regulations and guidelines, including:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011);
- *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010a); and
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b).

The ACHA will include the following key components:

- Identification of Aboriginal cultural heritage values relevant to the project site through background research, predictive modelling, Aboriginal consultation and archaeological field investigations. Archaeological survey will be undertaken by archaeologists and representatives of the local Aboriginal community. Potential project constraints identified during the survey will inform potential refinement of the project site to minimise impacts to Aboriginal heritage values. Measures will be developed to avoid and mitigate potential impacts to Aboriginal cultural heritage, as required. The findings of the background research and surveys will inform the need for further archaeological assessment (such as test excavation).
- Assessment of the significance of Aboriginal objects, sites and locations identified in the course of the archaeological investigations and through Aboriginal community consultation.
- Assessment of the impact of the project on identified Aboriginal cultural heritage values.
- Provision of appropriate management measures for potentially impacted Aboriginal cultural heritage values in response to their assessed significance.



Source: EMM (2022); Terrain (2022); DFSI (2017, 2021); GA (2011); Metromap (2022)

0 0.5 1 km

GDA2020 MGA Zone 56

N

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR004_AHIMS_20220523_02.mxd 31/08/2022

KEY

- Project site
- Major road
- Named watercourse
- Named waterbody

AHIMS (site feature)

- Artefact
- Artefact, Grinding groove
- Modified tree (carved or scarred)

AHIMS sites within and surrounding the study area

Maison Dieu Solar Farm
Scoping report
Figure 6.2

EMM creating opportunities

6.5 Traffic and transport

6.5.1 Existing environment

The project site is accessible from Maison Dieu Road. Maison Dieu Road is a 10.4 km-long sealed one-lane two-way road connecting to the New England Highway approximately 5 km east of the project site.

6.5.2 Preliminary impact assessment

There are two options currently being investigated for access into the project site from Maison Dieu Road. A final access option will be detailed within the EIS following consultation with Singleton Council, TfNSW and neighbouring landholders and with consideration to necessary road and intersection upgrades and associated impacts (including biodiversity and heritage).

The project will generate significant levels of traffic during construction related to the movement of construction workers and the delivery of materials, plant and equipment. Operational traffic generation will be minimal with less than 10 light vehicle movements per day and heavy vehicles deliveries only as required.

6.5.3 Proposed assessment approach

A detailed traffic impact assessment will be prepared as part of the EIS and will include:

- characterisation of the existing road network, including existing road widths and the condition of the road surface, existing road capacity (or 'level of service'), daily and peak traffic volumes and the proportion of light and heavy vehicle traffic movements;
- review of key intersection performance (namely intersection of Maison Dieu Road and New England Highway) and relevant accident history and safety requirements;
- expected traffic movements during the relevant project stages, including the maximum and average light and heavy vehicle traffic movements during construction and operations; and
- recommended management measures to mitigate identified potential impacts of the project.

A swept path analysis will be included for the proposed design of the project site with Maison Dieu Road to ensure that the largest vehicle requiring access to the project site will be able to safely enter and exit the project site.

The assessment of traffic and access impacts will be prepared using the following guidelines, policies and design requirements:

- NSW Roads and Traffic Authority (now TfNSW) *Guide to Traffic Generating Developments* (RTA, 2002);
- *Austroads Guides to Road Design* (various publications);
- *Guide to Traffic Management – Part 3 Traffic Studies and Analysis* (Austroads, 2013).
- Australian Standard AS 2890 Parts 1 and 2; and
- *Australian Code for Dangerous Goods Transport*.

Specific engagement is proposed with TfNSW and Singleton Council in relation to site access.

6.6 Noise and vibration

6.6.1 Existing environment

Noise and vibration in the vicinity of the project is currently influenced by neighbouring mining operations, agricultural activities and traffic on the existing road network. There are 39 residences within 2 km of the project site with the closest approximately 40 m from the project site.

6.6.2 Preliminary impact assessment

No preliminary noise assessments were undertaken to support the Scoping Report. Noise impacts from the project will mostly be associated with construction activities and include noise generated by preparatory earthworks, delivery and assembly of the solar panel infrastructure (including pile driving), construction of the BESS, on-site substation and grid connection works and operation of light and heavy vehicles.

Operational noise impacts will include the operation of the solar tracking system, on-site substation and BESS. The location of noise-generating infrastructure within the project site will be determined with consideration to noise impacts on surrounding residences.

6.6.3 Proposed assessment approach

A detailed assessment of potential noise impacts will be completed and documented in the EIS. The assessment will consider relevant noise impacts to local receptors within the vicinity of the project site and cumulative impacts with surrounding mining operations. A detailed level noise and vibration impact assessment will assess impacts associated with construction and operation of the project and include:

- determination of ambient noise levels via deployment of noise loggers within proximity of the project site (including consideration of the role that neighbouring mining operations play in the baseline environment);
- identification of noise sources and relevant noise outputs of construction equipment and infrastructure proposed by the Project; and
- noise modelling and assessment, taking into consideration the following:
    - predictive modelling;
    - noise mitigation strategies; and
    - potential construction activity, road traffic noise and operational noise impacts;

The assessment will be undertaken in accordance with:

- NSW *Interim Construction Noise Guideline* (ICNG) (DECC, 2009);
- NSW *Noise Policy for Industry* (NPfI) (EPA, 2017);
- *NSW Road Noise Policy* (RNP) (DECCW, 2011); and
- NSW *Assessing Vibration: A Technical Guideline* (DEC, 2006).

Targeted community engagement is proposed with surrounding landholders in relation to noise and vibration.

6.7 Surface water

6.7.1 Existing environment

The project site contains mapped first, second, third and fourth order watercourses and is in close proximity to the Hunter River. Some limited areas of the project site is prone to flooding.

6.7.2 Preliminary impact assessment

A preliminary surface water constraints analysis was completed as part of the preparation of this Scoping Report (Appendix D) and has identified relevant riparian offset constraints and flooding potential that may influence project design.

i Riparian corridor – inner area

The Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018) describes a standardised method for establishing riparian corridors for watercourses. The Riparian Corridor – Inner Area refers to the channel and the inner portion of the Vegetated Riparian Zone (VRZ). The Riparian Corridor – Inner Area was calculated for each watercourse based on stream order and the estimated thalweg and top of bank alignments, using the methodology described in the Guidelines for controlled activities on waterfront land – Riparian Corridors (DoI, 2018).

ii Additional riparian constraints

Additional Riparian Constraints refer to parts of the watercourse that are likely to be constrained by flooding but are outside of the Riparian Corridor – Inner Area. An example includes a floodplain pocket located on a watercourse bend. Additional Riparian Constraints were identified using LiDAR derived surface levels and aerial imagery.

iii Riparian corridor – outer area

The Riparian Corridor – Outer Area refers to the outer portion of the VRZ. The Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018) allow for development in this zone provided the development area is offset. Hence, this zone is considered a potential constraint.

iv Summary

The construction of the project has the potential to impact on riparian vegetation and will require the establishment of watercourse crossings. Any watercourse crossings will be designed and constructed in accordance with relevant regulations and best practice design and construction methods.

The project is not likely to impact groundwater during construction, operation, or decommissioning due to the limited amount of subsurface disturbance activities required during the installation and decommissioning of project infrastructure.

Water used by the project during construction and operation is expected to be sourced off-site and delivered by truck, although water from on-site dams may be utilised if available and suitable. Impacts of the traffic associated with water trucks will be assessed in the EIS in accordance with Section 6.5.

6.7.3 Proposed assessment approach

The surface water assessment will include a review of the existing surface water environment, an assessment of the surface water impacts and a description of any proposed mitigation and management measures. Key surface water issues to be explored will include:

- flood risk assessment to identify flood extents and potential flooding characteristics;
- water management during construction and operation; and
- impacts to receiving waters.

6.8 Land and soils

6.8.1 Existing environment

Regionally mapped BSAL is associated with the alluvial soils of the Hunter River, within the Hunter Soil Landscape as mapped in the *Soil Landscapes of Singleton Map Sheet 1:250,000* (Kovac M. and Lawrie J.M, 1991). As shown on Figure 6.3, the project site contains LSC Class I land with the majority of land mapped as LSC Class IV, V and VI. There is no mapped BSAL within the project site.

6.8.2 Preliminary impact assessment

The project site has been and is currently used for grazing. The project will impact on agricultural land use availability. Construction of the project has the potential to cause erosion and sedimentation issues in surrounding waterways.

6.8.3 Proposed assessment approach

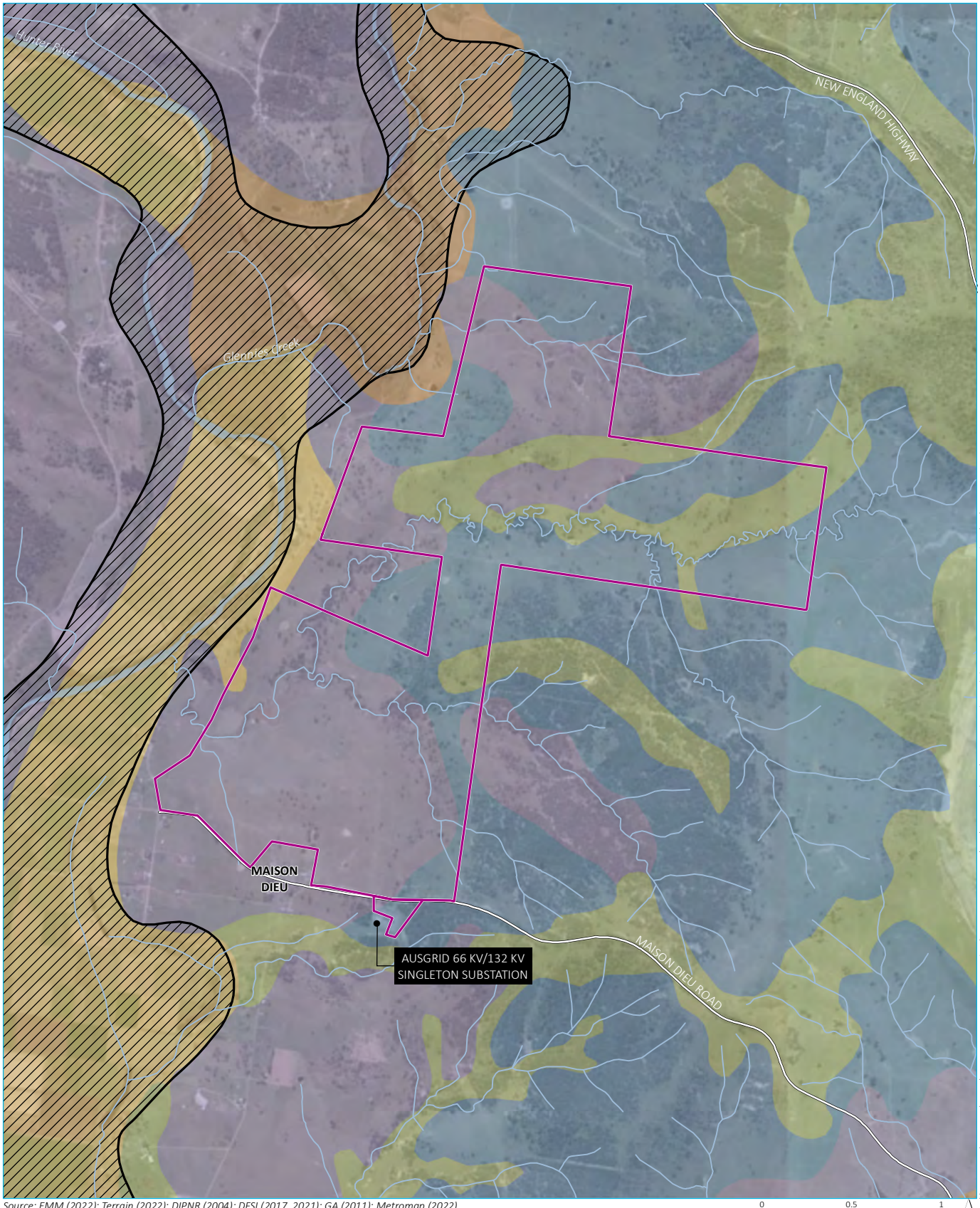
The project will be designed to minimise impacts on agricultural land, where practical. As part of the EIS, a land use conflict risk assessment (LUCRA) will be undertaken in accordance with the *Land Use Conflict Risk Assessment Guideline* (DPI, 2011) and in consultation with neighbouring landholders. The LUCRA will assess the project's potential impacts on neighbouring agricultural operations. Should they be required, land management practices will be implemented to avoid or minimise potential impacts on neighbouring agricultural operations.

Consideration of impacts to soils and the potential for erosion and sedimentation issues will be included in the EIS and will include:

- a description of relevant environmental constraints (eg rainfall, topography, land use, vegetation, waterways and floodplains and existing soil types);
- a description of the biophysical environment including climate, topography, geology, hydrology, existing land use and site condition as context for erosion potential;
- an overview of LSC classes for the project site, soil landscapes and soil types likely to be present on-site and commentary on their constraints relevant to erosion risk; and
- a detailed erosion hazard analysis including:
    - findings of the erosion site hazard inspection and soil analysis (laboratory characterisation);
    - an erosion risk assessment based on the Revised Universal Soil Loss Equation (RUSLE) methodology and applicable soil erodibility (K-Factor) and monthly rainfall erosivity (R-Factor);
    - description of best-practice procedures and strategies to mitigate erosion and sediment risk;

- conceptual design standards for drainage, erosion and sediment controls consistent with the International Erosion Control Association (IECA) *Best Practice Erosion and Sediment Control* (BPESC) document (IECA, 2008); and
- recommended control measures for specific site locations and likely forms of ground disturbance (eg trenching, cuts and fills, roads, hard-stands and office areas).

The assessment will also include reference to the methodology prescribed by the *Draft Large-Scale Solar Energy Guideline* (DPIE, 2021g) and include consideration of the project's impacts on agricultural production within the project site.



Source: EMM (2022); Terrain (2022); DIPNR (2004); DFSI (2017, 2021); GA (2011); Metromap (2022)

0 0.5 1 km

GDA2020 MGA Zone 56

N

KEY

- Project site
- Major road
- Named watercourse
- Named waterbody
- Biophysical Strategic Agricultural Land

Land capability

- Class I
- Class II
- Class IV
- Class V
- Class VI

\\emmsvr1\EMM22\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SR\SR011_LandCapabilityBSAL_20220524_01.mxd 31/08/2022

Land class capability and BSAL

Maison Dieu Solar Farm
Scoping report
Figure 6.3

EMM
creating opportunities

6.9 Air quality

6.9.1 Existing environment

Air quality in the vicinity of the project site is influenced by a range of potential sources, including existing open-cut mining operations, agricultural activities, bushfires and 'burning off', other heavy industry (eg nearby mines and coal-fired power stations), vehicle movements, roads, wind-blown dust and domestic wood fires.

6.9.2 Preliminary impact assessment

Dust generation may result during the construction phase of the project, due to the increase in exposed areas following site preparation works and from construction traffic movements on unsealed access roads within the project site. This dust generation is expected to be localised and able to be easily mitigated through implementation of standard management measures.

No significant dust generation is expected during operation given exposed areas and roads will be sealed, treated or rehabilitated.

Minor levels of dust may be generated during decommissioning as a result of structures being removed, areas being temporarily exposed and during rehabilitation works. This will only occur for a short duration before rehabilitation of exposed areas has been established.

6.9.3 Proposed assessment approach

A quantitative air quality assessment with dispersion modelling is not considered to be warranted given risk of air quality impacts is expected to be low and will not extend beyond the construction phase of the project. Cumulative impacts of dust from surrounding mining operations and coal fired power stations that influence the existing background environment will be considered.

The impacts to neighbouring sensitive receptors (human and ecological) from construction dust emissions will be assessed using a qualitative impact assessment approach. While no specific methodology for such an assessment is available in Australia, the United Kingdom-based Institute of Air Quality Management (IAQM) has prepared the *Guidance on the Assessment of Dust from Demolition and Construction* (GADDC) (IAQM, 2014).

The GADDC has been applied for construction projects in NSW and accepted by the NSW Environment Protection Authority (EPA) air technical policy department as a progressive approach to assess the particulate matter impact risk associated with short-term construction and demolition projects. The approach reviews the sensitivity of the local environment and identifies residual risks to dust impacts. Recommendations on dust mitigation measures are then provided.

Specific engagement is proposed with the local community in relation to air quality.

6.10 Historic heritage

6.10.1 Existing environment

The project site does not contain any listed heritage items (World Heritage List, National Heritage List, Commonwealth Heritage List, State Heritage List or Singleton LEP). In the broader region, however, there are six listed heritage items under the Singleton LEP within a 5 km radius of the project site as detailed in Table 6.4.

Table 6.4 Listed historic heritage items within 5 km of the project site

Listing	LEP item number	Listing name	Within project site	Distance from project site
LEP	I12	St Clement's Anglican Church	No	3 km
LEP	I13	Community Hall	No	2.4 km
LEP	I19	Kangory homestead (formerly 'Dulwich')	No	4 km
LEP	I45	Coke ovens	No	3.5 km

6.10.2 Preliminary impact assessment

Construction of the project has the potential to impact currently unidentified historic heritage sites. The potential for historic heritage sites to occur within the project site will be established through further archaeological investigation, desktop research and consultation, which will also provide valuable information on the historic heritage values of the project site and broader region.

Terrain Solar will seek to avoid impacts to historic heritage sites wherever possible. Any impacts and mitigation and management measures will be defined in the EIS.

6.10.3 Proposed assessment approach

A standard level of assessment for historic heritage impacts is proposed for the EIS. A historic heritage impact assessment will be prepared in accordance with relevant regulations and guidelines, including:

- the principal articles of *The Burra Charter – The Australia ICOMOS Charter for Places of Cultural Significance* (ICOMOS, 2013);
- *Statements of Heritage Impact* (Heritage Office, Statements of Heritage Impact, 1996);
- *Investigating Heritage Significance Draft Guideline* (Heritage Office, 2004);
- *Assessing Heritage Significance* (Heritage Office, 2001); and
- *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Branch Department of Planning, 2009).

The historical heritage impact assessment will consider the wider region to determine the potential for historical finds to be present on-site and if so, assess the potential significance of the finds and provide recommendations for the appropriate management of any finds.

6.11 Social

A SIA Scoping Report has been prepared to support this Scoping Report (Appendix B) and has been prepared in consideration of the SIA Guideline (DPIE, 2021e). The below summarises the key outcomes of findings of the Scoping Study.

6.11.1 Existing environment

The local study area for the SIA Scoping Report encompasses the state suburb codes (SSC) of Maison Dieu, Camberwell and McDougalls Hill, whilst the regional study area encompasses the Singleton LGA.

In 2016, the local study area had a combined total population of 408, while the regional study area had a population of 22,987 (ABS, 2016). The most common industry of employment across the local and regional study area was reported as coal mining (ABS, 2016).

6.11.2 Preliminary impact assessment

There are a variety of potential social impacts which may arise from the project, both during construction and operations. Without mitigation, these social impacts could contribute to negative changes to the existing community (such as to their way of life or livelihood through the disruption of farming and agricultural practices).

Changes to the accessibility of local properties, impacts on the availability of social infrastructure and changes to the amenity of the rural landscape (eg due to visibility of project infrastructure and project-related noise) may have material impacts on the health and wellbeing of the local community. For instance, increased noise may cause tensions between project-related and non-project-related landholders, as well as the project workforce who can also begin to change the composition of the local community and effect the local 'character'. However, with suitable mitigation measures, many of these impacts can be mitigated, and closely monitored throughout the project's construction and operations.

The project also has the potential to bring positive social impacts, such as increased opportunities for employment and occupational training, increased economic flow into the local community, and upgrades to existing infrastructure like roads. Where possible, the project should implement measures to maximise these benefits (such as a preference for a local workforce and suppliers where feasible), in addition to other mitigation measures.

Individuals and groups identified below are likely to be affected, positively and/or negatively, by the project:

- residents of Maison Dieu, Camberwell and McDougalls Hill SSC;
- residents and service providers in Singleton LGA;
- Aboriginal community members;
- landholders and nearby neighbours, including businesses;
- local business community; and
- project employees.

6.11.3 Proposed assessment approach

A standard SIA will be prepared to support the EIS and will be led by a suitably qualified Social Scientist who will adopt the methodology illustrated in Figure 6.4 and will use social science methods and tools for the collection of qualitative and quantitative data.

The identification of social impacts will be informed by community and stakeholder engagement activities as well as SIA field study activities and will be conducted in an integrated manner to ensure consistency, reduce duplication, and allow for management of consultation fatigue. In addition, findings from the technical assessments will be considered to understand the consequences to the community and existing research and previous SIAs will inform the identification of the social impacts.

Potential social impacts and benefits will then be assessed according to the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (DPIE, 2021e) and will use the risk matrix presented in the *Technical Supplement* (DPIE, 2021h).

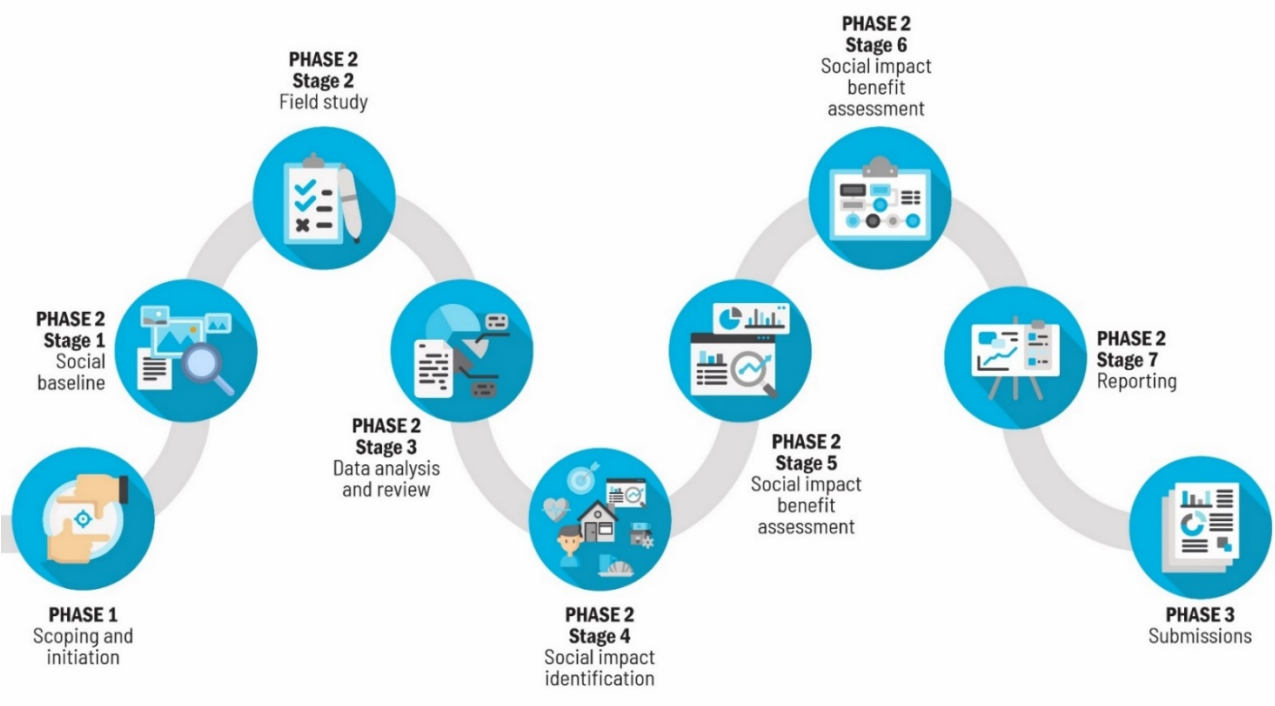


Figure 6.4 SIA methodology

6.12 Land contamination

6.12.1 Existing environment

A search of the EPA's contaminated land public record of notice and list of sites notified to the EPA under Section 60 of the NSW *Contaminated Land Management Act 1997* (CLM Act) on 2 February 2022 indicated no record of site contamination.

The site has historically been, and is currently, used for agricultural activities. The *Managing Land Contamination Planning Guidelines: SEPP 55 – Remediation of Land* (DUAP, 1998) lists agricultural/horticultural activities as an activity which potentially causes contamination.

6.12.2 Preliminary impact assessment

Land contamination is not likely to be a significant risk given any soil disturbance during construction will be shallow. If contamination is identified, standard management measures will be implemented.

6.12.3 Proposed assessment approach

State Environmental Planning Policy (Resilience and Hazards) 2021 requires consideration of a preliminary investigation of the land where there is a proposed change in land use from certain development (including agriculture). Therefore, a standard preliminary site investigation (PSI) is proposed. Subject to the findings of the PSI, further investigation (such as sampling) may be required where there is a suspected source of contamination or contaminating activity identified.

The PSI will be prepared in accordance with *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines* (EPA, 2020).

6.13 Waste

6.13.1 Preliminary impact assessment

The project will produce a number of waste streams during construction. Minor quantities of waste will also continue to be generated by the day-to-day operation of the project. Waste will also be generated as part of decommissioning at the end of the project's operational life.

Waste streams likely to be generated during the construction and ongoing operation of the project include:

- cardboard packaging, plastic wrapping, plastic ties, wood pallets and other timber offcuts (eg wood separators to prevent damage to PV modules) for PV modules and tracker components;
- general waste from the operations and maintenance (O&M) buildings;
- comingled recycling;
- oily rags, filters and drums (primarily during construction); and
- waste batteries.

6.13.2 Proposed assessment approach

As part of the preparation of the EIS, consideration will be made as to how the project's waste will be managed in accordance with relevant guidelines and policies. The EIS will identify, quantify and classify the likely waste streams to be generated during different phases of the project, and will describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste.

6.14 Hazard and risk

Potential hazardous scenarios and risks associated with the project include bushfires, dangerous goods and hazardous substances, and exposure to electromagnetic fields. The project site has been mapped as having bushfire prone vegetation (BPV) categories 1, 2 and 3. BPV Category 1 is the highest vegetation hazard for bush fire. Accordingly, the EIS will include the following:

- an assessment of potential hazards and risks, including but not limited to bushfires and electromagnetic fields from proposed electrical infrastructure (including assessment against the International Commission on Non-Ionizing Radiation Protection (ICNIRP) *Guidelines for limiting exposure to Time-varying Electric, Magnetic and Electromagnetic Fields* (ICNIRP, 1998));
- a bushfire assessment in accordance with *Planning for Bushfire Protection* (RFS, 2019); and
- a Preliminary Hazard Analysis prepared in accordance with:
  - *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis* (Department of Planning, 2011a); and
  - *Multi-Level Risk Assessment* (Department of Planning, 2011b).

6.15 Cumulative impacts

The project may generate cumulative impacts in conjunction with surrounding mines, power stations or projects, including those identified in Section 2.6, during both construction and operation. These impacts may include cumulative traffic, construction and operational noise, visual, social (including workforce and accommodation capacity), and biodiversity impacts. However, there may also be a cumulative benefit to local communities from the project and other developments in the region through the generation of jobs.

The EIS will carry out a cumulative assessment in accordance with the CIA Guideline (DPIE, 2021c).

6.16 Matters requiring no further assessment

Matters listed in Appendix B of the Scoping Report Guidelines that do not require further assessment in the EIS are listed in Table 6.5.

Table 6.5 Matter requiring no further assessment in the EIS

Matters	Relevance
Access – rail, port and airport facilities	The project site does not contain rail, port and airport facilities. No interactions with such facilities are proposed under the project.
Amenity – odour	The project will not generate any odorous emissions.
Built environment	The project will have no impacts on the built environment.
Biodiversity – conservation areas	There are no conservation areas within the project site.
Hazards and risks – biosecurity	The project will have low risk to biosecurity. Potential introduction of weeds to or from the project site will be limited to vehicle movements. These risks can be easily mitigated through the implementation of standard management measures.
Hazards and risks – dams safety	There are existing farm dams within the project site and surrounding land. These dams do not pose any safety risk. No dams are proposed to be constructed under the project.
Hazards and risks – coastal hazards	The project site is not within a coastal zone.
Hazards and risks – environmental hazards	Environmental hazards relevant to the site are incorporated in other proposed assessments.
Hazards and risks – groundwater contamination	The project is unlikely to have potential for groundwater contamination. Management of chemical storage to prevent potential ground contamination that could then migrate to groundwater sources will be considered in the EIS.
Hazards and risks - land movement	The project site does not contain land mapped as land slide risk. Erosion risks will be considered in the land, soil and erosion assessment.
Heritage – natural	The project site does not contain any areas of natural heritage significance.
Land – stability	The project site does not contain land mapped as land slide risk. Erosion risks will be considered in the land, soil and erosion assessment.
Land – soil chemistry	The project will not involve any processes that alter soil chemistry.
Land – topography	The project will not significantly alter the topography within the project site.
Social – decision-making systems	The project will be in accordance with relevant decision-making systems but has no impact on those systems.

Table 6.5 Matter requiring no further assessment in the EIS

Matters	Relevance
Water – water availability	The project will not produce or consume water from local water sources. Water used by the project during construction and operation is expected to be sourced off-site and delivered by truck.

Abbreviations

ABS	Australian Bureau of Statistics
AC	Alternating current
ACHA	Aboriginal cultural heritage assessment
AHIMS	Aboriginal Heritage Information Management System
BAM	Biodiversity Assessment Method
BDAR	Biodiversity Development Assessment Report
BESS	Battery energy storage system
BSAL	Biophysical Strategic Agricultural Land
BPV	Bushfire prone vegetation
CEEC	Critically endangered ecological community
CLM Act	NSW *Contaminated Land Management Act 1997*
CIV	Capital investment value
DPE	Department of Planning and Environment
EEC	Endangered ecological community
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Limited
EPA	NSW Environment Protection Authority (EPA)
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
GADDC	Guidance on the Assessment of Dust from Demolition and Construction
GDP	gross domestic product
GHG	Greenhouse gas
ha	hectares
ICNG	NSW *Interim Construction Noise Guideline*
ILUAs	Indigenous Land Use Agreement
IAQM	Institute of Air Quality Management
Km	Kilometre
Km^2	Square kilometre
kV	Kilovolt
LEP	Local Environmental Plan
LGA	Local Government Area
LSC	Land and soil capability

LSEA	Land, soil, erosion and sediment assessment
LUCRA	Land use conflict risk assessment
MNES	Matters of national environmental significance
MW	Megawatts
NDC	Nationally Determined Contribution
NSW	New South Wales
O&M	operations and maintenance
PCT	Plant community type
PMST	Commonwealth Protected Matters Search Tool
PSI	preliminary site investigation
PV	Photovoltaic
RAPs	Registered Aboriginal Parties
SEARs	Secretary's Environmental Assessment Requirements
SEED	NSW Government Central Resource for Sharing and Enabling Environmental Data in NSW
SIA	Social impact assessment
SSD	State Significant Development
SSC	Singleton City Council
Terrain Solar	Terrain Solar Pty Ltd
TfNSW	Transport for NSW
RAPs	Registered Aboriginal Parties
RUSLE	Revised Universal Soil Loss Equation
VRZ	Vegetated Riparian Zone

References

ABS (Australian Bureau of Statistics). 2016, *Census of Population and Housing: Quickstats*.

DEC (Department of Environment and Conservation) 2006, *Assessing Vibration: A Technical Guideline.*

DECC (Department of Environment and Climate Change) 2009, *Interim Construction Noise Guideline*.

DECCW (Department of Environment, Climate Change and Water) 2010, *Aboriginal Cultural Heritage Consultation Requirements for Proponents.*

DECCW (Department of Environment, Climate Change and Water) 2011, *NSW Road Noise Policy.*

Department of Planning 2011a, *Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis.*

Department of Planning 2011b, *Multi-Level Risk Assessment.*

DOE (Department of the Environment) 2013, *Significant Impact Guidelines 1.1 – Matters of National Environmental Significance.*

DoI (Department of Industry) 2018, *Guidelines for controlled activities on waterfront land—Riparian corridors*

DPI (Department of Primary Industries) 2011, *Land Use Conflict Risk Assessment Guideline.*

DPIE (Department of Planning, Industry and Environment) 2019, *NSW Electricity Strategy.*

DPIE (Department of Planning, Industry and Environment) 2020, *Net Zero Plan Stage 1 2020-2030*.

DPIE (Department of Planning, Industry and Environment)2020b, *Biodiversity Assessment Method*.

DPIE (Department of Planning, Industry and Environment) 2020c, *Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method.*

DPIE (Department of Planning, Industry and Environment) 2021a, *State significant development guidelines - preparing a scoping report: Appendix A to the state significant development guidelines.*

DPIE (Department of Planning, Industry and Environment) 2021b, *Draft Hunter Regional Plan*.

DPIE (Department of Planning, Industry and Environment) 2021c, *Cumulative Impact Assessment Guideline for State Significant Projects.*

DPIE (Department of Planning, Industry and Environment) 2021d, *Undertaking Engagement Guidelines for State Significant Projects.*

DPIE (Department of Planning, Industry and Environment) 2021e, *Social Impact Assessment Guideline for State Significant Projects.*

DPIE (Department of Planning, Industry and Environment) 2021f, *State Significant development ¬ preparing an environmental impact statement ¬ Appendix B to the state significant development guidelines.*

DPIE (Department of Planning, Industry and Environment) 2021g, *Draft Large-Scale Solar Energy Guideline.*

DPIE (Department of Planning, Industry and Environment) 2021h, *Technical Supplement - Social Impact Assessment Guideline for State Significant Projects.*

DUAP (Department of Urban Affairs and Planning) 1998, *Managing Land Contamination Planning Guidelines.*

EPA (Environment Protection Authority) 2017, *Noise Policy for Industry.*

EPA (Environment Protection Authority) 2020, *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines.*

Heritage Branch Department of Planning 2009, *Assessing Significance for Historical Archaeological Sites and 'Relics'.*

Heritage Office 1996, *Statements of Heritage Impact.*

Heritage Office 2001, *Assessing Heritage Significance.*

Heritage Office 2004, *Investigating Heritage Significance Draft Guideline*.

IAQM (Institute of Air Quality Management) 2014, *Guidance on the Assessment of Dust from Demolition and Construction.*

ICNIRP (International Commission on Non-Ionizing Radiation Protection) 1998, *ICNIRP Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields.*

ICOMOS (International Council on Monuments and Sites) 2013, *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance.*

IECA (International Erosion Control Association) 2008, *Best Practice Erosion and Sediment Control.*

Kovac M. and Lawrie J.M. 1991, *Soil Landscapes of the Singleton 1:250,000 Sheet.*

RFS (Rural Fire Service) 2019, *Planning for Bush Fire Protection.*

RTA (Roads and Traffic Authority) 2002, *Guide to Traffic Generating Developments Version 2.2.*

Singleton Council 2019, *Singleton Sustainability Strategy 2019-2027.*

Appendix A
Scoping summary table

EMM
creating opportunities

A.1 Scoping summary table

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
Detailed	Biodiversity	Yes	General	• Biodiversity Assessment Method (DPIE 2020). • Commonwealth EPBC 1.1 *Significant Impact Guidelines – Matters of National Environmental Significance* (Commonwealth of Australia, 2013). • Commonwealth EPBC 1.2 *Significant Impact Guidelines – Actions on, or Impacting upon Commonwealth Land and Actions by Commonwealth Agencies* (Commonwealth of Australia, 2013). • Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various).	Section 6.3
	Noise and vibration	Yes	General	• *NSW Interim Construction Noise Guideline* (DECC 2009). • NSW Noise Policy for Industry (EPA 2017). • NSW Road Noise Policy (DECCW 2011). • *Assessing Vibration: A Technical Guideline* (DECC 2006).	Section 6.6
	Traffic	Yes	General	• NSW Roads and Traffic Authority (now TfNSW) *Guide to Traffic Generating Developments* (RTA, 2002); • *Austroads Guides to Road Design* (various publications); • *Guide to Traffic Management* – Part 3 Traffic Studies and Analysis (Austroads, 2013). • Australian Standard AS 2890 Parts 1 and 2. • Australian Code for Dangerous Goods Transport.	Section 6.5
	Aboriginal heritage	Yes	Specific	• Guide to investigating, *Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011). • *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW 2010). • *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010).	Section 6.4

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
	Visual	Yes	Specific	• *Guidelines for Landscape and Visual Impact Assessment* (United Kingdom Landscape Institute of Environmental Management and Assessment 2013). • *Wind Energy: Visual Assessment Bulletin AB 01 For State Significant Wind Energy Development* (DPE 2016). • *Guidance Note for Landscape and Visual Assessment* (Australian Institute of Landscape Architects 2018).	Section 6.2
	Social	Yes	Specific	• *Social Impact Assessment Guideline for State Significant Projects 2021* (DPIE 2021).	Section 6.11
Standard	Land and soils	No	General	• *Land Use Conflict Risk Assessment Guideline* (DPI 2011). • International Erosion Control Association (IECA) *Best Practice Erosion and Sediment Control* (BPESC) document (IECA, 2008).	Section 6.8
	Hazards and risk	No	General	• Hazardous Industry Planning Advisory Paper No. 6 – *Guideline for Hazard Analysis* (DoP, 2011a). • Multi-Level Risk Assessment (DoP, 2011b). • *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (DoP 2011).	Section 6.14
	Contaminated land	No	General	• *Consultants Reporting on Contaminated Land: Contaminated Land Guidelines* (EPA, 2020). • *Managing Land Contamination: Planning Guidelines State Environmental Planning Policy No 55 Remediation of land* (Department of Urban Affairs and Planning and Environment Protection Authority, 1998).	Section 6.12
	Waste	No	General	• N/A	Section 6.13
	Surface water	No	General	• *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004). • *Managing Urban Stormwater: Soils and Construction Volume 2* (Department of Environment and Climate Change, 2008). • *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC / ARMCANZ, 2000). • *Guidelines for instream works on waterfront land* (NOW 2012). • *Guidelines for riparian corridors on waterfront land* (NOW 2012). • *Guidelines for watercourse crossings on waterfront land* (NOW 2012).	Section 6.7

Level of assessment	Matter	Cumulative Impact Assessment	Engagement	Relevant policies and guidelines	Scoping report reference
	Air quality	No	General	• N/A	Section 6.9
	Historical heritage	No	General	• The principal articles of The Burra Charter – *The Australia ICOMOS Charter for Places of Cultural Significance* (ICOMOS, 2013); • *Statements of Heritage Impact* (Heritage Office, Statements of Heritage Impact, 1996); • *Investigating Heritage Significance Draft Guideline* (Heritage Office, 2004); • *Assessing Heritage Significance* (Heritage Office, 2001); and • *Assessing Significance for Historical Archaeological Sites and 'Relics'* (Heritage Branch Department of Planning, 2009).	Section 6.10

Appendix B

Social Impact Assessment Scoping Report

EMM
creating opportunities

Maison Dieu Solar Farm

Social Impact Assessment - Scoping Report

Prepared for Terrain Solar Pty Ltd

August 2022

Maison Dieu Solar Farm

Social Impact Assessment - Scoping Report

Terrain Solar Pty Ltd

E220101 RP2

August 2022

Version	Date	Prepared by	Approved by	Comments
1	12 August 2022	Nena Lane-Kirwan	James Wearne	
2	31 August 2022	Nena Lane-Kirwan	James Wearne	

Approved by

James Wearne
Associate, Approvals and Environment
31 August 2022

Level 3 175 Scott Street
Newcastle NSW 2300

TABLE OF CONTENTS

1 Introduction **1**

1.1 Purpose 1

1.2 SIA study area 1

2 Community profile **4**

2.1 Demographic profile 4

2.2 Aboriginal and/or Torres Strait Islander peoples 5

2.3 Employment 5

2.4 Local businesses 6

2.5 Socio-economic advantage and disadvantage 6

2.6 Homelessness 7

2.7 Health 7

3 Proposed SIA scope **9**

3.1 Potential social impacts 9

3.2 Proposed methodology 10

References **12**

Appendices

Appendix A SIA Scoping Worksheet

Tables

Table 1.1 Locations within the SIA study area mapped to ABS categories 1

Table 2.1 Population (2016) 4

Table 2.2 Age group distribution (2016) 4

Table 2.3 Aboriginal and/or Torres Strait Islander population 5

Table 2.4 Unemployment and labour force participation rates (2016) 5

Table 2.5 Top industries of employment (2016) 6

Table 2.6 Health indicator summary (2020) 8

Table 3.1 Identified potential social impact mapped to issues, positive and negative 9

Figures

Figure 1.1 Social impact assessment study area 3

Figure 2.1 SEIFA deciles in the local and regional area 7

Plates

Plate 3.1 Social impact assessment methodology 11

1 Introduction

1.1 Purpose

This social impact assessment (SIA) scoping study is an evaluative procedure, and its primary objective is to define the scope of the SIA for the Maison Dieu Solar Farm (the project) in accordance with the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021) by:

- identifying potentially affected people;
- identifying and understanding the area of social influence;
- identifying the potential, negative and positive, social impacts for further investigation; and
- determining the level of assessment required for each potential social impact.

1.2 SIA study area

Project information, along with Australian Bureau of Statistic (ABS) demographic and economic data was used to inform the SIA study area, and to identify potentially affected communities and key stakeholders. The SIA study area identifies surrounding stakeholders who could potentially be directly or indirectly affected by the project. This includes landholders, businesses and social services who may have an interest in the project and who could be impacted.

The project site is in Maison Dieu and Camberwell which are the communities with potential to be directly impacted by the project. Singleton is anticipated to be the main hub for community gathering, access to services, and business activity closest to the project site and will therefore be included in the SIA study area as an impacted community.

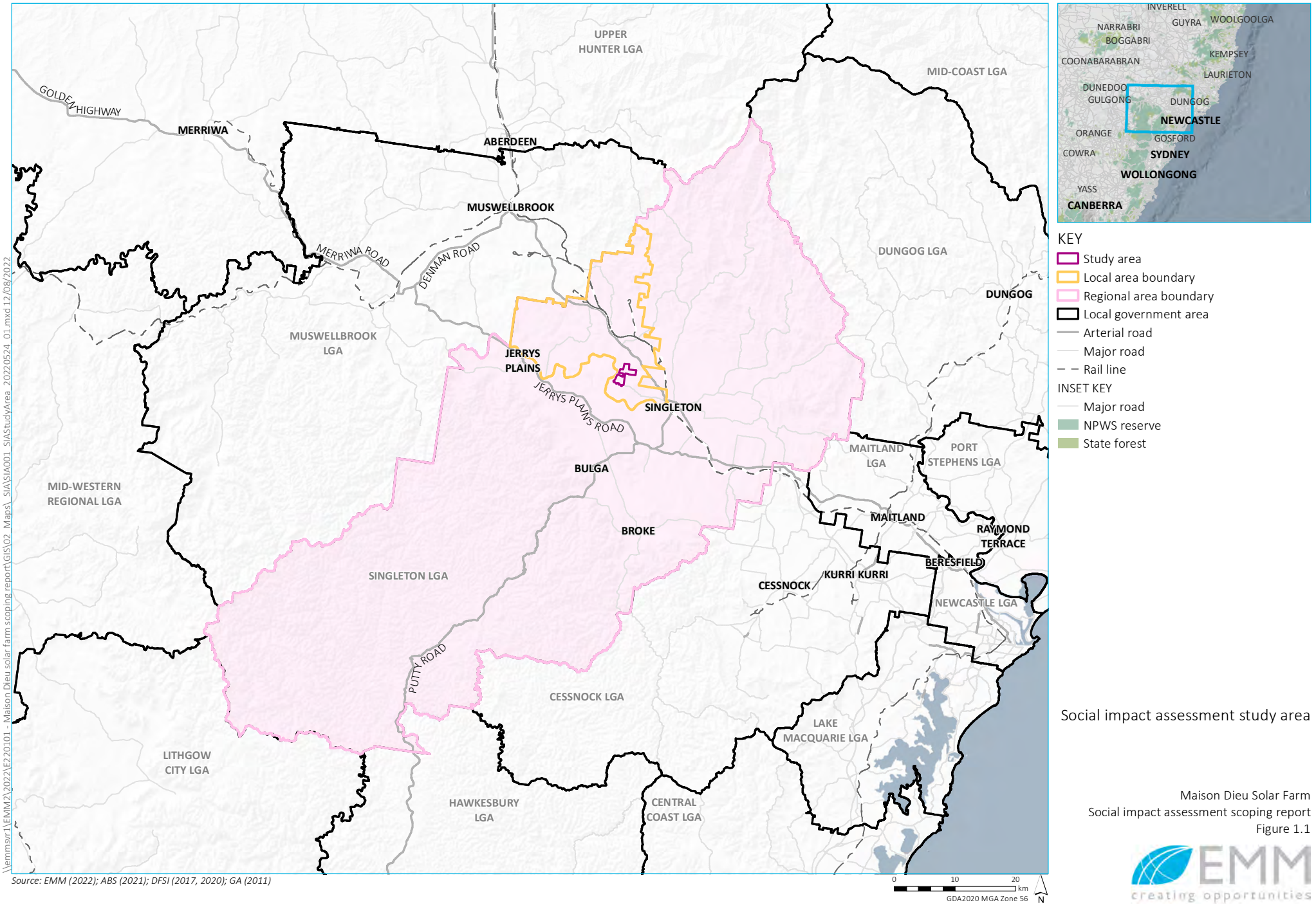
Singleton local government area (LGA) may experience some direct and indirect impacts, mostly related to workforce accommodation, local procurement opportunities and employment. The SIA study area is shown on Figure 1.1 and summarised in Table 1.1.

Table 1.1 Locations within the SIA study area mapped to ABS categories

Location	ABS category	Study area
Maison Dieu	Maison Dieu State Suburb Code (SSC)	Local area
Camberwell	Camberwell SSC	
McDougalls Hill	McDougalls Hill SSC	
Singleton region	Singleton LGA	Regional area

Individuals and groups identified below are likely to be affected, positively and/or negatively, by the project:

- residents of Maison Dieu, Camberwell and McDougalls Hill SSC;
- residents and service providers in Singleton LGA;
- Aboriginal community members;
- landholders and nearby neighbours, including businesses;
- local business community; and
- project employees.



\\emmsvr1\EMM2\2022\E220101 - Maison Dieu solar farm scoping report\GIS\02_Maps_SIA\SIA001_SIAStudyArea_20220524_01.mxd 12/08/2022

Source: EMM (2022); ABS (2021); DFSI (2017, 2020); GA (2011)

Social impact assessment study area

Maison Dieu Solar Farm
Social impact assessment scoping report
Figure 1.1

EMM
creating opportunities

2 Community profile

2.1 Demographic profile

In 2016, the local area (comprising of Maison Dieu SSC, Camberwell SSC and McDougalls Hill SSC) had a combined total population of 408 (Table 2.1). The regional area, defined by the Singleton LGA, had a population of 22,987. McDougalls Hill SSC has a significantly higher percentage of males (59.4%) and lower percentage of females (40.6%) compared to NSW (49.3% male and 50.7% female) while the proportion of males and females across Maison Dieu SSC and Camberwell SSC is comparable to the state (ABS 2016).

Table 2.1 Population (2016)

Area	Population	Male (%)	Female (%)
Maison Dieu SSC	181	52.8	47.2
Camberwell SSC	83	50	50
McDougalls Hill SSC	144	59.4	40.6
Singleton LGA	22,987	50.9	49.1
NSW	**7,480,228**	**49.3%**	**50.7%**

Source: ABS (2016).

The median age in McDougalls Hill SSC (45) is significantly higher than NSW (38); however, Maison Dieu SSC (37), Camberwell SSC (37) and Singleton LGA (36) are comparable. The population aged 40–49, 50–59 and 60–69 within McDougalls Hill SSC is significantly higher than the NSW average. The highest percentage per head of population age group for both Maison Dieu SSC and Singleton LGA is 40–49 years, whilst for McDougalls Hill it is 50–59 years (Table 2.2).

Table 2.2 Age group distribution (2016)

Area	0–9 years	10–19 years	20–29 years	30–39 years	40–49 years	50–59 years	60–69 years	70–79 years	80 years and older	Median age
Maison Dieu SSC	11%	16.5%	13.8%	11.1%	17.6%	11.6%	11.6%	6.6%	0%	37
Camberwell SSC[1]	-	-	-	-	-	-	-	-	-	37
McDougalls Hill SSC	11.4%	7.1%	9.3%	9.2%	19.2%	21.3%	14.2%	6.4%	2.1%	45
Singleton LGA	14.3%	14.1%	12.8%	12.5%	14.5%	13.7%	9.8%	5.2%	3%	36
NSW	**12.6%**	**11.9%**	**13.5%**	**13.9%**	**13.3%**	**12.8%**	**10.7%**	**6.8%**	**4.3%**	**38**

1. Data unavailable due to size of population in this area.

Source: ABS (2016).

2.2 Aboriginal and/or Torres Strait Islander peoples

There is a higher proportion of persons who identify as Aboriginal and/or Torres Strait Islander across the regional area (5.7%) than in NSW (2.9%), as shown in Table 2.3. Within the local area, all assessed suburbs recorded a higher percentage population of people who identify as Aboriginal and/or Torres Strait Islander than across NSW. The median age of people who identify as Aboriginal and/or Torres Strait Islander in Singleton LGA is slightly below the NSW median at 21 years old.

Table 2.3 Aboriginal and/or Torres Strait Islander population

Area	Aboriginal and/or Torres Strait Islander population	Aboriginal and/or Torres Strait islander population (% of total population)	Male (%)	Female (%)	Median age
Maison Dieu SSC	13	7.0%	75%	25%	23
Camberwell SSC[1]	18	21.7%	72%	28%	-
McDougalls Hill SSC	6	4.1%	100%	0%	40
Singleton LGA	1,302	5.7%	50%	50%	21
NSW	**216,176**	**2.9%**	**49.7%**	**50.3%**	**22**

1. Data unavailable due to size of population in this area.

Source: ABS (2016).

2.3 Employment

Unemployment in Singleton LGA was slightly lower (6.1%) than the NSW state average at 6.3%, though the rates in Maison Dieu SSC (3.8%) and McDougalls Hill SSC (0%) were notably lower (Table 2.4).

Table 2.4 Unemployment and labour force participation rates (2016)

Area	Unemployment rate
Maison Dieu SSC	3.8%
Camberwell SSC	9.7%
McDougalls Hill SSC	0%
Singleton LGA	6.1%
NSW	**6.3%**

Source: ABS (2016).

The most common industry of employment across the study area was coal mining, accounting for the highest proportion of the workforce within Maison Dieu SSC at 31%, McDougalls Hill SSC at 46.2% and Singleton LGA at 22% (Table 2.5). Dairy cattle farming (10.3%) and takeaway food service (8.6%) also provide for a large proportion of employment in Maison Dieu SSC. Employment in hospitals make up 12.8% of the workforce in McDougalls Hill SSC. Within the Singleton LGA, defence (4.2%) is also an important industry. The industries of employment data reflect a diversity of industries that support the local economy.

Table 2.5 Top industries of employment (2016)

Area	First		Second		Third	
Maison Dieu SSC	Coal mining	31%	Dairy cattle farming	10.3%	Takeaway food services	8.6%
Camberwell SSC[1]	-	-	-	-	-	-
McDougalls Hill SSC	Coal mining	46.2%	Hospitals	12.8%	Other machinery and equipment repair and maintenance	10.3%
Singleton LGA	Coal mining	22%	Defence	4.2%	Takeaway food services	2.6%
NSW	**Health care and social assistance**	**11.7%**	**Retail trade**	**9.1%**	**Education and training**	**7.8%**

1. Data unavailable due to size of population in this area.

Source: ABS (2016).

2.4 Local businesses

In June 2021, there were 2,086 registered businesses in Singleton LGA, of which the largest category was agriculture, forestry and fishing (565 businesses) (ABS 2021). Of these businesses, 1,238 are non-employing (59%), with a further 785 employing fewer than 20 people (38%). Only 59 businesses employed 20 or more employees (3%).

2.5 Socio-economic advantage and disadvantage

The level of disadvantage or advantage in the population is indicated by Socio-Economic Indexes for Areas (SEIFA), which focuses on low-income earners, relatively lower education attainment, high unemployment and dwellings without motor vehicles. SEIFA is a suite of four summary measures created from ABS Census data, including:

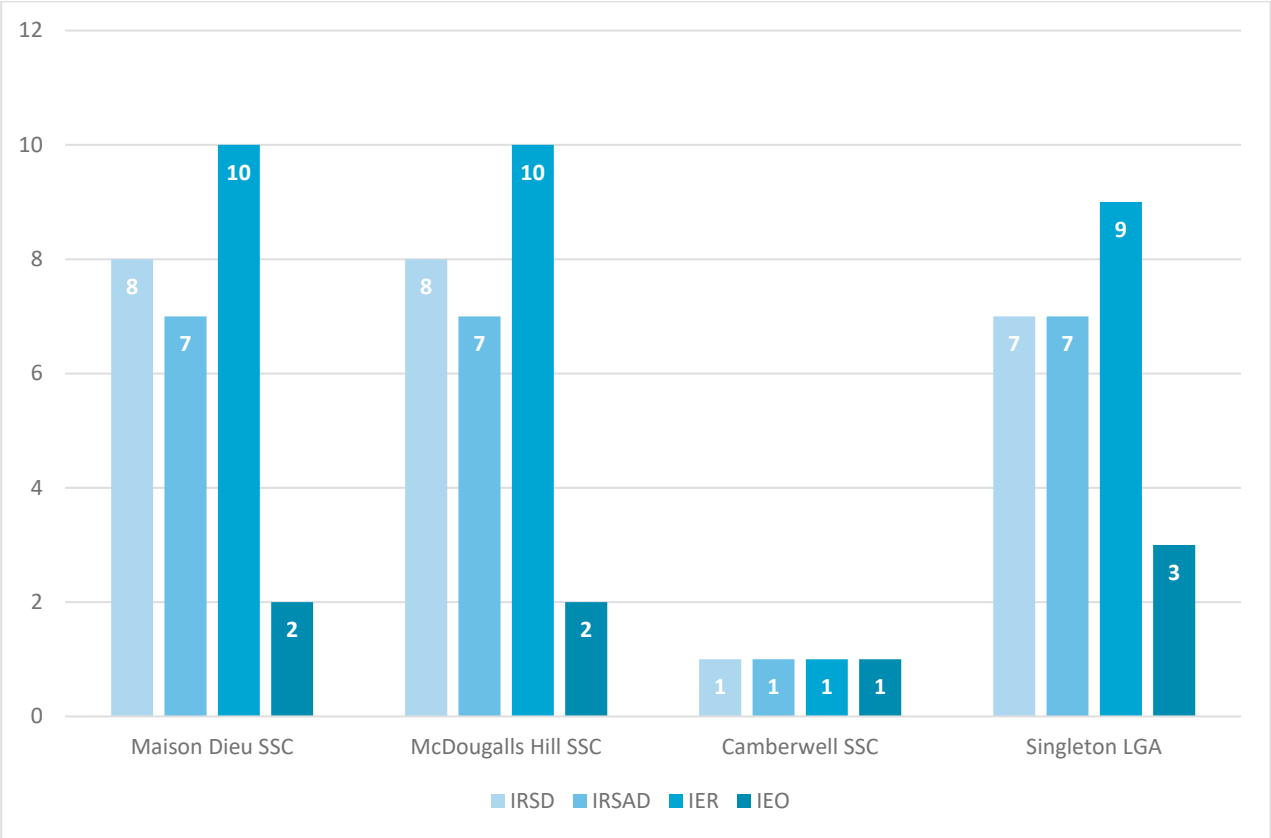
- the Index of Relative Socio-Economic Disadvantage (IRSD);
- the Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD);
- the Index of Economic Resources (IER); and
- the Index of Education and Occupation (IEO).

The rankings of the communities within the study area for each of the four summary measures are provided in Figure 2.1.

The SEIFA index rankings across Maison Dieu SSC, McDougalls Hill SSC and Singleton LGA are similar, suggesting consistency in the level of advantage and disadvantage across populations in these areas; however, the index rankings for Camberwell SSC are significantly lower, in terms of IRSD, IRSAD and IER, and are the lowest across the study area for IEO.

According to the data, Maison Dieu SSC, McDougalls Hill SSC and Singleton LGA all experience a relatively high level of advantage with indices for IRSD, IRSAD and IER ranking 7 or above in all three areas.

All regions scored an IEO ranking at 3 or under, indicating a lower proportion of people within the SIA study area with high level qualifications or in highly skilled occupations.



Source: ABS (2018).

Figure 2.1 SEIFA deciles in the local and regional area

2.6 Homelessness

The rate of homelessness data is only available at LGA level.

According to the 2016 ABS Census of Population and Housing, the estimated homeless population in Singleton LGA is 37 people, creating a homelessness rate of 16 per 10,000 people. This proportion is significantly lower than the NSW homeless rate of 50.4 per 10,000 people, with the NSW total homeless population estimated to be 37,692 (ABS 2016).

2.7 Health

Singleton LGA is serviced by the Hunter New England NSW Local Health District, the success of which is measured using health indicators exhibited in Table 2.6. Hunter New England NSW has higher proportions of people involved in health indices relating to alcohol, smoking, obesity and mental health than those across broader NSW. For example, 43.6% of the population in Hunter New England NSW engages in alcohol drinking which increases long-term risk in adults, compared with only 32.5% for the NSW population. The asthma prevalence in adults in Hunter New England NSW is 11.0%, compared with 11.5% in NSW.

Table 2.6 Health indicator summary (2020)

Health indicator	Hunter New England NSW LHD	NSW
Alcohol drinking, long-term risk in adults	43.6%	32.5%
Daily smoking in adults	10.4%	9.2%
Overweight and obesity in adults	67.7%	56.8%
Asthma prevalence in adults	11.0%	11.5%
High or very high psychological distress in adults	18.5%	16.7%

Source: NSW Health (2021).

3 Proposed SIA scope

3.1 Potential social impacts

A preliminary set of potential impacts and benefits of the project has been identified based on the scoping assessment, including the outcomes of community and stakeholder engagement, and understanding of the local community and study area. The purpose of identifying potential impacts and benefits at this preliminary stage is to ensure the environmental impact statement (EIS) preparation focuses on:

- the potential social impacts identified by, and of greatest concern, to the community; and
- an appropriate range of stakeholders, and that affected groups or individuals are included in the SIA field study activities.

Potential positive and negative social impacts have been identified are detailed in Table 3.1. Additional details are provided in the SIA Scoping Worksheet (Appendix A).

Table 3.1 Identified potential social impact mapped to issues, positive and negative

Potential social impacts	Issue – negative related to:	Issue – positive related to:
Livelihood	Disruption to farming activity may lead to lowered productivity. Land use tensions. Low unemployment in the local area may require outsourcing of construction and operation workforce.	Increased economic activity during construction with local accommodation providers and local service providers. Increased opportunity for local employment during construction and occupational training to diversify skill sets from within the local community. Diversification of local economy through direct/indirect economic benefits and employment opportunities for local community and businesses during construction and ongoing operations.
Health and wellbeing	Increased noise (during construction and operations). Public safety due to truck movements along roads (construction only).	-
Way of life	Construction may disrupt farming activity or cause a reduction in the availability of agricultural land.	-
Access	Increased traffic may cause perceived road safety risks (during construction). Construction workers may place increased pressure on social infrastructure (eg accommodation). Waste management.	Any road upgrades to facilitate construction traffic may benefit local users through improved road safety conditions following the completion of construction activities.
Surroundings	Changes to the landscape can impact the visual amenity of the area.	-
Culture	Potential loss of or impacts to Aboriginal heritage sites.	

Table 3.1 Identified potential social impact mapped to issues, positive and negative

Potential social impacts	Issue – negative related to:	Issue – positive related to:
Community	New workers may affect the composition of the local community, and community identity and cohesion.	New workers may integrate and add value to the local community.
	A short-term construction workforce could impact short-term accommodation availability and affordability.	

There are a variety of potential social impacts which may arise from the project, both during construction and operations. Without mitigation, these social impacts could contribute to negative changes to the existing community (such as to their way of life or livelihood through the disruption of farming and agricultural practices).

Changes to the accessibility of local properties, impacts on the availability of social infrastructure and changes to the amenity of the rural landscape (eg due to visibility of project infrastructure and project-related noise) may have material impacts on the health and wellbeing of the local community. For instance, increased noise may cause tensions between project-related and non-project-related landholders, as well as the project workforce who can also begin to change the composition of the local community and effect the local 'character'. However, with suitable mitigation measures, many of these impacts can be mitigated, and closely monitored throughout the project's construction and operations.

The project also has the potential to bring positive social impacts, such as increased opportunities for employment and occupational training, economic flow into the local community, and upgrades to existing infrastructure like roads. Where possible, the project should implement measures to maximise these benefits (such as a preference for a local workforce and suppliers where feasible), in addition to other mitigation measures.

3.2 Proposed methodology

The SIA will be led by a suitably qualified Social Scientist who will adopt the methodology illustrated in Plate 3.1 and will use social science methods and tools for the collection of qualitative and quantitative data.

The identification of social impacts will be informed by community and stakeholder engagement activities, as well as SIA field study activities, and will be conducted in an integrated manner to ensure consistency, reduce duplication and allow for management of consultation fatigue. In addition, findings from the technical assessments will be considered to understand the consequences to the community and existing research and previous SIAs for surrounding mining operations (including Hunter Valley Operations (HVO)) will inform the identification of social impacts.

Potential social impacts and benefits will be assessed according to the requirements of the *Social Impact Assessment Guideline for State Significant Projects* (DPIE 2021a) and will use the risk matrix presented in the *Technical Supplement* (DPIE 2021b).

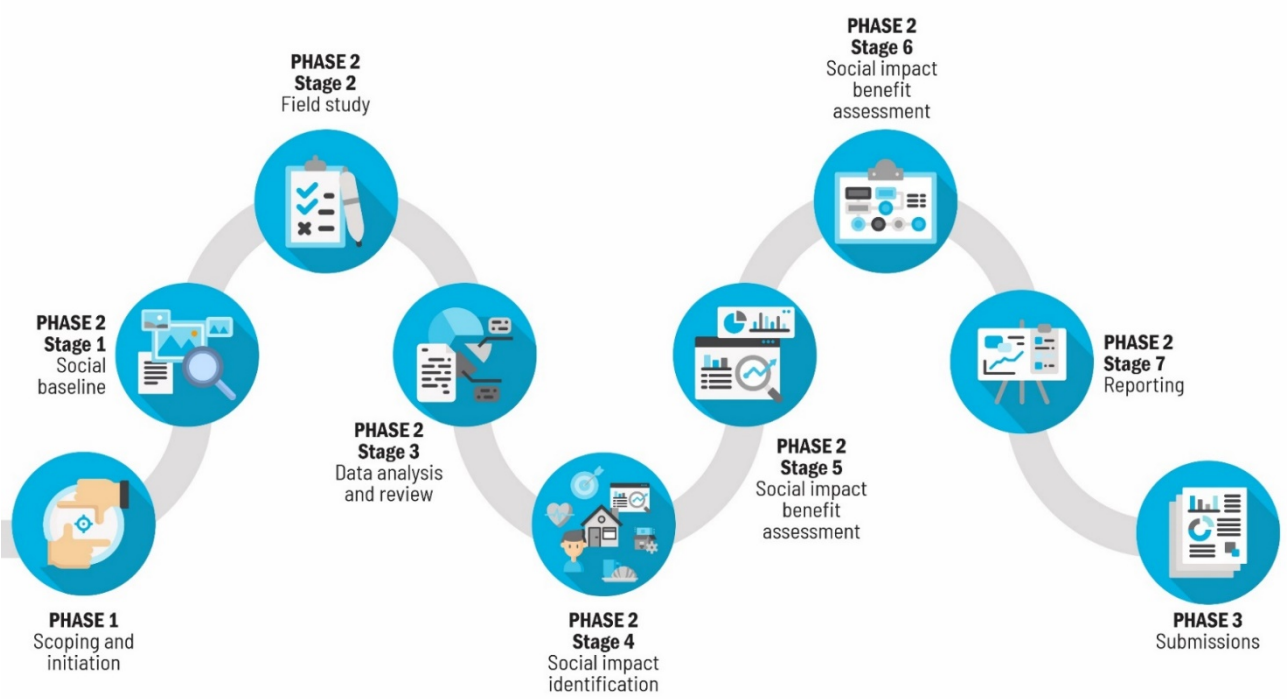


Plate 3.1 Social impact assessment methodology

References

ABS 2016, *Census of Population and Housing: Quickstats*.

- 2018, *Socio-Economic Indexes for Australia* (SIEFA).
- 2021, *Counts of Australian Businesses, including Entries and Exits* (June 2017 to June 2021).

DPIE 2021a, *Social Impact Assessment Guideline for State Significant Projects*.

- 2021b, *Technical Supplement: Social Impact Assessment Guideline for State Significant Projects*.

NSW Health 2021, *Healthstats NSW*.

Appendix A
SIA Scoping Worksheet

EMM
creating opportunities

Social Impact Assessment (SIA) Worksheet **Project name:** Maison Dieu Solar Farm **Date:** 3 May 2022

CATEGORIES OF SOCIAL IMPACTS	POTENTIAL IMPACTS ON PEOPLE		PREVIOUS INVESTIGATION OF IMPACT		CUMULATIVE IMPACTS	ELEMENTS OF IMPACTS - Based on preliminary investigation						ASSESSMENT LEVEL FOR EACH IMPACT				PROJECT REFINEMENT	MITIGATION / ENHANCEMENT MEASURES
what **social impact categories** could be affected by the project activities	What impacts are likely, and what concerns/aspirations have people expressed about the impact? Summarise how each relevant stakeholder group might experience the impact. **NB. Where there are multiple stakeholder groups affected differently by an impact, or more than one impact from the activity, please add an additional row.**	Is the impact expected to be **positive or negative**	Has this impact previously been investigated (on this or other project/s)?	If "yes - this project," briefly describe the previous investigation. If "yes - other project," identify the other project and investigation	Will this impact combine with others from this project (think about when and where), and/or with impacts from other projects (cumulative)?	If yes, identify which other impacts and/or projects	Will the project activity (without mitigation or enhancement) cause a material social impact in terms of its: You can also consider the various magnitudes of these characteristics **extent** i.e. number of people potentially affected?	**duration** of expected impacts? (**i.e. construction vs operational phase**)	**intensity** of expected impacts i.e. scale or degree of change?	**sensitivity** or **vulnerability** of people potentially affected?	**level of concern/interest** of people potentially affected?	Level of assessment for each social impact	What methods and data sources will be used to investigate this impact? Secondary data	Primary Data - Consultation	Primary Data - Research	Has the project been refined in response to preliminary impact evaluation or stakeholder feedback?	What **mitigation / enhancement measures** are being considered?
livelihoods	**Increased opportunity for local employment.**	Positive	**Yes - other project**	New England Solar Farm (SSD-9255) - EIS and SIA	Yes	Diversification of local economy through direct and indirect economic benefits (including employment opportunities and increased local spending) during construction.	Yes	Yes	No	Unknown	No	Standard	Required	Broad consultation	Not required	Not applicable	Use of local labour force and supplies, where possible.
health and wellbeing	Increased noise (during construction).	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - Construction noise assessment Orange Grove Sun Farm (SSD-8882) - Construction noise assessment	Yes	Potential for cumulative noise impacts from ongoing operation of neighbouring mines and construction of this project.	Unknown	Unknown	Unknown	Unknown	Unknown	Standard	Required	Broad consultation	Targeted research (NVIA)	No	Noise management measures will be determined based on the outcomes of the noise impact assessment to be completed as part of the EIS. Standard construction hours only (with reference to the *Interim Construction Noise Guideline* (DECC 2009)).
livelihoods	Disruption to agricultural operations and loss of agricultural land resulting in a reduction in productivity.	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - EIS Orange Grove Sun Farm (SSD-8882) - EIS	Yes	Cumulative loss of agricultural land when considered alongside surrounding mining operations.	No	Yes	Yes	Unknown	Unknown	Standard	Required	Broad consultation	Targeted research (LUCRA)	No	The study area encompasses parcels of land that relevant landholders are willing to lease to the proponent for use as part of the project. Agricultural operations will be able to continue on adjoining land.
livelihoods	Increase pressure on short term accommodation and housing affordability	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - EIS and SIA Orange Grove Sun Farm (SSD-8882) - EIS	Unknown	Increased risk of short term impact availability of construction activities coincide with the construction of the Singleton bypass due to commence in 2023.	Unknown	Yes	Yes	Unknown	Unknown	Standard	Required	Broad consultation	Not required	No	The construction workforce will be sourced from the local area as far as practicable. Accommodation for non-local construction staff is expected to be sourced through the use of available rental and motel accommodation in surrounding townships and regional centres.
way of life	Change in land use from agricultural production to electricity generation and potential for land use conflicts or tensions impacting existing land uses.	Negative	Yes - other project	New England Solar Farm (SSD-9255) - Land use conflict risk assessment Orange Grove Sun Farm (SSD-8882) - EIS	Yes	Cumulative loss of agricultural land when considered alongside surrounding mining operations.	No	Yes	Yes	Unknown	Unknown	Standard	Required	Broad consultation	Targeted research (LUCRA)	No	The study area encompasses parcels of land that relevant landholders are willing to lease to the proponent for use as part of the project. Agricultural operations will be able to continue on adjoining land.
access	Increased traffic on Maison Dieu Road may result in a requirement for upgrades to the road corridor, improving road safety for local road users following construction.	Positive	**Yes - other project**	New England Solar Farm (SSD-9255) - Traffic impact assessment Orange Grove Sun Farm (SSD-8882) - Traffic impact assessment	No	-	Yes	Yes	No	Unknown	Unknown	Standard	Required	Broad consultation	Targeted research (traffic assessment)	No	Traffic impact assessment will determine whether the local and regional road network can accommodate proposed project-related vehicle movements and determine what, if any, road upgrades are required.
access	Increased traffic on Maison Dieu Road and New England Highway may impact trip times for other local road users.	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - Traffic impact assessment Orange Grove Sun Farm (SSD-8882) - Traffic impact assessment	Yes	When considered alongside potential visual amenity and construction noise impacts, it would further contribute to a negative experience for neighbouring landholders.	Yes	No	Unknown	**Unknown**	**Unknown**	Standard	Required	Broad consultation	Targeted research (traffic assessment)	No	Traffic impact assessment will determine whether project-related vehicle movements will impact the local and regional road network.
health and wellbeing	Increased traffic on Maison Dieu Road may raise concerns around road safety (eg increase movements, congestion, speed, conflict between road users).	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - Traffic impact assessment Orange Grove Sun Farm (SSD-8882) - Traffic impact assessment	Yes	When considered alongside potential visual amenity and construction noise impacts, it would further contribute to a negative experience for neighbouring landholders.	No	No	Unknown	**Unknown**	**Unknown**	Standard	Required	Broad consultation	Targeted research (traffic assessment)	No	Traffic impact assessment will determine potential safety risks associated with project-related vehicle movements on the local and regional road network. Additional measures could be introduced to avoid deliveries during school bus times or restricted speeds for project-related vehicles on Maison Dieu Road.
culture	Impacts to Aboriginal cultural and/or historic heritage sites.	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - Aboriginal and historic heritage assessments and subsequent management plans	Yes	When considered alongside other developments within Singleton LGA, collectively contributes to a loss of heritage value within the landscape.	Unknown	Yes	Unknown	**Unknown**	**Unknown**	Standard	Required	Broad consultation	Targeted research (Aboriginal cultural and historic heritage assessment)	No	Should Aboriginal cultural and/or historic heritage sites be identified, mitigation and management measures will be determined as part of the relevant assessment.
access	Increased pressure on social infrastructure (such as housing and accommodation).	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - EIS and SIA	Yes	When considered alongside the construction workforces required for other developments within Singleton LGA, collectively contributes to an increase in demand for short-term accommodation.	Unknown	Unknown	Unknown	**Unknown**	**Unknown**	Standard	Required	Broad consultation	Targeted research into availability of short-term accommodation in Singleton LGA and surrounds may be warranted.	Not applicable	Mitigation measures will be considered as part of the SIA, including a construction workforce accommodation strategy or similar (if required).
surroundings	Changes to landscape and visual amenity.	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - Visual impact assessment Orange Grove Sun Farm (SSD-8882) - Visual impact assessment	Yes	When considered alongside potential operational noise impacts, it would further contribute to a negative experience for neighbouring landholders.	Unknown	Yes	Unknown	**Unknown**	**Yes**	Standard	Required	Broad consultation	Targeted research (visual impact assessment)	No	Visual amenity mitigation and management measures will be determined based on the outcomes of the visual impact assessment to be completed as part of the EIS (eg localised screening at residences or along boundary fences).
way of life	Reduction in land available for agricultural production (ie within study area).	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - EIS Orange Grove Sun Farm (SSD-8882) - EIS	Yes	Cumulative loss of agricultural land when considered alongside surrounding mining operations.	No	Yes	No	**Unknown**	**Unknown**	Standard	Required	Broad consultation	Targeted research (land, soil and erosion assessment)	No	The study area encompasses parcels of land that relevant landholders are willing to lease to the proponent for use as part of the project. Agricultural operations will be able to continue on adjoining land.
livelihoods	Increase in availability of long-term employment options.	Positive	**Yes - other project**	New England Solar Farm (SSD-9255) - EIS	Yes	Diversification of employment opportunities in the region with the future closure of power stations.	No	No	No	**No**	**No**	Standard	Required	Broad consultation	Not required	Not applicable	None required due to limited number of jobs available as part of ongoing operations.
health and wellbeing	Increased noise (during operations).	Negative	**Yes - other project**	New England Solar Farm (SSD-9255) - Operational noise assessment Orange Grove Sun Farm (SSD-8882) - Operational noise assessment	Yes	When considered alongside potential visual amenity impacts, it would further contribute to a negative experience for neighbouring landholders.	Unknown	Yes	Unknown	**Unknown**	**Yes**	Standard	Required	Broad consultation	Targeted research (NVIA)	No	Noise management measures will be determined based on the outcomes of the noise impact assessment to be completed as part of the EIS.
community	Community cohesion may be impacted as a consequence of multiple projects.	Negative	**Yes - other project**	Hunter Valley Operations (MP06_0261 & DA450-10-2003) - SIA Rix's Creek Coal Mine Extension (SSD-6300) - SIA	Yes	When considered alongside the construction workforces required for other developments within Singleton LGA, collectively contributes to a large number of people temporarily migrating to this area.	Unknown	Unknown	Unknown	**Unknown**	**Unknown**	Standard	Required	Broad consultation	Targeted research into availability of short-term accommodation in Singleton LGA and surrounds may be warranted.	Not applicable	To be determined as part of the SIA.

Australia

SYDNEY
Ground floor 20 Chandos Street
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE
Level 3 175 Scott Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE
Level 1 87 Wickham Terrace
Spring Hill QLD 4000
T 07 3648 1200

CANBERRA
Level 2 Suite 2.04
15 London Circuit
Canberra City ACT 2601

ADELAIDE
Level 4 74 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE
Suite 8.03 Level 8 454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH
Suite 9.02 Level 9 109 St Georges Terrace
Perth WA 6000

Canada

TORONTO
2345 Younge Street Suite 300
Toronto ON M4P 2E5

VANCOUVER
60 W 6th Ave Suite 200
Vancouver BC V5Y 1K1

linkedin.com/company/emm-consulting-pty-limited

emmconsulting.com.au

Appendix C

EPBC Act Protected Matters Report

EMM
creating opportunities

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 05-May-2022

Summary
Details
- Matters of NES
- Other Matters Protected by the EPBC Act
- Extra Information

Caveat
Acknowledgements

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	6
Listed Threatened Species:	30
Listed Migratory Species:	12

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	19
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	8
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands) [Resource Information]

Ramsar Site Name	Proximity
Hunter estuary wetlands	50 - 100km upstream from Ramsar site

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community likely to occur within area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area
Hunter Valley Weeping Myall (Acacia pendula) Woodland	Critically Endangered	Community may occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community may occur within area
Warkworth Sands Woodland of the Hunter Valley	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
FROG		
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Litoria booroolongensis		
Booroolong Frog [1844]	Endangered	Species or species habitat may occur within area
MAMMAL		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Nyctophilus corbeni		
Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider [254]	Vulnerable	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Petrogale penicillata		
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area
Pteropus poliocephalus		
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		

Scientific Name	Threatened Category	Presence Text
Eucalyptus glaucina		
Slaty Red Gum [5670]	Vulnerable	Species or species habitat known to occur within area
Euphrasia arguta		
[4325]	Critically Endangered	Species or species habitat may occur within area
Prasophyllum sp. Wybong (C.Phelps ORG 5269)		
a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area
Pterostylis gibbosa		
Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri		
Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Thesium australe		
Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
REPTILE		
Aprasia parapulchella		
Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area
Delma impar		
Striped Legless Lizard, Striped Snake-lizard [1649]	Vulnerable	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus		
Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundapus caudacutus		
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat may occur within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat may occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat likely to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat may occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat likely to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Rostratula australis as Rostratula benghalensis (sensu lato)		
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State
North East NSW RFA	New South Wales

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Hunter Valley Coal Mining Operations North - State approved mining, NSW	2016/7640	Controlled Action	Post-Approval
Not controlled action			
Ashton Coal Project	2001/524	Not Controlled Action	Completed
Ashton Coal South East Open Cut Project	2010/5315	Not Controlled Action	Completed
Clearance of 35 ha in Ravensworth State Forest for extension of Mt Owen coal mining operations	2004/1369	Not Controlled Action	Completed
Hunter Valley Coal Mining Operations South - Modification 5	2016/7641	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
Rix's Creek Continuation of coal Mining Project, northwest of Singleton, NSW	2014/7348	Not Controlled Action	Completed
Not controlled action (particular manner)			
Aerial baiting for wild dog control	2006/2713	Not Controlled Action (Particular Manner)	Post-Approval

Bioregional Assessments

SubRegion	BioRegion	Website
Hunter	Northern Sydney Basin	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

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

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

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

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

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

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

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

Please feel free to provide feedback via the Contact Us page.

Department of Agriculture Water and the Environment
GPO Box 858
Canberra City ACT 2601 Australia
+61 2 6274 1111

Appendix D

Surface water constraints analysis

EMM
creating opportunities

Level 3, 175 Scott Street
Newcastle NSW 2300

T 02 4907 4800
E info@emmconsulting.com.au

www.emmconsulting.com.au

Memorandum

12 August 2022

To: Terrain Solar

From: Harrison Callen

Subject: Maison Dieu solar farm scoping report - Water constraints analysis

1 Introduction

This document describes preliminary analysis of surface water constraints that may affect project planning and the design of the Maison Dieu Solar Farm (the project). The project involves the development, construction and operation of a solar farm, within a site that is approximately 10 km to the north-west of Singleton and covers approximately 500 hectares (ha) (the Site). The following surface water features are in or near the Site:

- The Hunter River is located to the east of the Site and flows in a southerly direction. Parts of the Site may be on land that is prone to Hunter River flooding.
- An unnamed 4th order watercourse and several tributaries to this watercourse are located within the Site. These watercourses generally flow in a westerly or south-westerly direction towards the Hunter River.

The objective of this desktop review is to spatially identify constraints associated riparian corridors and flooding.

2 Approach

A desktop study was undertaken to identify riparian corridor and flooding constraints. The study considered information from publicly available flood studies, topographical maps and LiDAR derived surface levels. No site visit or modelling was undertaken. Identified constraints are described as being either:

- Probable constraints – which identify land that will likely be confirmed as constrained when further studies are undertaken; and
- Potential constraints – which identify land that may be constrained. Further studies (ie site inspections, flood modelling and riparian offsets) would be required to resolve potential constraints.

The constraints apply to the proposed solar arrays and other key infrastructure such as substations and inverters. Roads and service corridors can be constructed within the constraint areas with suitable controls.

The methodology applied to determine these constraints and their extents is described in Table 2.1. The identified constraints are presented in Section 3.

Table 2.1 Methodology used to determine constraints

Constraint	Description	Methodology	Limitations
Probable riparian constraints			
Riparian Corridor – Inner Area	The Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018) describes a standardised method for establishing riparian corridors for watercourses. The Riparian Corridor – Inner Area refers to the channel and the inner portion of the Vegetated Riparian Zone (VRZ). For most sections of the watercourse, the 1% Annual Exceedance Probability (AEP) flood extent is likely to be within the Riparian Corridor – Inner Area.	• The stream order of each watercourse was established using hydroline data (DFSI, 2020). • The thalweg (watercourse centre line) was estimated using LiDAR derived surface levels and aerial imagery (DFSI,2011). It is noted that the alignment of the watercourses may be different to the alignment in the hydroline data (DFSI, 2020), which was not established using LiDAR derived surface levels. • An average channel width was established for each stream reach using LiDAR derived surface levels and aerial imagery. The top of bank position was estimated using the average channel width and the thalweg. • The Riparian Corridor – Inner Area was calculated for each watercourse based on stream order and the estimated thalweg and top of bank alignments, using the methodology described in the Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018).	• The average width of channel applied for each individual reach may not be representative of the actual width in some areas. • The thalweg and channel width was determined using aerial imagery and a DEM dated 2011 (DFSI,2011) and may not be representative of the current conditions.
Additional Riparian Constraints	Additional Riparian Constraints refer to parts of the watercourse that are likely to be constrained by flooding but are outside of the Riparian Corridor – Inner Area. An example includes a floodplain pocket located on a watercourse bend.	• Additional Riparian Constraints were identified using LiDAR derived surface levels and aerial imagery.	The extent of Additional Riparian Constraints has not been informed by flood modelling.

Table 2.1 Methodology used to determine constraints

Constraint	Description	Methodology	Limitations
Potential riparian constraints			
Riparian Corridor – Outer Area	The Riparian Corridor – Outer Area refers to the outer portion of the VRZ. The Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018) allow for development in this zone provided the development area is offset. Hence, this zone is considered a potential constraint.	• The Riparian Corridor – Outer Area was calculated from the edge of the Inner Area using the methodology described in Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018).	• As per limitations for the Riparian Corridor – Inner Area.
Probable flood constraints			
Hunter River 1% AEP flood extent – non-conservative estimate	The western portion of the Site is on land that may be prone to Hunter River flooding. The Hunter River 1% AEP flood refers to a 1 in 100 year flood. It is likely that solar panels and other infrastructure that could be damaged by flood waters would need to be located above the 1% AEP flood extent from an approvals perspective.	There is no known government flood study that covers the study area. The following methodology was applied to estimate the 1% AEP flood extent within the Site: • The Wollombi Brook Flood Study (BMT, 2016) applied flood frequency methods to estimate flood levels for a range of Hunter River flood events at the Hunter River at Maison Dieu gauge (gauge number 210128). The gauge is located approximately 1 km downstream of the southern-most portion of the Site. • The 1% AEP flood extent within the Site was estimated based on the estimated levels at the gauge and adjusted to account for relief, using the general slope of the channel and its floodplain in the vicinity of the Site.	• The flood frequency analysis was informed by recorded water level information at the gauge between 1993 and 2015 (a 23- year period). This is a short period for flood frequency analysis and limits the reliability of the estimated levels. • The flood extents have not been informed by flood modelling.

Table 2.1 Methodology used to determine constraints

Constraint	Description	Methodology	Limitations
Potential flood constraints			
Hunter River 1% AEP flood extent – conservative estimate	This is a more conservative estimate of the Hunter River 1% AEP flood extent.	The conservative 1% AEP flood extent was estimated using the same methodology as the non-conservative estimate except the calculated 90% confidence limit (as calculated using FFA) level at the gauge was used. The 90% confidence limit level is approximately 3.5 m higher than the non-conservative level and is similar to the 0.2% AEP (1 in 500 year flood) level calculated in BMT 2016 using flood frequency methods.	As per limitations for the Hunter River 1% AEP flood extent – non-conservative estimate.
Combined constraints			
Total probable constraints	This is the combined area of all probable constraints.	This area was produced by combining the following constraints: • Riparian Corridor – Inner Area • Additional Riparian Constraints • Hunter River 1% AEP flood extent – non-conservative estimate	• No additional limitations
Total potential constraints	This is the combined area of all potential constraints	This area was produced by combining the following constraints: • Riparian Corridor – Outer Area • Hunter River 1% AEP flood extent – conservative estimate	• No additional limitations

3 Identified constraints

This section describes the identified constraints. Associated GIS files will also be provided to Terrain Solar.

3.1 Riparian constraints

Riparian corridor constraints are shown in the following figures:

- Figure 3.1 shows the probable riparian constraints (ie the Riparian Corridor – Inner Area and Additional Riparian Constraints); and
- Figure 3.2 shows the probable and potential riparian constraints (ie the probable constraints plus the Riparian Corridor – Outer Area).

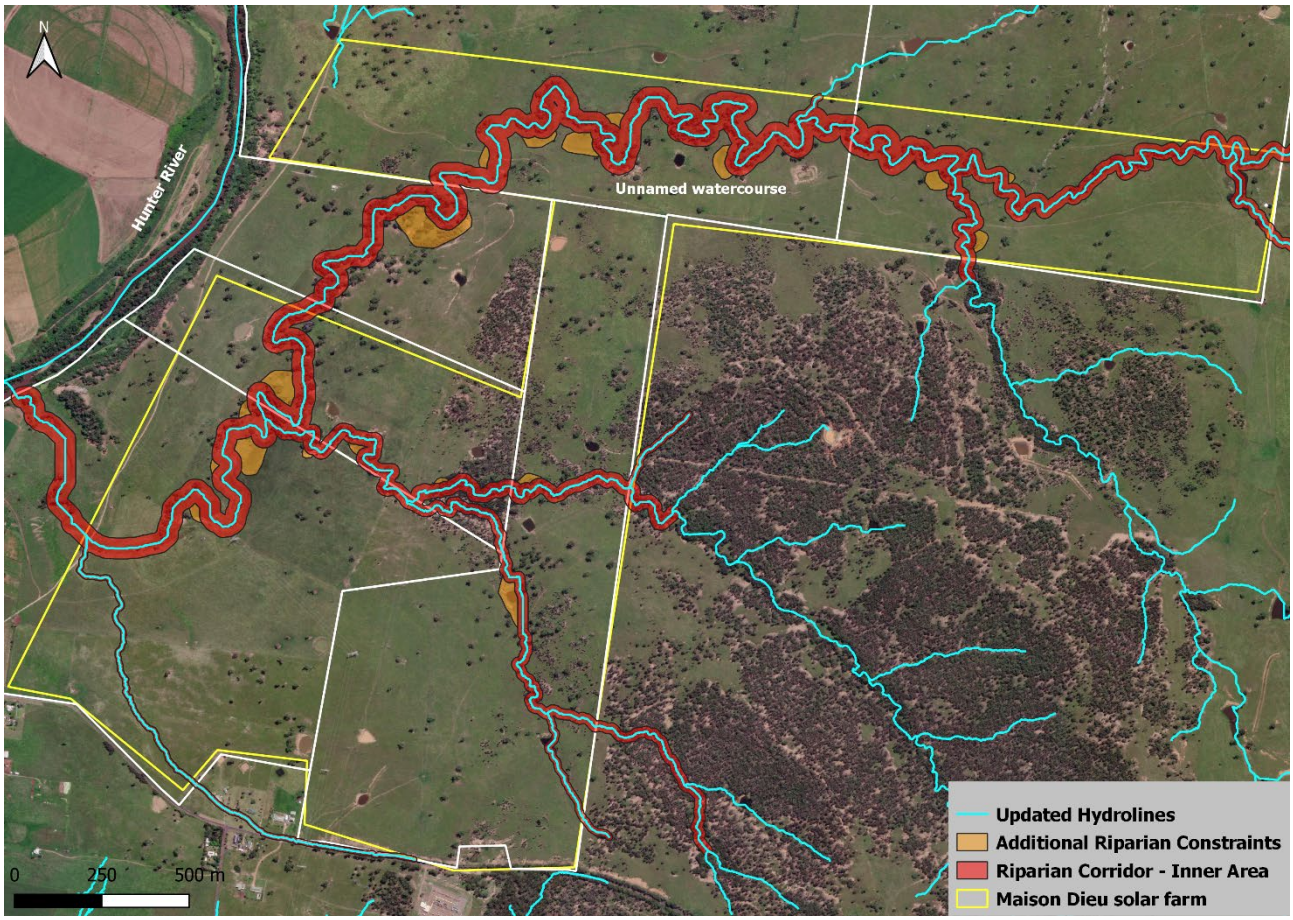


Figure 3.1 Probable riparian constraints

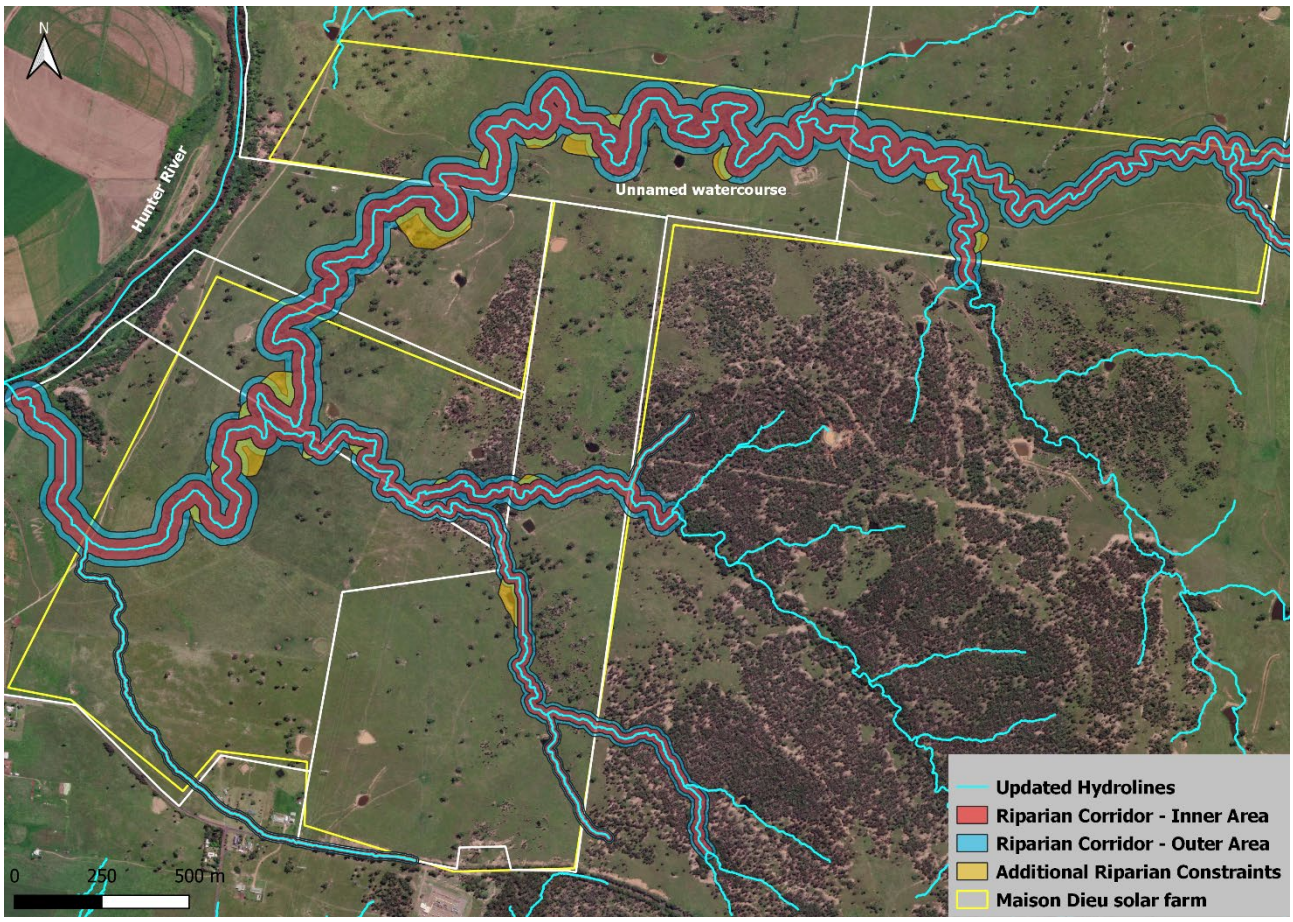


Figure 3.2 Probable and potential riparian constraints

The Riparian Corridor – Outer Area is described as a potential constraint as the Guidelines for controlled activities on waterfront land - Riparian Corridors (DoI, 2018) allow for development in this zone provided the development area is offset. The offset area needs to be the same as the development (or encroachment) area and connected to the riparian corridor. This mechanism provides flexibility to develop land on the periphery of riparian corridors and utilise land for offsets that may have other constraints (ie Additional Riparian Constraints or ecology) or not be practical to develop. Figure 3.3 shows an example of how riparian offsets could be implemented.

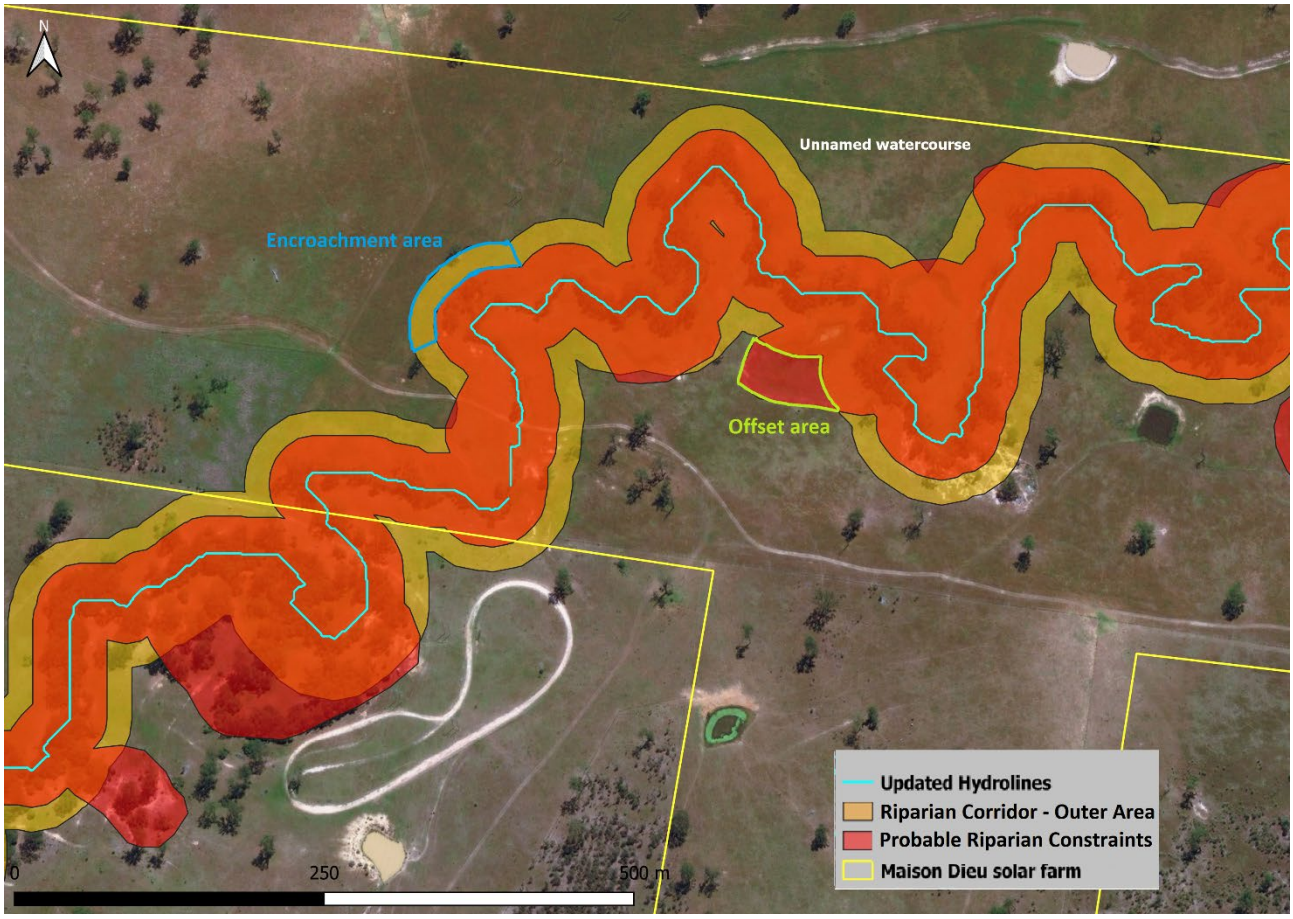


Figure 3.3 Riparian offset example

3.2 Hunter River flood constraints

Figure 3.4 shows the non-conservative and conservative estimates of the Hunter River 1% AEP flood extent. As described in Table 2.1, the conservative 1% AEP level is approximately 3.5 m higher than the non-conservative level and is similar to the 0.2% AEP (1 in 500 year flood) level calculated using the non-conservative methods.

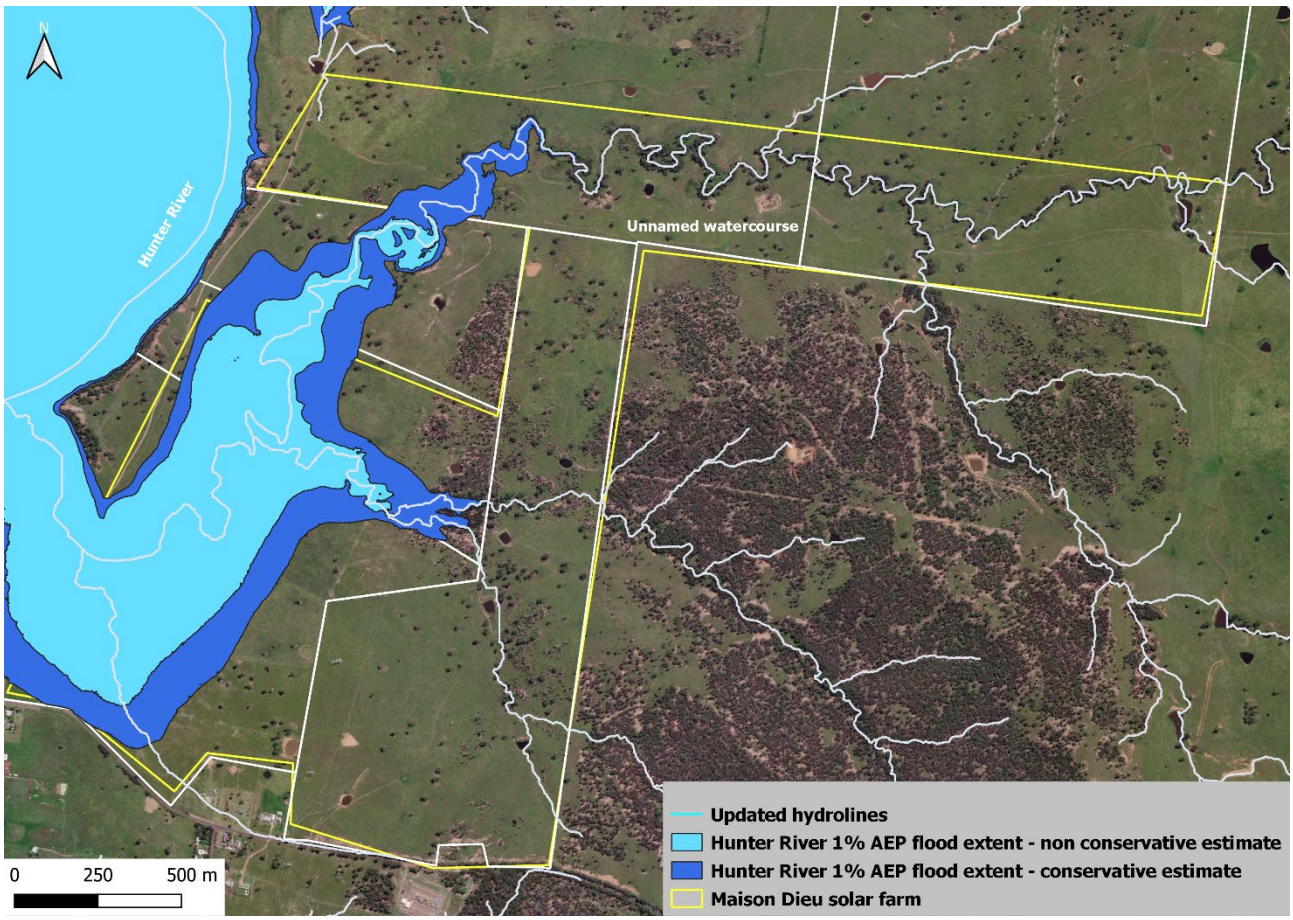


Figure 3.4 Hunter River flood constraints

3.3 Constraints summary

The combined probable and probable plus potential constraints are shown in Figure 3.5 and Figure 3.6 respectively. As discussed in Section 2, the constraints apply to the proposed solar arrays and other key infrastructure such as substations and inverters. Roads and service corridors can be constructed within the constraint areas with suitable controls

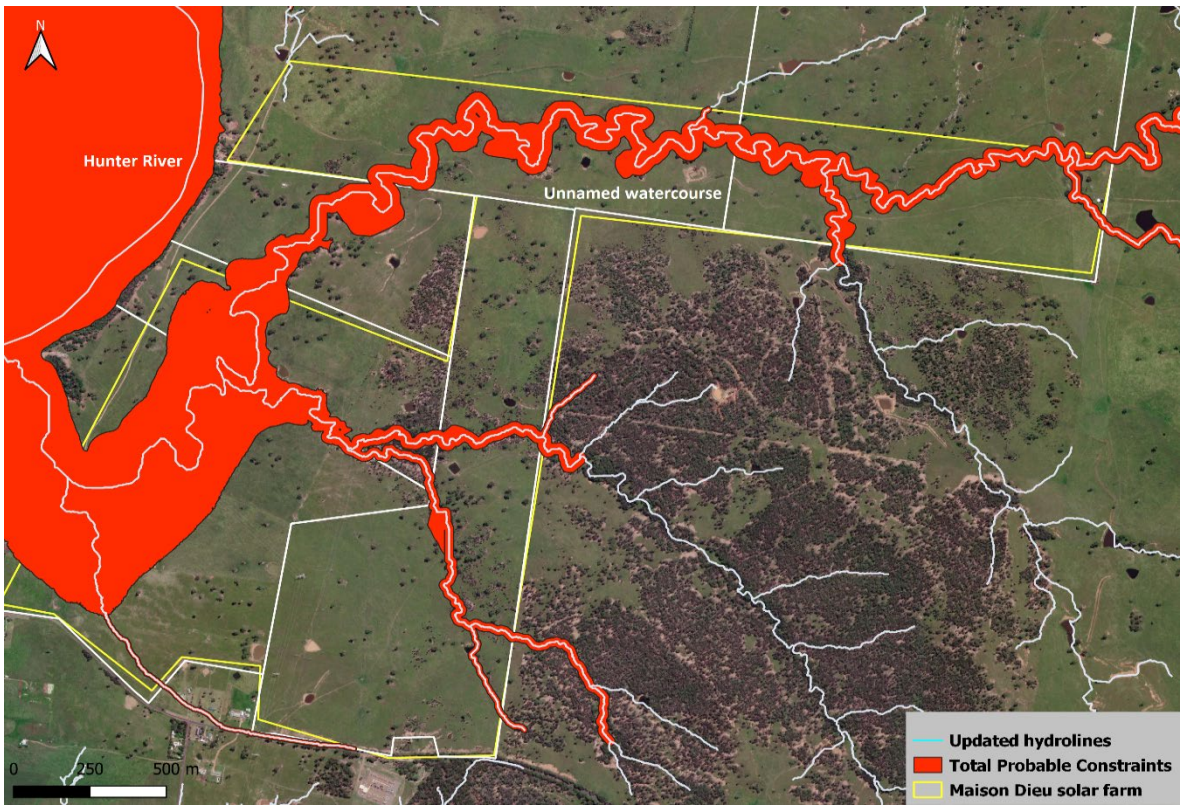


Figure 3.5 Combined probable constraints

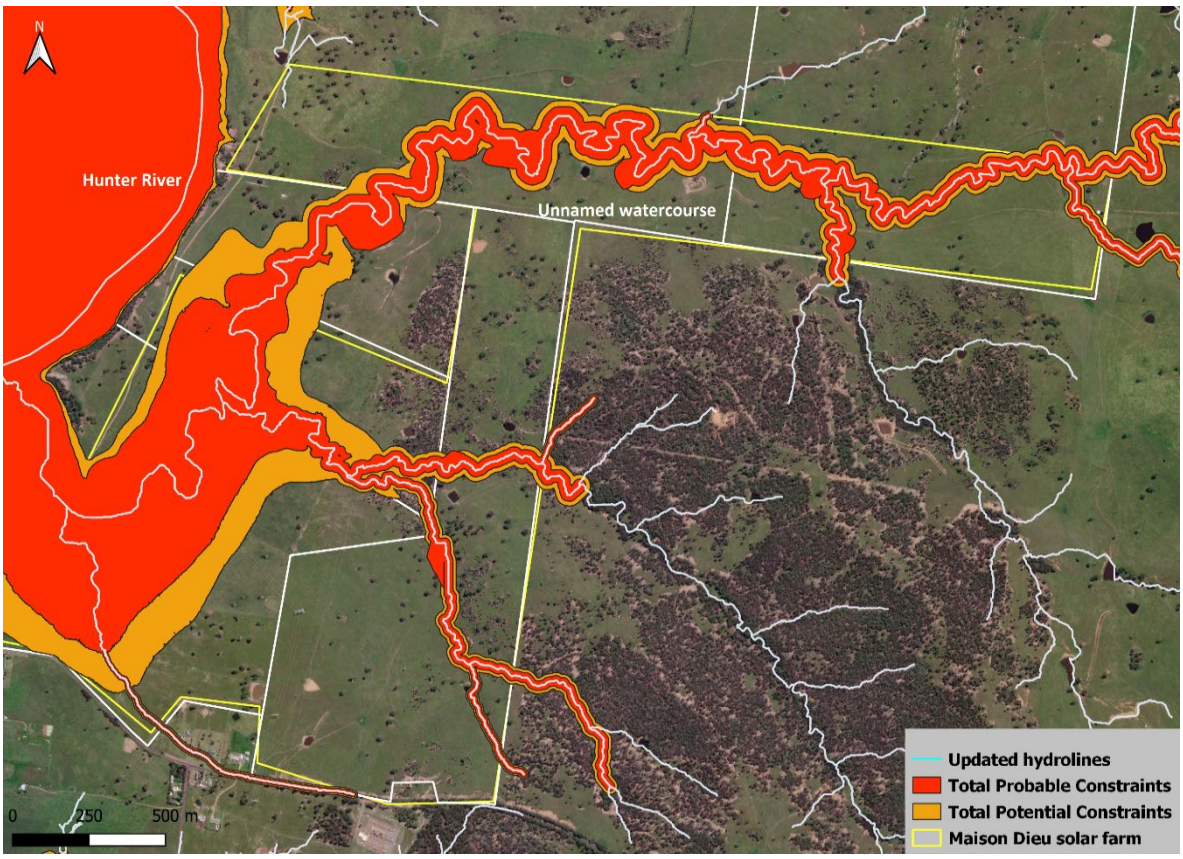


Figure 3.6 Combined probable plus potential constraints

4 Conclusions and recommendations

This document describes preliminary analysis of surface water constraints that may affect project planning and the design of the Maison Dieu Solar Farm. The analysis was undertaken to identify riparian corridor and flooding constraints and considered information from publicly available flood studies, topographical maps and LiDAR derived surface levels. No site visit or modelling was undertaken. Identified constraints are described as being either:

- Probable constraints – which identify land that will likely be confirmed as constrained when further studies are undertaken; and
- Potential constraints – which identify land that may be constrained. Further studies (ie site inspections, flood modelling and riparian offsets) would be required to resolve potential constraints.

Section 2 describes the approach and methods applied to establish constraints and identified constraints are spatially described in Section 3. Associated GIS files will also be provided to Terrain Solar.

It is recommended the solar panels and other key infrastructure such as substations and inverters are located outside of the identified probable constraint areas. Roads and service corridors can be constructed within the constraint areas with suitable controls. If development within potential constraint areas is desirable, it is recommended that further investigations are undertaken to resolve the constraints.

It is also noted that floods of greater magnitude than the 1% AEP event can occur. The risk of flood damage to key infrastructure can be minimised by locating high-cost components (ie substations and inverters) well above the identified 1% AEP flood extents.

The need for detailed studies to support an Environmental Impact Statement for the project will depend on the proximity of the development area to the identified constraints.

5 References

BMT WBM, 2016. *Wollombi Brook Flood Study*.

Bureau of Meteorology, 2020. Water Data Online. Retrieved April 26, 2022, from http://www.bom.gov.au/waterdata/

DoI, 2018. *Guidelines for controlled activities on waterfront land – riparian corridor*s, NSW Department of Industry.

DFSI, 2011. *1 metre Resolution Digital Elevation Model*. Retrieved April 15, 2022, from ELVIS portal. NSW Department of Finance, Service and Innovation.

DFSI, 2020. *Hydrolines*. Retrieved April 15, 2022, from ELVIS portal. NSW Department of Finance, Service and Innovation.

ICSM, 2020. ELVIS - Elevation and Depth - Foundation Spatial Data. Accessed at https://elevation.fsdf.org.au/

Australia

SYDNEY
Ground floor 20 Chandos Street
St Leonards NSW 2065
T 02 9493 9500

NEWCASTLE
Level 3 175 Scott Street
Newcastle NSW 2300
T 02 4907 4800

BRISBANE
Level 1 87 Wickham Terrace
Spring Hill QLD 4000
T 07 3648 1200

CANBERRA
Suite 2.04 Level 2
15 London Circuit
Canberra City ACT 2601

ADELAIDE
Level 4 74 Pirie Street
Adelaide SA 5000
T 08 8232 2253

MELBOURNE
Suite 8.03 Level 8
454 Collins Street
Melbourne VIC 3000
T 03 9993 1900

PERTH
Suite 9.02 Level 9
109 St Georges Terrace
Perth WA 6000
T 08 6430 4800

Canada

TORONTO
2345 Younge Street Suite 300
Toronto ON M4P 2E5
T 647 467 1605

VANCOUVER
60 W 6th Ave Suite 200
Vancouver BC V5Y 1K1
T 604 999 8297

linkedin.com/company/emm-consulting-pty-limited

emmconsulting.com.au