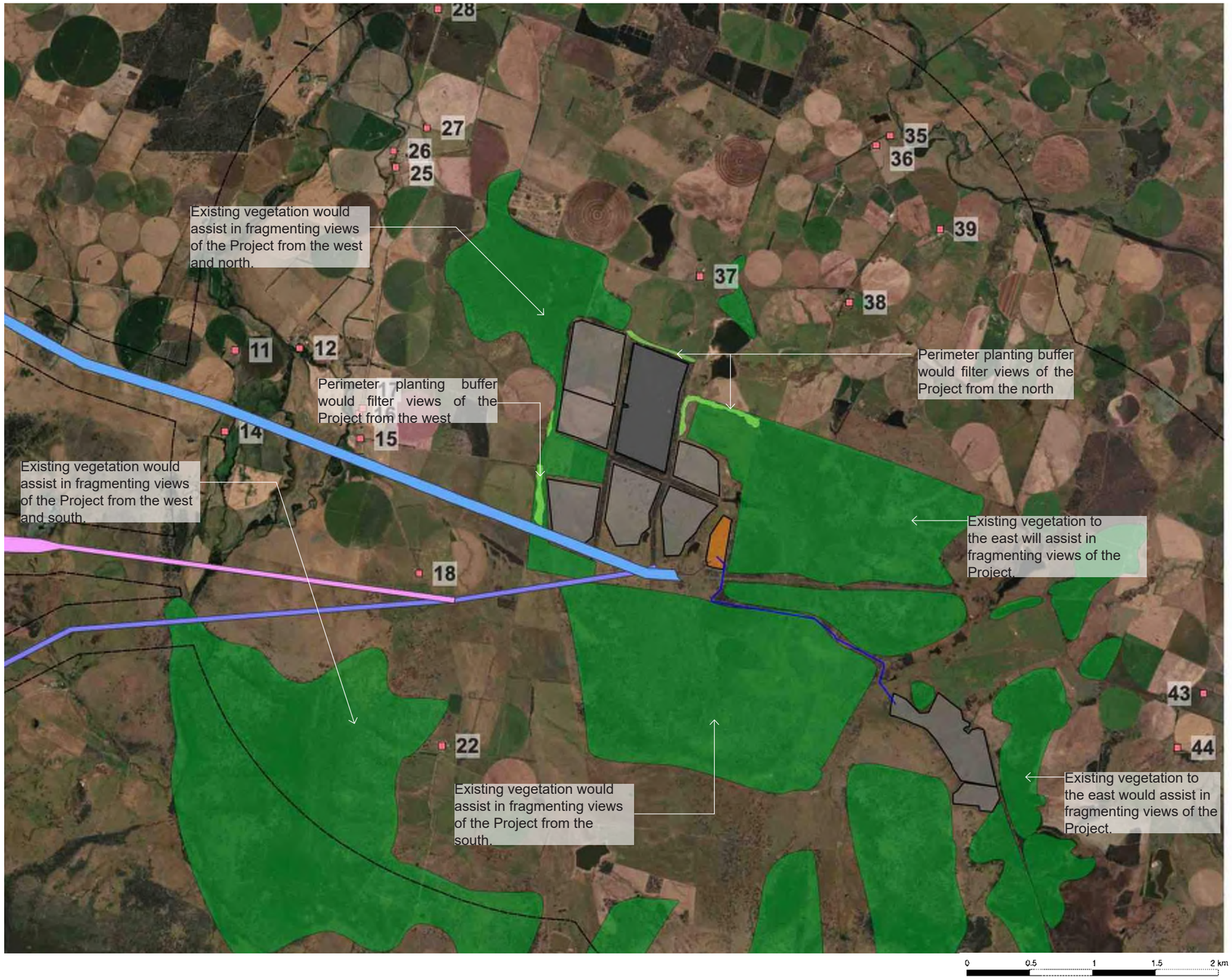
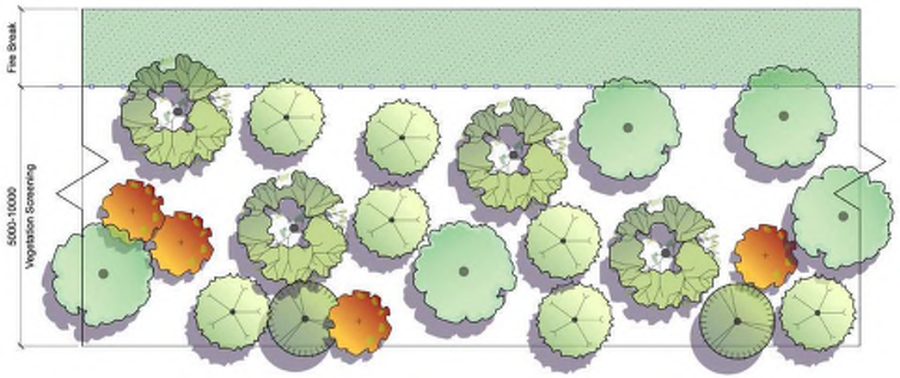
APPENDIX D
LANDSCAPE PLAN

DRAFT LANDSCAPE PLAN

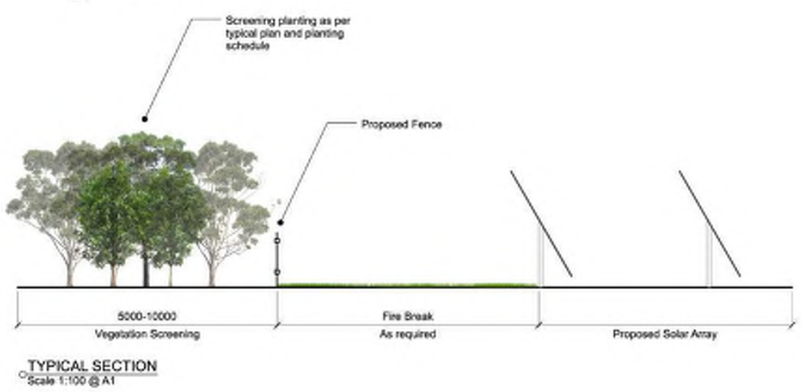


LEGEND

- Dwelling Location
- Solar Array Extent
- Infrastructure Extent
- Proposed 220kV Transmission Line Opt 1
- Proposed 220kV Transmission Line Opt 2.1
- Proposed 220kV Transmission Line Opt 2.2
- Proposed 33kV Transmission Line
- 5000m Extent Line (Study Area)
- Approximate Extent of Existing Vegetation
- Approximate Extent of Proposed Perimeter Planting



1 Typical Perimeter Vegetation Screening
Scale: 1:100

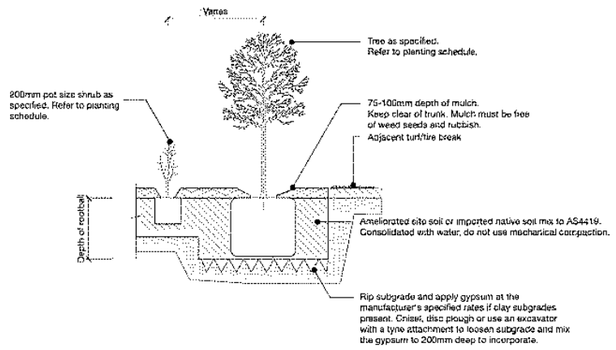


TYPICAL SECTION
Scale 1:100 @ A1

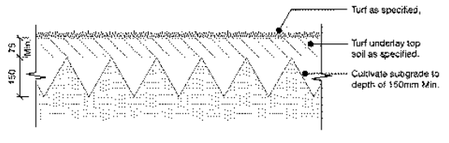
0 2 4 6 8 10m

Indicative Planting Schedule

Code	Botanical Name	Common Name	Pot Size	Mature Height	Mature Width
Trees					
ACA mel	*Acacia melanoxylon*	Blackwood	Tubestock	12m	5m
ALL ver	*Allocasuarina verticillata*	Drooping Sheoak	Tubestock	9m	5m
BUR spi	*Bursaria spinosa*	Prickly Box	Tubestock	4m	4m
Shrubs					
BAN mar	*Banksia marginata*	Silver Banksia	Tubestock	5m	4m
COR ref	*Correa reflexa*	Common Correa	Tubestock	2m	3m
DOD vis	*Dodonaea viscosa*	Broadleaf Hopbush	Tubestock	3m	2m

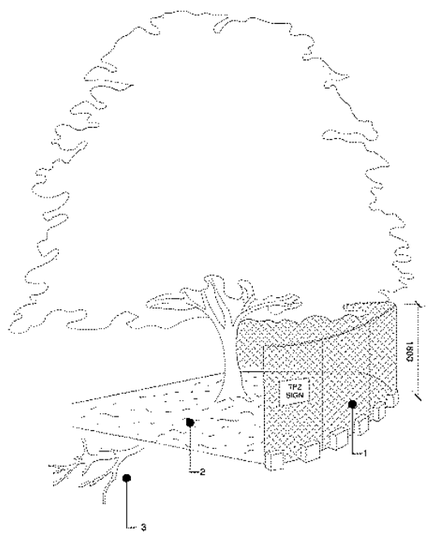


TYPICAL SCREENING PLANTING
Scale 1:20 @ A1



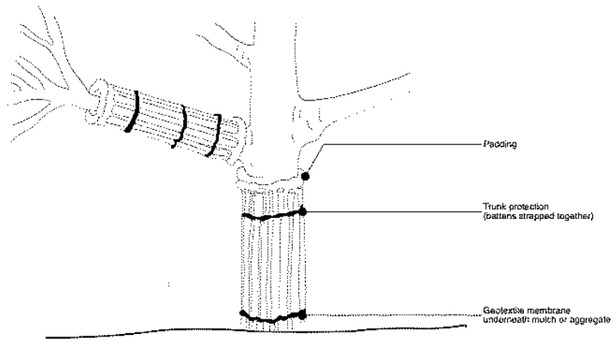
NOTES:
1. Finish crossfall to turf shall be 1:80 min. Finish flush with adjoining surfaces.
2. Soil as specified, provide a turf underlay that complies with AS4419.
3. Remove contaminated areas, deleterious material such as large rocks greater than 50mm, rubbish and large twigs.
4. Lay turf parallel to contour, close cutted and lightly tamp.
5. Fill joints with top dressing soil.
6. Provide subsoil drainage to address any poorly draining areas.
7. Water in and maintain consistent deep watering for 14 weeks minimum. (Separate to the plant establishment period)
8. Consistently top dress depressions to provide an even surface.
9. Mow, top dress and control pests and disease consistently during the remainder of the planting establishment period.
10. All turf orders to be supplied free of plastic reinforcement mesh.

TYPICAL TURF DETAIL IN FIREBREAK AREAS
Scale 1:10 @ A1



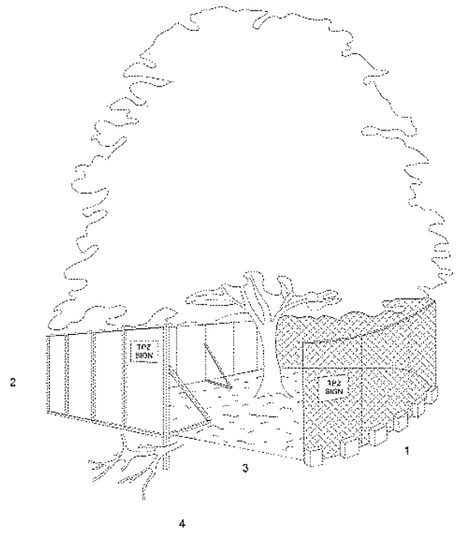
LEGEND:
1: Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet
2: Mulch installation across surface of TPZ
3: Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots

PROTECTIVE FENCING
Scale 1:50 @ A1



NOTE:
1. For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of suitable thickness to prevent soil compaction and root damage.

TREE PROTECTIVE MEASURES
Scale 1:50 @ A1



LEGEND:
1: Chain wire mesh panels with shade cloth if required attached, held in place with concrete feet
2: Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ
3: Mulch installation across surface of TPZ
4: Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots

PROTECTIVE FENCING
Scale 1:50 @ A1


moir
landscape architecture
Northern Midlands Solar Farm
Landscape and Visual Impact Assessment

Northern Midlands Solar Farm

Landscape and Visual Impact Assessment

Prepared for
Connorville Estates Pty Ltd c/o Robert Luxmoore Pty Ltd

Issue
REV C

Date
12.05.2023

Project Number
2248

Revision	Date	Author	Checked	Comment
A	03.02.23	SW | JR	SW	WIP
B	06.04.2023	SW	MED	Draft
C	12.05.2023	EB	DM	Final

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Contents

1.0 Introduction

1.1 Background

Moir Landscape Architecture have been commissioned by Connorville Estates Pty Ltd c/o Robert Luxmoore Pty Ltd to prepare a Landscape & Visual Impact Assessment (LVIA) for the proposed Northern Midlands Solar Farm (hereafter referred to as 'the Project'). The Project is located to the south of Launceston near the township of Cressy. The applicant proposes to develop the Project within the property at 394 Connorville Road, Cressy. The Project will include construction and operation of a 288MW DC / 370MWp AC Solar Farm and associated ancillary infrastructure including a Battery Energy Storage System (BESS) and Transmission Line. An existing Substation is located approximately 13km to the west of the Project, identified as Palmerston Substation, operated by TasNetworks. Figure 01 provides the Project context in relation to the township of Cressy.

The solar array footprint is 432.3 hectares, located solely on a single landholding. The Project is sited close to the existing transmission line running between Palmerston Substation to the west and Avoca Substation to the east. The 33kV internal transmission connecting Solar East to Solar West, is proposed to be connected to the Palmerston Substation by a new 220kV double circuit overhead transmission line.

This initial concept will be further refined during the detailed design stage. The Project is located within the Northern Midlands Council Area, and is zoned as Agricultural Zone under Clause 21.0 to the 2022 Northern Midlands Planning Scheme. There are no residential dwellings identified within the Project.

Survey work was undertaken during December 2022, using key viewpoints and locations with potential views towards the Project. This report details the results of fieldwork, documents the assessment of the existing landscape character and assesses potential visual impacts associated with the Project.

The report also provides an overview of the proposed treatments which may be considered to assist in the mitigation of potential visual impacts. This information is provided with the understanding of the likely impacts and how they may be managed to ensure that the character of the immediate area and surrounding visual landscape is not overly modified or diminished.

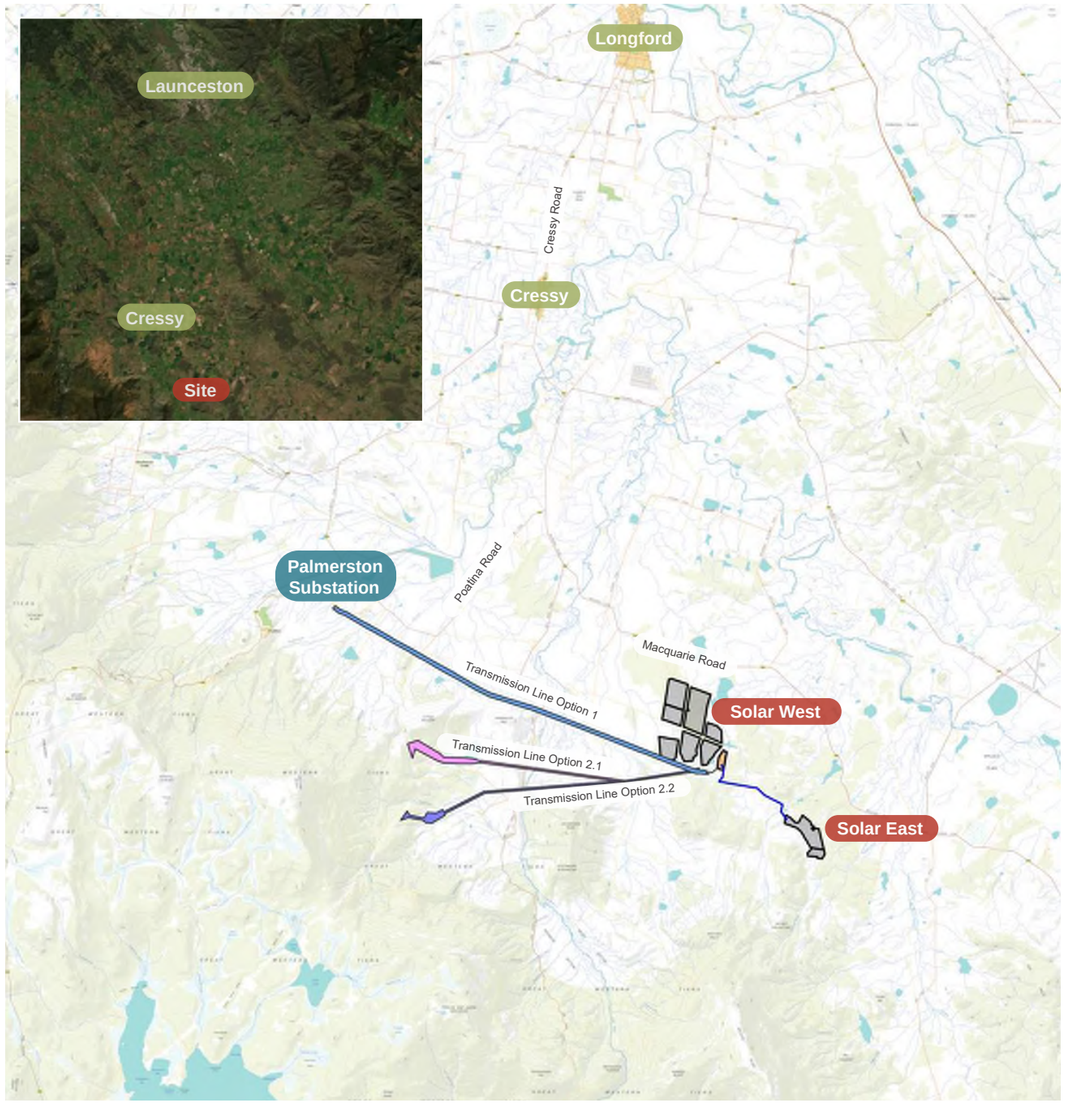


Figure 01 - Site Location Map (Source: LISTmap Tasmania, January 2023)

1.2 Report Structure

The following table provides an outline of the report structure and a summary of how these have been addressed in the LVIA. Detailed methodologies for each part of the assessment have been included in the relevant chapters of the report.

Visual Impact Assessment Report Structure	
Section 2.0: Study Method	Overview of Study Method utilised for the LVIA
Section 3.0: Project Overview	Project Description and overview of the Project and all components to be assessed within the LVIA
Section 4.0: Existing Landscape Character	Establish the existing landscape and visual conditions prior to undertaking any visual assessment
Section 5.0: Zone of Visual Influence	Assessment to identify potential visual impact
Section 6.0: Viewpoint Analysis	Assessment of key viewpoints within the visual catchment. Refer to Appendix B
Section 7.0: Photomontages	Preparation of 5 x photomontages to illustrate the appearance of the Project. Refer to Appendix C
Section 8.0: Visual Impact Assessment	Overview of the visual impacts resulting from the project
Section 9.0: Nightlighting	Overview of potential night lighting sources
Section 10.0: Cumulative Visual Impact	Overview of Cumulative Visual Impact from adjacent Substation
Section 11.0: Mitigation Recommendations	An outline of proposed mitigation and management options and draft landscape plans.
Section 12.0: Conclusion	

Table 01 - Report Structure

2.0 Study Method

2.1 Overview of the Study Method

The following provides an overview of the study method utilised for undertaking the Landscape and LVIA. This methodology is based on the relevant policies, frameworks and our experience in undertaking LVIAs for large infrastructure projects. The LVIA was undertaken in the stages as noted below:

PROJECT OVERVIEW Refer to Section 3.0	• Detailed Project Description • Visual Aspects of the Project
LANDSCAPE CHARACTER ASSESSMENT & CHARACTER ZONES Refer to Section 4.0	• Overview of the Existing Landscape Character and identification of key landscape features of the Site and surrounds. • Determine Scenic Quality Ratings of Landscape Character Zones (LCZ)
ASSESSMENT OF VISUAL IMPACTS Refer to Sections 5.0 - 10.0	• Assessment of the Potential Visual Impacts with the aid of computer modeling, viewpoint analysis and photomontage development. • Viewpoint Analysis (Section 6.0) • Photomontages (Section 7.0)
MITIGATION METHODS Refer to Sections 11.0	• Overview of Mitigation Methods • Preparation of recommendations for impact mitigation (where practical) to maintain the area's visual quality

2.2 Landscape Character Assessment

Landscape Character refers to the distinct and recognisable pattern of elements that occur consistently in a particular landscape. The Landscape Character of an area is generally defined by the most dominant landscape element or unique combination of elements that occur within that landscape. It reflects how particular combinations of geology, landforms, soils, vegetation, land use and human settlements create a particular sense of place for different areas within the landscape (Landscape Institute, 2013). The Landscape Character of the Study Area has been assessed at a regional, local and site scale. This study will utilise existing topographic maps, site imagery and land use maps. For this Project, the 'Study Area' has been defined as the Landscape Character within five (5) kilometres (km) of the Project.

2.2.1 Landscape Character Zones and Scenic Quality

Once the Landscape Character has been assessed, Landscape Character Zones (LCZ) can be identified within the Study Area. Landscape Character Zones are described as zones with the interplay between the natural features combined with the effects of land use and built development making one area distinct from another.

The Scenic Quality 'Frame of Reference' has been formulated by Moir LA (refer to Table 02) utilising *'An Approach to Landscape Sensitivity Assessment'* by Natural England, to quantify the sensitivity of the LCZ. Each category of the 'Frame of Reference' has been quantified for each LCZ to determine a 'Scenic Quality' Rating of HIGH, MODERATE or LOW.

Each LCZ will be assigned a 'Scenic Quality' Rating. Visual Sensitivity of a select location can be derived through the combination of 'Receptor Sensitivity' and 'Scenic Quality.

SCENIC QUALITY RATING		
DESCRIPTION	**LOW** ← **MODERATE** → **HIGH**	
LANDFORMS	• Flat Topography • Absence of Landscape Features • Open, broad extents of spaces	• Diversity in Topographical Range • Unique Landscape Features • Intimate spaces
WATERFORM	• Absence of Water	• Presence of Water • Visually prominent lakes, reservoirs, rivers streams and swamps.
VEGETATION	• Absence of vegetation • Lack of diversity • Land cleared of endemic vegetation • Low level of connection between vegetation and landscape / topography	• Abundant vegetation • High diversity • High retention of endemic vegetation. • High level of connectivity between natural landscape and landforms.
HUMAN INFLUENCE	• High population • High density in settlement • High presence of Infrastructure • High levels of landscape modification	• Low / dispersed population • No settlement • Absence of infrastructure • Landscape in natural state
ACTIVITY	• High levels of traffic movement • Presence of freight and passenger transport networks • Presence of production or industry.	• Low traffic movement • Absence of freight and passenger transport • Absence of production or industry
RARITY	• Typical landscape within a local and regional context	• Unique combination of landscape features in a local and regional context
RELATIONSHIP WITH ADJOINING LANDSCAPES	• Low visible connection with adjoining landscapes • Low variability between adjoining landscapes. • Landscape features do not contribute to amenity from adjoining landscapes	• High visibility with adjoining landscapes. • High variability and contrast with adjoining landscapes • Landscape features contribute significantly to amenity of adjoining landscapes

Table 02 - Scenic Quality Rating

2.2.2 Receptor Sensitivity Rating

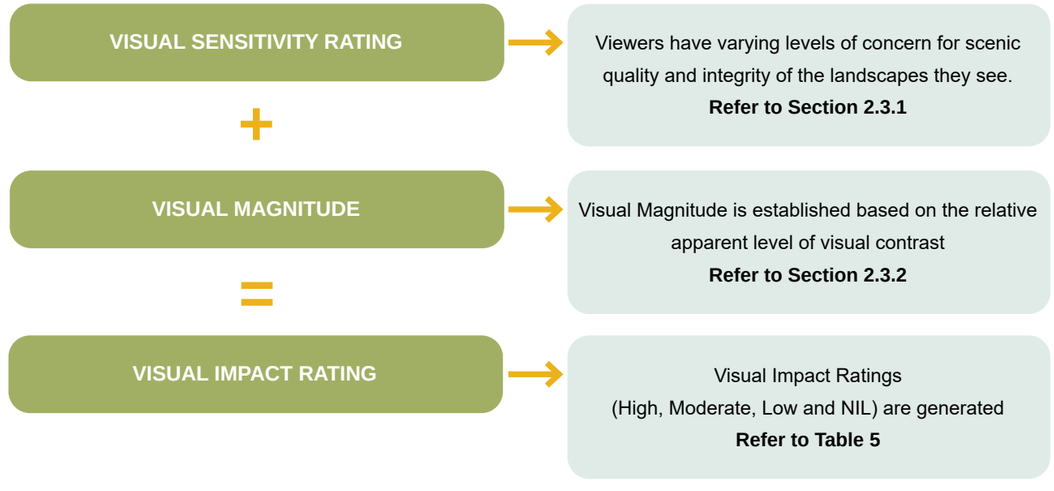
Receptor Sensitivity refers to the scenic concern of a select viewpoint based on the Land Use of that particular location (refer to Table 03). The intent is to classify the viewer sensitivity on the LCZ in which the Project is being viewed and assessed.

RECEPTOR SENSITIVITY RATING	
LOW	• Interstate and state passenger rail lines with daily daylight services • State Highways, freeways and classified main roads, classified tourist roads • Land management roads with occasional recreation traffic • Walking tracks of moderate local significance or infrequent recreation usage • Other low use and low concern receptors and travel routes • Navigable waterways
MODERATE	• Rural Dwelling • Tourist and Visitor Accommodation • Recreation, Cultural or Scenic Sites and Receptors of Regional Significance
HIGH	• Residential areas and rural villages • Recreation, cultural or scenic sites and viewpoints of National or State Significance • Any buildings, historic rural homesteads/residences on the State or local Government Heritage List

Table 03 - Receptor Sensitivity Rating

2.3 Visual Impact Assessment

The potential visual impact of the Project is then assessed based on the relationship between the visual sensitivity (refer to Section 2.3.1) and visual magnitude (refer to Section 2.3.2).



2.3.1 Visual Sensitivity

Sensitivity refers to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed nature of change (as noted in Sections 2.2.1 and 2.2.2). For example a pristine natural environment is likely to be more sensitive to a change of the nature of a four lane motorway than a built up industrial area. The design quality of the proposed development does not make the area less sensitive to change but instead affects the magnitude of the impact as described.

For example, a significant change that is not frequently seen may result in a low visual sensitivity although its impact on a landscape may be high. Generally the following principles apply:

- Visual sensitivity decreases as the viewing time decreases;
- Visual sensitivity decreases as the number of potential viewers decreases; and
- Visual sensitivity can also be related to viewer activity (e.g. A person viewing an affected Site whilst engaged in recreational activities will be more strongly affected by change than someone passing a scene in a car travelling to a desired destination).

Visual Sensitivity ratings are defined as HIGH, MODERATE and LOW based on the Scenic Quality and Receptor Sensitivity.

VISUAL SENSITIVITY

		SCENIC QUALITY LANDSCAPE CHARACTER ZONE		
		HIGH	**MODERATE**	**LOW**
RECEPTOR SENSITIVITY	**HIGH**	HIGH	HIGH	MODERATE
	MODERATE	HIGH	MODERATE	MODERATE
	LOW	MODERATE	LOW	LOW

Table 04 - Visual Sensitivity Rating Table

2.3.2 Visual Magnitude

Visual magnitude refers to the extent of change that will be experienced by receptors. Factors that are considered when assessing the magnitude of change include (AILA, 2018):

- the proportion of the view / landscape affected;
- extent of the area over which the change occurs;
- the size and scale of the change;
- the rate and duration of the change; and
- the level of contrast and compatibility.

2.3.3 Visual Impact

Visual impact refers to the change in appearance of the landscape as a result of development. (EPHC, 2010). Visual impact is the combined effect of visual sensitivity and visual magnitude. Various combinations of visual sensitivity and visual magnitude will result in HIGH, MODERATE, LOW and NIL overall visual impacts as suggested in Table 5 below

2.3.4 Visual Impact Analysis

This process involves a qualitative assessment of the conclusions of visual impact ratings for each viewpoint. The analysis takes into consideration other relevant influencing factors not easily addressed through the process of quantitative analysis.

VISUAL IMPACT RATING

		VISUAL MAGNITUDE			
		HIGH	**MODERATE**	**LOW**	**NIL**
VISUAL SENSITIVITY	**HIGH**	HIGH	HIGH-MODERATE	MODERATE	NIL
	MODERATE	HIGH-MODERATE	MODERATE	MODERATE-LOW	NIL
	LOW	MODERATE	MODERATE-LOW	LOW	NIL

Table 05 - Visual Impact Rating Table

2.4 Guidelines and Statutory Framework

The assessment will consider legislation, policies and standards relevant to LVIA, along with specific assessment criteria that have been derived for the purposes of this study. A broad review of the existing Commonwealth Legislation suggests that no policy is specifically applicable or relevant to this study. The Project is located within the Northern Midlands Council Area (LGA), and therefore, the Project should address relevant planning, landscape and visual performance objectives set out in the 2022 Northern Midlands Planning Scheme (NMPS 2022). The 'Land Use Planning and Approvals Act 1993' aims to provides a broad legal framework for preparing planning objectives, provisions and procedures in the Tasmanian Planning Scheme.

2.4.1 State Planning Provisions

The Project is zoned as Agriculture (Zone 21) under the State Planning Provisions.

The objectives of Agriculture (Zone 21) are as follows:

- *To provide for the use or development of land for agricultural use.*
- *To protect land for the use or development of agricultural use by minimising:*
  - *(a) conflict with or interference from non-agricultural uses;*
  - *(b) non-agricultural use or development that precludes the return of the land to agricultural use;*
  - *(c) use of land for non-agricultural use in irrigation districts.*
- *To provide for use or development that supports the use of the land for agricultural use.*

2.4.2 Scenic Protection Code: Northern Midlands Local Provision Schedule

Under the NMPS 2022, the Scenic Protection Code protects the Scenic Quality of nominated locations. The following Scenic Protections Areas are located in close proximity to the Project and need to be considered when defining the Scenic Quality and Visual Impact in Section 6.0 of this report: NOR-C8.1.5 (Great Western Tiers), NOR-C8.1.6 (O'Connor's and O'Connor's Sugarloaf), NOR-C8.1.7 (Pamook Hill) and NOR-C8.1.8 (Connorville). These areas will be nominated as having a high scenic quality. It is important to note that the Project is outside of these Scenic Protection Code areas, as is Transmission Line Option 1. However, Transmission route option 2.1 and 2.2 intersect with the NOR-C8.1.5 (Great Western Tiers) as illustrated in Figure 02.

The following Management Objectives apply to these Scenic Protection Areas:

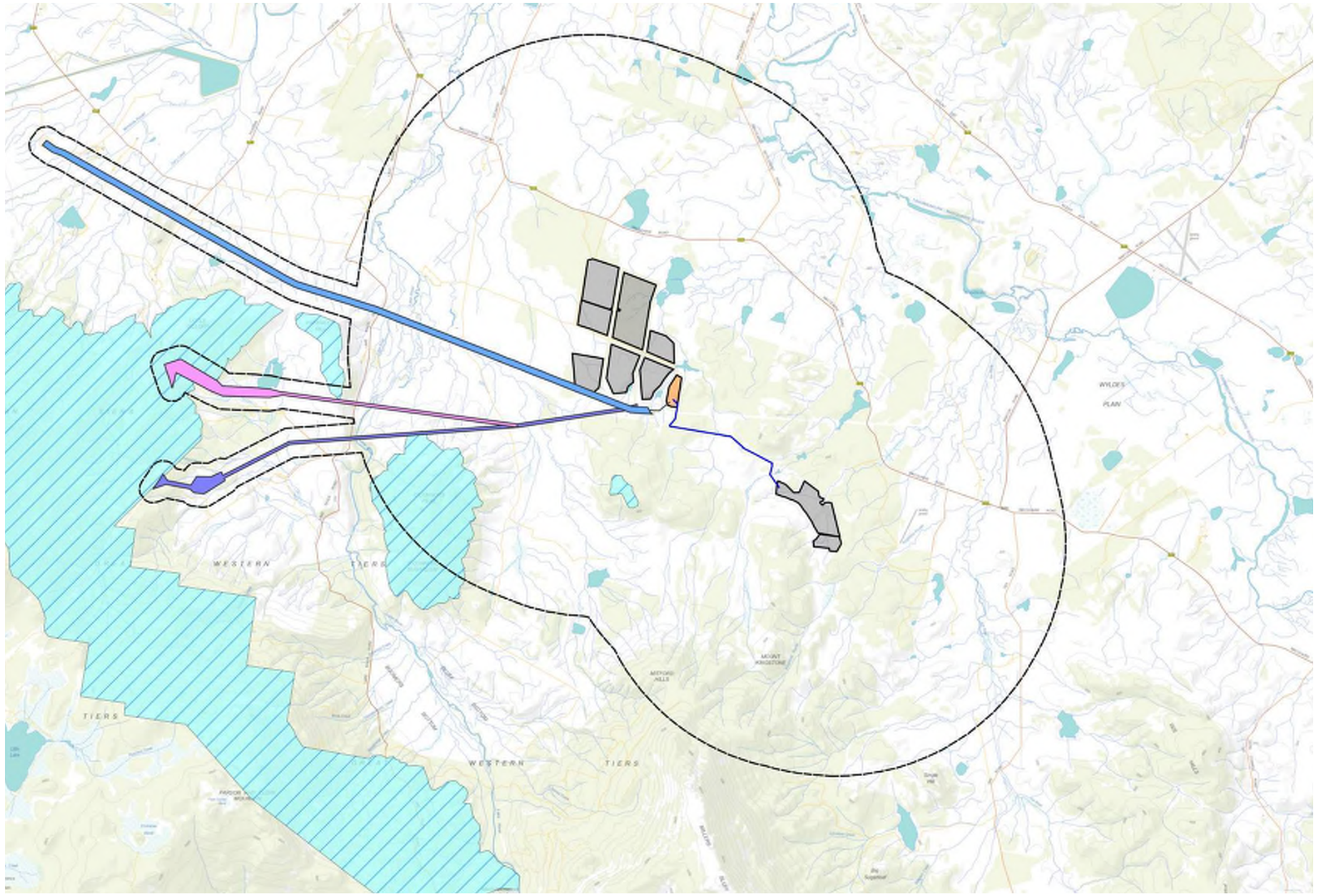
Retention of natural tree cover on skylines and existing bushland cover on elevated slopes and of pastoral views across river flood plains;
Development of land does not:
- *intrude onto skylines or river flood plains; or*
- *change the landscape character of elevated areas, pastoral scenes or*
- *river flood plain views;*

as seen from tourist corridors or through roads.

2.4.3 Renewable Energy Coordination Framework

The Tasmanian Government's vision is to increase the renewable energy sector within the state with this vision guided by the Renewable Energy Coordination Framework (RECF). This framework focuses on priority areas, also identified as 'pillars', including: integrated infrastructure, community, environmental and economic. These priorities area have associated actions that are addressed within the framework to achieve the Renewable Energy Target (RET) legislated by the Tasmanian Government. The target is to increase renewable energy output by 200% based on 2022 figures by 2040. Renewable Energy Zones (REZ) will assist in the siting of these Projects.

One of the actions within the 'Integrated Infrastructure' priority areas is the need to establish Renewable Energy Zones (REZs) as introduced by the Australian Energy Market Operator (AEMO). Currently there are three onshore REZs proposed for Tasmania including the: North West REZ, Central Highlands (Midlands) REZ and the North East REZ. Palmerston Substation will form an integral part of the proposed Central Highlands (Midlands) REZ with the Project located within this potential REZ and will connect into the grid through the Palmerston Substation.



Scenic Protection Code Areas

LEGEND

- Solar Array Extent
- Infrastructure Extent
- Proposed 220kV Transmission Line Opt 1
- Proposed 220kV Transmission Line Opt 2.1
- Proposed 220kV Transmission Line Opt 2.2
- Proposed 33kV Transmission Line
- 5000m Extent Line (Study Area)
- Scenic Protection Area

0 2 4 6 8km

Figure 02 - Scenic Protection Code Area (Source: Esri ArcGIS)

3.0 Project Overview

3.1 Project Overview

The Project includes the construction, operation and eventual decommissioning of a Solar Farm and associated infrastructure including a BESS and Transmission Lines. During its life of 30 years, the Project will produce energy for the state, increasing renewable energy production which in turn will reduce the demand for the use of fossil fuels. The Project installation utilises approximately 543 ha. The Project Footprint includes all proposed elements, i.e. the entire area covered by the PV Arrays, access tracks, 220kV transmission line, main infrastructure area, construction areas/carparking, and the internal 33kV line. Of the total Project Footprint, Solar West comprises of approximately 369.2 ha and Solar East comprises of approximately 63.1 ha.

Key infrastructure and assets associated with the Project includes:

- Solar Photo Voltaic Modules
- Single Axis tracking in 2P Format
- Battery Energy Storage System
- Internal cabling and Transmission Network (33kV) between Solar East and Solar West
- Switchyards
- Internal lane ways for maintenance and for movement of livestock
- Internal access and maintenance roads and car parking
- Operation and Maintenance offices and shed located near the main substation
- Access roads into the Project
- Three (3) Transmission Line Options are being considered to connect the Project into the National Grid. The expected height of the proposed 220kV transmission line is 35-45m (almost double the height of the existing 110kVline)

During the construction phase, temporary facilities would include a laydown area with a secure compound for security, construction site offices and amenities and car and bus parking areas for construction staff. After decommissioning, most above ground infrastructure would be removed and the site returned to its existing land capability, for continued agricultural or alternative appropriate uses.

The Project will be connected to the Grid via the Palmerston Substation located west of the Project by a new transmission line. Currently, three (3) transmission line options have been explored, only one route will be selected and developed. Option 1 is considered to have the least landscape and visual impact of the three options. The layout of the Project can be seen in Figure 03.

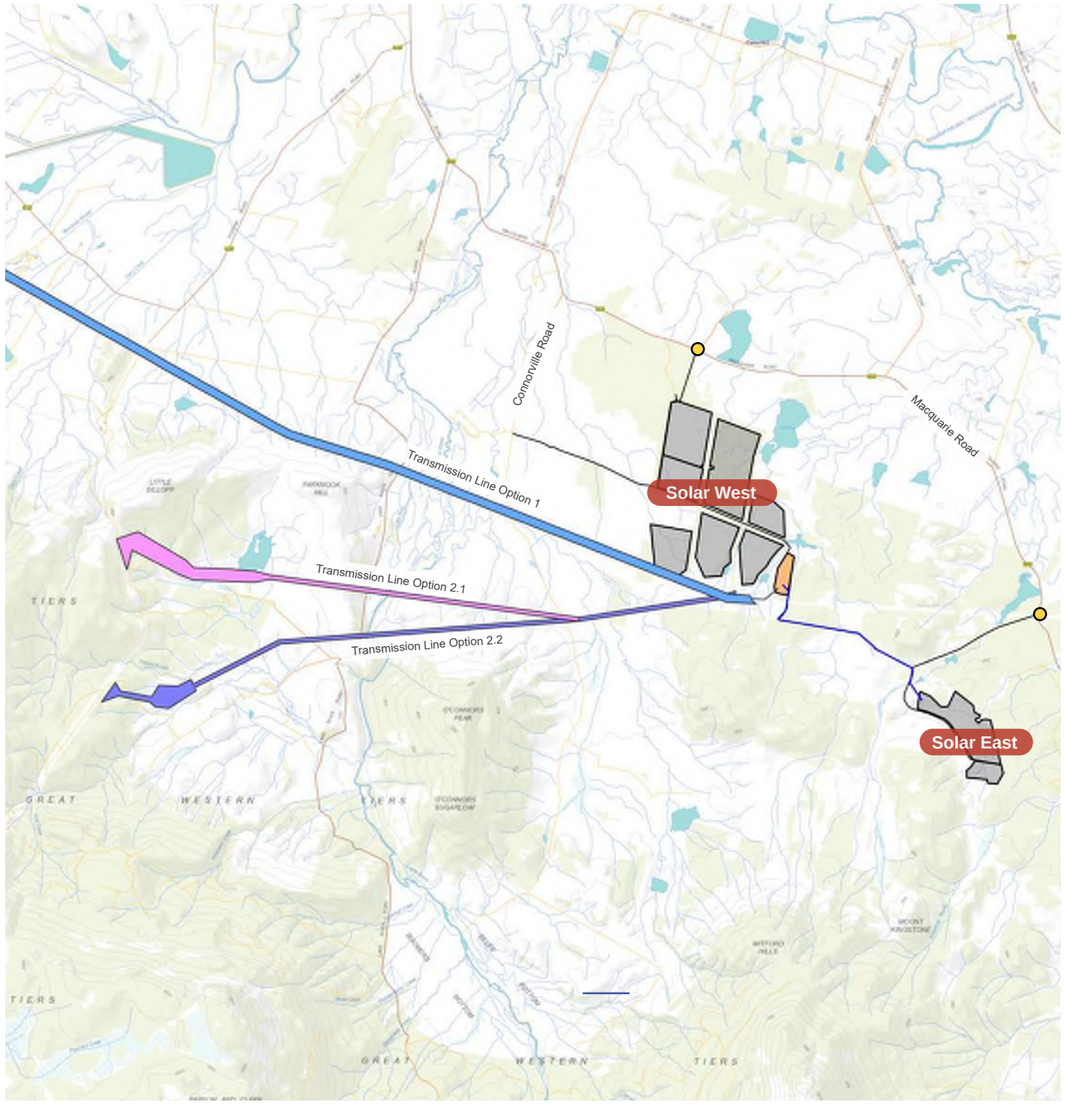


Figure 03 - Project Layout (Source: LISTmap Tasmania, January 2023)

4.0 Existing Landscape Character

4.1 Site Description

The Project is located off Macquarie Road, approximately 14 km southeast of Cressy in Tasmania. The Project is primarily zoned as Agriculture (Zone 21) under NMPS 2022 (refer to section 2.4). Currently is the Project Site is being used for agricultural practices outside the conservation protection areas which currently accessed by Connorville Road to the west of the Project (privately owned road) located off Macquarie Road running to the south.

Between the proposed solar array and infrastructure extent, the Project Site is heavily vegetated by local species protected by conservation measures under the NMPS 2022. Within the proposed extent, the land is relatively cleared with scattered vegetation visible, allowing for grazing and cropping. Observations during fieldwork confirms no residential dwellings are located within the Project Site. Lake River runs north to the south through the irrigated pastures to the west of Connorville Road. The terrain is relatively flat in this location with the land form undulating to the south and southwest. These undulations form part of the Great Western Tiers mountain range, including the O'Connors Peak (615 AHD) and Little Billopp.

An existing TasNetwork transmission line is running to the south of the Project connecting Palmerston Substation in the west to Avoca Substation to the east. Infrastructure associated with the substation such as overhead transmission lines and poles are viewed as part of the existing visual character.

For the purposes of this report, references made to the 'Study Area' is generally defined as the land up to five (5) km from the Project and also includes the proposed transmission line options as shown in Figure 04.

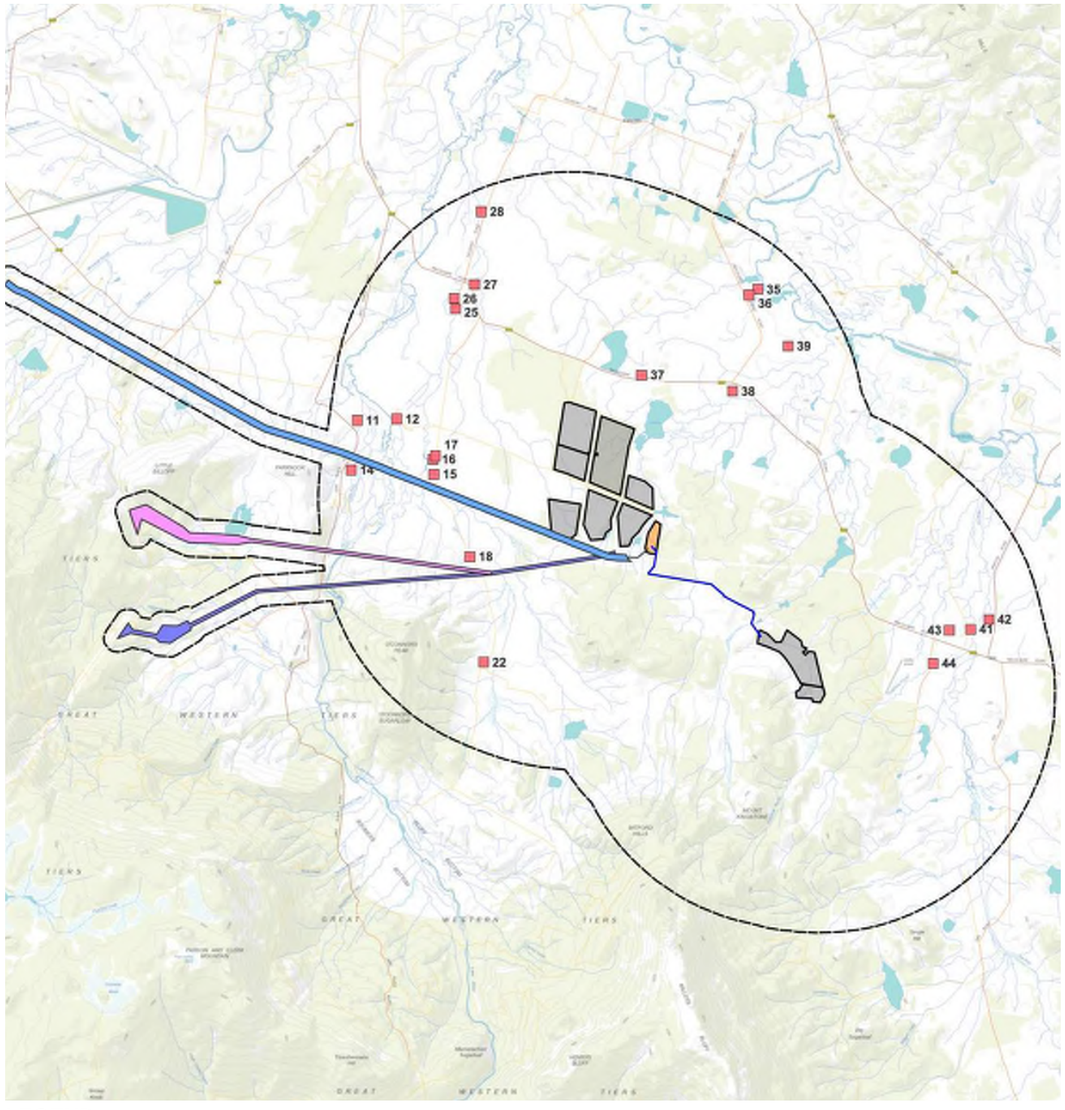


Figure 04 - Site Context (Source: LISTmap Tasmania, January 2023)

4.2 Existing Landscape Character

The surrounding character is dominated by rural properties which are generally cleared (outside the conservation protection areas) to support farming activities including irrigated pastures, grazing and cropping. The Great Western Tiers Mountain Range (GWT) is a key landscape feature of the area and is situated to the south of the Project (refer to Image 01) and is densly vegetated.

4.2.1 Topography & Hydrological Character

The Project lies within the Macquarie River Catchment. Lake River (refer to Image 02) is located approx. 3km west of the Project, and starts near Paradise Hill within the GWT, at an elevation of approx. 750m AHD, where it runs downhill to connect with the Macquarie River south of Cressy. There are no creek channels identified within the Project Area. The terrain is relatively flat to gently undulating within the agricultural areas surrounding the Project, with the topographic condition changing to the south, forming a part of the GWT. O'Connor Peak (615 AHD), which is part of the GWT is located at the northern boundary of the Tasmanian Wilderness World Conservation Area. These sites have been identified under the Scenic Protection Code (see Figure 02) as outlined in Section 2.4.2, and have been determined to enhance scenic quality.

4.2.2 Vegetation

Vegetation vcommunities, including grasslands and dry eucalyptus forests located along the GWT, are visible within the heavily vegetated nature reserves surrounding the Project (refer to Image 04). Dense vegetation is visible along Lake River corridor. Scattered trees are dotted throughout the adjoining pastures. The Project Area is generally cleared with scattered vegetation similar to those of the adjoining pastures. Established vegetation outside the extent of the conservation areas is generally associated with rural properties and riapratin corridors.

4.2.3 Infrastructure & Facilities

With the exception of rural dwellings dotted through the Study Area, there are existing energy infrastrucure elements visible within the landscape, which include transmission lines (refer to Image 06) running approx. 60 km between Palmerston Substation and Avoca Substation. This infrastructure forms part of the visual landscape character. St Marks Anglican Church (NOR-C6.1.109) to the northwest of the Project (refer to Image 03) is located within the Study Area and is listed under the NMC LPS as being of local significance.

Image 01 - Great Western Tiers Mountain Range and O'Connor Peak

Image 02 - Lake River Crossing

Image 03 - St Marks Anglican Church

4.2.4 Roads

Seven (7) roads were identified within the Study Area, these are; Macquarie Road, Connorville Road, Lake River Road, Barton Road, Rothbury Road, Quarry Road and Delmont Road. The majority of the roads are low use roads providing access to rural properties in the area. Primary access to the Project is currently via Connorville Road (privately owned). Macquarie Road is a major road connecting rural roads to the township of Cressy. The Midland Highway is located to the northeast, with Barton Road connecting Macquarie Road to the highway, a major route between Launceston and Hobart. Palmerston Substation is located off Poatina Road, providing a route to the township of Poatina and the Poatina Power Station with nearby lookout.

4.2.5 Towns

The Project is located approximately 13km southeast of Cressy. Other nearby townships located in proximity include Poatina and Campbell Town. 21 dwellings have been identified within the Study Area. Surrounding dwellings are typical rural dwellings with surrounding vegetation utilised as buffers and screening.

4.3 Key Landscape Features

Primarily, the terrain within the Study Area is relatively flat to gently undulating, supporting agricultural practices including cropping, grazing and irrigated pastures (refer to Image 05). A number of nature reserves are located near the Project, consisting of dense vegetation, specifically dry eucalyptus varieties. Infrastructure associated with farming practices and transmission lines are visible within the landscape. The GWT and nature reserves is a key landscape feature of the region, a backdrop to the township of Cressy and the Project. The relatively flat terrain in the area allows for expansive views of the GWT.

Image 04 - Typical Conservation Area within the Study Area off Lake River Road

Image 05 - Typical Irrigated Pastures within Study Area

Image 06 - Transmission Line adjoining Macquarie Road

4.0 Existing Landscape Character

Image 07 - Landscape Character (Project Area Note: for visual purposes only - refer to Figure 2 'Project Layout')

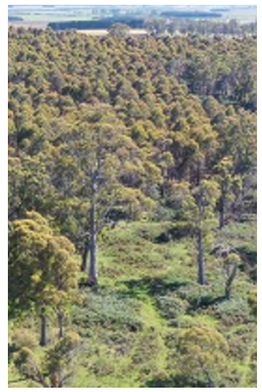
4.4 Landscape Character Zones

As assessment of existing land use and landscape features suggests the Study Area and surrounds consist of infrastructure associated with energy production, agricultural activities and pockets of dense vegetation. A number of Landscape Character Zones (LCZs) exist within the Study Area as shown in Figure 05, with four (4) key landscape typologies being identified.

Table 06 provides an overview of each LCZ and Scenic Quality Ratings that have been applied using the 'Frame of Reference'. These ratings have been developed to form part of the assessment in determining the Visual Sensitivity as described in (Section 2.0).

LCZ01

LCZ02



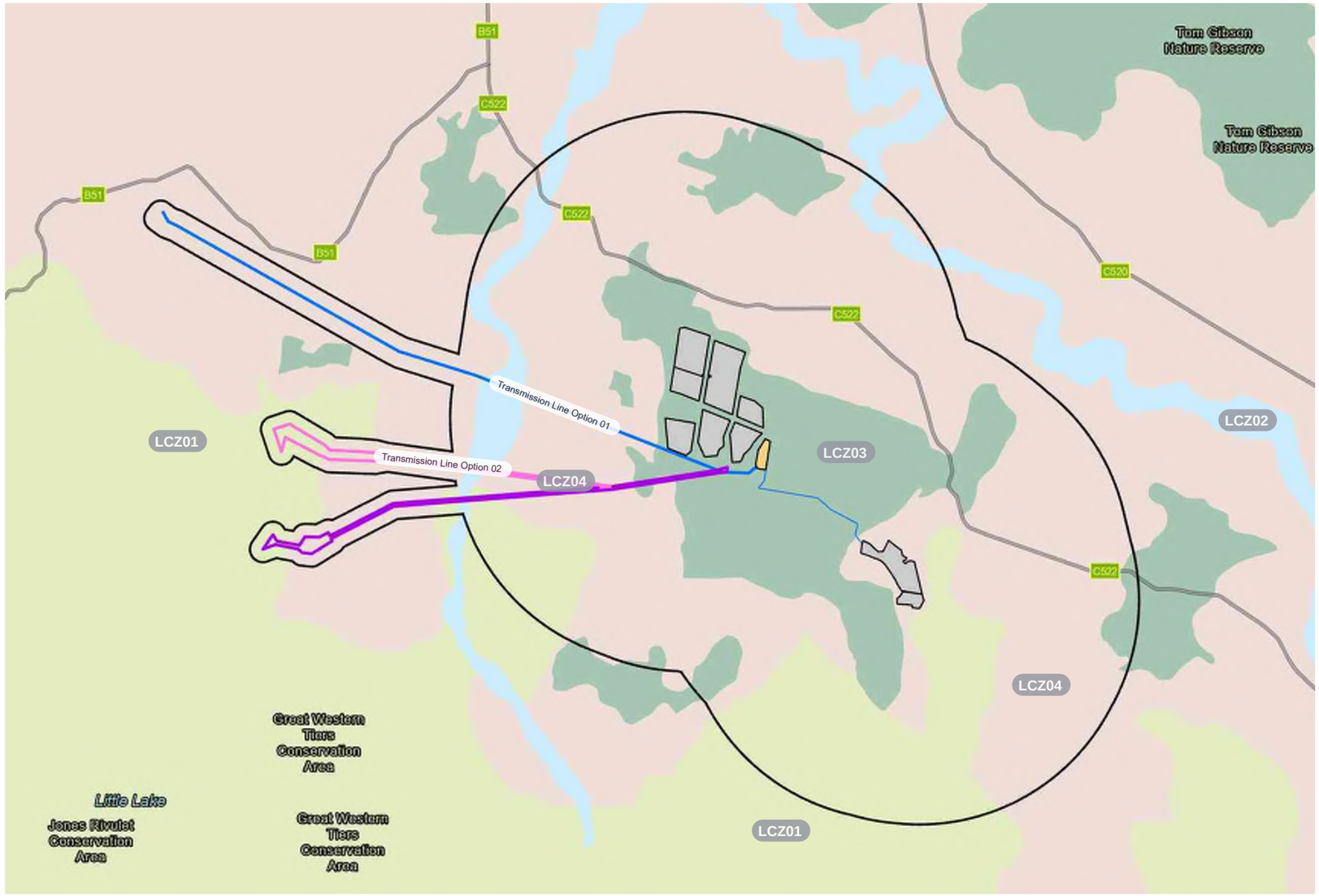
LCZ03

LCZ04

LANDSCAPE CHARACTER ZONES

LCZ	NAME	GENERAL CHARACTER		Application of Scenic Quality Rating Frame of Reference							SCENIC QUALITY RATING
				Landform	Waterforms	Vegetation	Human Influence	Activity	Rarity	Relationship with Adjoining Landscapes	
LCZ01	Great Western Tiers & Undulations	Key landscape feature of the area. The Great Western Tiers mountain range, the northern part of the Tasmanian Wilderness Conservation Area, is a backdrop to the valley and to the township. Terrain is undulating throughout this area, with dense vegetation consisting of dry eucalyptus varieties along the undulations.	H				●	●	●	●	HIGH
			M		●	●					
			L								
LCZ02	Rivers	Lake River, apart of the Macquarie River Catchment runs downhill from the Great Western Tiers mountain range to the Macquarie River to the south of Cressy. Grasslands and scattered vegetation running along the river banks.	H		●						MODERATE
			M			●	●	●	●	●	
			L	●							
LCZ03	Conservation Areas & Dense Vegetation	Typically consists of vegetation conservation areas/reserves with similar established vegetation seen in LCZ01 along the undulations. Relatively flat terrain throughout, with dense vegetation visible. Typically adjoining pastures and farming areas.	H			●					MODERATE
			M	●			●	●	●	●	
			L		●						
LCZ04	Farming & Pastures	Relatively flat and land clear of vegetation being used for agricultural practices including grazing and cropping. Minimal vegetation visible in this location.	H								LOW
			M		●		●				
			L	●		●		●	●	●	

Table 06 - Landscape Character Zones & Scenic Quality Rating



Landscape Character Zones

LEGEND

- LCZ01 - Great Western Tiers and Undulations
- LCZ02 - Rivers
- LCZ03 - Nature Reserves and Dense Vegetation
- LCZ04 - Farming and Pastures
- 5000m Extent Line (Study Area)
- Proposed 220kV Transmission Line
- Proposed 33kV Transmission Line

Figure 05 - Landscape Character Zones (Source: Esri ArcGIS)

5.0 Zone of Visual Influence

5.1 Overview of Zone of Visual Influence

An initial visibility assessment was undertaken utilising Zone of Visual Influence mapping (refer to Figure 06). This tool assists in defining the theoretical areas from which the Project would have potential visibility and create the 'Visual Catchment'.

The Zone of Visual Influence (ZVI) represents the area over which a development can theoretically be seen, and is based on a Digital Terrain Model (DTM). The ZVI is a desktop tool intended to make the fieldwork more efficient by clearly excluding areas that are screened by topography. Considerable field assessment is then undertaken predominantly within the areas where potential for impact exists.

The ZVI usually presents a bare ground scenario - i.e. a landscape without screening, structures or vegetation, and is usually presented on a base map. It is also referred to as a zone of theoretical visibility (The Landscape Institute and the institute of Environmental Management and Assessment, 2013). As accurate information on the height and coverage of vegetation and buildings is unavailable, it is important to note the ZVI is based solely on topographic information. Therefore, this form of mapping should be acknowledged as representing the worst case scenario.

5.2 Summary of Zone of Visual Influence

The Zone of Visual Influence (ZVI) was prepared based on the Project at a maximum assumed height of 3.8 metres to represent the worst case scenario. The ZVI indicates the potential to view the Project (higher than 25% potentially visibility) to the immediate north, west and southwest of the Project. It is crucial to note that the ZVI is based solely on topographical information and represents a bare ground scenario - i.e. a landscape without screening, vegetation or structures.

As the figure illustrates, no dwellings having potential views of over 50% based on topography alone. Topography will screen views four (4) dwellings within the Study Area. Five (5) dwellings were identified as having 26-50% of potential visibility, and 12 dwellings were identified as having 1-25% of potential visibility of the Project. The ZVI has been used to identify areas of potentially high visibility which informed the viewpoint analysis (refer to Section 6.0) and identify dwellings requiring detailed assessment.

As discussed previously, the proposed transmission options are keeping in with existing character visible on within the Study Area. Therefore, the potential visual impact is likely to be low.

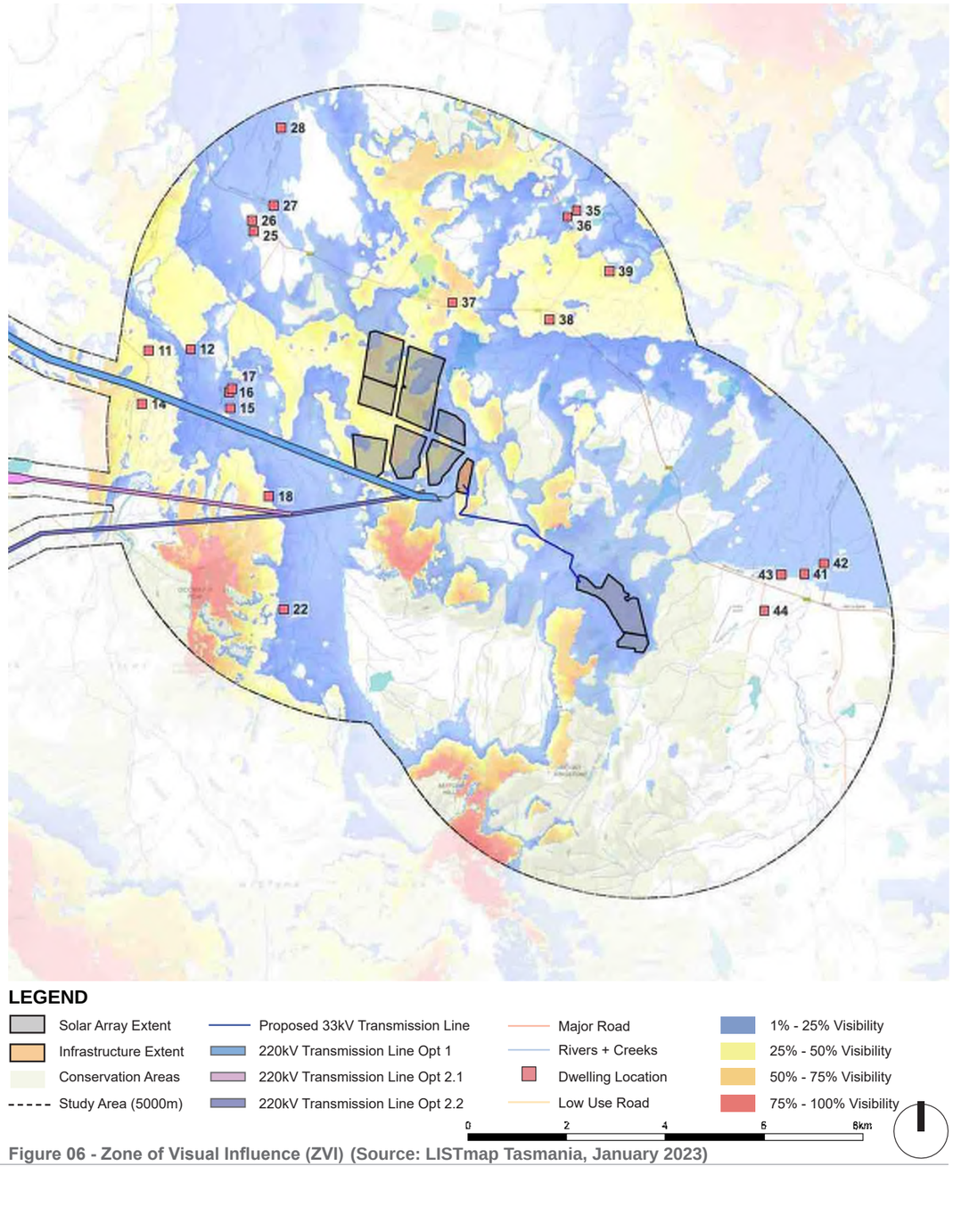


Figure 06 - Zone of Visual Influence (ZVI) (Source: LISTmap Tasmania, January 2023)

6.0 Viewpoint Analysis

6.1 Viewpoint Analysis Methodology

The viewpoint analysis considers the likely impact of the Project on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints.

Once the viewpoints were selected, panoramic photographs were taken on a level tripod at a height of 150cm (to represent eye level). Photographs were taken with a Canon EOS 5D Mark IV Full Frame digital SLR through a 50mm fixed focal lens which closely represents the central field of vision of the human eye.

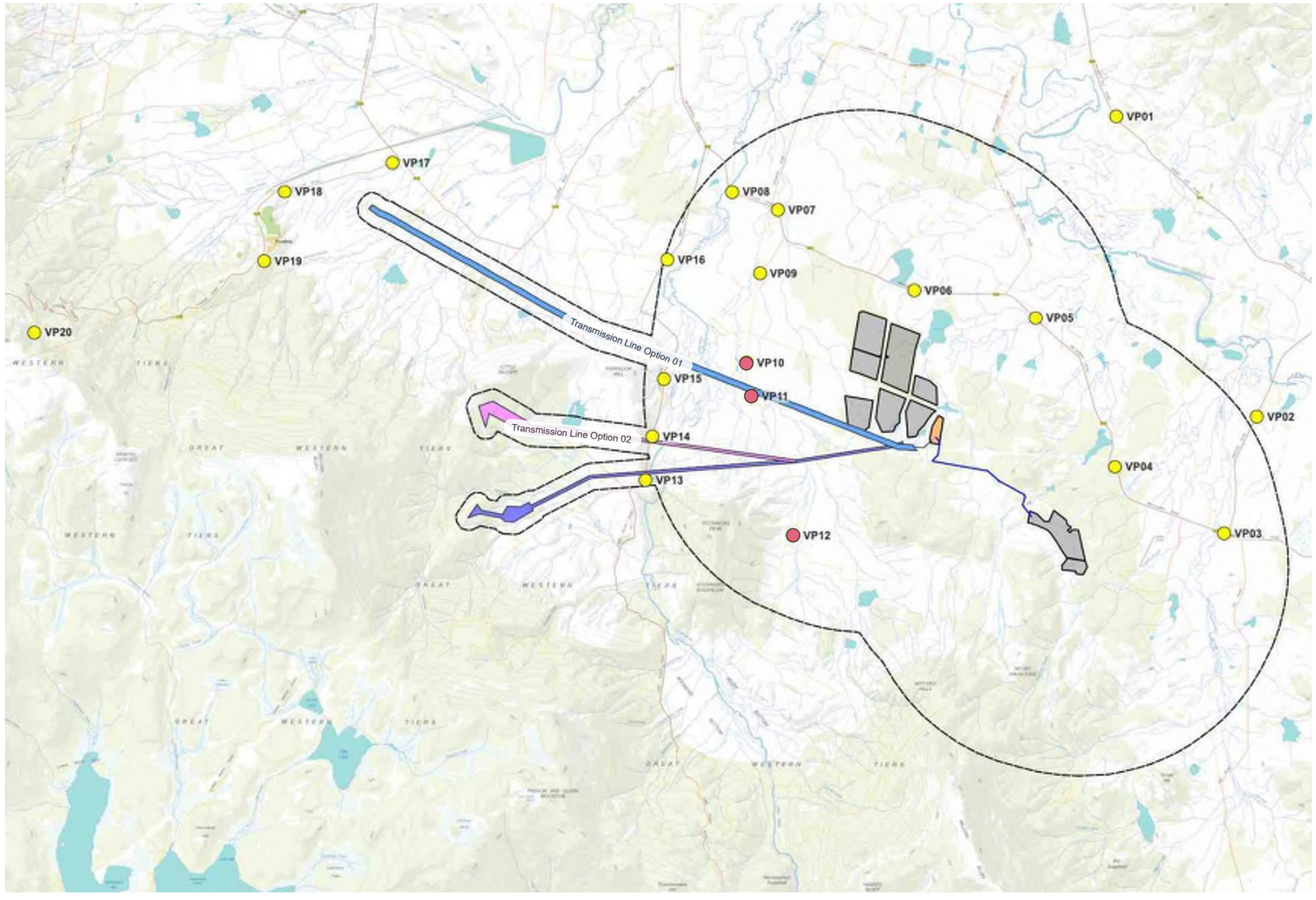
The visual impact of the viewpoint was then assessed both on site and with the topographic and aerial information to ensure accuracy. For each viewpoint, the potential visual impact was analysed through the use of a combination of the 3D terrain modelling, topographic maps and on site analysis. Viewpoint photographs and analysis is included in the following pages. The findings of the viewpoint analysis have been quantified and are summarised in Table 07.

6.2 Viewpoint Selection Process

The locations of the viewpoints have been identified in Figure 07. A total of 20 viewpoints, 17 from publicly accessible land and three (3) from private property, have been carefully selected to be representative of the range of views within the study area. The selection of viewpoints is informed by topographical maps, fieldwork observations and other relevant influences such as access, landscape character and the popularity of vantage points.

Viewpoints are selected to illustrate a combination of the following:

- Areas of high landscape or scenic value
- Visual composition (e.g. focused or panoramic views, simple or complex landscape pattern)
- Range of distances
- Varying aspects
- Various elevations
- Various extent of development visibility (full and partial visibility)
- Views from major routes



Viewpoint Locations

LEGEND

- Public Viewpoint Locations
- Private Viewpoint Locations
- 5000m Extent Line (Study Area)
- Proposed 220kV Transmission Line Opt 1
- Proposed 220kV Transmission Line Opt 2.1
- Proposed 220kV Transmission Line Opt 2.2
- Proposed 33kV Transmission Line
- Solar Array Extent
- Infrastructure Extent

Figure 07 - Viewpoint Locations (Source: LISTmap Tasmania, January 2023)

6.3 Overview of Viewpoint Analysis

As discussed in the rationale for the viewpoint selection process, these viewpoints are representative of the worst case scenario. For each viewpoint, the potential visual impact was analysed through a combination of topographic maps and on site analysis.

The visual sensitivity and visual magnitude of each viewpoint have been assessed which, when combined, results in an overall visual impact for the viewpoint (refer to Table 07).

Of the 20 viewpoints assessed as part of this LVIA, 14 viewpoints were determined to have a visual impact rating of ‘nil’, two (2) were rated as ‘low’ and four (4) were rated as ‘moderate’ as the scenic quality of the region was generally high due to the ‘Scenic Protection Areas’ to the south of the Project.

It is noted that visual impacts associated with the Project are likely to be higher during the construction phases and ultimately achieve a low or negligible visual impact level when the Project is constructed. The incorporated mitigation measures outlined in Section 11 of this report seek to avoid, reduce and where possible remedy adverse visual magnitudes arising from the proposed development.

Generally, the viewpoints rated as having a ‘moderate’ visual impact were taken in close proximity of the Project viewing onto ‘Scenic Protection Areas’ that are of high scenic quality. The viewpoints that were rated as ‘low’ impact contained limited views to the Project, adequate screening or roadside vegetation which obscures most views.

For a detailed viewpoint assessment refer to **Appendix B**

VIEWPOINT	LOCATION	SCENIC QUALITY RATING	RECEPTOR RATING	**OVERALL VISUAL SENSITIVITY**	**VISUAL MAGNITUDE**	**POTENTIAL VISUAL IMPACT** (WITHOUT MITIGATION)	RECOMMENDED MITIGATION	**POTENTIAL VISUAL IMPACT** (WITH MITIGATION)
VP01	Mount Joy Road, Cressy	HIGH	HIGH	**HIGH**	**LOW**	**MODERATE**	Project is in excess of 5 km from this location. Mitigation measures along the northern perimeter will limit views of the Project	**Low**
VP02	Barton Road, Campbell Town	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP03	Macquarie Road, Campbell Town	HIGH	LOW	**MODERATE**	**NIL**	**NIL**	Not Required	**NIL**
VP04	Macquarie Road, Campbell Town	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP05	Macquarie Road, Cressy	MODERATE	MODERATE	**MODERATE**	**NIL**	**NIL**	Not Required	**NIL**
VP06	Macquarie Road, Cressy	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP07	Macquarie Road, Cressy	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP08	Macquarie Road, Cressy	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP09	Connorville Road, Cressy	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP10	Connorville Road, Cressy	MODERATE	LOW	**LOW**	**LOW**	**LOW**	Not Required.	**NIL**
VP11	Connorville Road, Cressy	LOW	LOW	**LOW**	**LOW**	**LOW**	Not Required. Views from Private Road associated with the Project	**NIL**
VP12	Connorville Road, Cressy	LOW	LOW	**LOW**	**NIL**	**NIL**	Not Required. Views from Private Road associated with the Project	**NIL**
VP13	Lake River Road, Cressy	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required. Views from Private Road associated with the Project	**NIL**
VP14	Lake River Road, Cressy	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**
VP15	Lake River Road, Cressy	HIGH	HIGH	**HIGH**	**LOW**	**MODERATE**	Not Required	**NIL**
VP16	Lake River Road, Cressy	HIGH	HIGH	**HIGH**	**LOW**	**MODERATE**	Not Required	**NIL**
VP17	Poatina Road, Cressy	HIGH	HIGH	**HIGH**	**LOW**	**MODERATE**	Not Required	**NIL**
VP18	Poatina Road, Poatina	HIGH	HIGH	**LOW**	**NIL**	**NIL**	Not Required	**NIL**
VP19	Gordon Road, Poatina	MODERATE	MODERATE	**MODERATE**	**NIL**	**NIL**	Not Required	**NIL**
VP20	Poatina Road Lookout, Poatina	HIGH	HIGH	**HIGH**	**NIL**	**NIL**	Not Required	**NIL**

*Please note the Viewpoint Visibility Assessment Summary is based on the visibility assessment criteria outlined in Section 2.1 of this report.

Table 07 - Viewpoint Visual Impact Summary

7.0 Photomontages

7.1 Photomontage Development

A photomontage is a visualisation based on the superimposition of an image (i.e. building, road, landscape addition etc.) onto a photograph for the purpose of creating a realistic representation of proposed or potential changes to a view. (Horner and Maclennan et al, 2006). Photomontages have been utilised in this LVIA to assist in the impact assessment of the Project.

7.1.1 Photomontage Development Process

Photomontages are representations of the Project that are superimposed onto a viewpoint taken while on fieldwork to represent the visual impact of the Project on that select viewpoint location. The process for generating these images involves computer generation of a wire frame perspective view of the Project. This process includes:

- Capturing a viewpoint with a Canon EOS 5D Mark IIII digital SLR through a 50mm fixed focal lens which closely represents the central field of vision of the human eye.
- Build wireframe model of the Project.
- Match wireframe model to viewpoint location using Windpro to superimpose onto viewpoint image.
- Render model into a viewpoint image to create a realistic level illustrating the scale and position of the Project in relation to the reception from that viewpoint location.

The photo simulations based on photography from typical sensitive viewpoints are included within the following analysis section.

7.1.2 Photomontage Selection Process

Five (5) photomontages of the Project within the existing context were selected as key views and represent general visibility of the Project. Photomontages have been prepared for Viewpoint VP01, VP10, VP15, VP17 and VP19 (refer to Figure 08). When undertaking a LVIA, viewpoints selected for the preparation of photomontages are generally those viewpoints determined to have a higher visual impact rating (refer to Section 06). These viewpoints generally had a low visual magnitude due to the elevated position or in close proximity to the Project and/or associated infrastructure. A combination of topography and intervening vegetation results in the Project being indiscernible from other viewpoint locations assessed as having a negligible to nil impact. For photomontages refer to Appendix C.

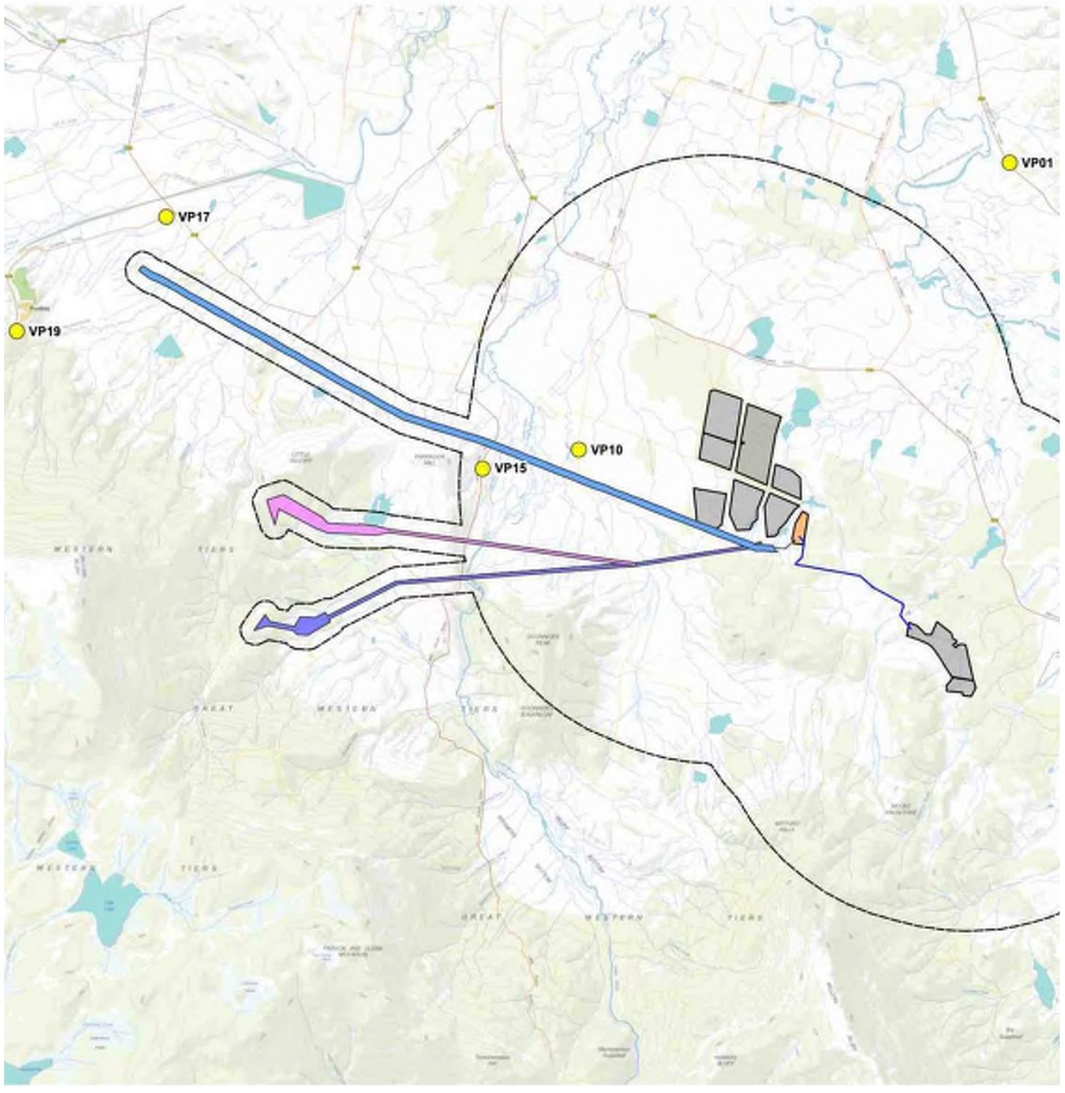


Figure 08 - Photomontage Locations (Source: LISTmap Tasmania, January 2023)

8.0 Visual Impact Assessment

8.1 Overview of Visual Impacts

In addition to the photographic viewpoint assessment, the following section provides an overview of the potential visibility from areas surrounding the Site and how the requirements of various regulatory frameworks are being met. This is by no means an exhaustive description of the visibility from every locality, it is intended to provide an overall assessment of the potential visual impact on areas potentially affected by the Project.

8.2 Overview of Visual Impact on Public Land

The Project overall will result in a 'Low to Moderate' modification to the existing visual landscape character. The Project is in compatibility with the existing energy production infrastructure present within the landscape. There are very limited opportunities to view the Project from publicly accessible land and roads, including the majority of Macquarie Road, Connorville Road and Lake River Road.

Photomontages representing key viewpoints where the receptor is located at a higher elevation or close to the Project are likely to view the Project or a part of the Project have been prepared. Scenic Protection Areas located south of the Project identified a higher viewer sensitivity associated with these receptors. However, as the Project is unlikely to alter the existing visual landscape, it therefore presents a 'Low' visual magnitude rating (refer to Section 2.4.2).

The proposed associated infrastructure, specifically transmission line option 1 connecting the Project to Palmerston Substation, will have a low visual change to the landscape as it aligns with the existing transmission line which already forms part of the existing visual landscape. Options 2.1 and 2.2 are located at a further distance from existing transmission lines, with option 2.1 also encroaching into the Scenic Protection Area, therefore option 1 is preferred. There are minimal opportunities for nearby dwellings or public receptors to view the Solar Farm due to the terrain and dense vegetation surrounding the solar array extent. Overall the Project achieves the objectives outlined in the 'Scenic Protection Area' as it does not affect views of the ridgeline or alter the pastoral and river views within the landscape.

8.3 Visual Impact Rating Methodology for Residences

Moir LA have developed a framework for defining and rating the level of visual effect from each dwelling.

The framework in Table 04 has been prepared with regards to the third edition of the Guidelines for Landscape and Visual Impact Assessment (GLVIA3), Residential Visual Amenity Assessment (RVAA) and Moir LA's extensive professional experience in undertaking LVIA's. Published in 2013, the GLVIA3 is well established as providing 'best practice guidance' when undertaking an LVIA. RVAA is a stage beyond LVIA and focuses exclusively on private views and private visual amenity. Considerations outlined in the RVVA provide a framework for describing and evaluating the predicted magnitude of visual change and related visual amenity effects, which includes:

- *Distance of property from the proposed development having regard to its size / scale and location relative to the property (e.g. on higher or lower ground);*
- *Type and nature of the available views (e.g. panoramic, open, framed, enclosed, focused etc.) and how they may be affected, having regard to seasonal and diurnal variations;*
- *Direction of view / aspect of property affected, having regard to both the main / primary and peripheral / secondary views from the property;*
- *Extent to which development / landscape changes would be visible from the property (or parts of) having regard to views from principal rooms, the domestic curtilage (i.e. garden) and the private access route, taking into account seasonal and diurnal variations;*
- *Scale of change in views having regard to such factors as the loss or addition of features and compositional changes including the proportion of view occupied by the development, taking account of seasonal and diurnal variations;*
- *Degree of contrast or integration of new features or changes in the landscape compared to the existing situation in terms of form, scale and mass, line, height, colour and texture, having regard to seasonal and diurnal variations;*
- *Duration and nature of the changes, whether temporary or permanent, intermittent or continuous, reversible or irreversible etc. and*
- *Mitigation opportunities – consider implications of both embedded and potential further mitigation.*

(Source: RVVA, 2019)

8.4 Overview of Dwellings

Dwellings within 2 km:

The assessment identified a total of 21 dwellings located within two (2) km of the Project. For the purpose of this LVIA, all dwellings have been assigned an ID (refer to Figure 06) and an assessment from each has been outlined in Appendix A.

Of the 21 dwellings, 15 dwellings have been identified as having a 'nil' visual impact as the Project will not be visible due to a combination of intervening topography or existing vegetation. The remaining six (6) dwellings have been identified as having a 'low' visual impact as these dwellings are located at a higher elevation and/or have reduced vegetation screening between the dwelling and the Project. It is important to note that the visual impact assessed at these dwellings is due to the proposed transmission line and thus will have minimal alteration to their visual landscape, as vegetation surrounding their dwelling will filter majority of views to the Project.

Refer to Appendix A - Dwelling Assessment Table for each dwelling's visual impact rating within two (2) km as per the criteria highlighted in Table 08.

DWELLING VISUAL IMPACT RATING				
	NIL	LOW	MODERATE	HIGH
Distance	The project will not be visible.	The Project may be visible in distance or very partially visible in the foreground.	The Project maybe visible in the middle ground or a small extent may be visible in the near ground.	The Project will be highly visible in the foreground.
Type of views		Views from the dwelling are not focused on the Project.	Views from the dwelling are not focused entirely on the Project.	Views are focused directly towards the Project.
Direction of view		The Project may be visible in peripheral views or form a very minor element in primary views.	The Project may be visible from, yet will not dominate primary views.	The Project will be highly visible and has the potential to be a dominant element in primary views from the property.
Extent of visibility		The Project may be partially visible or fragmented.	The Project may be visible from the dwelling yet will not significantly alter the existing visual character.	The Project has the potential to significantly alter the existing visual character when viewed from the dwelling.
Scale of change		The Project may be visible yet will not change to the existing visual character.	The Project has the potential to become a noticeable element in the view, yet will not overly diminish the existing visual character.	The Project has the potential to alter the existing visual character.
Degree of contrast		The Project will have a low level of contrast with the existing landscape.	The Project will result in a moderate level of contrast with the existing landscape.	The scale of the Project will result in a high level of contrast with the existing landscape.
Duration of change		Changes are temporary.	Changes to the landscape have the potential to be reduced over time (with the employment of mitigation methods).	Changes to the landscape are continuous and / or irreversible.
Mitigation Options		Existing screening factors contribute to reducing the potential visibility.	Some existing screening factors may contribute to fragmenting the Project or there is opportunity to screen the Project.	Limited opportunities to screen the Project.

Table 08 - Dwelling Visual Impact Rating

9.0 Nightlighting

9.1 Overview of Potential Night Lighting Sources

Due to the location of the Project, very little existing sources of lighting are present in the night time landscape of the Study Area. Existing lighting associated with homesteads and motor vehicles is dispersed around the Study Area. Isolated receptors within the Study Area experience a dark night sky with minimal light sources. The impact of night lighting is unlikely to be experienced from inside of a dwelling as internal lights reflect on windows and limit views to the exterior at night time.

The requirements for night lighting on Ancillary Infrastructure is generally limited to security lighting to the Substation and within the operations and maintenance facility. The light sources are limited to low-level lighting for security, night time maintenance and emergency purposes. There will be no permanently illuminated lighting installed. The proposed ancillary infrastructure has been carefully sited to minimise visibility from existing residences and publicly accessible viewpoints. It is unlikely the proposed night lighting associated with the ancillary infrastructure would create a noticeable impact on the existing night time landscape.

9.2 Design Principles

The following recommendations have been developed with consideration of the principles outlined in relevant best practice guidelines for lighting design. The Dark Sky Planning Guidelines have been developed by the Department of Planning and Environment (June 2016) provide guidelines for lighting practices that support the maintenance of a dark sky and improve lighting practice. The guidelines are related to projects within 200 km of the Siding Spring Observatory, however they provide relevant guidance to reduce potential light pollution can be applied to lighting design for the Ancillary Infrastructure for the Project. *The Australian Government Department of the Environment and Energy, National Light Pollution Guidelines for Wildlife: Including marina turtles, seabirds and migratory shorebirds, January 2020 Version 1.0* may also be considered during the detailed design phase. It is likely there will be limited or no visual impacts resulting from night lighting of Ancillary Structures.

1. Control the Level of Lighting

- Only use lighting for areas that require lighting i.e.. paths, building entry points.
- Reduce the duration of lighting:
- Switch off lighting when not required
- Consider the use of sensors to activate lighting and timers to switch off lighting

2. Lighting Design

- Use the lowest intensity required for the job
- Use energy efficient bulbs and warm colours
- Direct light downwards to eliminate
- Ensure lights are not directed at reflective surfaces
- Use non-reflective dark coloured surfaces to reduce reflection of lighting (Figure 09)
- Keep lights close to the ground and / or directed downwards (Figure 10)
- Use light shield fittings to avoid light spill (refer to Figure 11).

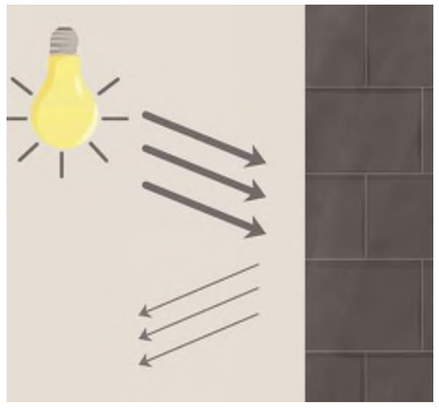


Figure 09 - Surface Reflectivity
(Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife 2020)

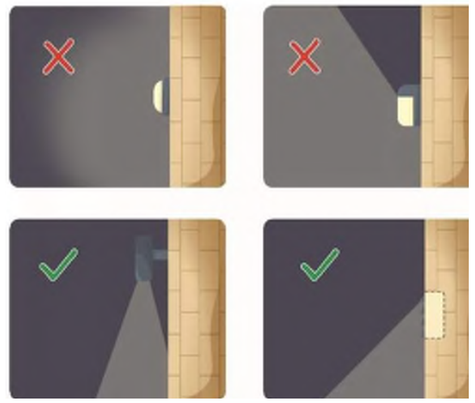


Figure 10 - Downward
(Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife 2020)

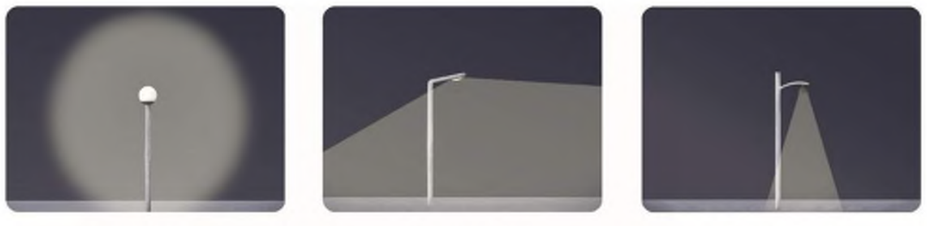


Figure 11 - Light Shielding
(Source: Department of Environment and Energy National Light Pollution Guidelines for Wildlife 2020)

10.0 Cumulative Visual Impacts

10.1 Assessment of Cumulative Visual Impact

Cumulative landscape and visual effects result from additional changes to the landscape or visual amenity caused by the proposed development in conjunction with other developments (associated with or separate to it) or actions that occurred in the past, present or are likely to occur in the foreseeable future (Landscape Institute et al, 2013). Cumulative effects may also affect the way a landscape is experienced and can be positive or negative. Where they comprise benefits, they may be considered to form part of the mitigation measures.

A cumulative impact assessment has several dimensions:

- The impact of the proposed development when added to the combined impacts of all other existing developments and environmental characteristics of the area.
- The impact of this development in the context of the potential for other infrastructure developments in the local, regional and national context.
- The impact of developments which are ancillary to or otherwise associated with the proposed Facility eg. the development of substations and associated infrastructure.

The potential cumulative visual impact must also be assessed in relation to the potential visual impact when viewed sequentially. If the Project is viewed in succession as a traveller moves through the landscape (eg. motorist travel routes) this may result in a change in the overall perception of the landscape character. The viewer may only see one development at a time, but if each successive stretch of the road is dominated by views of a development, then that can be argued to be a cumulative visual impact (EPHC, 2010).

10.2 Assessment of Associated Infrastructure

In addition to the proposed PV arrays, the associated infrastructure (as described in Section 3.0 of this report) has the potential to contrast with the existing visual landscape. Due to a relatively low scale and siting of the Project, access roads, transmission lines and other ancillary structures are unlikely to alter the existing visual landscape. An overview of the potential visual impact resulting from associated infrastructure and Project components is provided below.

A summary of the proposed infrastructure associated with the development can be found in Section 3.0. Section

10.2.1 Main Solar Farm Substation and Eastern Solar Farm switchyard

The Collector Substation to the northwestern corner of the Solar Farm East block will take up an area 2,500 m2 once built and the main substation to the southeastern corner of the Solar Farm that will connect to the Palmertson station will be 12,500 m2. If deemed necessary during the detailed design phase, mitigation methods such as screen planting could be employed to reduce any potential visual impacts. Due to its isolated location of the switchyard, within the Project Site, the potential visual impact has been rated as negligible. Colour scheme and materiality used in the construction of the Substation are in keeping in with the general character of the area.

The proposed switchyard Area at Solar West is 100m x 125m. At Solar East it is 50m x 50m. Colour scheme and materiality used in the construction of the switching station are in keeping in with the general character of the area.

10.2.2 Transmission Lines

Transmission lines and poles feature in the existing landscape and form part of the existing landscape character of the area. A 220 kV double circuit overhead transmission line to Palmerston Substation is being considered. Currently, three (3) route options have been explored for the transmission line connection. A 33kV transmission line is being considered to connect the Solar East and Solar West.

The proposed transmission lines and poles will form part of the existing visual character thus having a negligible visual impact from the associated infrastructure. The resulting visual impact would be rated as low.

Work and Laydown areas will be kept to a minimum ensuring little environmental damage.

10.2.3 Site Access and Facilities

Site access is proposed off Macquarie Road using existing tracks and roads. The proposed access routes are proposed to utilise existing farm roads within the study area and are not additional visual elements.

Facilities for the operation of the Project include an operations and maintenance facility including staff office, meeting facilities and amenities, storage facilities, workshops and car parking facilities. The appearance of these facilities are in keeping with existing farms structures within the landscape.

Recommendations to minimise any potential visual impacts of these facilities have been included in Section 11.0

10.3 Cumulative Impact on Broader Landscape Character

The development of large-scale renewable energy projects within a region has the potential to alter the perception of the overall landscape character irrespective of being viewed in a single viewshed. It is important to determine whether the effect of multiple renewable projects within the region would combine to become the dominant visual element, altering the perception of the general landscape character.

At the time of lodgement no other renewable energy projects were identified within the general Study Area of the Project.

11.0 Mitigation Recommendations

11.1 Recommended Mitigation Methods

Opportunities to view the Project are limited from within the Study Area. As a result, there are no areas likely to experience unacceptable visual impacts

11.1.1 Design Considerations

Good design principles employed through the Project design phase can significantly reduce the visual impact. These include the siting principles, access, layout and other aspects of the design which directly influence the appearance of the proposed development. The following outlines the design considerations that have been applied to the site:

- The design will retain the existing roadside planting where possible along the eastern and southern boundary of the site to reduce the overall visual impact.
- Consideration will be given to the colours of the battery facility, O&M buildings and storage shed to ensure minimal contrast and to help blend into the surrounding landscape to the extent practicable (see Image 08).
- Existing vegetation generally present around the Site will be retained and protected to maintain the existing level of screening.
- Consideration should be given to controlling the type and height of the battery facility and storage shed to ensure the development does not contrast significantly with surrounding landscape.
- The proposed transmission line options are keeping in with the existing landscape character and does not take away from the existing visual character. Therefore mitigation recommendations have not been proposed.

Image 08. Example of a building colour palette sympathetic to the surroundings

11.1.2 Landscape Principles

To ensure that the screen planting integrates into the existing landscape character, the bands should be planted with fast growing small trees and bushes, and low lying vegetation to ensure a naturalistic effect. Plant species are to be selected in keeping with existing plant communities generally present at the site. Additional screen planting in the form of scattered groups could be considered along the northern boundary to further reduce impact of the proposed development.

The existing character of the landscape allows for a variety of methods of landscaping and visual screening which will remain in keeping with the landscape character. General guidelines to adhere to when planning for landscaping and visual screening include:

- Planting is recommended post construction in consultation with the landowner.
- Planting should remain in keeping with existing landscape character.
- Species selection is to be typical of the area.
- Planting layout should avoid screening views of the broader landscape.
- Avoid the clearing of existing vegetation. Where appropriate reinstate any lost vegetation.
- Allow natural vegetation to regrow over any areas of disturbance.

Locally native plant species are preferred, as they help to preserve the landscape character and scenic quality of the area as well as building habitat for local fauna. Native species are also well-suited to local conditions (ie. soil, climate, etc.) and will build on the existing vegetation assemblages in the area.

Refer to Appendix D for a Landscape Plan.

12.0 Conclusion

12.1 Conclusion

With all visual impact assessments the objective is not to determine whether the proposal is visible or not, it is to determine how the proposal will impact on existing visual amenity, landscape character and scenic quality. If there is a potential for a negative impact on these factors it must then be investigated and determined how this impact can be mitigated to the extent that the impact is reduced to an acceptable level.

The Project is located south of Launceston near the town of Cressy. The Project is located entirely on a single landholding title. Three (3) 220kV transmission line route options have been explored for this Project, with the preferred being Option 1 which runs alongside the existing transmission line that connects the site to Palmerston Substation and has the least visual impact. The Project area is zoned as Agricultural within Zone Number 21 under the State Planning Scheme.

As identified in the ZVI study topographical changes within the study area will likely fragment views towards the Project. Potential views of the Project are visible to the north,west and southwest areas of the Project. No dwellings were identified as having more than 50% of potential visibility towards the Project. Five (5) dwellings were identified as having 26-50% of potential visibility, and 12 dwellings were identified as having 1-25% of potential visibility of the Project. It is crucial to note that the ZVI is based solely on topographical information and represents a bare ground scenario - i.e. a landscape without screening, vegetation or structures. The transmission line route option runs along the existing transmission line and is keeping in with the existing landscape character of the area.

Visual impact ratings for four (4) locations were rated as ‘Moderate’ as the scenic quality of the region was generally high due to the ‘Scenic Protection Areas’ to the south of the Project. Generally, the viewpoints rated as having a ‘Moderate’ visual impact were taken in close proximity or had a higher elevation than the Project viewing onto ‘Scenic Protection Areas’ which are deemed as having a high scenic quality. The viewpoints that were rated as ‘Low’ impact contained limited views to the Project, adequate screening or roadside vegetation which obscures most views.

There are limited opportunities to view the Project from publicly accessible land and roads. Overall the Project will result in a ‘Low to Moderate’ modification to the existing visual landscape character. Mitigation strategies through retaining existing vegetation will assist in reducing the visual impact experienced at certain locations.

With the implementation of the recommended mitigation measures as discussed in Section 11 of this report, the Project could be undertaken whilst maintaining the core landscape character of the area, and have a minimal visual impact on the surrounding visual landscape.

The landscape has the capacity to absorb low scale visual changes associated with the Project if the recommended mitigation strategies are adopted and managed effectively. Although alteration to the existing visual landscape is possible during the construction stage, over time the Project have minimal visual impact on the existing landscape character.

References

Australian Government Department of the Environment and Energy, National Light Pollution Guidelines for Wildlife: Including marina turtles, seabirds and migratory shorebirds, January 2020 Version 1.0

Australian Institute of Landscape Architects (AILA) Guidance Note for Landscape and Visual Impact Assessment, June 2018

Colleran, JR. & Gearing D. (1980) A Visual Assessment Method for Botany Bay, Landscape Australia, 3 August.

Department of Planning and Environment, The Dark Sky Planning Guideline: Protecting the observing conditions at Siding Spring, June 2016

Department of State Growth 2020, TASMANIAN RENEWABLE ENERGY ACTION PLAN.

Department of State Growth 2021, Renewables Tasmania - Draft Renewable Energy Coordination Framework.

DOP (1988) Rural Land Evaluation, Government Printer, Department of Planning.

EDAW (Australia) Pty Ltd (2000) 'Section 12 – Visual Assessment', The Mount Arthur North Coal Project: Environmental Impact Statement, URS Australia Pty Ltd, Prepared for Coal Operations Limited.

Federal Aviation Administration, Technical Guidance for Evaluating Selected Solar Technologies on Airports, April 2018, Washington, DC

Horner + Maclennan & Envision (2006) Visual Representation of Windfarms - Good Practice Guidelines. Scottish Natural Heritage, Inverness, Scotland.

Northern Midlands Council 2021, 'Tasmanian Planning Scheme - Scenic Protection Code: Northern Midlands Local Provisions Schedule', Tasmanian Planning Scheme - Scenic Protection Code

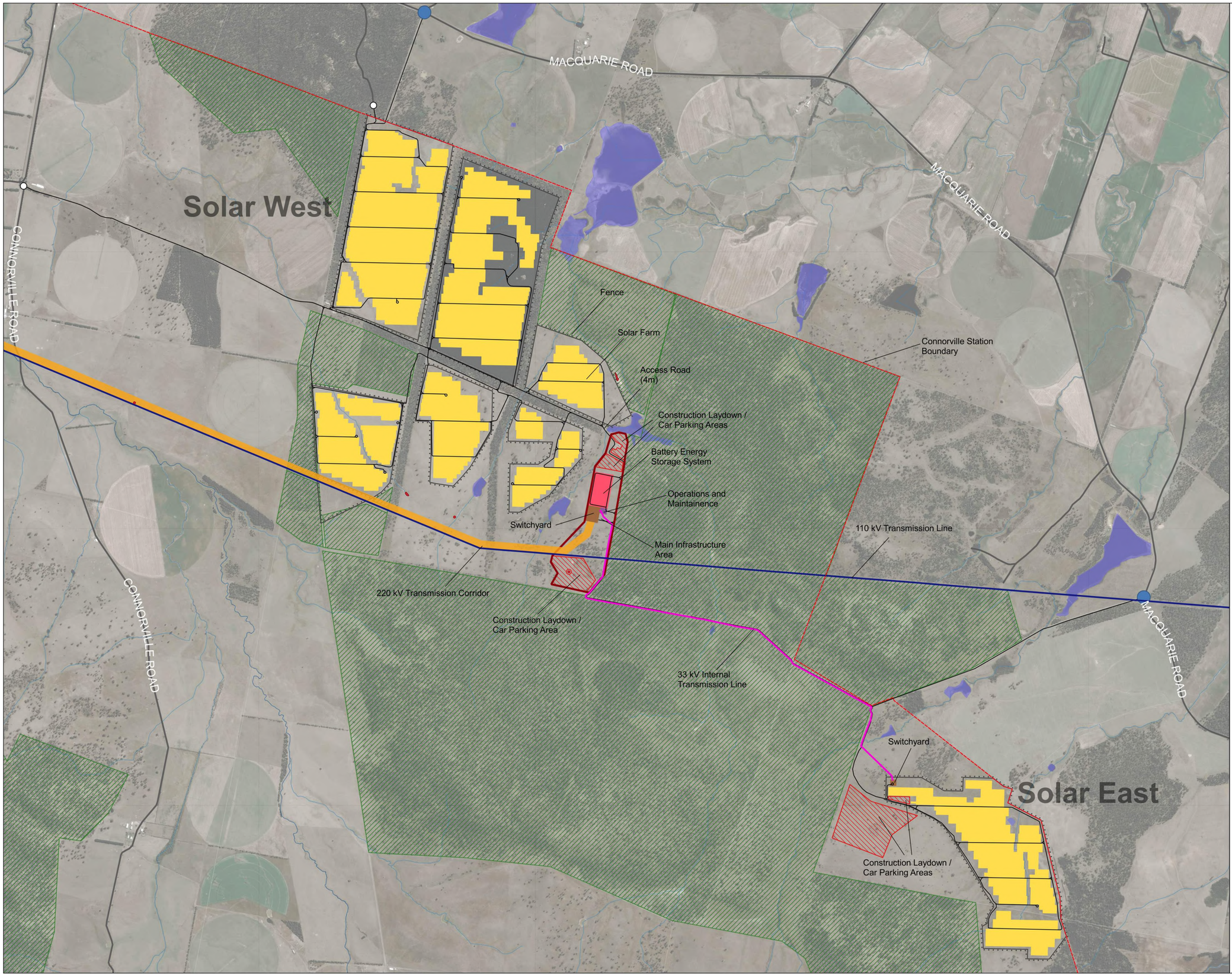
Renewables, Climate and Future Industries Tasmania 2021, RENEWABLE ENERGY COORDINATION FRAMEWORK.

State Planning Provisions 2022, Tasmanian Planning Scheme, 20 July.

Tasmanian Government n.d., Tasmanian Planning Policies.

The Landscape Institute with the Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Assessment Third Edition, Newport, Lincoln.

Transport for NSW, Guideline for landscape and visual impact assessment: Environmental Impact Assessment Note EIA-NO4, August 2020



cogency

ROBERT LUXMOORE
Project Management

Masterplan Page 1
Overall Area

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- Conservation Covenant and Greening Australia Reserve
- Dam
- Watercourse
- 110 kV Transmission Line

Cultural Heritage Sites
- Artefact Scatter
- Isolated Artefact

Proposed Development
- Connorville Station
- Access Road
- Solar Farm
- Main Infrastructure Area
- Battery Energy Storage System
- Operations and Maintainence
- Swtichyard
- Construction Laydown / Car Parking Area
- 220 kV Transmission Corridor
- 33 kV Internal Tranmission Line
- Fence
- Main Access Point
- Secondary/Emergency Access Point

Version: 5.2

Date: 17/05/2023

0 250 500 m

1:13,000 at A1

cogency

ROBERT LUXMOORE
Project Management

Masterplan Page 2
Transmission Line

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- Conservation Covenant and Greening Australia Reserve
- Dam
- Watercourse
- Transmission Line

Cultural Heritage Sites
- Artefact Scatter
- Isolated Artefact

Proposed Development
- Connorville Station
- Access Road
- Solar Farm
- Main Infrastructure Area
- Battery Energy Storage System
- Operations and Maintainence
- Swtichyard
- Construction Laydown / Car Parking Area
- 220 kV Transmission Corridor
- 33 kV Internal Tranmission Line
- Fence
- Main Access Point
- Secondary/Emergency Access Point

Version: 5.2

Date: 17/05/2023

0 250 500 m

1:25,000 at A1

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Masterplan Page 3
Transmission Line - Palmerston Substation

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- Dams
- Watercourse
- Palmerston Substation
- Transmission Line

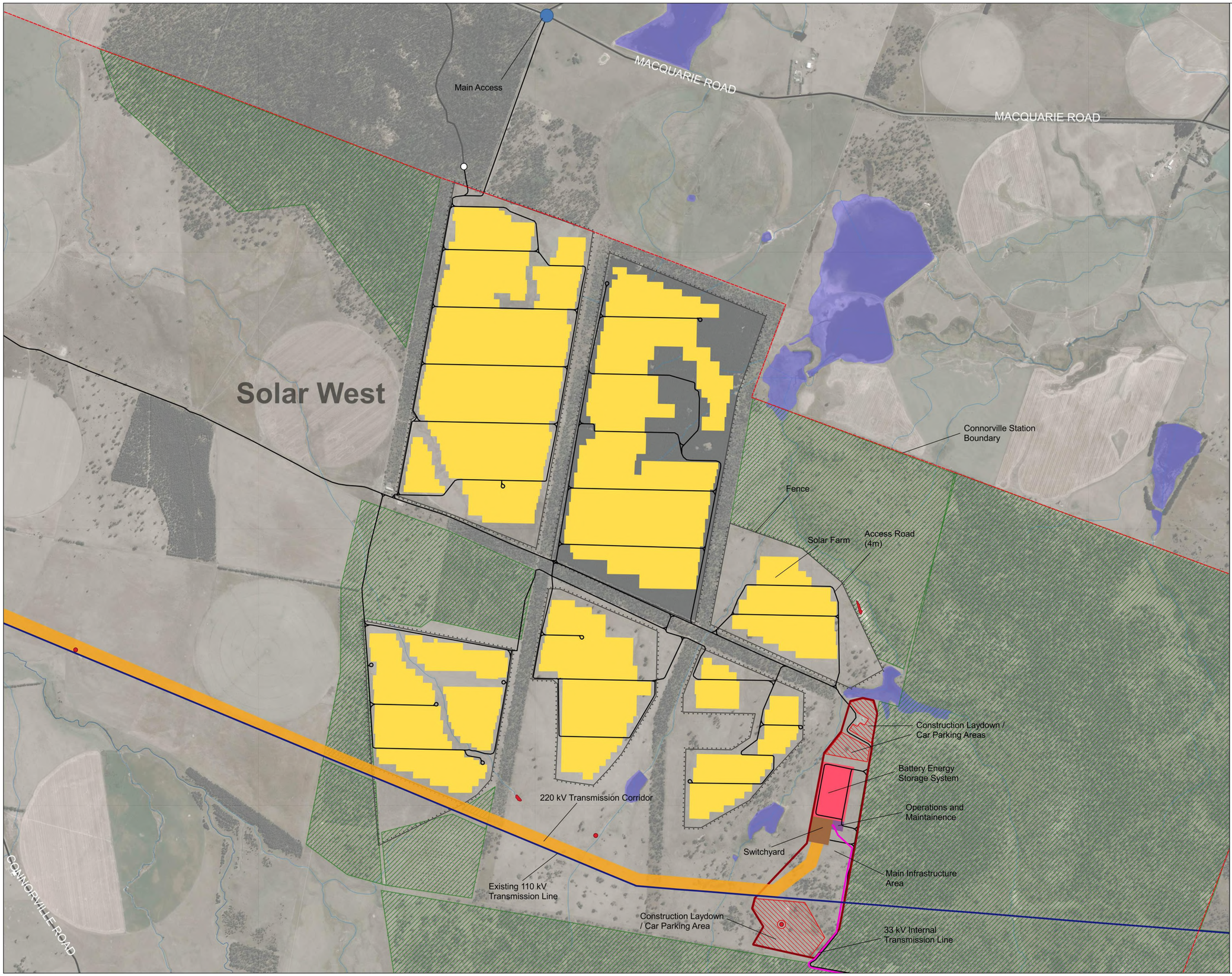
Proposed Development
- 220 kV Transmission Corridor

Version: 5.2

Date: 17/05/2023

0 50 100 m

1:5,000 at A1



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ROBERT LUXMOORE Project Management

Masterplan Page 4
West Area

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- Conservation Covenant and Greening Australia Reserves
- Dam
- Watercourse
- 110 kV Transmission Line

Cultural Heritage Sites
- Artefact Scatter
- Isolated Artefact

Proposed Development
- Connorville Station
- Access Road
- Solar Farm
- Main Infrastructure Area
- Battery Energy Storage System
- Operations and Maintainence
- Swtichyard
- Construction Laydown / Car Parking Area
- 220 kV Transmission Corridor
- 33 kV Internal Tranmission Line
- Fence
- Main Access Point
- Secondary/Emergency Access Point

Version: 5.2

Date: 17/05/2023

0 100 200 m

1:8,000 at A1

Main Access

110 kV Transmission Line

MACQUARIE ROAD

Connorville Station Boundary

33 kV Internal Transmission Line

Solar East

Switchyard

Fence

Construction Laydown / Car Parking Areas

Access Road (4m)

Solar Farm

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ROBERT LUXMOORE Project Management

Masterplan Page 5
East Area

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- Conservation Covenant and Greening Australia Reserves
- Dam
- Watercourse
- 110 kV Transmission Line

Proposed Development
- Connorville Station
- Access Road
- Solar Farm
- Swtichyard
- 33 kV Internal Tranmission Line
- Construction Laydown / Car Parking Area
- Fence
- Main Access Point
- Secondary/Emergency Access Point

Version: 5.2

Date: 17/05/2023

0 50 100 150 m

1:5,000 at A1

AC-COUPLED BESS - PLAN VIEW

SCALE 1:500

NOTES:

1. DESIGN IS PRELIMINARY ONLY. NOT FOR CONSTRUCTION.
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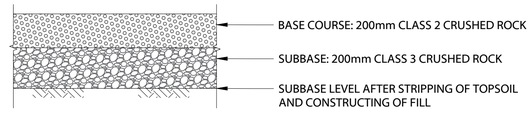
   - 2.1. OPERATION OF THE FACILITY TO ENSURE ADHERENCE TO FIRE DANGER PERIODS, HIGH FIRE DANGER AND TOTAL FIRE BAN DAYS.
3. BESS & PV SYSTEM AND ASSOCIATED EQUIPMENT SHALL HAVE SET-BACK FROM SECURITY FENCE OF MINIMUM 10M.
4. BATTERY ENERGY STORAGE SYSTEM MODULAR ENCLOSURES INDICATIVE. ADEQUATE VENTILATION OF THE BESS CONTAINER/STORAGE AREA IS ALLOWED BASED IN COMPLIANCE WITH AS/NZS 5139-2017 AND MANUFACTURER'S REQUIREMENTS.
5. FIRE BREAKS TO BE ESTABLISHED AND MAINTAINED IN LINE WITH THE FOLOWING:
   - 5.1. AROUND THE PERIMETRE OF THE FACILITY , COMMENCING FROM THE BOUNDARY OF THE FACILITY OR FROM THE VEGETATION SCREENING INSIDE THE PROPERTY BOUNDARY.
   - 5.2. AROUND THE PERIMETER OF CONTROL ROOMS, ELECTRICITY COMPOUNDS, SUBSTATIONS AND ALL OTHER BUILDINGS ON-SITE.
   - 5.3. BE A MINIMUM OF 10m, AND AT LEAST THE DISTANCE WHERE RADIANT HEAT FLUX (OUTPUT) FROM THE VEGETATION DOES NOT CREATE THE POTENTIAL FOR IGNITION OF ON-SITE INFRASTRUCTURE.
   - 5.4. FIRE BREAK TO BE VEGETATION FREE AT ALL TIMES AND TO BE NON-COMBUSTIBLE, CONSTRUCTED USING EITHER MINERAL EARTH OR NON-COMBUSTIBLE MULCH SUCH AS CRUSHED ROCK.
   - 5.5. FIRE BREAK TO BE FREE OF OBSTRUCTIONS AT ALL TIMES. NO PLANT OR EQUIPMENT OF ANY KIND IS TO BE STORED IN FIRE BREAKS.
6. THERE IS TO BE NO LONG GRASS OR LEAF LITTER IN AREAS WHERE PLANT AND HEAVY EQUIPMENT WILL BE WORKING.
7. ACCESS ROADS TO ARE TO BE OF ALL-WEATHER CONSTRUCTION AND CAPABLE OF ACCOMMODATING A VEHICLE OF 15 TONNES. ACCESS ROADS TO COMPLY WITH ALL REQUIREMENTS AS DETAILED IN THE PLANNING PERMIT.
   - 7.1. CONSTRUCTED ROADS TO BE A MINIMUM OF 4M IN WIDTH WITH A 4M VERTICAL CLEARANCE FOR THE WIDTH OF THE FORMED ROADS.
   - 7.2. PASSING BAYS TO BE INCORPORATED EVERY 600M AND AT LEAST 20M IN LENGTH, WITH A MINIMUM OF 6M IN WIDTH. WHERE ROADS ARE LESS THAN 600M LONG, AT LEAST ONE PASSING BAY IS TO BE INCORPORATED.
   - 7.3. THE AVERAGE GRADE MUST BE NO MORE THAN 1 IN 7 (14.4% OR 8.1°) WITH A MAXIMUM OF NO MORE THAN 1 IN 5 (20% OR 11.3°) FOR NO MORE THAN 50M.
   - 7.4. DIPS IN THE ROAD MUST HAVE NO MORE THAN 1 IN 8 (12.5% OR 7.1°) ENTRY AND EXIT ANGLE.
   - 7.5. ACCESS ROADS AND HARDSTANDS TO BE KEPT CLEAR AT ALL TIMES.
   - 7.6. CORNERS, BENDS AND TURNING CIRCLES ON INTERNAL ACCESS ROADS SHOULD CONSIDER AN ARTICULATED VEHICLE WITH A MINIMUM TURNING RADIUS NOT EXCEEDING 12.5m (NOT BE LESS THAN) AS SPECIFIED IN AS 2890.1.
   - 7.7. A SWEPT PATH ANALYSIS IS TO BE COMPLETED AT A LATER PHASE OF THE DESIGN USING THE LARGEST VEHICLE ACCESSING THE SITE.
8. BLACK PVC COATED CHAIN WIRE SECURITY FENCING TO BE 2.2M WITH 300MM OF BARBED (OR EQUIVALENT WIRE) FOR A TOTAL MAXIMUM HEIGHT OF 2.5M, IN ACCORDANCE WITH PLANNING PERMIT.
   - 8.1. GATES TO BE INSTALLED AT APPROPRIATE INTERVALS TO ALLOW ACCESS FOR LANDSCAPING MAINTENANCE ACTIVITIES INSIDE THE SITE.
9. BATTERY ENERGY STORAGE SYSTEM TO BE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION REQUIREMENTS AND RELEVANT AUSTRALIAN STANDARDS, INCLUDING REQUIREMENTS OF THE DANGEROUS GOODS ACT 1985.
10. BATTERY ENERGY STORAGE FACILITY AREAS TO BE KEPT FREE OF EXTRANEOUS MATERIALS AND COMBUSTIBLE MATERIALS OF ALL KINDS.
11. CONTAINERS/INFRASTRUCTURE FOR BATTERY INSTALLATIONS ARE TO BE PROVIDED WITH APPROPRIATE SPILL CONTAINMENT/BUNDING THAT INCLUDES PROVISION FOR FIRE WATER RUNOFF.
12. FOR THIS FACILITY, WITH A BATTERY ENERGY STORAGE SYSTEM AND WITH NO RETICULATED WATER AVAILABLE, THE FIRE PROTECTION SYSTEM MUST INCLUDE A FIRE WATER SUPPLY IN STATIC WATER STORAGE TANKS, WHERE THE STATIC WATER TANKS ARE TO:
   - 12.1. COMPLY WITH AS 2419.1. AUSTRALIAN STANDARD FIRE HYDRANT INSTALLATIONS.
   - 12.2. SHALL BE OF NOT LESS THAN 288,000L EFFECTIVE CAPACITY, OR AS PER THE PROVISIONS FOR OPEN YARD PROTECTION OF AS 2419.1-2005 FLOWING FOR A PERIOD OF NO LESS THAN FOUR HOURS AT 20L/s, WHICHEVER IS THE GREATER.
   - 12.3. THE QUANTITY OF STATIC FIRE WATER STORAGE IS TO BE CALCULATED FROM THE NUMBER OF HYDRANTS REQUIRED TO FLOW FROM AS 2419.1-2005, TABLE 3.3.
   - 12.4. FIRE HYDRANTS MUST BE PROVIDED AND LOCATED SO THAT EVERY PART OF THE BATTERY ENERGY STORAGE SYSTEM IS WITHIN REACH OF A 10m HOSE STREAM ISSUING FROM A NOZZLE AT THE END OF A 60m LENGTH OF HOSE CONNECTED TO A FIRE HYDRANT OUTLET.
   - 12.5. THE FIRE WATER SUPPLY MUST BE LOCATED AT VEHICLE ENTRANCES TOT HE FACILITY, AT LEAST 10m FROM ANY INFRASTRUCTURE (ELECTRICAL SUBSTATIONS, INVERTERS, BATTERY ENERGY STORAGE SYSTEMS, BUILDINGS).
   - 12.6. THE FIRE WATER SUPPLY MUST BE REASONABLY ADJACENT TO THE BATTERY ENERGY STORAGE SYSTEM AND SHALL BE ACCESSIBLE WITHOUT UNDUE DANGER IN AN EMERGENCY. (E.G., FIRE WATER TANKS ARE TO BE LOCATED CLOSER TO THE SITE ENTRANCE THAN THE BATTERY ENERGY STORAGE SYSTEM.
   - 12.7. STATIC WATER TANK SHALL BE AN ABOVE-GROUND WATER TANK CONSTRUCTED OF CONCRETE OR STEEL.
   - 12.8. THE STATIC WATER STORAGE TANK(S) MUST BE CAPABLE OF BEING COMPLETELY REFILLED AUTOMATICALLY OR MANUALLY WITHIN 24 HOURS.
   - 12.9. HARDSTAND AND ACCESS ROAD TO BE KEPT CLEAR AT ALL TIMES.
   - 12.10. THE HARD-SUCTION POINT MUST BE PROVIDED, WITH A 150mm FULL BORE ISOLATION VALVE EQUIPPED WITH A STORZ CONNECTION, SIZED TO COMPLY WITH THE REQUIRED SUCTION HYDAULIC PERFORMANCE. ADAPTERS THAT MAY BE REQUIRED TO MATCH THE CONNECTION ARE 125mm, 100mm, 90mm, 75mm, 65mm STORZ TREE ADAPTERS WITH A MATCHING BLANK END CAP TO BE PROVIDED.
   - 12.11. THE HARD SUCTION POINT MUST BE POSITIONED WITHIN FOUR (4) METRES TO A HARDSTAND AREA AND PROVIDE A CLEAR ACCESS FOR EMERGENCY SERVICES PERSONNEL.
   - 12.12. ALL-WEATHER ROAD ACCESS AND HARDSTAND SHALL BE PROVIDED TO THE HARD-SUCTION POINT. THE HARDSTAND SHALL BE MAINTAINED TO A MINIMUM OF 15 TONNES GVM, 8 METRES LONG AND 6 METRES WIDE OR TO THE SATISFACTION OF THE RELEVANT FIRE AUTHORITY.
   - 12.13. THE HARD-SUCTION POINT MUST BE PROTECTED FROM MECHANICAL DAMAGE WHERE NECESSARY.
   - 12.14. AN EXTERNAL WATER LEVEL INDICATOR MUST BE PROVIDED TO THE TANK AND BE VISIVLE FROM THE HARDSTAND AREA. CAR PARKING AREA IS LOCATED WITHIN PROXIMITY TO THE ENTRANCES TO THE SITE WITH A TOTAL CAPACITY OF SEVEN (7) VEHICLES AND IN ACCORDANCE WITH THE DESIGN GUIDELINES OF PLANNING PERMIT CLAUSE 52.06.
13. PAVEMENT DESIGN INDICATIVE ONLY.
14. PLEASE REFER TO 10390815-AUME-TN-01-A AU PE TTECHNICAL NOTE (NORTHERN MIDLANDS BESS).



ACCESS ROAD PAVEMENT/BENCH

SCALE: NTS

REFERENCE DRAWINGS:

GENERAL NOTES:

- ALL DIMENSIONS IN MILLIMETERS (UNLESS NOTED)
- DRAWN TO AS1100
- DO NOT SCALE FROM THIS DRAWING
- ALWAYS CHECK DIMENSIONS ON SITE BEFORE USING ANY INFORMATION CONTAINED WITHIN THIS DRAWING.
- ALL DIMENSIONS SHOWN ARE INDICATIVE ONLY AND NEED TO VERIFIED ON-SITE. DNV ACCEPTS NO LIABILITY FROM ERRORS OR OMISSIONS SHOWN ON THIS DRAWING.
- CHECK THIS DRAWING IN THE LATEST VERSION. DO NOT REPRODUCE ALL OR PART OF THIS DRAWING WITHOUT PRIOR CONSENT.

HYBRID SOLAR FARM & AC-COUPLED BESS SPECIFICATIONS

GRID TRANSFER LIMIT	2 x 144.00 MWac
SOLAR FARM (COMBINED 2 x HYBRID CONNECTION POINTS)	
SOLAR PV DC CAPACITY	341.53 MWp
SOLAR PV AC CAPACITY	298.2 MVA
SOLAR INVERTER & QTY	SMA SC4200-UP x 71
TRANSFORMER & QTY	4.4 MVA @ 25°C (0.63/33kV) x 71
BESS (COMBINED 2 x HYBRID CONNECTION POINTS)	
BESS DC ENERGY CAPACITY @ RATED POWER	Up to 691.7 MWh [BOL]
BESS NAME / RATED POWER	POWIN CENTIPEDE STACK750E 354.9 MW
BATTERY INVERTER & QTY	SMA SC3600-UP-XT x 96
TRANSFORMER & QUANTITY	3.62 MVA @ 25°C (0.63/33kV) x 96

LEGEND:

- SITE SECURITY FENCING
- 10m FIRE BREAK OF NON-COMBUSTIBLE MULCH (CLEAR OF VEGETATION, INCLUDING GRASS)
- 8 x 6m HARDSTAND AREA FOR FIRE FIGHTING
- SECURITY GATE
- VEGETATION CLEAR ZONE
- 288,000L STATIC WATER TANK (10.4m ϕ)
- INVERTER
- BATTERY MODULE
- COMMS AND CONTROL CABINET
- ACCESS ROAD (min 4m)
- SURFACE CRUSHED ROCK / BLUE METAL TBD BASED ON CIVIL DESIGN
- CLASS 2 CRUSHED ROCK
- CLASS 3 CRUSHED ROCK

0 5 10 20 30
Full Size 1:500 ; Half Reduction 1:1000
SCALE (m)

PRELIMINARY

Rev	Date	Comments	Dwn	Chkd
C	27/04/23	REVISED PRELIMINARY ISSUE	LW	RC
B	20/04/23	PRELIMINARY ISSUE	LW	RC
A	07/03/23	PRELIMINARY ISSUE	GC/PD	LW

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT

CLIENT LOGO: ROBERT LUXMOORE Project Management

THIRD ANGLE PROJECTION

DESIGNED BY: L.WALKER | CHECKED BY: LW

DRAWN BY: GC/PD | APPROVED BY: LB

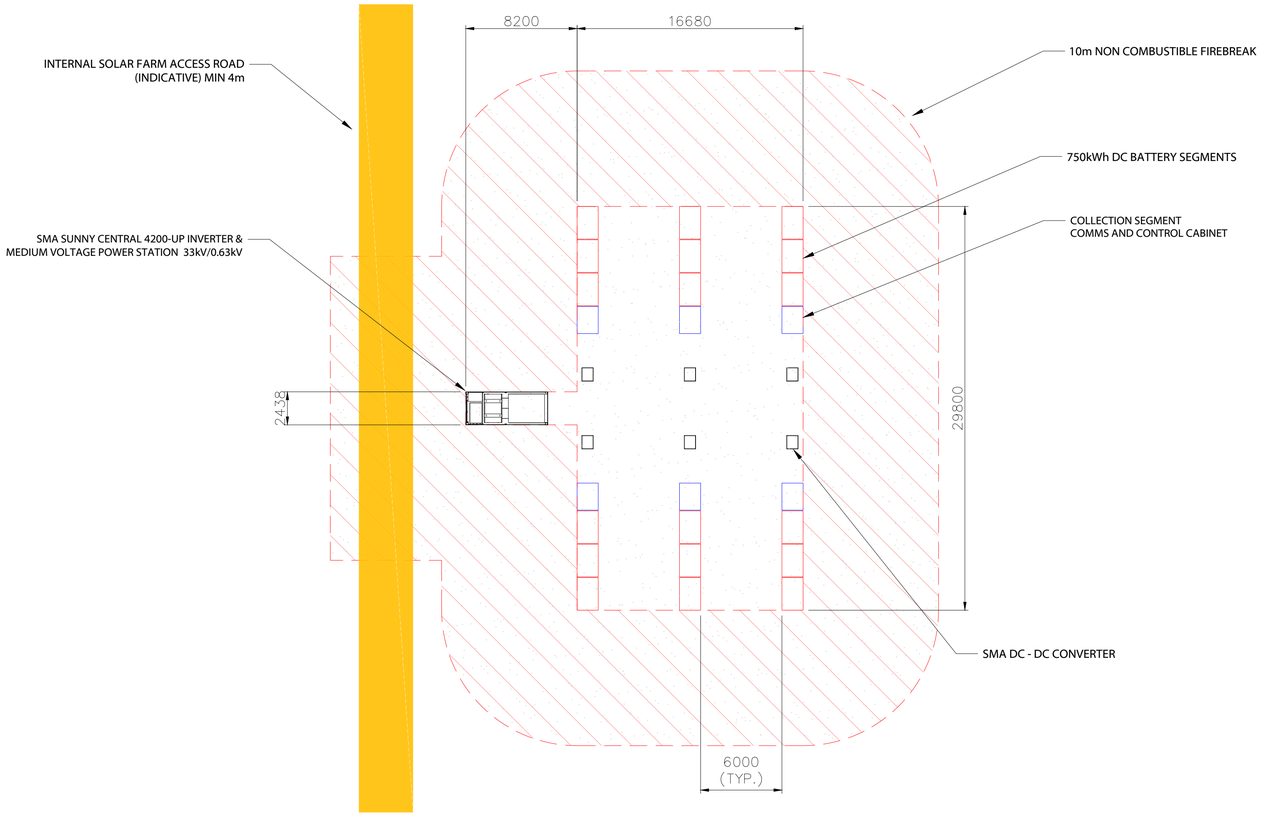
SI metric

DNV
T: +613 8615 1515
W: www.dnv.com.au
ABN: 14 154 635 319

PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA

TITLE: AC-COUPLED BESS GENERAL ARRANGEMENT

Dwg No: 10390815-CI-0001-01 | Scale:1:500 | Rev: C | A1



DC-COUPLED MODULAR BESS (TYP) - PLAN VIEW
SCALE 1:200

REFERENCE DRAWINGS:

GENERAL NOTES:

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HYBRID SOLAR FARM & DC-COUPLED BESS SPECIFICATIONS

GRID TRANSFER LIMIT	2 x 144.00 MWac
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SOLAR INVERTER & QTY	SMA SC4200-UP x 71
TRANSFORMER & QTY	4.4 MVA @ 25°C (0.63/33kV) x 71
BESS (COMBINED 2 x HYBRID CONNECTION POINTS)	
BESS DC ENERGY CAPACITY @ RATED POWER	Up to 935.6 MWh [BOL]
BESS NAME / RATED POWER	POWIN CENTIPEDE STACK750E / 311.9 MW
BATTERY INVERTER & QTY	N/A
TRANSFORMER & QUANTITY	N/A

LEGEND:

- 10m FIRE BREAK OF NON-COMBUSTIBLE MULCH (CLEAR OF VEGETATION, INCLUDING GRASS)
- INVERTER
- BATTERY MODULE
- COMMS AND CONTROL CABINET
- DC - DC CONVERTER
- ACCESS ROAD (min 4m)
- SURFACE CRUSHED ROCK / BLUE METAL TBD BASED ON CIVIL DESIGN
- CLASS 2 CRUSHED ROCK
- CLASS 3 CRUSHED ROCK

0 2 4 8 12
Full Size 1:200 ; Half Reduction 1:400
SCALE (m)

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5. FIRE BREAKS TO BE ESTABLISHED AND MAINTAINED IN LINE WITH THE FOLOWING:
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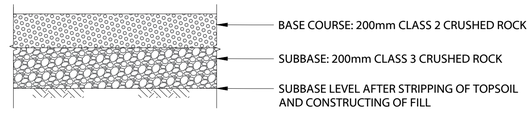
   - 5.2. AROUND THE PERIMETER OF CONTROL ROOMS, ELECTRICITY COMPOUNDS, SUBSTATIONS AND ALL OTHER BUILDINGS ON-SITE.
   - 5.3. BE A MINIMUM OF 10m, AND AT LEAST THE DISTANCE WHERE RADIANT HEAT FLUX (OUTPUT) FROM THE VEGETATION DOES NOT CREATE THE POTENTIAL FOR IGNITION OF ON-SITE INFRASTRUCTURE.
   - 5.4. FIRE BREAK TO BE VEGETATION FREE AT ALL TIMES AND TO BE NON-COMBUSTIBLE, CONSTRUCTED USING EITHER MINERAL EARTH OR NON-COMBUSTIBLE MULCH SUCH AS CRUSHED ROCK.
   - 5.5. FIRE BREAK TO BE FREE OF OBSTRUCTIONS AT ALL TIMES. NO PLANT OR EQUIPMENT OF ANY KIND IS TO BE STORED IN FIRE BREAKS.
6. THERE IS TO BE NO LONG GRASS OR LEAF LITTER IN AREAS WHERE PLANT AND HEAVY EQUIPMENT WILL BE WORKING.
7. ACCESS ROADS TO ARE TO BE OF ALL-WEATHER CONSTRUCTION AND CAPABLE OF ACCOMMODATING A VEHICLE OF 15 TONNES. ACCESS ROADS TO COMPLY WITH ALL REQUIREMENTS AS DETAILED IN THE PLANNING PERMIT.
   - 7.1. CONSTRUCTED ROADS TO BE A MINIMUM OF 4M IN WIDTH WITH A 4M VERTICAL CLEARANCE FOR THE WIDTH OF THE FORMED ROADS.
   - 7.2. PASSING BAYS TO BE INCORPORATED EVERY 600M AND AT LEAST 20M IN LENGTH, WITH A MINIMUM OF 6M IN WIDTH. WHERE ROADS ARE LESS THAN 600M LONG, AT LEAST ONE PASSING BAY IS TO BE INCORPORATED.
   - 7.3. THE AVERAGE GRADE MUST BE NO MORE THAN 1 IN 7 (14.4% OR 8.1°) WITH A MAXIMUM OF NO MORE THAN 1 IN 5 (20% OR 11.3°) FOR NO MORE THAN 50M.
   - 7.4. DIPS IN THE ROAD MUST HAVE NO MORE THAN 1 IN 8 (12.5% OR 7.1°) ENTRY AND EXIT ANGLE.
   - 7.5. ACCESS ROADS AND HARDSTANDS TO BE KEPT CLEAR AT ALL TIMES.
   - 7.6. CORNERS, BENDS AND TURNING CIRCLES ON INTERNAL ACCESS ROADS SHOULD CONSIDER AN ARTICULATED VEHICLE WITH A MINIMUM TURNING RADIUS NOT EXCEEDING 12.5m (NOT BE LESS THAN) AS SPECIFIED IN AS 2890.1.
   - 7.7. A SWEPT PATH ANALYSIS IS TO BE COMPLETED AT A LATER PHASE OF THE DESIGN USING THE LARGEST VEHICLE ACCESSING THE SITE.
8. BLACK PVC COATED CHAIN WIRE SECURITY FENCING TO BE 2.2M WITH 300MM OF BARBED (OR EQUIVALENT WIRE) FOR A TOTAL MAXIMUM HEIGHT OF 2.5M, IN ACCORDANCE WITH PLANNING PERMIT.
   - 8.1. GATES TO BE INSTALLED AT APPROPRIATE INTERVALS TO ALLOW ACCESS FOR LANDSCAPING MAINTENANCE ACTIVITIES INSIDE THE SITE.
9. BATTERY ENERGY STORAGE SYSTEM TO BE IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION REQUIREMENTS AND RELEVANT AUSTRALIAN STANDARDS, INCLUDING REQUIREMENTS OF THE DANGEROUS GOODS ACT 1985.
10. BATTERY ENERGY STORAGE FACILITY AREAS TO BE KEPT FREE OF EXTRANEOUS MATERIALS AND COMBUSTIBLE MATERIALS OF ALL KINDS.
11. CONTAINERS/INFRASTRUCTURE FOR BATTERY INSTALLATIONS ARE TO BE PROVIDED WITH APPROPRIATE SPILL CONTAINMENT/BUNDING THAT INCLUDES PROVISION FOR FIRE WATER RUNOFF.
12. FOR THIS FACILITY, WITH A BATTERY ENERGY STORAGE SYSTEM AND WITH NO RETICULATED WATER AVAILABLE, THE FIRE PROTECTION SYSTEM MUST INCLUDE A FIRE WATER SUPPLY IN STATIC WATER STORAGE TANKS, WHERE THE STATIC WATER TANKS ARE TO:
   - 12.1. COMPLY WITH AS 2419.1. AUSTRALIAN STANDARD FIRE HYDRANT INSTALLATIONS.
   - 12.2. SHALL BE OF NOT LESS THAN 288,000L EFFECTIVE CAPACITY, OR AS PER THE PROVISIONS FOR OPEN YARD PROTECTION OF AS 2419.1-2005 FLOWING FOR A PERIOD OF NO LESS THAN FOUR HOURS AT 20L/s, WHICHEVER IS THE GREATER.
   - 12.3. THE QUANTITY OF STATIC FIRE WATER STORAGE IS TO BE CALCULATED FROM THE NUMBER OF HYDRANTS REQUIRED TO FLOW FROM AS 2419.1-2005, TABLE 3.3.
   - 12.4. FIRE HYDRANTS MUST BE PROVIDED AND LOCATED SO THAT EVERY PART OF THE BATTERY ENERGY STORAGE SYSTEM IS WITHIN REACH OF A 10m HOSE STREAM ISSUING FROM A NOZZLE AT THE END OF A 60m LENGTH OF HOSE CONNECTED TO A FIRE HYDRANT OUTLET.
   - 12.5. THE FIRE WATER SUPPLY MUST BE LOCATED AT VEHICLE ENTRANCES TOT HE FACILITY, AT LEAST 10m FROM ANY INFRASTRUCTURE (ELECTRICAL SUBSTATIONS, INVERTERS, BATTERY ENERGY STORAGE SYSTEMS, BUILDINGS).
   - 12.6. THE FIRE WATER SUPPLY MUST BE REASONABLY ADJACENT TO THE BATTERY ENERGY STORAGE SYSTEM AND SHALL BE ACCESSIBLE WITHOUT UNDUE DANGER IN AN EMERGENCY. (E.G., FIRE WATER TANKS ARE TO BE LOCATED CLOSER TO THE SITE ENTRANCE THAN THE BATTERY ENERGY STORAGE SYSTEM.
   - 12.7. STATIC WATER TANK SHALL BE AN ABOVE-GROUND WATER TANK CONSTRUCTED OF CONCRETE OR STEEL.
   - 12.8. THE STATIC WATER STORAGE TANK(S) MUST BE CAPABLE OF BEING COMPLETELY REFILLED AUTOMATICALLY OR MANUALLY WITHIN 24 HOURS.
   - 12.9. HARDSTAND AND ACCESS ROAD TO BE KEPT CLEAR AT ALL TIMES.
   - 12.10. THE HARD-SUCTION POINT MUST BE PROVIDED, WITH A 150mm FULL BORE ISOLATION VALVE EQUIPPED WITH A STORZ CONNECTION, SIZED TO COMPLY WITH THE REQUIRED SUCTION HYDRAULIC PERFORMANCE. ADAPTERS THAT MAY BE REQUIRED TO MATCH THE CONNECTION ARE 125mm, 100mm, 90mm, 75mm, 65mm STORZ TREE ADAPTERS WITH A MATCHING BLANK END CAP TO BE PROVIDED.
   - 12.11. THE HARD SUCTION POINT MUST BE POSITIONED WITHIN FOUR (4) METRES TO A HARDSTAND AREA AND PROVIDE A CLEAR ACCESS FOR EMERGENCY SERVICES PERSONNEL.
   - 12.12. ALL-WEATHER ROAD ACCESS AND HARDSTAND SHALL BE PROVIDED TO THE HARD-SUCTION POINT. THE HARDSTAND SHALL BE MAINTAINED TO A MINIMUM OF 15 TONNES GVM, 8 METRES LONG AND 6 METRES WIDE OR TO THE SATISFACTION OF THE RELEVANT FIRE AUTHORITY.
   - 12.13. THE HARD-SUCTION POINT MUST BE PROTECTED FROM MECHANICAL DAMAGE WHERE NECESSARY.
   - 12.14. AN EXTERNAL WATER LEVEL INDICATOR MUST BE PROVIDED TO THE TANK AND BE VISIVLE FROM THE HARDSTAND AREA. CAR PARKING AREA IS LOCATED WITHIN PROXIMITY TO THE ENTRANCES TO THE SITE WITH A TOTAL CAPACITY OF SEVEN (7) VEHICLES AND IN ACCORDANCE WITH THE DESIGN GUIDELINES OF PLANNING PERMIT CLAUSE 52.06.
13. PAVEMENT DESIGN INDICATIVE ONLY.
14. PLEASE REFER TO 10390815-AUME-TN-01-A AU PE TTECHNICAL NOTE (NORTHERN MIDLANDS BESS).



ACCESS ROAD PAVEMENT/BENCH
SCALE: NTS

PRELIMINARY

Rev	Date	Comments	Dwn	Chkd
B	20/04/23	PRELIMINARY ISSUE	LW	RC
A	07/03/23	PRELIMINARY ISSUE	GC/PD	LW

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT

CLIENT LOGO: ROBERT LUXMOORE Project Management

THIRD ANGLE PROJECTION

DESIGNED BY: L.WALKER | CHECKED BY: LW

DRAWN BY: GC/PD | APPROVED BY: LB

SI metric

DNV
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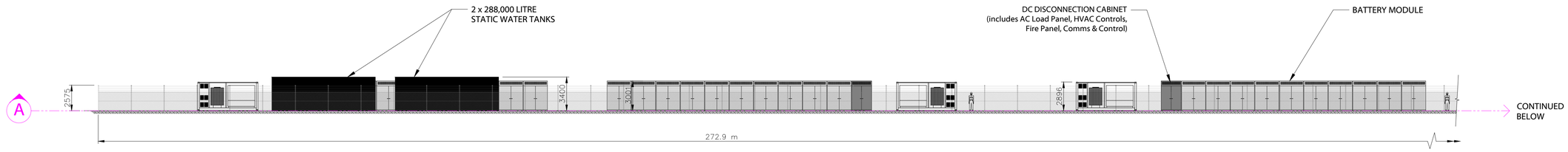
ABN: 14 154 635 319

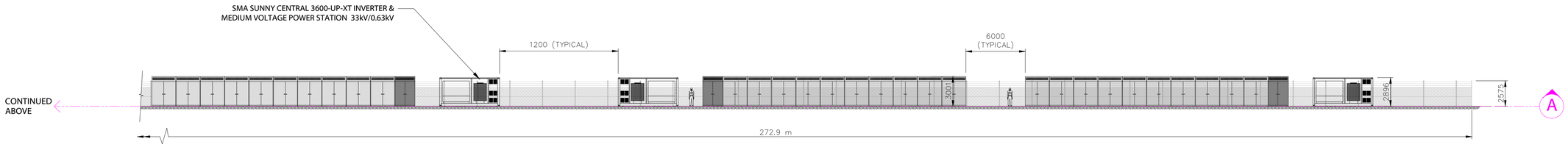
PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA

TITLE: DC-COUPLED BESS GENERAL ARRANGEMENT

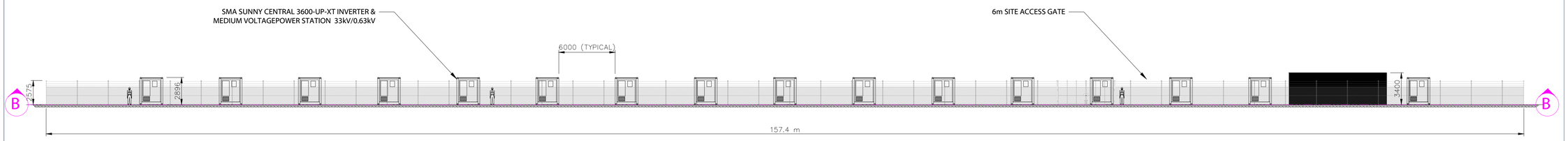
Dwg No: 10390815-CI-0002-01 | Scale:1:200 | Rev: B | A1



AC-COUPLED BESS - FRONT ELEVATION (LHS)
SCALE 1:200



AC-COUPLED BESS - FRONT ELEVATION (RHS)
SCALE 1:200



AC-COUPLED BESS - SIDE ELEVATION
SCALE 1:200

0 2 4 8 12
Full Size 1:200 ; Half Reduction 1:400
SCALE (m)

REFERENCE DRAWINGS:

GENERAL NOTES:
- DRAWN TO AS1100
- DO NOT SCALE FROM THIS DRAWING
- ALWAYS CHECK DIMENSIONS ON SITE BEFORE USING ANY INFORMATION CONTAINED WITHIN THIS DRAWING.
- ALL DIMENSIONS SHOWN ARE INDICATIVE ONLY AND NEED TO VERIFIED ON-SITE, DNV ACCEPTS NO LIABILITY FROM ERRORS OR OMISSIONS SHOWN ON THIS DRAWING.
- CHECK THIS DRAWING IN THE LATEST VERSION. DO NOT REPRODUCE ALL OR PART OF THIS DRAWING WITHOUT PRIOR CONSENT.

NOTES:
1. ALL EQUIPMENT TO BE INSTALLED AS PER ALL RELEVANT MANUFACTURER REQUIREMENTS.
2. ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE SPECIFIED.
3. REFER DWG. 10390815-CI-0001-01 AC-COUPLED BESS GENERAL ARRANGEMENT.
4. PLEASE REFER TO 10390815-AUME-TN-01-A AU PE TTECHNICAL NOTE (NORTHERN MIDLANDS BESS).

PRELIMINARY

Rev	Date	Comments	Dwn	Chkd
C	27/04/23	REVISED PRELIMINARY ISSUE	LW	RC
B	20/04/23	PRELIMINARY ISSUE	LW	RC
A	07/03/23	PRELIMINARY ISSUE	GC/PD	LW

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT
CLIENT LOGO:
DESIGNED BY: LW CHECKED BY: LW
DRAWN BY: GC/PD APPROVED BY: RC

THIRD ANGLE PROJECTION
SI metric

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T: +613 8615 1515
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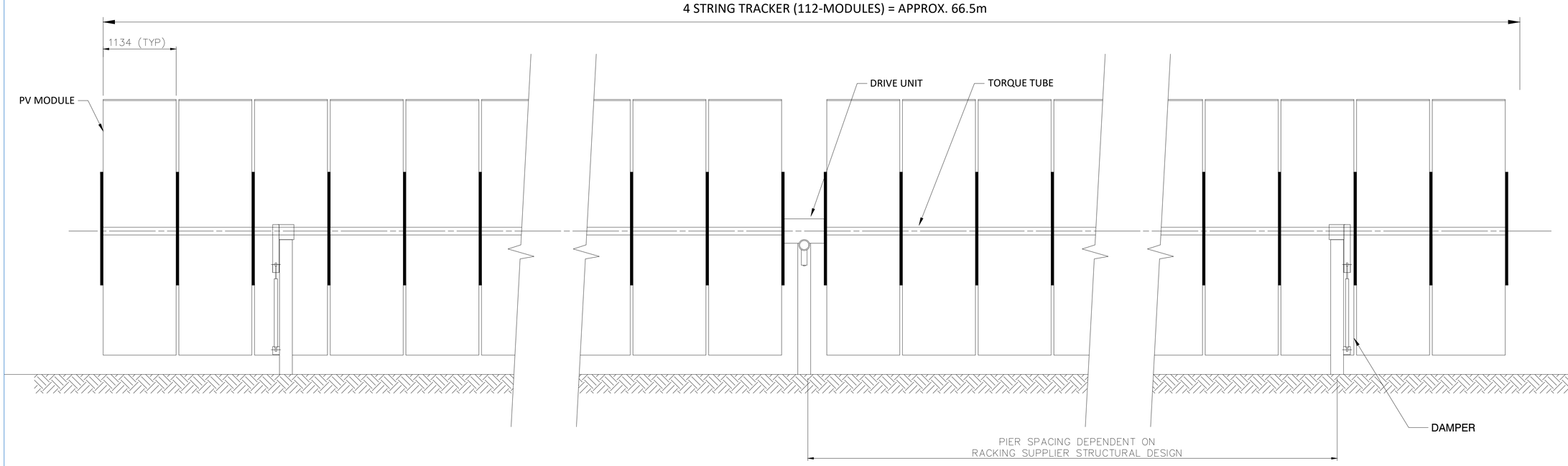
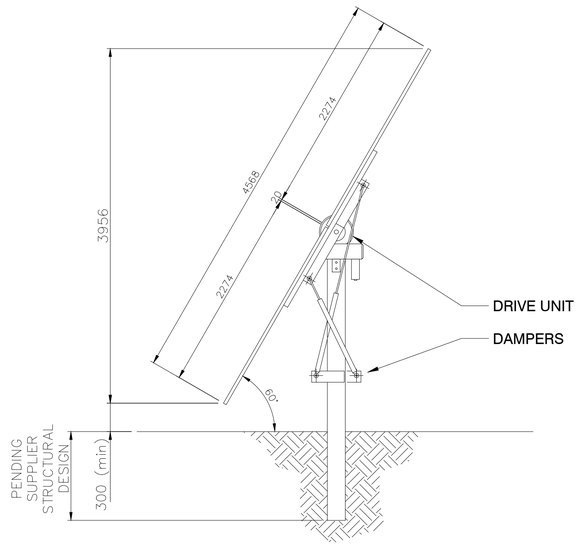
ABN: 14 154 635 319

PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA
TITLE: AC-COUPLED BESS ELEVATIONS
FRONT AND SIDE ELEVATIONS
Dwg No: 10390815-ME-0001-01 Scale: 1:200 Rev: C A1



PV TRACKER (TYP) - REAR ELEVATION
SCALE 1:30



PV TRACKER (TYP) - SIDE ELEVATION)
SCALE 1:30

0 0.3 0.6 1.2 1.8
Full Size 1:30 ; Half Reduction 1:60
SCALE (m)

REFERENCE DRAWINGS:

GENERAL NOTES:

- DRAWN TO AS1100
- DO NOT SCALE FROM THIS DRAWING
- ALWAYS CHECK DIMENSIONS ON SITE BEFORE USING ANY INFORMATION CONTAINED WITHIN THIS DRAWING.
- ALL DIMENSIONS SHOWN ARE INDICATIVE ONLY AND NEED TO VERIFIED ON-SITE, DNV ACCEPTS NO LIABILITY FROM ERRORS OR OMISSIONS SHOWN ON THIS DRAWING.
- CHECK THIS DRAWING IN THE LATEST VERSION. DO NOT REPRODUCE ALL OR PART OF THIS DRAWING WITHOUT PRIOR CONSENT.

NOTES:

1. ALL EQUIPMENT TO BE INSTALLED AS PER ALL RELEVANT MANUFACTURER REQUIREMENTS.
2. ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE SPECIFIED.
3. PV TRACKER DESIGN BASED ON FTC VOYAGER TRACKER FOR PRELIMINARY DESIGN PURPOSES ONLY AND SUBJECT TO CHANGE DURING DETAILED DESIGN.
4. PV MODULE BASED ON DIMENSIONS OF 2274mm x 1134mm x 35mm, BUT MAY BE SUBJECT TO CHANGE DURING DETAILED DESIGN.
5. PLEASE REFER TO 10390815-AUME-TN-01-A AU PE TTECHNICAL NOTE (NORTHERN MIDLANDS BESS).

PRELIMINARY

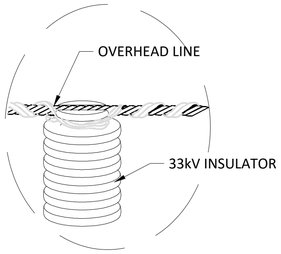
Rev	Date	Comments	Dwn	Chkd
B	20/04/23	PRELIMINARY ISSUE	LW	RC
A	07/03/23	PRELIMINARY ISSUE	GC/PD	LW

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT
CLIENT LOGO: ROBERT LUXMOORE Project Management
DESIGNED BY: LW CHECKED BY: LW
DRAWN BY: GC/PD APPROVED BY: RC

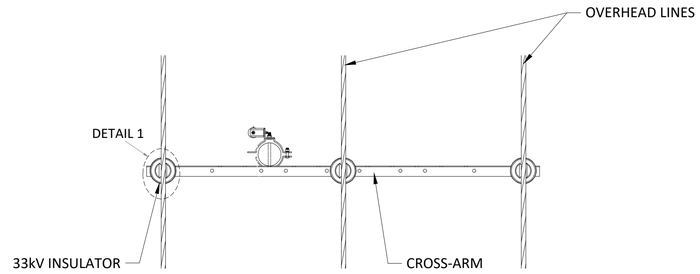
THIRD ANGLE PROJECTION
SI metric

DNV
T: +613 8615 1515
W: www.dnv.com.au
ABN: 14 154 635 319

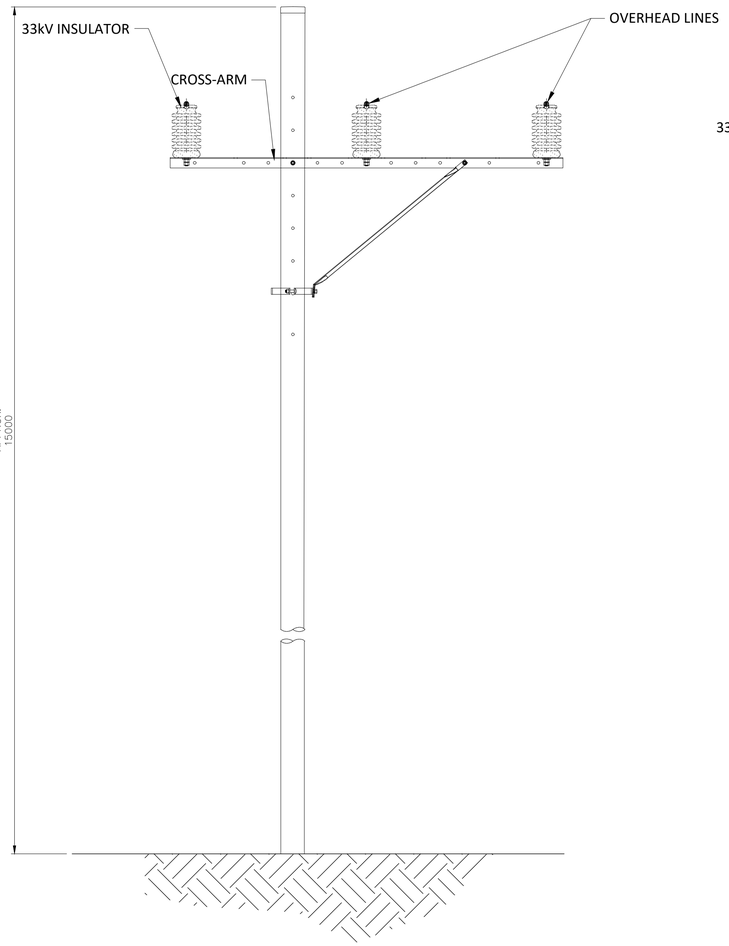
PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA
TITLE: PV TRACKER ELEVATIONS
REAR & SIDE ELEVATION
Dwg No: 10390815-ME-0002-01 Scale: AS SHOWN Rev: B A1



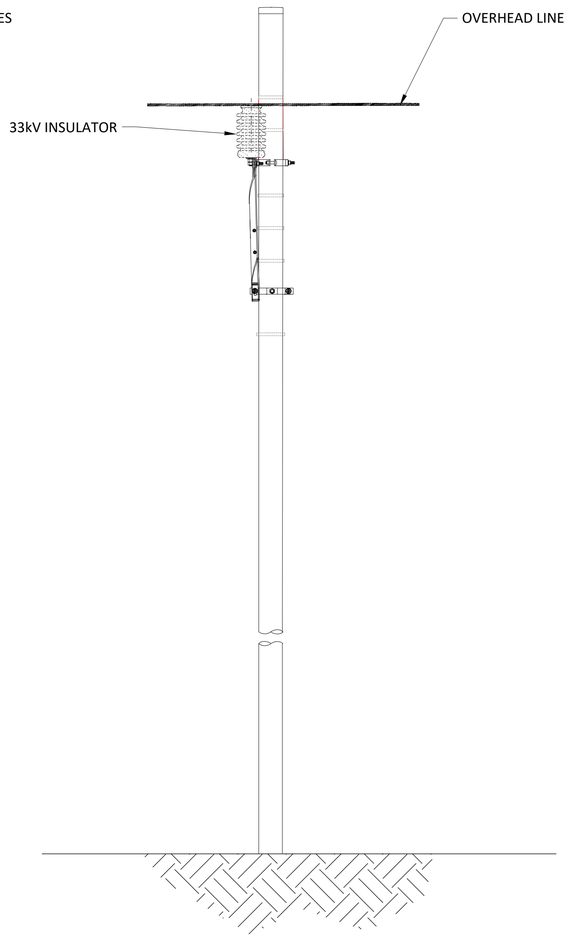
DETAIL 1
SCALE: NTS



33kV OVERHEAD ELECTRICITY POLE - PLAN VIEW
SCALE: 1:20



33kV OVERHEAD ELECTRICITY POLE - FRONT ELEVATION
SCALE: 1:20



33kV OVERHEAD ELECTRICITY POLE - SIDE ELEVATION
SCALE: 1:20

0 0.2 0.4 0.8 1.2
Full Size 1:20 ; Half Reduction 1:40
SCALE (m)

REFERENCE DRAWINGS:

GENERAL NOTES:

- DRAWN TO AS1100
- DO NOT SCALE FROM THIS DRAWING
- ALWAYS CHECK DIMENSIONS ON SITE BEFORE USING ANY INFORMATION CONTAINED WITHIN THIS DRAWING.
- ALL DIMENSIONS SHOWN ARE INDICATIVE ONLY AND NEED TO VERIFIED ON-SITE, DNV ACCEPTS NO LIABILITY FROM ERRORS OR OMISSIONS SHOWN ON THIS DRAWING.
- CHECK THIS DRAWING IN THE LATEST VERSION. DO NOT REPRODUCE ALL OR PART OF THIS DRAWING WITHOUT PRIOR CONSENT.

NOTES:

1. TYPICAL ELECTRICITY POLE SHOWN
2. ALL EQUIPMENT TO BE INSTALLED AS PER ALL RELEVANT MANUFACTURER REQUIREMENTS.
3. ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE SPECIFIED.

PRELIMINARY

Rev	Date	Comments	Dwn	Chkd
B	20/04/23	PRELIMINARY ISSUE	RE	LW
A	07/03/23	PRELIMINARY ISSUE	GC/PD	LW

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT

CLIENT LOGO: ROBERT LUXMOORE Project Management

DESIGNED BY: LW CHECKED BY: LW

DRAWN BY: GC/PD APPROVED BY: RC

THIRD ANGLE PROJECTION

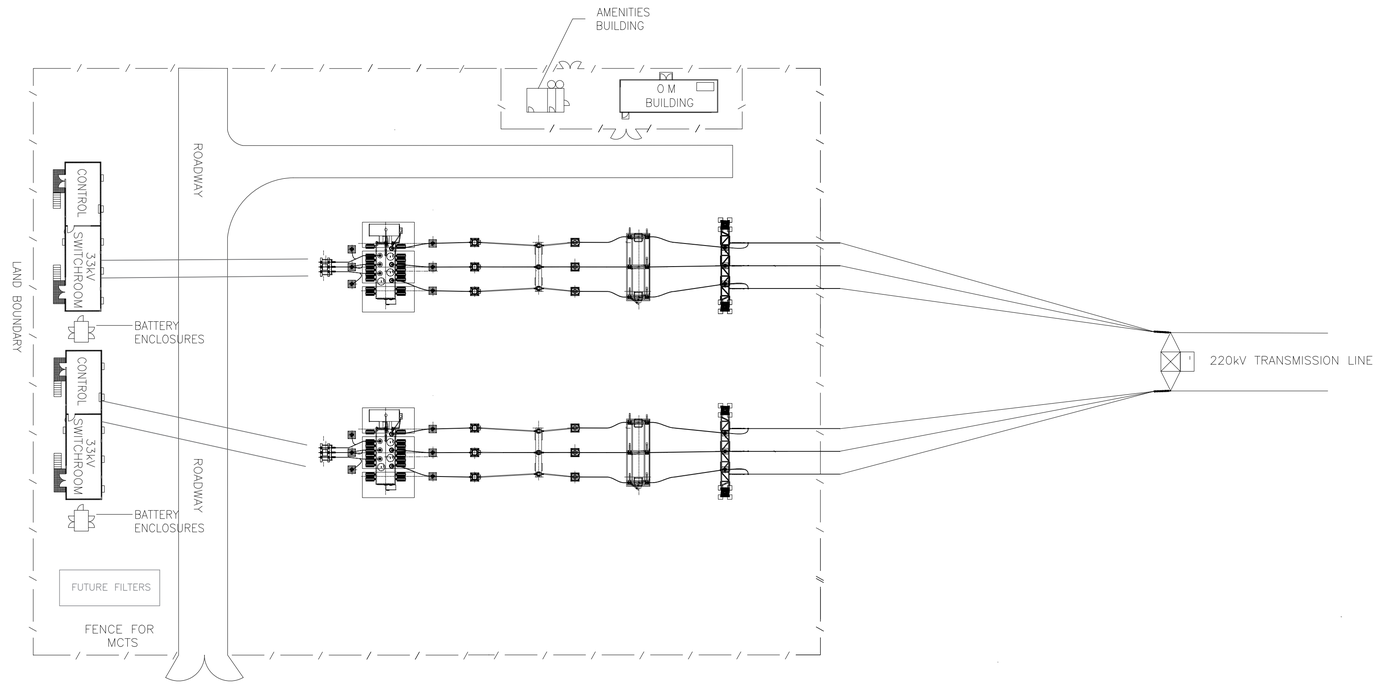
SI metric

DNV
T: +613 8615 1515
W: www.dnv.com.au
ABN: 14 154 635 319

PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA

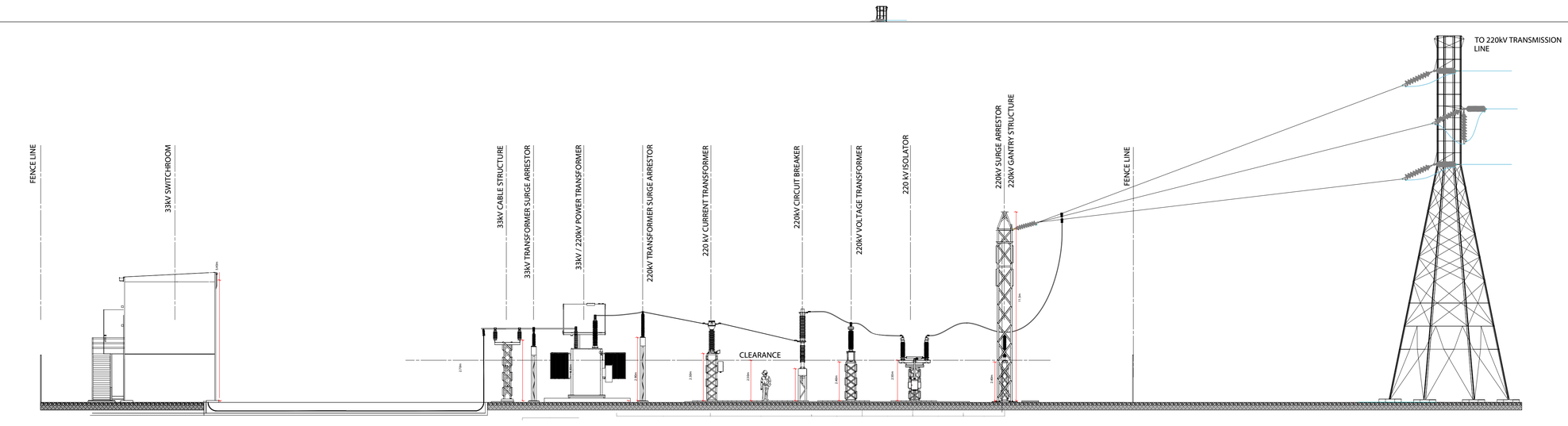
TITLE: 33kV OVERHEAD ELECTRICITY POLE ELEVATIONS
FRONT & SIDE ELEVATIONS

Dwg No: 10390815-ME-0003-01 | Scale: 1:20 | Rev: B | A1



NORTHERN MIDLANDS SOLAR FARM & BESS 220kV SWITCHYARD - PLAN VIEW
SCALE 1:500

0 5 10 20 30
Full Size 1:500 ; Half Reduction 1:1000
SCALE (m)



NORTHERN MIDLANDS SOLAR FARM & BESS 220kV SWITCHYARD - FRONT ELEVATION
SCALE 1:200

0 2 4 8 12
Full Size 1:200 ; Half Reduction 1:400
SCALE (m)

REFERENCE DRAWINGS:

GENERAL NOTES:

- DRAWN TO AS1100
- DO NOT SCALE FROM THIS DRAWING
- ALWAYS CHECK DIMENSIONS ON SITE BEFORE USING ANY INFORMATION CONTAINED WITHIN THIS DRAWING.
- ALL DIMENSIONS SHOWN ARE INDICATIVE ONLY AND NEED TO VERIFIED ON-SITE, DNV ACCEPTS NO LIABILITY FROM ERRORS OR OMISSIONS SHOWN ON THIS DRAWING.
- CHECK THIS DRAWING IN THE LATEST VERSION. DO NOT REPRODUCE ALL OR PART OF THIS DRAWING WITHOUT PRIOR CONSENT.

NOTES:

1. CONCEPT DESIGN ONLY.TYPICAL SWITCHYARD SHOWN.
2. INSTALLATION TO COMPLY WITH AS 2067. CLEARANCES SHOWN INDICATIVE AS PART OF THE DEVELOPMENT APPROVAL PACKAGE.
3. ALL EQUIPMENT TO BE INSTALLED AS PER ALL RELEVANT MANUFACTURER REQUIREMENTS.
4. ALL DIMENSIONS ARE IN METERS (M) UNLESS OTHERWISE SPECIFIED.
5. THE 33 kV VOLTAGE TRANSFORMER WILL BE IN THE 33 kV SWITCHROOM.

PRELIMINARY

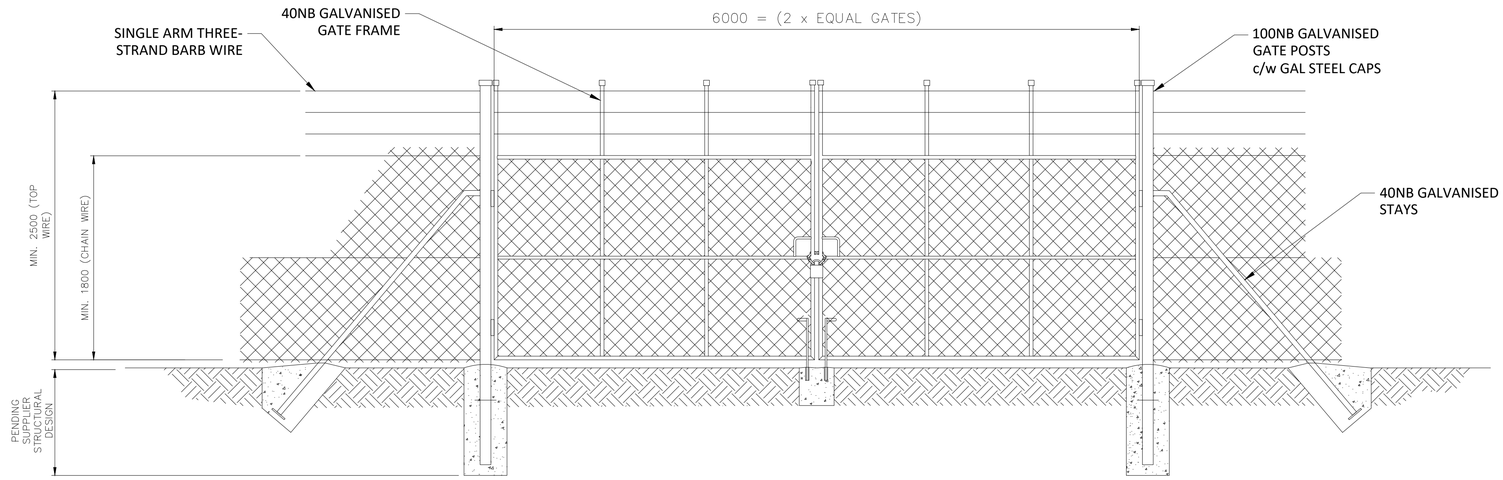
Rev	Date	Comments	Dwn	Chkd
B	19/04/23	UPDATED ISSUE	RE	CM
A	07/03/23	PRELIMINARY ISSUE	GC/PD	RE

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT
CLIENT LOGO:
DESIGNED BY: RE CHECKED BY: CM
DRAWN BY: JH/PD APPROVED BY: RE

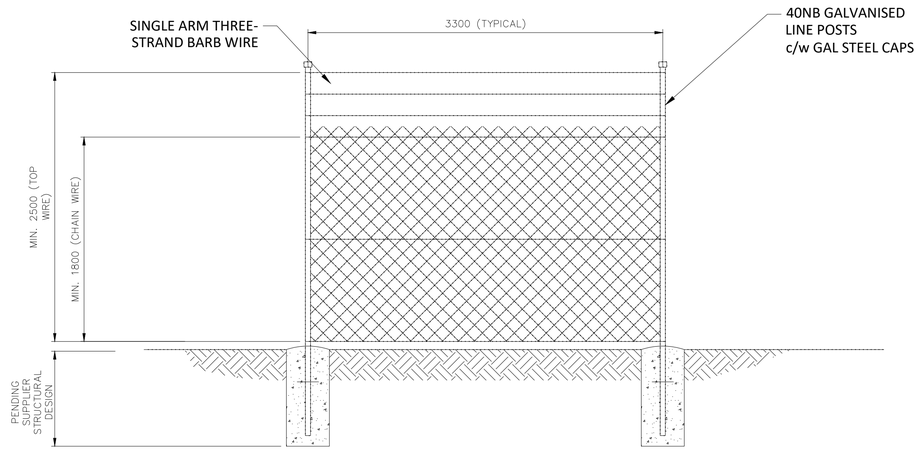
THIRD ANGLE PROJECTION
SI metric

DNV
T: +613 8615 1515
W: www.dnv.com.au
ABN: 14 154 635 319

PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA
TITLE: 220kV SWITCHYARD
PLAN AND FRONT ELEVATION
Dwg No: 10390815-ME-0004-01 Scale: AS SHOWN Rev: B A1



BESS SECURITY FENCING - TYPICAL SITE GATE
SCALE 1:25



BESS SECURITY FENCING - TYPICAL FENCE PANEL
SCALE 1:25

0 0.25 0.5 1.0 1.5
Full Size 1:25 ; Half Reduction 1:50
SCALE (m)

REFERENCE DRAWINGS:

GENERAL NOTES:

- DRAWN TO AS1100
- DO NOT SCALE FROM THIS DRAWING
- ALWAYS CHECK DIMENSIONS ON SITE BEFORE USING ANY INFORMATION CONTAINED WITHIN THIS DRAWING.
- ALL DIMENSIONS SHOWN ARE INDICATIVE ONLY AND NEED TO VERIFIED ON-SITE, DNV ACCEPTS NO LIABILITY FROM ERRORS OR OMISSIONS SHOWN ON THIS DRAWING.
- CHECK THIS DRAWING IN THE LATEST VERSION. DO NOT REPRODUCE ALL OR PART OF THIS DRAWING WITHOUT PRIOR CONSENT.

NOTES:

1. ALL EQUIPMENT TO BE INSTALLED AS PER ALL RELEVANT MANUFACTURER REQUIREMENTS.
2. ALL DIMENSIONS ARE IN MILLIMETERS (mm) UNLESS OTHERWISE SPECIFIED.
3. SECURITY FENCING DESIGN AND CONSTRUCTION TO BE IN ACCORDANCE WITH AS 1725 AND ALL OTHER RELEVANT CODES AND STANDARDS.
4. DESIGN AND CONSTRUCTION OF SUBSTATION SECURITY FENCING WHERE ASSETS ARE SHARED WITH TAS NETWORKS TO BE ALSO COMPLIANT WITH TAS NETWORKS SECURITY FENCES AND GATES STANDARD R579297.
5. PLEASE REFER TO 10390815-AUME-TN-01-A AU PE TTECHNICAL NOTE (NORTHERN MIDLANDS BESS).

PRELIMINARY

Rev	Date	Comments	Dwn	Chkd
B	20/04/23	PRELIMINARY ISSUE	LW	RC
A	07/03/23	PRELIMINARY ISSUE	GC/PD	LW

CLIENT: ROBERT LUXMOORE PROJECT MANAGEMENT

CLIENT LOGO: ROBERT LUXMOORE Project Management

DESIGNED BY: LW CHECKED BY: LW

DRAWN BY: GC/PD APPROVED BY: RC

THIRD ANGLE PROJECTION

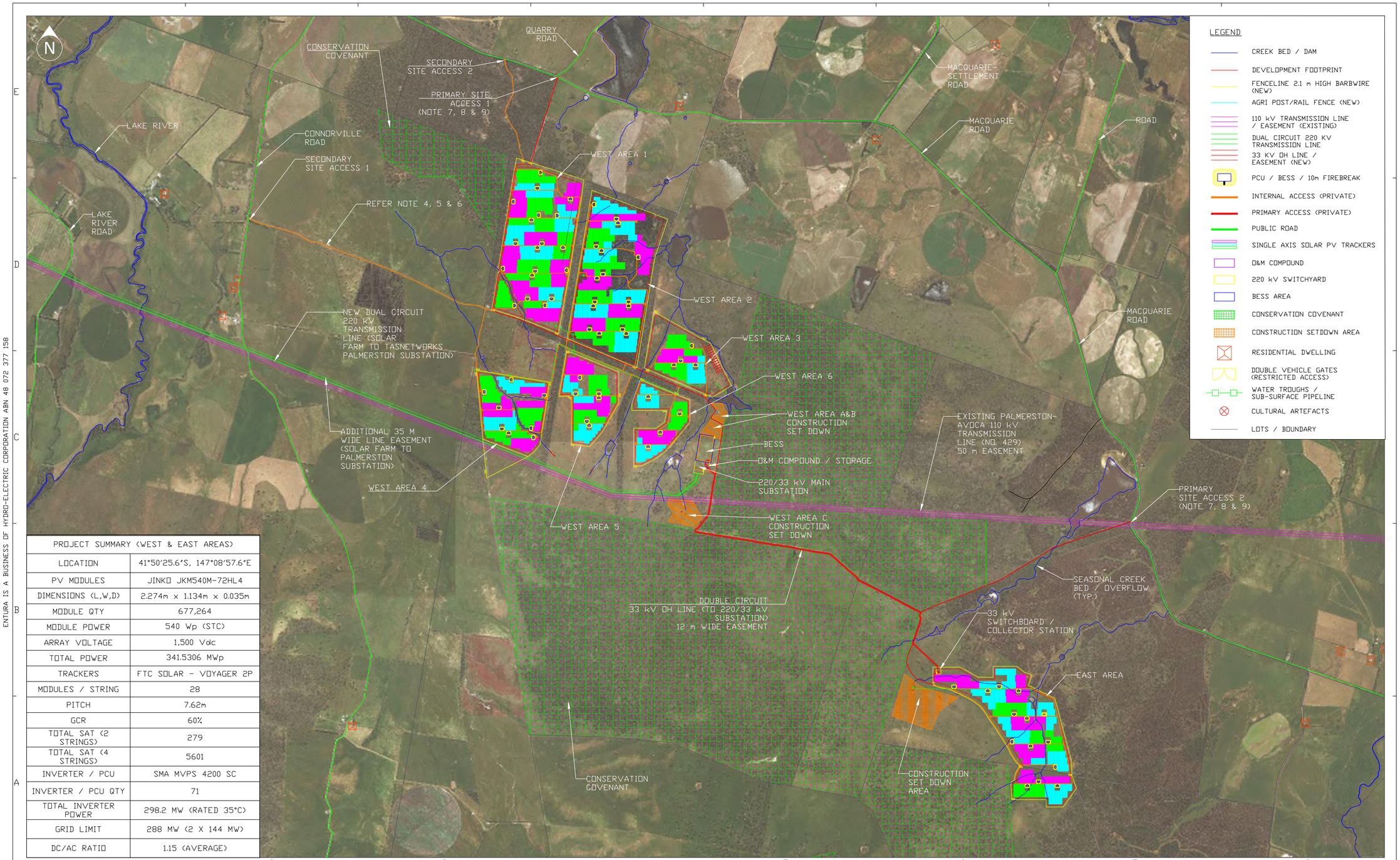
SI metric

DNV
T: +613 8615 1515
W: www.dnv.com.au
ABN: 14 154 635 319

PROJECT: NORTHERN MIDLANDS SOLAR FARM & BESS
TASMANIA, AUSTRALIA

TITLE: BESS SECURITY FENCING ELEVATIONS
TYPICAL DETAIL

Dwg No: 10390815-ME-0005-01 Scale: 1:25 Rev: B A1



PROJECT SUMMARY (WEST & EAST AREAS)	
LOCATION	41°50'25.6"S, 147°08'57.6"E
PV MODULES	JINKO JKM540M-72HL4
DIMENSIONS (L,W,D)	2.274m x 1.134m x 0.035m
MODULE QTY	677,264
MODULE POWER	540 Wp (STC)
ARRAY VOLTAGE	1,500 Vdc
TOTAL POWER	341.5306 MWp
TRACKERS	FTC SOLAR - VOYAGER 2P
MODULES / STRING	28
PITCH	7.62m
GCR	60%
TOTAL SAT (2 STRINGS)	279
TOTAL SAT (4 STRINGS)	5601
INVERTER / PCU	SMA MVPS 4200 SC
INVERTER / PCU QTY	71
TOTAL INVERTER POWER	298.2 MW (RATED 35°C)
GRID LIMIT	288 MW (2 X 144 MW)
DC/AC RATIO	1.15 (AVERAGE)

NOTES

1. NOT FOR CONSTRUCTION. CONCEPT DESIGN ONLY
2. PV TRACKER DESIGN BASED AS PER FTC SOLAR (SUNDAT-LAYOUT-REV_D)
3. DESIGN ADHERES TO BUSH FIRE MITIGATION PLAN (APPENDIX 2)
4. INTERNAL ACCESS ROADS (OTHER THAN PRIMARY ACCESS ROUTES) SHALL BE:
   - ALL WEATHER ACCESS
   - 4 METERS WIDE WITH;
   - PASSING BAYS PLACED EVERY 200 METERS TO PROVIDE TWO-WAY ACCESS.
   - PASSING BAYS TO BE 20 METERS LONG AND EXTEND THE WIDTH OF THE ROAD OUT TO 5.5 METERS IN THESE LOCATIONS.
   - PASSING BAYS TO EXTEND IN THE DIRECTION AWAY FROM SENSITIVE VEGETATION
5. GRADE OF INTERNAL ACCESS ROADS MUST NOT EXCEED A GRADE OF 1:65 (15.4%) AND THAT RATE OF CHANGE OF GRADE MUST NOT EXCEED 1:16 (6.25%) AS SPECIFIED IN AS 2890.1
6. CORNERS, BENDS AND TURNING CIRCLES ON INTERNAL ACCESS ROADS SHOULD CONSIDER AN ARTICULATED VEHICLE WITH A MINIMUM TURNING RADIUS NOT EXCEEDING 12.5 METERS (NOT LESS THAN) AS SPECIFIED IN AS2890.1
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9. PRIMARY ACCESS ROUTES MUST BE CAPABLE TO TAKE THE LOAD OF AN OVERSIZE & OVERMASS (OSOM) VEHICLE, CLASS 1, CARRYING A MAX. LOAD OF 100 TONNES

ALTERATIONS

DRAWN	JM
CHECKED	DS
DESIGNED	JM
CHECKED	DS
APPROVED	
DATE	10.03.23
CLIENT APP'D	
DATE	

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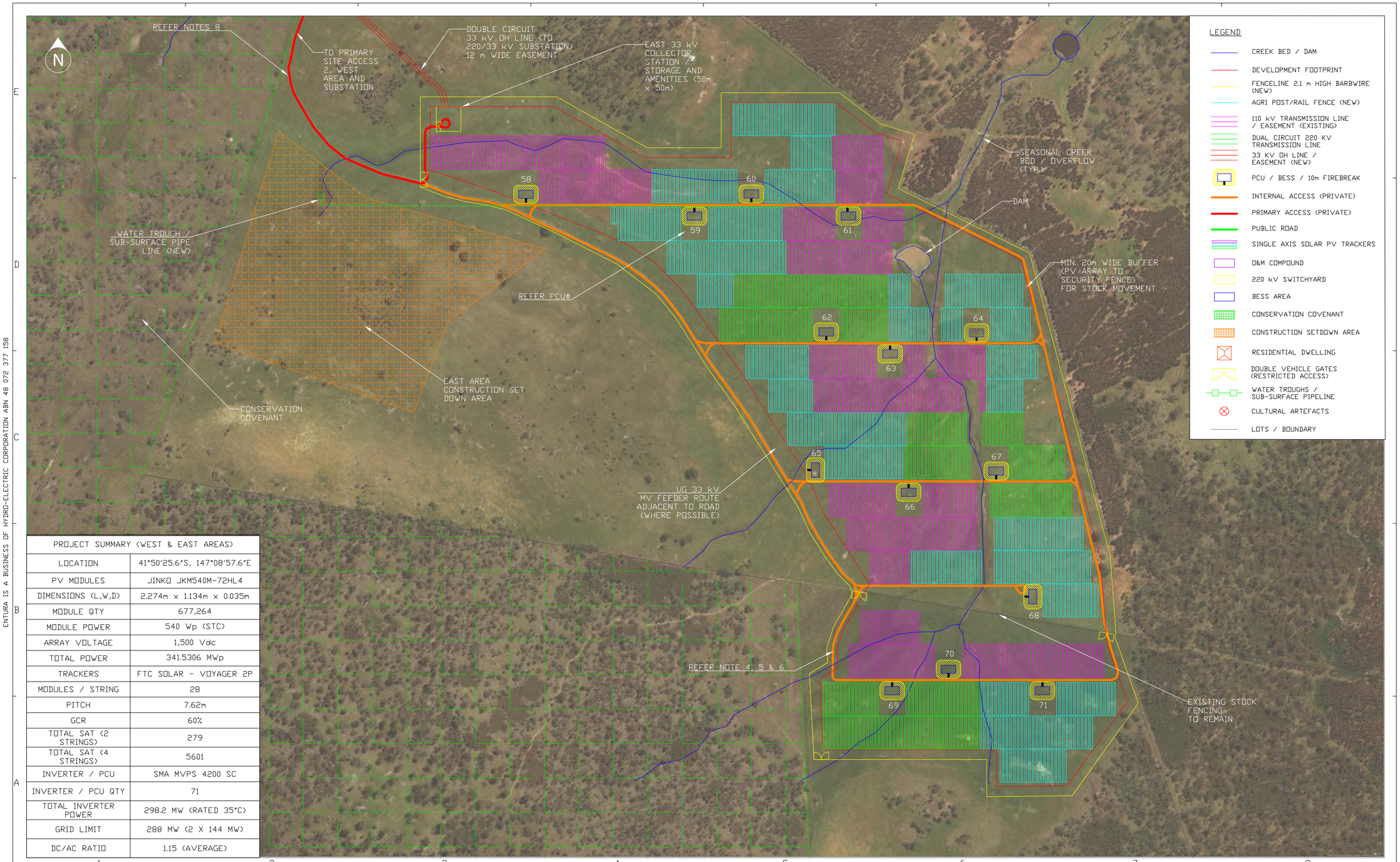
CLIENT: CONNORVILLE ESTATES PTY LTD ENGAGEMENT No: E310322

TITLE: NORTHERN MIDLANDS SOLAR FARM
PV CONCEPT LAYOUT (FINAL)
SITE OVERVIEW

SCALE: 1:17500
SIZE: A1
DRG No.: E3103220-EL-ENT-DWG-0001
SHT.:
REV.: 2

FILENAME: C:\USERS\MUMFORDJ\ONEDRIVE - HYDRO TASMANIA\DESKTOP\CONNORVILLE SF.DWG



PROJECT SUMMARY (WEST & EAST AREAS)	
LOCATION	41°50'25.6"S, 147°08'57.6"E
PV MODULES	JINKO JKM540M-72HL4
DIMENSIONS (L,W,D)	2.274m x 1.134m x 0.035m
MODULE QTY	677,264
MODULE POWER	540 Wp (STC)
ARRAY VOLTAGE	1,500 Vdc
TOTAL POWER	341.5306 MWp
TRACKERS	FTC SOLAR - VOYAGER 2P
MODULES / STRING	28
PITCH	7.62m
GCR	60%
TOTAL SAT (2 STRINGS)	279
TOTAL SAT (4 STRINGS)	5601
INVERTER / PCU	SMA MVPS 4200 SC
INVERTER / PCU QTY	71
TOTAL INVERTER POWER	298.2 MW (RATED 35°C)
GRID LIMIT	288 MW (2 X 144 MW)
DC/AC RATIO	1.15 (AVERAGE)

ENTURA IS A BUSINESS OF HYDRO-ELECTRIC CORPORATION ABN 48 072 377 158

NOTES

1. NOT FOR CONSTRUCTION. CONCEPT DESIGN ONLY
2. PV TRACKER DESIGN BASED AS PER FTC SOLAR (SUNDAT-LAYOUT-REV_D)
3. DESIGN ADHERES TO BUSH FIRE MITIGATION PLAN (APPENDIX 2)
4. INTERNAL ACCESS ROADS (OTHER THAN PRIMARY ACCESS ROUTES) SHALL BE:
   - ALL WEATHER ACCESS
   - 4 METERS WIDE WITH;
   - PASSING BAYS PLACED EVERY 200 METERS TO PROVIDE TWO-WAY ACCESS.
   - PASSING BAYS TO BE 20 METERS LONG AND EXTEND THE WIDTH OF THE ROAD OUT TO 5.5 METERS IN THESE LOCATIONS.
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ALTERATIONS

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CHECKED	DS
DESIGNED	JM
CHECKED	DS
APPROVED	
DATE	10.03.23
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CLIENT: CONNORVILLE ESTATES PTY LTD
ENGAGEMENT No: E310322
TITLE: NORTHERN MIDLANDS SOLAR FARM
PV CONCEPT LAYOUT (FINAL)
EAST AREA
SCALE: 1:3500
SIZE: A1
DRG No.: E3103220-EL-ENT-DWG-0002
SHT.:
REV.: 2

FILENAME: C:\USERS\MUMFORDJ\ONEDRIVE - HYDRO TASMANIA\DESKTOP\CONNORVILLE SF.DWG

TO MACQUARIE RD SITE ACCESS

TO CONNORVILLE RD SITE ACCESS

REFER PCU#

EXISTING FENCE TO BE REMOVED

MIN. 20m WIDE BUFFER (PV ARRAY TO SECURITY FENCE) FOR STOCK MOVEMENT

WEST 2 AREA

DAM (TYP.)

UG 33 kV MV FEEDER ROUTE ADJACENT TO ROAD (WHERE POSSIBLE) TYP.

WEST 1 AREA

REFER NOTE 4 & 5

FARM BUILDING

REFER NOTE 4, 5 & 6

SEASONAL CREEK BED / OVERFLOW (TYP.)

WEST 3 AREA

EXISTING VEHICLE TRACKS VEGETATION CORRIDORS (5 OF)

NEW DUAL CIRCUIT 220 kV TRANSMISSION LINE (SOLAR FARM TO TASNETWORKS PALMERSTON SUBSTATION)

CULTURAL ARTEFACTS

CONSERVATION COVENANT

WEST 4 AREA

ADDITIONAL 35 M WIDE LINE EASEMENT (SOLAR FARM TO PALMERSTON SUBSTATION)

AGRICULTURAL POST & RAIL FENCE (NEW)

REFER NOTE 9

SHOOTERS HUT (A&B)

WEST AREA A&B CONSTRUCTION SET DOWN

WEST 6 AREA

110 kV OH TRANSMISSION LINE (NO. 429) PALMERSTON-AVOCA

BESS FENCED AREA (272.9m x 157.4m) TO INCLUDE MIN. 10 METRE NON-COMBUSTIBLE FIREBREAK WITHIN FENCED AREA. TO INCLUDE MIN. 20 METRE BUFFER BETWEEN BESS FENCE AND ANY EXISTING FENCE FOR STOCK MOVEMENT TO INCLUDE 2 x 288,000 L FIRE FIGHTING WATER TANKS

CULTURAL ARTEFACTS

CULTURAL ARTEFACTS (WITH BUFFER)

220/33kV SUBSTATION 125m x 100m

50 M WIDE LINE EASEMENT (LINE 429) PALMERSTON-AVOCA

WEST 5 AREA

DOUBLE CIRCUIT 33 kV OH LINE (TO EAST SOLAR FARM AREA) 12m WIDE EASEMENT

WEST AREA C CONSTRUCTION SET DOWN

O&M COMPOUND / STORAGE 65m x 45m

LEGEND

- CREEK BED / DAM
- DEVELOPMENT FOOTPRINT
- FENCELINE 2.1 m HIGH BARBWIRE (NEW)
- AGRI POST/RAIL FENCE (NEW)
- 110 kV TRANSMISSION LINE / EASEMENT (EXISTING)
- DUAL CIRCUIT 220 kV TRANSMISSION LINE
- 33 KV OH LINE / EASEMENT (NEW)
- PCU / BESS / 10m FIREBREAK
- INTERNAL ACCESS (PRIVATE)
- PRIMARY ACCESS (PRIVATE)
- PUBLIC ROAD
- SINGLE AXIS SOLAR PV TRACKERS
- O&M COMPOUND
- 220 kV SWITCHYARD
- BESS AREA
- CONSERVATION COVENANT
- CONSTRUCTION SETDOWN AREA
- RESIDENTIAL DWELLING
- DOUBLE VEHICLE GATES (RESTRICTED ACCESS)
- WATER TROUGHS / SUB-SURFACE PIPELINE
- CULTURAL ARTEFACTS
- LOTS / BOUNDARY

PROJECT SUMMARY (WEST & EAST AREAS)	
LOCATION	41°50'25.6"S, 147°08'57.6"E
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ALTERATIONS		
	DRAWN	JM
	CHECKED	DS
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	DATE	10.03.23
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CLIENT: CONNORVILLE ESTATES PTY LTD ENGAGEMENT No: E310322

TITLE: NORTHERN MIDLANDS SOLAR FARM
PV CONCEPT LAYOUT (FINAL)
WEST AREA

SCALE: 1:7500

SIZE: A1

DRG No: E3103220-EL-ENT-DWG-0003 SHT. REV: 2

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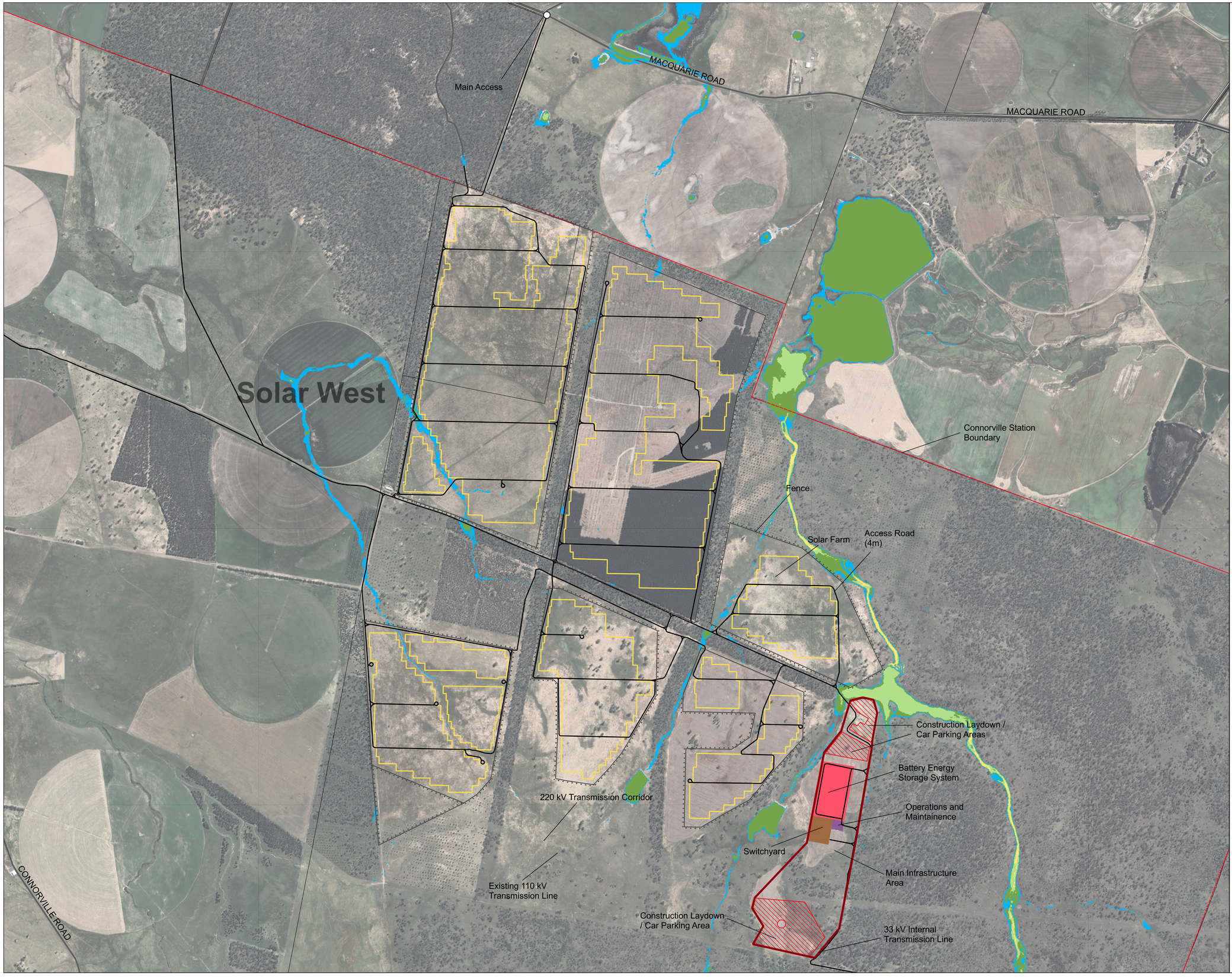


cogency

ROBERT LUXMOORE
Project Management

Masterplan Page 4 West Area (Hydrology Overlay)

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- 110 kV Transmission Line

Cultural Heritage Sites
- Artefact Scatter
- Isolated Artefact

Proposed Development
- Connorville Station
- Access Road
- Solar Farm
- Main Infrastructure Area
- Battery Energy Storage System
- Operations and Maintainence
- Switchyard
- Construction Laydown / Car Parking Area
- 220 kV Transmission Corridor
- 33 kV Internal Tranmission Line
- Fence
- Main Access Point
- Secondary/Emergency Access Point

Solar West 1% AEP Peak Hazard
- H2
- H3
- H4
- H5
- H6

Version: 1.0

Date: 14/09/2023

0 100 200 m

1:8,000 at A1

Main Access

110 kV Transmission Line

MACQUARIE ROAD

Connorville Station Boundary

Solar East

33 kV Internal Transmission Line

Switchyard

Fence

Construction Laydown / Car Parking Areas

Access Road (4m)

Solar Farm

cogency

ROBERT LUXMOORE Project Management

Masterplan Page 5 East Area (Hydrology Overlay)

2210 - Northern Midlands Solar Farm

Existing Features
- Parcels
- Existing Road
- 110 kV Transmission Line

Proposed Development
- Connorville Station
- Access Road
- Solar Farm
- Swtichyard
- 33 kV Internal Tranmission Line
- Construction Laydown / Car Parking Area
- Fence
- Main Access Point
- Secondary/Emergency Access Point

Solar East 1% AEP Peak Hazard
- H2
- H3
- H4
- H5
- H6

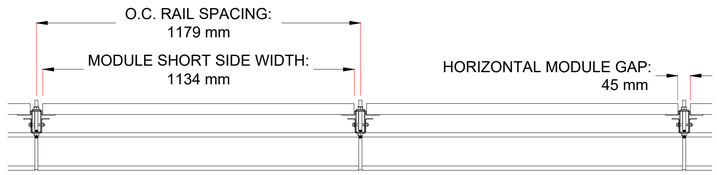
Version: 1.0

Date: 14/09/2023

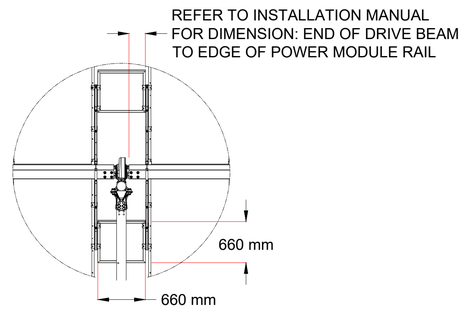
0 50 100 150 m

1:5,000 at A1

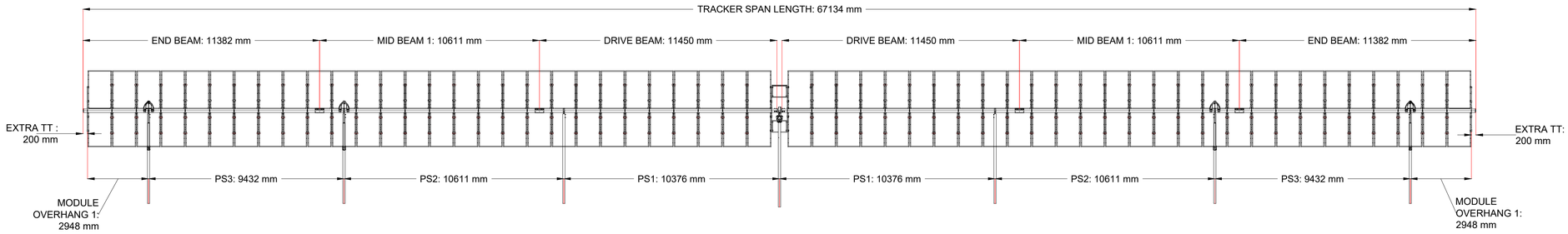
MODULE RAIL SPACING



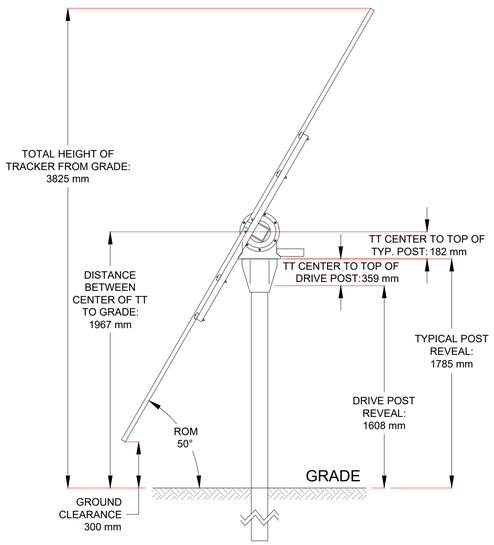
POWER MODULE DETAIL



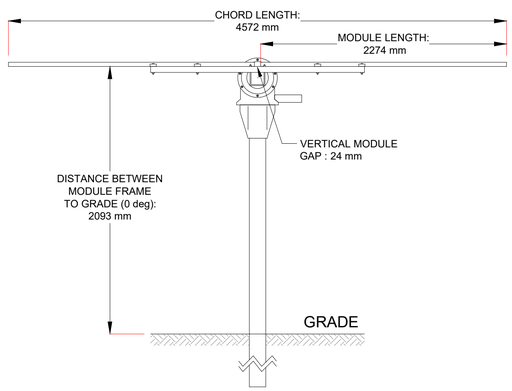
MECHANICAL LAYOUT



ELEVATION VIEWS



N-S ELEVATION @ MAX. TILT



N-S ELEVATION @ 0

PLAN VIEW

PROJECT DESIGN NOTES

PROJECT	CONNORVILLE
SYSTEM VOLTAGE	1500
STRING SIZE	28
# STRINGS PER FULL TABLE	4
# STRINGS PER 3/4 TABLE	3
# STRINGS PER 1/2 TABLE	2
# MODULES / ROW FULL TABLE	112
# MODULES / ROW 3/4 TABLE	84
# MODULES / ROW 1/2 TABLE	56
APPLICABLE DESIGN CODES	AS1170
SITE WIND SPEED (MPH)	90
STOW FLAT	WIND SPEED > 33MPH
GROUND SNOW (PSF)	0
MODULE PRODUCT	JKM54072HL4
GROUND COVERAGE RATIO (%)	33
CORROSION CATEGORY	C1/C2 - PRE-GAL G90
RAIL HANGER POSITION	TBD

FTC SOLAR

STAMP:

NOT FOR CONSTRUCTION

CONNORVILLE
CONNORVILLE ROAD CRESSY NULL
AUSTRALIA

PROJECT NUM:
0063L00000PIQSFAA0

SHEET TITLE:
TRACKER GENERAL ARRANGEMENT

SHEET SIZE:
A1
594 X 841 (23.4" x 33.1")
0 1cm 2

NO.	REVISION	DATE	INIT.
A	INITIAL RELEASE	05/27/2022	AMV

DATE:	05/27/2022
DRAWN BY:	AMV
ENGINEER:	GOKUL KALYAN
APPROVED BY:	SK

PROJECT PHASE:
PRELIMINARY

SHEET NO.:
S-200

Bushfire Impact Statement

Proposed Northern Midlands Agri – Solar Farm

For Robert Luxmoore Pty Ltd / Connorville Estates Pty Ltd

10th May 2023

Ground Proof Mapping Pty Ltd Commercial in Confidence

GROUND PROOF MAPPING P/L
PO Box 1027 | Launceston | Tasmania| 7250
M 0487 476 479 | F 03 6334 0215 | E justin@groundproofmapping.com.au
www.groundproofmapping.com.au | ABN 75 159 326 735

Contents

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Figures

Tables

Appendices to this BIS

Appendix No.	Document Name	Requirement
Appendix No. 1	Solar Farm Bushfire Mitigation Overview Map	Planning
Appendix No. 2	Solar Farm Transmission Line Options Map	Planning
Appendix No. 3	Bushfire Mitigation Plan (BMP) Incorporates a Bushfire Hazard Management Plan (BHMP) and a Bushfire Emergency Management Strategy BEMS)	Planning
Appendix No. 3.1	BHMP Site 1 – West Area Construction Laydown	Planning
Appendix No. 3.2	BHMP Site 2 – BESS Area	Planning
Appendix No. 3.3	BHMP Site 3 – 220/33 kV Main Substation & Switchyard	Planning
Appendix No. 3.4	BHMP Site 4 – East Area Construction Laydown	Planning
Appendix No. 3.5	BHMP Site 5 – 33 kV Switchyard Collector Station	Planning
Appendix No. 4	Fire Hazard & Risk Assessment 8039 FHRA 02 – BESS Area	Planning

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Glossary of Terms

Term	Definition
Assets	Anything valued by people which includes buildings, crops, and forests and in many cases the environment.
BAL	A means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per square metre, which is the basis for establishing the requirements for construction to improve protection of building elements from attack by a bushfire (AS 3959-2018).
BAL ratings	Used as the basis for establishing the requirements for construction to improve protection of a (proposed) building from bushfire attack. There are 6 BAL ratings; low, 12.5, 19, 29, 40 and FZ.
Burn plan	The plan which is approved for the conduct of prescribed burning. It contains a map identifying the area to be burnt and incorporates the specifications and conditions under which the operation is to be conducted.
Burning program	A program of prescribed burns scheduled for a designated area over a nominated time, normally looking ahead over one fire season (for the coming spring to the following autumn), but can also look ahead five years or more.
Burning rotation	The period between reburning of a prescribed area for management purposes.
Burning unit	A specified land area for which prescribed burning is planned.
Bushfire Risk Assessment Model (BRAM)	A computer-based modelling tool that uses a series of inputs to assess the risk of bushfires to a specific area. The BRAM has a capacity to produce a series of outputs. It was developed and is managed by Tasmanian Parks & Wildlife Service.
Bushfire	Unplanned vegetation fire. A generic term which includes grass, forest and scrub fires both with and without a suppression objective.
Bushfire management	All those activities directed to prevention, detection, damage mitigation, and suppression of bushfires. Includes bushfire legislation, policy, administration, law enforcement, community education, training of fire fighters, planning, communications systems, equipment, research, and the multitude of field operations undertaken by land managers and emergency services personnel relating to bushfire control.

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Bushfire-prone area	Means: land that is within the boundary of a bushfire-prone area shown on an overlay on a planning scheme map; and where there is no overlay on a planning scheme map, or where the land is outside the boundary of a bushfire-prone area shown on an overlay on such a map, land that is within 100m of an area of bushfire-prone vegetation equal to or greater than 1 hectare.
Bushfire-prone vegetation	Means contiguous vegetation including grasses and shrubs but not including maintained lawns, parks and gardens, nature strips, plant nurseries, golf courses, vineyards, orchards or vegetation on land that is used for horticultural purposes.
Community Bushfire Protection Plan (CPP)	A bushfire plan for community members, to support their personal Bushfire Protection Plans. The focus of this plan is on safety options.
Community Bushfire Response Plan (CRP)	A bushfire incident plan for Incident Management Teams, TFS brigades and emergency management agencies. This plan is designed to assist response, management, planning and recovery.
Consequence	Consequences are defined as a qualitative rating of damage from fire to values.
Defendable space	An area of land around a building where vegetation is modified and managed to reduce the effects of flame contact and radiant heat associated with a bushfire.
Elevated fuel	The standing and supported combustibles not in direct contact with the ground and consisting mainly of foliage, twigs, branches, stems, bark and creepers.
Fine fuel	Fuel such as grass, leaves, bark and twigs less than 6mm in diameter that ignite readily and are burnt rapidly when dry.
Fire behaviour potential	The factors that affect the development and propagation of a fire.
Fire break	Any natural or constructed discontinuity in a fuel bed used to segregate, stop, and control the spread of a bushfire, or to provide a fire line from which to supress fire.
Fire Danger Index (FDI)	A relative number denoting an evaluation rate of the potential fire rate of spread, or fire suppression difficulty for specific combinations of temperature, relative humidity, wind speed and drought effects.
Fire Danger Rating (FDR)	A relative class denoting an evaluation of fire rate of spread, or fire suppression difficulty for specific combinations of temperature, relative humidity, drought effects and wind speed. Rated as no rating, moderate, high, extreme or

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	catastrophic indicating the relative evaluation of bushfire danger.
Fire frequency	A general term referring to the recurrence of fire in a given area over time.
Fireground	The area in the vicinity of a fire suppression operations, and the area immediately threatened by the fire. It includes burning and burnt areas; constructed and proposed fire lines; the area where firefighters, vehicles, machinery and equipment are located when deployed; roads and access points under traffic management control; tracks and facilities in the area surrounding the actual fire; and may extend to adjoining area directly threatened by the fire.
Fire line intensity	The rate of energy release per unit length of fire front usually expressed in kilowatts per metre (Kw/m).
Fire regime	The history of fire use in a particular vegetation type or area including the frequency, intensity and season of burning.
Fire risk	Processes, occurrences or actions that increase the likelihood of fires occurring.
Fire season	The period during which wildfires are likely to occur, spread and do sufficient damage to warrant organised fire control.
Fire trail	A formed track which provides access for firefighting vehicles, is built to specific standards, has no other intended purpose and is not generally available for public access
FMAC	Fire Management Area Committee
Forest	An area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of overstorey strata about equal to or greater than 20%.
STT	Sustainable Timbers Tasmania
Fuel	Any material such as grass, leaf litter and live vegetation which can be ignited and sustains a fire. Fuel is usually measured in tonnes per hectare.
Fuel continuity	The degree or extent of continuous or uninterrupted distribution of fuel particles in a fuel bed thus affecting a fire's ability to sustain combustion and spread. This applies to aerial fuels as well as surface fuels.
Fuel load	The oven dry weight of fuel per unit area. Commonly expressed as tonnes per hectare.
Hazard management zone / area	Means the zone / area, between a habitable building or building area and bushfire-prone vegetation, which provides access to a fire front for firefighting, which is maintained in a minimal fuel condition and in which there are no other

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	hazards present which will significantly contribute to the spread of a bushfire.
Likelihood	Likelihood is defined as a qualitative method to assess the likelihood rating to the consequences occurring.
Low intensity fire	A fire which travels slowly and only burns lower storey vegetation, like grass and lower tree branches, with an average intensity of less than 500 kW.m-1 and flame height less than 1.5m. Usually causes little or no crown scorch and is easily controlled.
Mitigation Plan	Plan or document to identify, articulate and manage risk at area level.
Mosaic	Used in reference to the spatial arrangement of burnt and unburnt fuels at either a local or a landscape scale.
Patch burning	Burning in patches to prepare sites for group planting or sowing or to form a barrier to subsequent fires.
Prescribed burning	The controlled application of fire under specified environmental conditions to a predetermined area and at the time, intensity, and rate of spread required to attain planned resource management objectives. It is undertaken in specified environmental conditions.
Preparedness	The results of measures to ensure, if an emergency occurs, that communities, resources and services are capable of responding to, and coping with the effects.
Prevention	The results of measures taken in advance of an emergency aimed at decreasing or eliminating its impact on the community and the environment.
PWS	Parks and Wildlife Service.
Response	The results of strategies and services to control, limit or modify the emergency to reduce its consequences.
Risk	The exposure to the possibility of such things as economic or financial loss or gain, physical damage, injury or delay, as a consequence of pursuing a particular course of action. The concept of risk has two elements, i.e., the likelihood of something happening and the consequences if it happens.
Risk acceptance	The informed decision to accept a risk, based on the knowledge gained during the risk assessment process.
Risk analysis	A systematic use of available information to determine how often specific events may occur and the magnitude of their likely consequences.
Risk assessment	The systematic process of identifying, analysing and evaluating risk.

Risk criteria	Standards (or statements) by which the results of risk assessments can be assessed. They are inexact and should be seen as guidelines rather than rules.
Risk evaluation	The process of comparing the outcomes of risk analysis to the risk criteria in order to determine whether a risk is acceptable or tolerable.
Risk identification	The process of recognising, identifying and describing risks.
Risk treatment	A process to select and implement appropriate measures undertaken to modify risk.
Slope	The slope under the classified vegetation.
SFMC	State Fire Management Council.
TFS	Tasmanian Fire Service
Wildfire	All unplanned vegetation fires. A generic term which includes grass fires, forest fires and scrub fires.
Woodland	A subset of forest plant communities in which the trees form only an open canopy (between 20% and 50% crown cover), the intervening area being occupied by lower vegetation, usually grass or scrub

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Abbreviations

Abbreviation	Description
APZ	Asset Protection Zone
BAL	Bushfire Attack Level
BEP	Bushfire Emergency Plan
BEMS	Bushfire Emergency Management Strategy
BESS	Battery Energy Storage Systems
BHMP	Bushfire Hazard Management Plan
BMP	Bushfire Mitigation Plan
BIS	Bushfire Impact Statement
BRAM	Bushfire Risk Assessment Modelling
CFA	Country Fire Authority (VIC)
GPM	Ground Proof Mapping Pty Ltd
HMA	Hazard Management Area
NRE	Department of Natural Resources and Environment Tasmania
OFH	Overall Fuel Hazard
OHS	Occupational Health & Safety
PPE	Personal Protection Equipment
PV System	Photovoltaic System
PWS	Parks and Wildlife Service
STT	Sustainable Timbers Tasmania
TFS	Tasmania Fire Service
The Guidelines	Design Guidelines and Model Requirements, Renewable Energy Facilities, CFA, V3.0, March 2022

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Executive Summary

This Bushfire Impact Statement (BIS) provides an analysis and evaluation of the bushfire potential at a local and landscape level surrounding the proposed 300MW Connorville Agri-Solar Farm and associated transmission line routes and battery storage. Factors including, however not limited to, vegetation types and flammability, topographical layout, fire weather, fire history, current land use, proposed land use and proposed infrastructure have been assessed.

This BIS has identified whilst there is potential for a bushfire to impact the site, predominantly by ember transfer, there is a lack of bushfire prone vegetation connectivity across the proposed site, resulting in fire severity that is unlikely to be a significant threat to the proposal site. It should be also noted that as the proposal is Agri-Solar, the majority of the site will be grazed by sheep on a continual basis, minimising any grass fire risk.

The BIS has also addressed the potential fire risk emanating from the proposed development, both during construction and operational phases at a localised level. Buildings, battery storage and associated sources of fire have been identified and deemed as low risk, providing mitigation measures are in place.

The BIS has determined that the bushfire risk surrounding the and including the site has been considered in detail and proposed recommended mitigation measures to moderate the risk to an acceptable level. Mitigation measures will be specified in the form of a Bushfire Mitigation Plan (BMP) appended to this BIS.

The BMP addresses the facility location and design (hazard management areas, access, bushfire fighting water supply and firebreaks) for the entire development and provides bushfire mitigation strategies to be implemented. The BMP also cover the construction (vegetation & fuel management, machinery usage, fuel storage, semi-permanent office & storage buildings) and production phases.

In the absence of any Tasmanian guidelines, the BMP is based on the 'Design Guidelines and Model Requirements, Renewable Energy Facilities, CFA, V3.0, March 2022. Where there are higher standards for Tasmania as specified in the Tasmanian Planning Scheme - Northern Midlands Local Provision Schedule 2022, C13.0 Bushfire-Prone Areas Code, then these have been defined as the minimum standard required.

With respect to this BIS, the proposal has been assessed under the Tasmanian Planning Scheme – Northern Midlands Local Provision Schedule 2022, and more specifically, C13.0 Bushfire-Prone Areas Code. Although Battery Use/Storage is not clearly defined in the Planning Scheme as a hazardous use, it is considered as a hazardous use under the Bushfire Prone Areas Code. Therefore, a Bushfire Hazard Management Plan (BHMP) has been completed and is part of the BMP.

Additionally, a Bushfire Emergency Management Strategy (BEMS) has been incorporated, to ensure that the facility is prepared in the event of an unplanned fire, providing for safety of site personnel, emergency responders and the community. This will cover the construction and production phases. This BEMS will guide the formation of a Bushfire Emergency Plan (BEP) to be prepared at Building Approval stage.

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Introduction & Context

Purpose

The purpose of this report (BIS) is to provide a comprehensive assessment and analysis of the bushfire risk associated with this development proposal at the subject site at Connorville Estate, with respect to a large Agri-Solar Farm and associated infrastructure (including a transmission line and battery storage). The BIS will address the fire risk emanating from and potentially threatening from an external source, the proposed development at both a localised and landscape level.

Copyright

Last updated: 10th May 2023, Version 1.0

Report Author: Justin Cashion

Disclaimer

The information and data collected in the preparation of this report is current as of the date of onsite inspections and various external data, reports and documentation supplied by Robert Luxmoore Pty Ltd. Given the discretionary and independent assessment process under the Resource Management Planning System in Tasmania, GPM cannot guarantee a planning approval will be received from the Northern Midlands Council for any planning application submitted to Council, especially in regards to fire management.

As part of the research contained within this report, GPM has not approached the Northern Midlands Council to determine if there are any outstanding orders, notices or compliance matters associated with the subject site. These are outside the scope of this report. In the event that advice is required in these areas, it is recommended that legal advice is sought from a barrister & solicitor who specialises in local government and development (including planning and building) law within the state of Tasmania. This report does not constitute legal advice.

No other GPM client benefits from the information or recommendations contained within this report.

Request for Fire Consultancy Services

GPM was approach by the client's Project Manager, Robert Luxmoore Project Management in August 2022 to provide a Request for Proposal for fire and bushfire consultancy services. GPM was engaged on the 16th September 2022.

Project Scope

This report is in the form of a BIS, which will support a planning application to the Northern Midlands Council.

In support of the BIS report, a BMP has been developed, with recommendations provided to mitigate the fire risk outlined in the BIS.

The BMP addresses the facility location and design (hazard management areas, access, bushfire fighting water supply and firebreaks) for the entire development and provides bushfire mitigation

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strategies to be implemented. The BMP also covers the construction (vegetation & fuel management, machinery usage, fuel storage, semi-permanent office & storage buildings) and production phases.

In absence of any Tasmanian guidelines, the BMP will be based on the 'Design Guidelines and Model Requirements, Renewable Energy Facilities', CFA, V3.0, March 2022. The BMP will cover the construction (vegetation & fuel management, machinery usage, fuel storage, semi-permanent office & storage buildings), commissioning and production phases.

A BHMP and a BEMS has also been developed for the site to ensure that the facility is prepared in the event of an unplanned fire, providing for safety of site personnel, emergency responders and the community. This will cover the construction and production phases and will guide a site BEP to be prepared at the Building Approval stage.

Figure 1: Example of Agri Solar.

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The Proposed Development

Connorville Estates Pty Ltd seeks to develop part of their landholding into a long-term renewable energy asset in the form an Agri-Solar farm. A table of assumptions and general project information is listed in the table below:

Table 1:

Client	Connorville Estates Pty Ltd (Connorville)
Project Name	Northern Midlands Solar Farm
Development Area	Entire "Development Area" = 543 Ha (This includes all the Proposal elements, i.e. Solar East & Solar West, access tracks, 220kV transmission line, main infrastructure area (including the switchyard, BESS1, and O&M compound), construction areas/car parking, and internal 33kV line). Of the total Development Area, Solar West comprises 369.2 Ha and Solar East comprises 63.1 Ha, approximately. This Development Area is mostly located within the proponent's property, "Connorville Station"
Study Area	Development Area
Address	Connorville Station, 394 Connorville Rd, Cressy, TAS. The entire property is 17,600 Ha, in single ownership. Family has owned the land since 1823.
Local Government	Northern Midlands Council
Planning Zone	Agriculture Zone
Planning Use Class	'Utilities' is the most appropriate definition in the planning scheme and includes all elements of the proposal.
Overlays	Solar Farm: Electricity Transmission Infrastructure Protection Code, Waterway and Coastal Protection Area (Natural Assets Code), Bushfire-Prone Areas Code, Landslip Hazard Code, and Conservation Covenant. Transmission line: Bushfire-Prone Areas Code, Flood-prone hazard areas code, Landslip Hazard Code, Local Historic Heritage Code, Waterway and Coastal Protection Area (Natural Assets Code), (Scenic Protection Code - only to Option 2.1 & 2.2 alignments)
Solar Capacity	288MW DC / 370MWp AC
Battery Capacity	BESS combined capacity totalling 345.9 MW / 691.7 MWh at the Beginning-of-Life (BOL)
Electricity Infrastructure	Transmission line = 220kV double circuit overhead line from the Development Area to the Palmerston Substation. It runs adjacent to the existing 110kV line (which does not have the capacity to accommodate this project). The proposed 220kV line is 15.4km in length and the easement is 35m in width (the easement width is narrow as it is proposed to utilise some of the existing 110kV easement). The width of the transmission easement increases as the line approaches Palmerston

	Substation, to allow for additional infrastructure. Internal line = 33kV line which connects Solar East and Solar West and runs overhead along an existing access track. The proposed 33kV line is 4.0 km in length and the easement is expected to be 12 m in width. Note: Three 220kV transmission line route options were explored as part of the planning and technical assessment of the Northern Midlands Solar Farm proposal: Option 1, Option 2.1 and Option 2.2. Based on the findings of the assessments and advice from Watts Advisory and TasNetworks, Option 1 was selected as the preferred route for the new 220kV transmission line.
Construction Jobs FTE	The estimated construction investment of $478 million is estimated to generate $1.09 billion in total economic output and support 986 (FTE) jobs during the construction phase, including 370 direct jobs.
Operational Jobs FTE	The ongoing operation of the solar farm is estimated to generate $36 million in total economic output and support 27 (FTE) jobs per annum, which includes 11 direct jobs (FTE).
Construction Length	Approximately 1.5 years
Agri solar	Sheep grazing below panels confirmed. Typical panel section included in OneDrive documents from FTC Solar
Project Design Life	30 years
Panel racking	Single-axis tracking in 2P format
Module product type (typical)	JINKO SOLAR TIGER PRO 72HC-TV JKM540M-72HL4-TV 540 W This was the module used in the concept design. The power class of the module will likely increase by the time Development Approval received. Requirement should be to use a Tier 1 product with 30-year performance warranty. Open to bifacial module technology.
String size	Concept design based on string length of 28 modules. This will be dependent on PV Module and inverter technology selected.
Inverter (typical)	SMA Model SC 4200 UP 4.2 MVA

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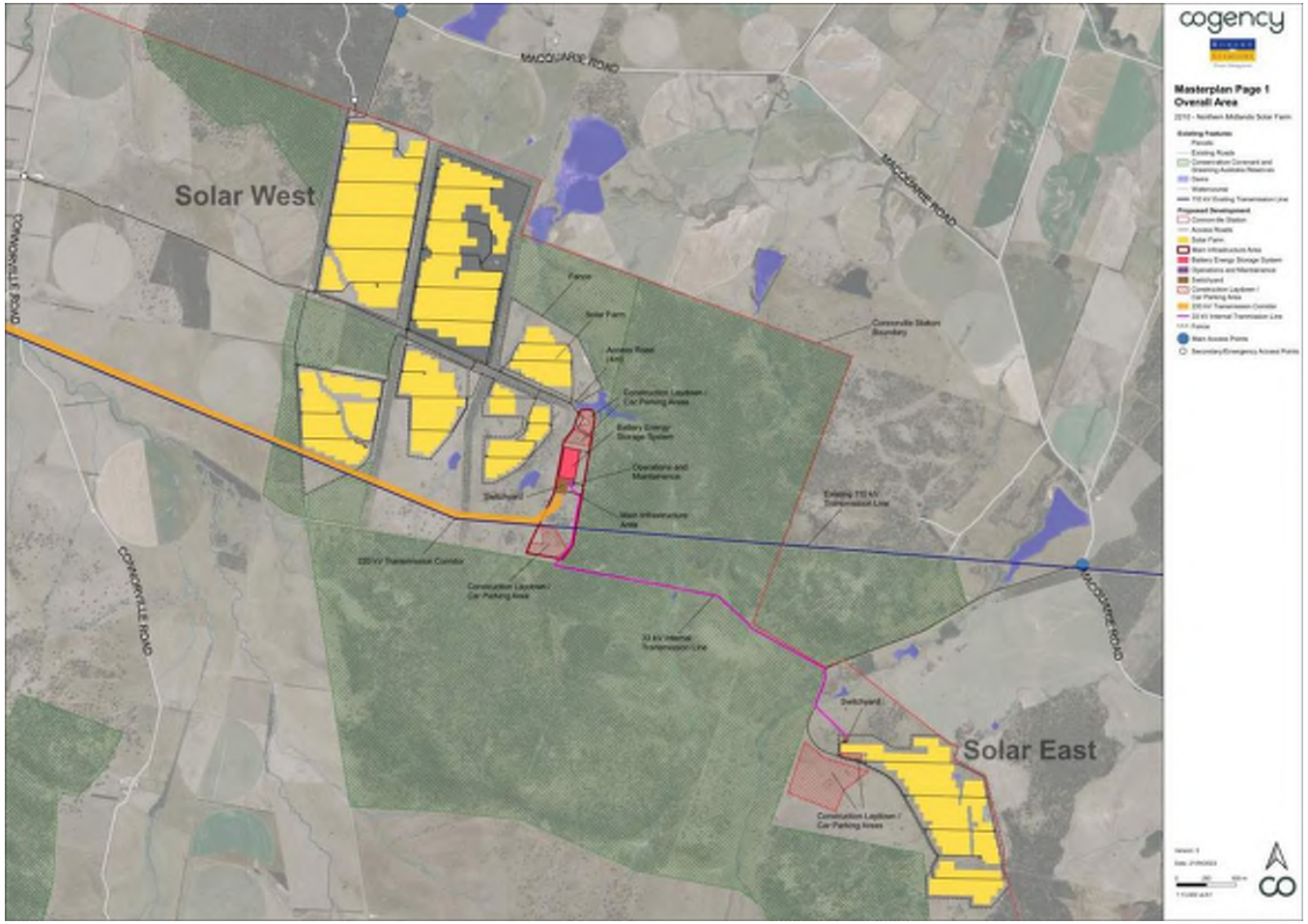
A Masterplan of the project is shown below:



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Applicable Planning Scheme Zone Use and Development Standards

The site is zoned as 'Agriculture' Zoning under the Tasmanian Planning Scheme – Northern Midlands Local Provision Schedule 2022 and the intended use is broadly defined as 'Utilities'. Given that the power generated by the proposed Agri-Solar Farm and associated infrastructure is not intended solely for existing uses, under which minor 'Utilities' do not require a permit, the proposed development is deemed as 'Discretionary', thus the proposal is permissible subject to Council approval.

With respect to this BIS, the proposal has been assessed under the Tasmanian Planning Scheme - Northern Midlands Local Provision Schedule 2022, and more specifically, C13.0 Bushfire-Prone Areas Code. The purpose of the Bushfire-Prone Areas Code is to ensure that use and development is appropriately designed, located, serviced, and constructed, to reduce the risk to human life and property, and the cost to the community, caused by bushfires. This code applies to:

(a) subdivision of land that is located within, or partially within, a bushfire-prone area; and

(b) a use, on land that is located within, or partially within, a bushfire-prone area, that is a vulnerable use or **hazardous use.**

Hazardous use, means a use where:

(a) hazardous chemicals of a manifest quantity are stored on a site; or

(b) explosives are stored on a site and where, classified as an explosives location or large explosives location as specified in the Explosives Act 2012.

As per the Tasmanian Work Health and Safety Regulations 2022, Chapter 7, Part 7.1, the Explosives Act 2012 and the Tasmanian Planning Scheme – Northern Midlands Local Provision Schedule 2022, and more specifically, C13.0 Bushfire-Prone Areas Code – C1.5.2 – P1(e – other advice, if any, from the TFS), it has been determined that both the battery storage compounds and compounds for diesel storage (construction and operating phases) will exceed the manifest quantities. Although exact quantities are unknown, the project manager provided the following advice:

Construction Phase:

- Expected to have 20kL+ bulk storage for diesel during earthworks, utilised to fill mobile vehicles with 400L to 1000L storage capacity.

Operational Phase:

Substation

- 2 x 220/33kV Transformers – 70kL of mineral oil per transformer, bunded and typically drained through some form of oil water separator, either parallel plate separator or buried separation tank with a hydrocarbon discharge of <5ppm.
- Other equipment – only minor quantities (<200L per item) for CVT's, diesel generator.

Battery Energy Storage System (BESS)

- Assumed ~300MW capacity, approximately 60 x 0.4/33kV 5-6MVA step up transformers – 3900L per transformer (based off FR3 natural ester oil typically used to minimise fire clearances).

The following extract from the Tasmanian Planning Scheme – State Planning Provisions - C13.5 Hazardous uses and refers to the Objective, Acceptable Solutions and Performance Criteria for Hazardous Use, and illustrates the project's compliance against the criteria:

Table 2:

Objective:	That hazardous uses can only be located on land within a bushfire-prone area where tolerable risks are achieved through mitigation measures that take into account the specific characteristics of both the hazardous use and the bushfire hazard.	
Acceptable Solutions:	**Performance Criteria:**	**Project Compliance:**
A1 - No Acceptable Solution.	P1 - A hazardous use must only be located in a bushfire-prone area if a tolerable risk from bushfire can be achieved and maintained, having regard to: (a) the location, characteristics, nature and scale of the use; (b) whether there is an overriding benefit to the community; (c) whether there is no suitable alternative lower-risk site; (d) the emergency management strategy (hazardous use) and bushfire management plan; and (e) other advice, if any, from the TFS.	• The proposed location of the development is in a suitable site on a title where there is an excellent resource to generate electricity from solar. The risk from bushfire is considered tolerable as long as the measures proposed in this BIS, the BMP and the BHMP are adhered to.
A2 - An emergency management strategy (hazardous use) endorsed by the TFS or accredited person.	P2 - No Performance Criterion.	• A BEMS has been developed. • All hazardous substances must be stored and signed as per requirements under the Work Health & Safety Act 2012, the Explosives Act 2012, and AS1940, AS3780 & AS2187 to limit the risk of exposure to a hazardous substance in a bushfire emergency • All hazardous materials storage must be ember proof • All hazardous chemicals will be stored in bunded areas, which will assist in preventing any spill entering the surrounding landscape and contributing to the nearby bushfire threat • A local ignition event could lead to there not being enough time to leave

		the site and so occupants may need to take refuge on site in areas away from the hazardous materials, the site office facilities are the recommended location until the Operation and Maintenance building is constructed, which will then take over as the shelter in place facilities
A3 - A bushfire hazard management plan that contains appropriate bushfire protection measures that is certified by the TFS or an accredited person.	P3 - No Performance Criterion.	• A BMP has been prepared for the entire site • A BHMP has been developed and a HMA has been designed (where each known hazardous use is located) and endorsed by an accredited person (as part of the BMP) • Any buildings within the hazardous use sites storing hazardous materials must be constructed to BAL 12.5 standards as a minimum • HMAs have designed with setbacks from each location's boundaries, with all land within the boundary also required to be managed as part of the HMA. The HMA for each location also incorporates all other site infrastructure, access, and the proposed water supply • Site access across the project site will be adequate for bushfire purposes and for evacuation purposes • A static water supply that is compliant with Table C13.5 of the Code must be installed at each hazardous use site.

Existing Site Conditions and Establishing the Bushfire Threat

Location

Connorville Estate is a large standing of private property located in the Northern Midlands area of Tasmania, ±15km south, southeast of the Cressy township. The entire estate is defined as being in a Bushfire Prone Area under the Tasmanian Planning Scheme – Northern Midlands Local Provisions Schedule. There are multiple access points to the property, however the primary access is off Macquarie Road that leads onto Connorville Road.

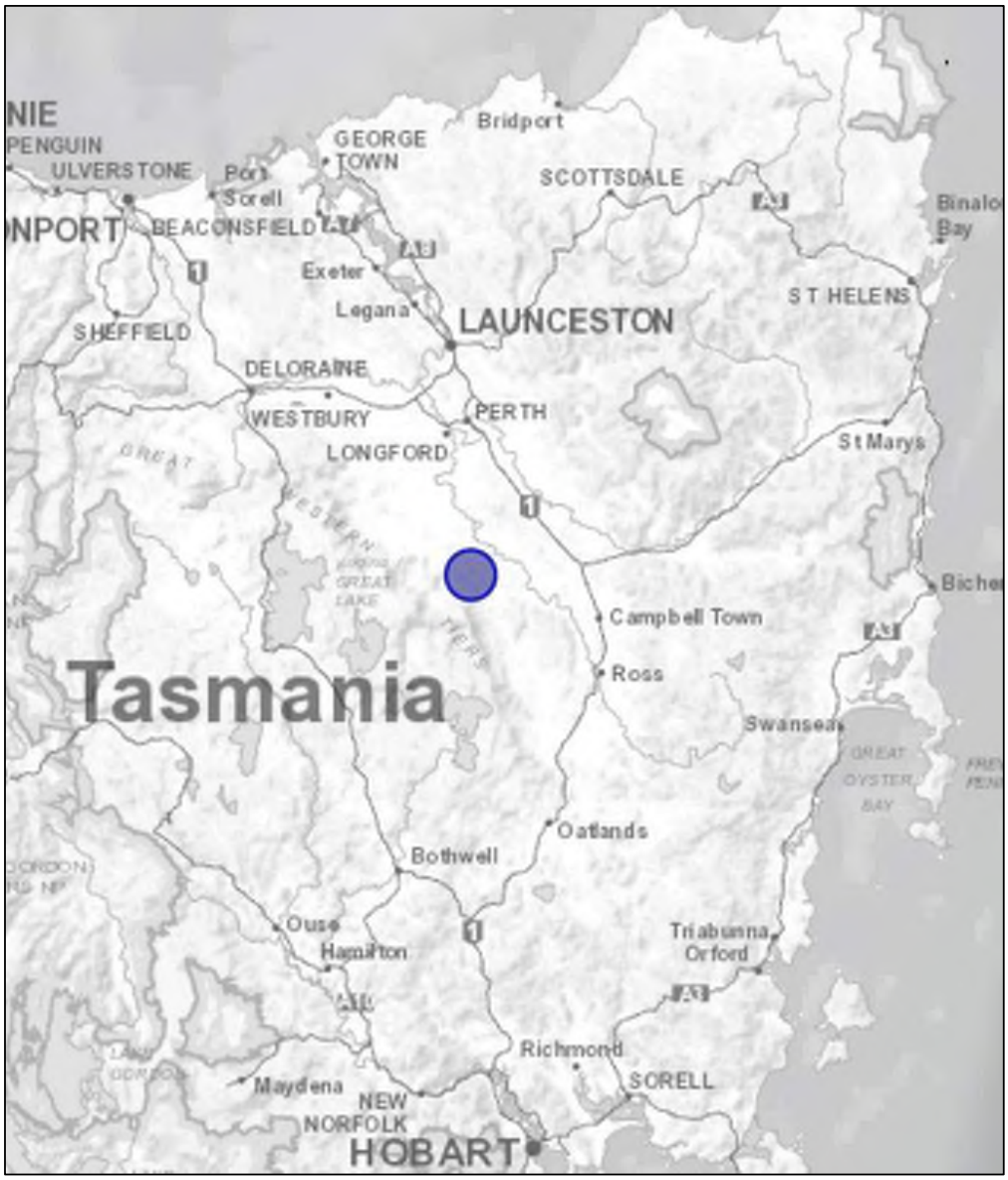

Figure 2: Location map.

Property Land Use

Established in 1824 and held entirely within the O'Connor family since that time, Connorville Estate is one of Tasmania's original and pre-eminent wool properties. The large sheep-grazing property (±17,200ha) also involves mixed farming enterprises such as cropping and farm forestry. Much of the farming land to the north and northwest, where most of the fire weather comes from during the summer bushfire period, is under irrigation, resulting in minimal fire risk. Ignition sources would be limited to occurrences such as escapes from burning of stubble from crops or fire from farm harvesting machinery.

Figure 3: Typical of agricultural grassland areas in area of development.

Connorville Estate has many areas that consist of native vegetation and regenerated areas that are quite rich and diverse in native flora and fauna. Conservation Covenants exist on some native vegetation areas and are managed for conservation purposes - with populations of eastern quolls, spotted-tailed quolls, eastern barred bandicoots, Tasmanian devils, eastern bettongs and woodland birds, among others present across the property.

There is a consolidated patch of Eucalyptus amygdalina inland forest and woodland on Cainozoic deposits (DAZ) adjoining to the northwest of the proposed Solar Farm West development site, some of which is part of a Conservation Covenant. It is recommended that this section of native forest have a fuel reduction burn applied to the area, reducing the fine fuels, thus reducing the intensity of any wildfire from the northwest direction (predominant fire weather direction). This mitigation approach would need to be carefully planned and balanced against the floristic and ecological values of the site as well as the Conservation Covenant fire management parameters.

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Figure 4: Conservation Covenant vegetation adjoining to the northwest of the development site.

Another large Conservation Covenant lies between both the Solar Farm West and Solar Farm East proposed development sites. Vegetation consists of *Eucalyptus viminalis* grassy forest and woodland (DVG), *Eucalyptus amygdalina* forest and woodland on dolerite DAD), Lowland grassland complex (GCL), *Bursaria - Acacia* woodland (NBA), Lowland *Themeda triandra* grassland (GTL), Lowland *Poa labillardierei* grassland (GPL) and a small patch of Fresh water aquatic sedgeland and rushland (ASF). As for the covenanted area to the northwest of the proposed Solar Farm West development site, it is recommended that this area be subject to fuel reduction, dependant on similar values and parameters. Priority should be given to the fuel reduction of areas to the northwest of the development site.

Figure 5: Typical of grassy woodland areas surrounding the development area.

One large area of Plantations for silviculture – softwood (FPS) - *pinus radiata* plantation is located on the proposed Solar Farm West development site. At the time of inspection this was being harvested.

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It is expected that the harvesting residue from this operation is removed prior to construction, thus is only a short-term fire management issue.

Other small remnant patches of natural native vegetation and planted native vegetation exist across the sites in the forms of riparian strips and shelterbelts etc. These areas are small enough in size, with broken connectivity, that they pose very little risk in relation to fire spread, and in fact may offer some ember trap resistance.

Figure 6: Typical of areas of native vegetation plantings across the property.

Adjoining Land Use

The land surrounding the site for several kilometres is zoned as agriculture. This land is primarily used for mixed enterprise farming purposes including grazing and cropping, with scattered residential dwellings and associated infrastructure such as outbuildings and sheds etc. As for the subject property, much of the farming land to the north and northwest, where the majority of fire weather comes from during the summer bushfire period, is under irrigation, resulting in minimal fire risk. Ignition sources would be limited to occurrences such as escapes from burning of stubble from crops or fire from farm harvesting machinery.

Establishing the Bushfire Threat

Bushfire threat has been considered by considering the following components:

- Influences on fire behaviour (topography, fuel moisture, atmospheric stability)
- Vegetation type, flammability & sensitivity.
- Fuel hazard ratings.
- Onsite weather characteristics.
- Prevailing fire weather conditions

Topography

Topography is a combination of site characteristics including, slope, steepness, elevation, aspect and landscape pattern. This inadvertently effects fire behaviour. The issue of the influence of slope on fire spread rate was modelled by McArthur (1967) who predicted that the rate of fire spread would

double for every 10º of slope uphill and halve for every 10º of slope downhill. McArthur (1967) also states that on fires burning in undulating country, the effect of spotting across lee slopes onto the next uphill slope will overcome the effects fires burning slowly down lee slopes before burning rapidly up the next upslope and hence, during these fires the effect of slope can be ignored.

Steep land also increases wind at the heads of gullies and hence can increase fire behaviour. Wind channelling can also occur on areas with steep slopes. North facing slopes are drier than south facing slopes, and consequently fuels on north facing slopes can ignite and burn more easily than those on south facing slopes.

The identified development sites consist of undulating topography with slopes that range from 0 – 10°, with some slopes of 15°, mainly surrounding watercourses. These slopes can be considered quite moderate, thus pose minimal risk in heightening fire behaviour. Elevation range is varying between 180m and 240m across the proposed development sites.

Figure 7: Existing transmission line in location of infrastructure zone.

Fuel Moisture

For fire management purposes, the term fuel moisture is the fuel moisture content of dead fine fuel which has a diameter of less than six millimetres. Fuel moisture is calculated as the percentage weight of water in the fuel to its oven dry weight.

The most important factors influencing the fuel moisture are relative humidity, dew point temperature, amount of solar radiation (which is in turn influenced by the cloud cover, season, slope and aspect) and recent rainfall. By itself, temperature only has very minor influences on fuel moisture and hence, fire behaviour.

In dry eucalypt forests such as those identified across and surrounding the proposed development site, fires will normally fail to sustain (i.e., keep burning) when the fuel moisture exceeds about 30%, and typically only burn at low intensity when the fuel moisture exceeds about 20 to 25%. However, these forests have the potential to burn with high rates of spread, high intensity and with a high risk of spot fires when the fuel moisture is less than about 10% (Tolhurst and Cheney 1999).

Site specific changes in fuel moisture also occur within vegetation types as a result of changes in aspect and/or slope. For example, gullies or south facing slopes may be shaded and/or have denser

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vegetation resulting in their having higher dead fuel moistures than flat areas, ridges and north facing slopes. These areas with higher fuel moistures therefore have the potential to act as natural fire boundaries if their moisture contents are sufficiently high to make them non-flammable.

The development site consists predominantly of grassland fuels, thus fire modelling internally across the site is based on fine fuels.

Atmospheric Stability

For more than 50 years atmospheric stability has been recognised as a major factor influencing fire behaviour (e.g., Byram 1959; McArthur 1967; Luke and McArthur 1979; Hines 1988; Bally 1995; Tolhurst and Chatto 1999; Mills and McCaw 2010). Fires burning under unstable atmospheric conditions have increased probabilities that large-scale fire convection columns will develop, which have the potential to result in enhanced surface wind speeds, the drawing down of low humidity air from aloft down to the ground surface and the possibility of downdrafts causing abrupt changes in wind speed and fire behaviour.

Fuel Hazard Rating

The most important fuel factor influencing fire behaviour is the percentage of dead fuel followed by fuel structure which is in turn, more important than fuel load (see Marsden Smedley and Catchpole 1995a, 1995b, DEH 2012; Hines et al. 2010; Cheney et al. 2012, Gould et al. 2007a, 2007b). This is because by itself, the fuel load only has very minor influences on fire spread rate, although it does have significant influences on fire intensity. In order to address this issue, fuel hazard assessment systems have been developed which incorporate the different influences of different fuel factors into easily utilised ratings.

When fuel hazards are assessed, the level of fuel hazard is based on a combination of the surface, near-surface, elevated and bark fuels. Each of these stratums are assessed on a five-point scale between low and extreme (Hines et al. 2010) as shown in the diagram below:

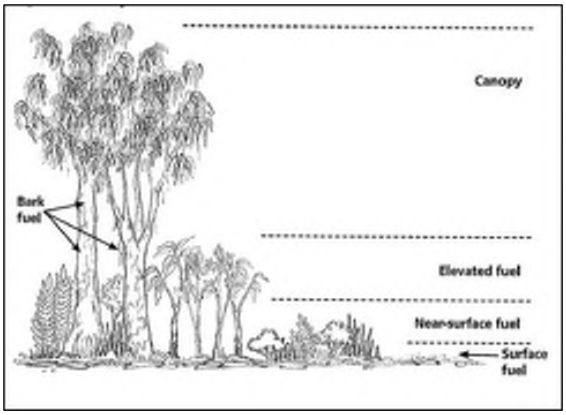

Figure 8: Illustration of differing fuel type stratum.

The surface fuel stratum is comprised of: dead grass; leaves; bark; and twigs; predominantly in a horizontal orientation and in contact or close to contact with the soil surface. Surface fuels often contain much of the fuel load and often have elevated fuel moistures and relatively low aeration. This results in these fuels having minor influences on rates of spread, but major influences on fire intensity.

The near-surface fuel stratum consists of live and dead fuels above the surface fuel stratum, and comprises both vertical and horizontal material. In some sites, the surface and near-surface fuel stratums integrate. Near-surface fuels are typically about 10 to 30 centimetres deep, but may be as high as one metre in some situations. Due to their proximity to the surface fuels, near-surface fuels will normally be burnt in a fire. Near surface fuels consist of fine fuel including: pasture grasses; native grasses; suspended bark; leaf litter; low shrubs; bracken; tussock grasses; and sedges and rushes.

The elevated fuel stratum consists of shrubs, immature overstorey species and tall bracken. The fuels in this stratum are primarily vertical in their orientation and are typically about one to two metres tall, but may be 8 to 10 metres tall in wet eucalypt forests. This stratum has a major influence on flame height and the development of crown fires (Gould et al. 2007a; Cheney et al. 2012).

The main bark types affecting fire behaviour are: smooth or gum barks; platy bark; and stringy bark. Gum bark (also known as candle bark) consists of long, coiled bark strips which may burn for extended periods and be lofted in the fire's convection column, resulting in the potential to for long distance spotting (i.e., greater than two kilometres). Platy bark (i.e., the bark tends to form small "plates") from peppermints, ironbark's and pines is characterised by layers of dead bark which can flake off and cause short to medium range spotting (i.e., up to about two kilometres). Stringy bark's form fibrous wads which can be removed by fire and can result in extensive short to medium range spotting.

Vegetation Types & Existing Fuels Onsite

The dominant vegetation on the development site is agricultural grassland. This fuel type is classified as fine fuel. The bushfire risk is lower in this environment when compared to a forested environment where there is ample elevated bark or fuels that can generate extreme bushfire behaviour.

Throughout the site, there are patches of natural native and planted native vegetation that provides protection for stock from the wind and inclement weather (shelterbelts). These patches are generally small in size and are deemed as low risk and are not expected to greatly influence fire behaviour. These shelter belts or windbreaks in the landscape can result in the increase of fine fuels as described above. However, in most cases, either allowing stock to graze within the shelterbelt or actively managing the fine fuels under the tree canopy can mitigate this risk.

A desktop vegetation assessment of the site was undertaken utilising TasVeg 4.0 Mapping (DPIPWE). This was later cross referenced with a detailed onsite assessment undertaken by Nature Advisory (Northern Midlands Solar Farm, Tasmania, Flora and Fauna Assessment, February 2023, Report No. 22239.01 - 1.3) Utilising site assessment findings and assessing available information such as the flammability ratings and fuel loads of different TasVeg types (as outlined by Pyrke and Marsden-Smedley 2005), an outline of fuel flammability (likelihood) and sensitivity for the vegetation types on and surrounding the development sites is outlined in the table below:

Table 3:

Onsite Vegetation Fuel Flammability & Sensitivity				
Location	Vegetation Community Description	Fire Attribute	Flammability (Likelihood)	Sensitivity
Large consolidated patch adjoining the north west corner of the Solar West development area and extended patches between the Solar West and Solar East development areas.	*Eucalyptus amygdalina* inland forest and woodland on Cainozoic deposits (DAZ)	Dry sclerophyll forest	High	Low
Large consolidated patch adjoining the southern boundary of the Solar West development area and extended patches between to the north, east and south of the Solar East development area.	*Eucalyptus viminalis* grassy forest and woodland (DVG)	Dry sclerophyll forest	High	Low
Scattered patch between the Solar West and Solar East development areas.	Bursaria - Acacia woodland (NBA)	Dry scrub and coastal scrub	High	Low
Across much of the development area and surrounding areas to the west, north and northeast of the development of the development area.	Agricultural land FAG)	Agricultural land and miscellaneous types	Moderate, High	Low
Scattered patch between the Solar West and Solar East development areas.	Lowland grassland complex (GCL)	Native grassland	High	Low
Scattered patch between the Solar West and Solar East development areas.	Lowland *Themeda triandra* grassland (GTL)	Native grassland	High	Low
Scattered patch between the Solar West and Solar East development areas.	Lowland *Poa labillardierei* grassland (GPL)	Native grassland	High	Low
Southwest of the Solar East development area.	Fresh water aquatic sedgeland and rushland (ASF)	Swamp and wetland	High	Low
Small patch to the north of the Solar East development area.	Weed infestation (FWU)	Flammable weeds and bracken	Very High	Low

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Onsite Weather Characteristics & Prevailing Fire Weather Conditions

The climate at Connorville Estate can be classified as temperate and is generally wet with a maritime influence. The climate is characterised by warm summers and cold winters. The mean maximum annual temperature for Palmerston (±10km to the west) is 17.5°C, ranging from 17.1°C in October to 24.4°C in February. The mean 1500hrs windspeed is 12km/hr, ranging from 14.9km/hr to 11.6km/hr in April. 40% of the time, the wind direction is from the northwest. These weather outputs are depicted in the charts below:

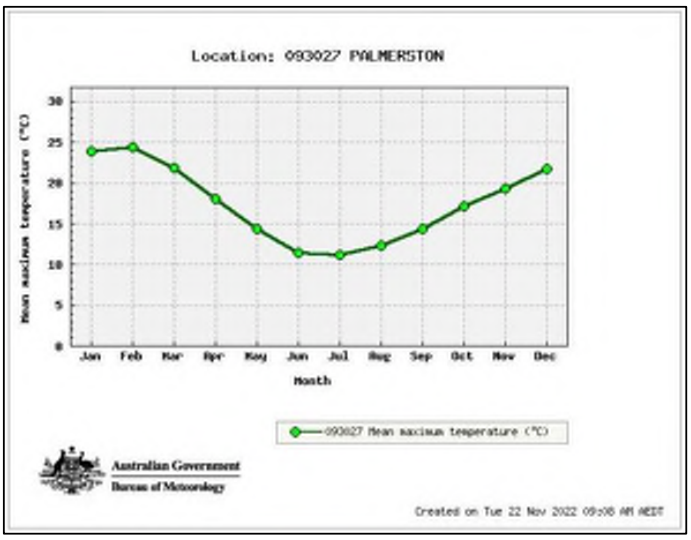

Figure 9: Mean annual temperature chart for development location.

Figure 10: Mean annual windspeed chart for development location.

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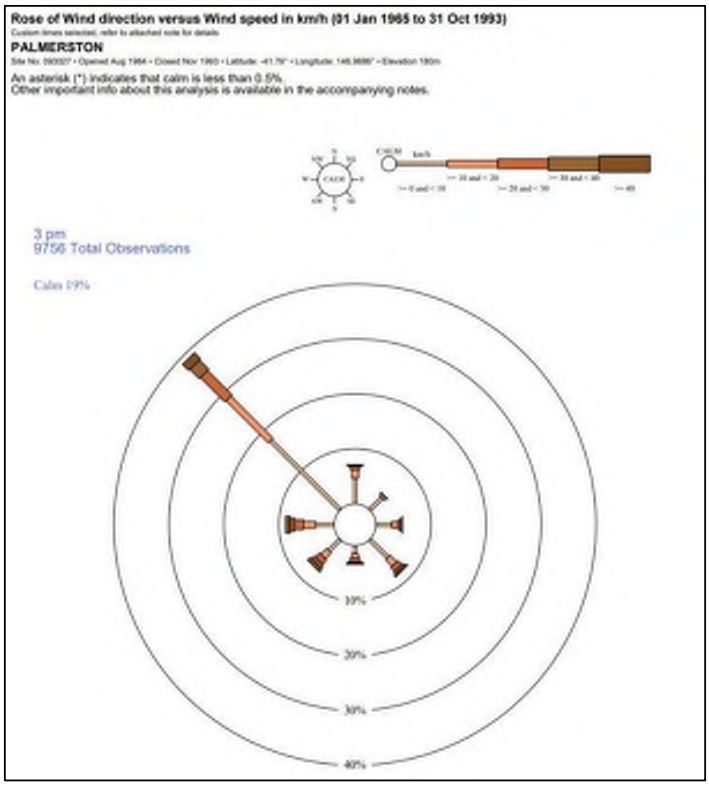

Figure 11: Wind rose for development location.

A fire season is defined as the period of time in which fires are most likely to occur. Fire seasons can vary geographically across Tasmania and the season traditionally occurs from November through to March, however in the past 10 years this period has extended from October through to April.

During the fire season, strong westerly to north westerly winds that often precede cold fronts can contain dry air from the interior of the Australian Mainland. This combination of strong winds and low relative humidity creates the ideal meteorological conditions for major bushfires. If a high-pressure system is blocked in the Tasman Sea, strong, hot north westerly winds can persist for several days and be followed by a "Blow Up" day when large fires cannot be controlled. These north and westerly winds are usually followed by a cooler west to south westerly change when the front passes, often associated with some rain. This wind change can turn the previous flank of the bushfire into the head fire which can continue to burn with high intensity until the cooler temperatures and higher humidity, brought by the change increased fuel moisture levels. This weather situation is shown on the synoptic chart below:

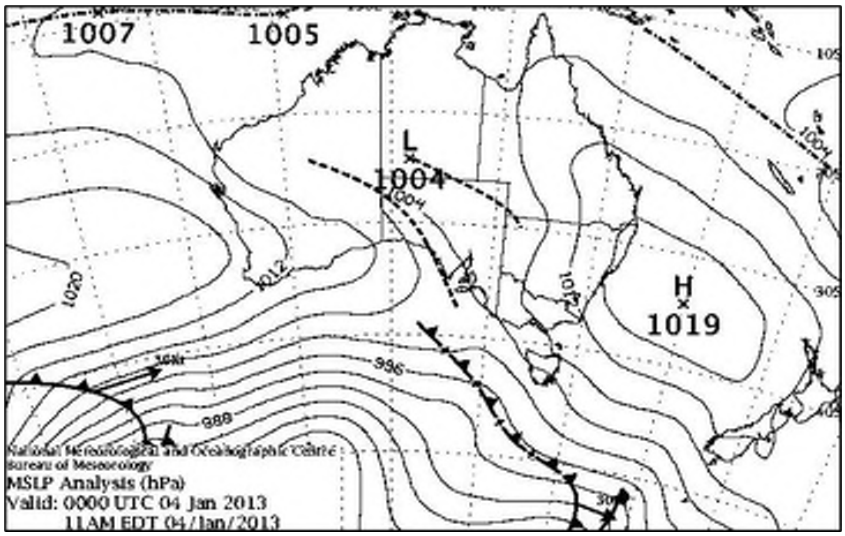

Figure 12: Weather chart depicting potential elevated fire weather conditions.

The prevailing fire weather conditions have been considered when determining site specific bushfire risk and mitigation options.

Fire Frequency, History and Ignition Causes

Fire frequency is defined as the total number of fires that occurred in the same area. Fire frequency records for the area have been obtained from records provided by the TFS, PWS and STT but the records are incomplete. There have been many fires recorded in the area of Connorville Estate in recent decades. Fire history in relation to Connorville Estate property is shown in the table below (please note that only large fires 50ha+, within a 20km radius over the past 20 years have been listed):

Table 4:

Fire Name	Location	Cause	Distance Range	Date	Size
Poatina	Arthur's Lake North	Arson	Within 12km to the west of the subject property	November 2012	±8500ha
Connorville Road	Connorville Estate	Natural - Lightning	Onsite	January 2016	±800ha
Symmons Plains	Symmons Plains	Accidental – Log heap reignition	Within 13.5km to the north of the subject property	February 2012	±530ha
Rothbury Road	Rothbury Road	Undetermined - unknown	Within 1.5km to the east of the subject property	November 2020	±125ha
Isis Road	Isis River	Undetermined - unknown	Within 8km to the southeast of the subject property	January 2017	±60ha

As can be seen from the above records, one of the largest and most recent fires that started on the property was due to natural causes and more specifically, dry lightning. Others listed above that have a cause of undetermined, also have a high probability of being caused by dry lightning as well. This aligns with climate change predictions of a higher chance of fires starting through dry lightning strikes. These records also align with Bushfire Risk Assessment Modelling (BRAM) outputs discussed in Section 7 – Bushfire Risk Assessment.

Potential Ignition Causes

The following have been identified as potential sources of ignition:

- PV Panels – Low Risk
- Battery Storage – Low Risk
- Substation – Low Risk
- Transmission Line & Associated Easement – Low Risk
- Plant & Machinery (during construction and production phases) – High Risk
- Vegetation within and surrounding the development sites – Moderate to High Risk (dependant on location)
- Human induced ignitions (accidental and deliberate – arson) – Moderate Risk
- Natural ignitions (i.e., lightning) – Low to Moderate Risk

All of the potential ignition causes listed above, can have a level of mitigation applied through prescriptions identified in the BMP to either minimise the ignition to start with or at a minimum, reduce the impact from that ignition.

Fires in Solar Farms

As solar farms are relatively new in Australia, there is limited information is relating to fires within Photovoltaic (PV) solar farms. There are some examples from the US and even few from within Australia. This section will address the following topics:

- Examples of fires in solar farms.
- The flammability of major components.
- Ignition risks during construction and decommissioning.
- Risk to firefighters.
- The risk of fire spread within a solar farm.

Historical Examples

A recent report by Firetrace International, July 2022, found that the solar industry is potentially underestimating the risk of fire at solar farms, partly due to a shortage of data on solar farm fires. The report also said that research into the issue has given rise to suspicions that fires at solar farms have been under-reported. As quoted by Ross Paznokas, global business development manager, clean energy at Firetrace International, “To be clear, fire risk is present across all utility scale, high voltage, renewable energy from wind to solar to battery storage systems, fire risks cannot be totally engineered out “.

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A comprehensive literature review by BRE (2017) [13] suggested that the reasons for this could be two-fold: firstly, the number of overall incidents is low; and secondly, there could be several unreported incidents. This implies that any such unreported incidents are likely to have been controlled effectively, without resulting in significant damage to buildings, or harm to people.

[12] Building Research Establishment (BRE) National Solar Centre, 2017. *Fire and Solar PV System – Investigations and Evidence. Available at:* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630639/fire-solar-pv-systems-investigations-evidence.pdf.

It should be noted that the following listed examples are of fires that started from separate sources.

The first example is a fire on a solar farm that came from an external ignition source, in the form of a grass fire, whilst the second example is a fire that started as part of the internal componentry of a large battery storage system (not a solar farm, however, a plant that involves similar battery storage componentry).

Example 1:

The most relevant Australian example was a fire that threatened the 35MW Brigalow Solar Farm in Yarranlea, near Pittsworth in Queensland in September 2019. Damage was reported to have occurred to the solar panels. It is believed that there was sufficient and continual vegetation on the ground that supported a ground surface fire, that needed to be extinguished by emergency personnel. This could be an indicator that the vegetation under the panels was not maintained and was sufficient to generate enough radiant heat to ignite plastics and cabling associated with the panels. It is worth noting that this solar farm was not Agri solar, where fuels are or should be maintained to low levels, primarily by grazing.

Example 2:

This fire occurred at Tesla's Big Battery in Victoria in July 2021. A liquid coolant leak caused thermal runaway in battery cells, which started a fire at the 300MW/450MWh plant. A single pre-manufactured 3MWh Megapack unit caught fire on 30 July 2021, spreading to a neighbouring Megapack. The spread stopped there and the fire burned itself out over a six-hour period. This was in line with guidance offered by the manufacturer to emergency responders to let burning Megapacks consume themselves while monitoring other possible exposures at a safe distance.

It was reported that that a leak within the first Megapack's liquid cooling system caused arcing within the battery modules. Heat created then took battery cells into thermal runaway. The Megapack is a lithium-ion battery energy storage system (BEMSS) consisting of battery modules, power electronics, a thermal management system, and control systems all pre-manufactured within a single cabinet that is approximately 7.2 meters (m) in length, 1.6 m deep and 2.5 m in height (23.5 feet [ft] x 5.4 ft x 8.3 ft). The investigation of the fire identified several gaps in Tesla's commissioning procedures, electrical fault protection devices and thermal roof design. Since the fire, Tesla has implemented several procedural, firmware, and hardware mitigations to address these gaps.

In an interview, Paul Rogers of ESRG, one of the company's principals and a former firefighter that elected to become a battery storage safety subject matter expert, said that battery fires are likely to be extremely rare events, but that every possible care needs to be taken to address both the risk and what to do in the event they do happen, as they can be extremely serious otherwise.

Combustibility of Solar Farm Components and Ignition Potential

Though solar farm fires are rare, they are not impossible. Any high-power electrical equipment, including a solar power plant, presents a risk for fire. When a fire starts at a solar farm, it rarely begins with the solar panel itself. The cables and connectors going into the panel, though, are a common place that fires start. Fires in solar facilities can potentially have serious consequences to the environment such as starting a bushfire, burnt out solar panels, batteries, other electrical equipment. The environmental pollution caused by the fire smoke and the toxic materials that could leak and contaminate the ground have a serious impact on biodiversity and can be hard to measure.

Fires at a solar farm can start within the DC combiner boxes or inverters, which manage and convert the electricity. There are four main parts that make up a solar farm:

- Solar Panels/DC Generators: When sunlight hits the generators, the electrons within the panel gain more energy to move. This creates a one-direction electric current known as direct current (DC).
- Inverter: Solar panels generate DC current, but the power grid relies on alternating current (AC). The inverter is therefore an essential part of the solar farm, where the energy from the solar panels is converted to AC if needed.
- Transformer/Substation: A transformer changes the voltage so that the power going into the grid is not too strong or too weak. Substations, owned and operated by utility companies or private energy companies, can also be used to lower the voltage and connect the solar farm to the grid— if they are close enough.
- Switchyard: A switchyard is an alternative method to connect the solar farm to the local grid. Switchyards direct the electricity coming out of the solar farm to a high-voltage line which is already part of the grid.

A fifth component, is Battery Storage. Please note that this component will be dealt with as a hazardous use, and will be addressed with requirements under the Planning Scheme, through the BMP, BHMP and BAL Report.

It has been found that here are three root causes for photovoltaic fires, namely, error in the design system, a faulty product/s, or poor installation practice. The inverters, DC combiner boxers, connectors, and cables are the most common places where solar farm fires start. Electrical shorts, flying sparks, and extreme heat build up inside the equipment are some of the leading causes. This is why regular maintenance and code inspections are so essential.

When a solar farm catches fire, what happens next depends on several variables, including the presence or absence of a fire suppression system. With a fire suppression system in place, the fire is likely to be contained within the electrical cabinet or inverter enclosure at the point of system failure. The fire suppression systems release an agent that suppresses the fire without damaging the electronics and leaves no residue. Without such a system, the fire can spread within the inverter or to other equipment and the surrounding environment.

It is imperative to reduce fire risks in these systems through strategic, targeted action through fire mitigation. To minimise the risk of solar farm fires igniting from internal componentry, the following procedures are recommended:

- Ensure solar systems are regularly tested by independent third parties.
- Incorporate additional safety components everywhere possible.
- Create standardised quality assurance measures.
- Ensure defective or prematurely aged components are promptly replaced.

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Other than addressing the vegetation risks to the internal componentry above, internal componentry fire issues will be addressed by other suppression systems external to this report.

Much of a solar farm by area is comprised of the arrays (the panels and their supporting tracking system). The panels are considered to have a low level of combustibility due to their high volume of glass (approximately 76% by weight). Indeed, as stated by the NC Clean Energy Technology Centre:

"…concern over solar fire hazards should be limited because only a small portion of materials in the panels are flammable, and those components cannot self-support a significant fire. Flammable components of PV panels include the thin layers of polymer encapsulates surrounding the PV cells, polymer back sheets (framed panels only), plastic junction boxes on rear of panel, and insulation on wiring. The rest of the panel is composed of non-flammable components, notably including one or two layers of protective glass that make up over three quarters of the panel's weight".

Provided that there is a limited heat source under the panel (which can be achieved through vegetation management), their low combustibility means that fires at a solar farm are not likely to be supported by fuels associated with the panels themselves.

Supporting the solar panels is the tracking system which is typically comprised of galvanized steel and therefore has very low combustibility. The tracking system is in turn supported on galvanized steel piles which are driven into the ground.

Cables within the array area may be exposed to flame contact if a fire were to spread within the solar farm beneath the panels, again emphasising the importance of vegetation management. Due to this risk, it is recommended that the design should consider the following features:

- Cables should be installed underground where practical; and/or
- Above ground cables and circuitry should be installed as high as practicable.

The design of the proposal includes DC wiring between panels that runs along the tracker at panel height. Wiring between individual trackers, from the trackers to the inverters, and from the inverters to the substation is designed to be installed underground. These measures significantly reduce fire risk associated with cabling.

It is noted that all electrical equipment must comply with relevant construction standards and design; installation of electrical equipment such as junction boxes, inverters, transformer and electrical cabling is to be in accordance with AS 3000:2007 'Wiring Rules'.

Other main components of the Proposal are the inverters, the substation and battery area, and the operations buildings.

The inverters, substation components, and battery units are critical electrical infrastructure that support the operation of a Solar Farm which must comply with the relevant Australian Standards. Design consideration should be given to worker and firefighter safety through sufficient access and egress and by ensuring that each component can be isolated both electrically and physically.

To support the safety of Solar Farm Workers, all buildings will be constructed to comply with the National Construction Code, AS 3959:2018 Construction of Buildings in Bushfire Prone Areas and the Directors Determination Bushfire Hazard-Areas V1.1 2021. This will be addressed at the Building Approval stage.

Transmission Line Easement Routes and Ignition Potential

Three transmission line options and the infrastructure study area were assessed. As per the Nature Advisory Northern Midlands Solar Farm, Tasmania, Flora and Fauna Assessment, February 2023, Report No. 22239.01 - 1.3, varying native vegetation types occurred along the transmission line routes, typically restricted to low rises along transmission line options 2.1 and 2.2.

However, most of the land along all the transmission line routes was primarily used for grazing and crops, supporting only scattered trees and small patches of low-quality native vegetation in the form of derived grassland. Transmission line option 1 had the least interaction with higher quality vegetation and fauna habitat. As the vegetation types along this route were primarily used for agricultural purposes, they also have the lowest vegetation classification from a bushfire perspective and pose the lowest threat of fire risk and ignition potential, compared to that of options 2.1 and 2.2.

Easement Installation and future vegetation management should be in compliance with the Tasmanian Electricity Code, November 2022, and more specifically, Chapter 8A, Distribution Powerline Vegetation Management.

Ignition Sources During Construction Phase

Activities associated with construction that may cause or increase the risk of bushfire include:

- Smoking and careless disposal of cigarettes on Site.
- Hot works activities such as welding, soldering, grinding and use of a blow torch.
- Use of petrol-powered tools.
- Operating a petrol, LPG or diesel-powered motor vehicle over land containing combustible material.
- Operating plant fitted with power hydraulics on land containing combustible material.
- Electrical faults during testing and commissioning.
- Unsafe storage of chemicals or hazardous materials.

These risks should be mitigated appropriately through the implementation of fire management strategies covered under the BMP and specifically the BEMS, which will ultimately guide the BEP.

Ignition Sources During Operation Phase

As PV solar farms are electrical in nature there is inherent fire risk from electrical faults. Most of the research identifies electrical faults as the key cause of fires involving Solar Panels. This could occur in solar farms through short circuits and arc faults caused by:

- Incorrect connecting of the inter module connectors.
- Corroded inter module connectors caused from incorrect storage of modules on site.
- Electrical connections on isolators / DC combiners.
- Miss match of inter module connectors causing insufficient electrical connections.

The issues listed above can be the result of incorrect installation and should be diagnosed during the DC testing phases of the installation, or during ongoing operational maintenance and testing. It is conceivable that arc faults could melt components in wiring within or adjacent to the panels, and if conditions were suitable, ignite grass fuels under or surrounding installations. As noted, this is unlikely if active vegetation management is in place. The use of remote sensing systems through the system would reduce this risk further and enable a quick response to fire ignitions, with the intention of

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preventing the instance of fire ignitions leading to an uncontrolled fire. Whilst these systems are not specifically for the purpose of detecting fires, they do detect rises in temperature and automatically notify the appropriate personnel.

Summary of Combustibility of Solar Farm Components and Ignition Potential

The occurrence of fires within Solar Farms is low. This is demonstrated in part by the lack of material discussing Solar Farm fires, and that potentially unreported incidents are likely to have had effectively managed outcomes if they were not reported.

The research outlines that there are several management actions that can be taken during the design, construction and operation of a solar farm to mitigate bushfire risk and fire risk generally. In the context of the proposal, the key opportunity to limit the potential for fires to spread is through the management of ground fuels, specifically under the solar panels.

Other mitigation management actions are discussed in detail in the BMP and will result in an overall reduction in the level of fuel at the site.

The research has identified that Solar Farms, when appropriately managed, can be considered low risk. In the event of a fire, there are numerous risks and challenges expected, however, with appropriate mitigation actions, this risk can be effectively managed.

Bushfire Risk Assessment

This Section provides a bushfire risk assessment for the proposal against relevant legislation, standards, guidelines and other information. The outcomes of these assessments are utilised to develop mitigation recommendations for the design, construction and operational phases of the proposal and are documented through the BMP, BHMP, BEMS and the Tasmanian Planning Scheme - Northern Midlands Local Provision Schedule, and more specifically, C13.0 Bushfire-Prone Areas Code.

BRAM Modelling

What is Bushfire Risk?

'The combination of factors that contribute to the probability of a bushfire spreading (we call this likelihood) and having negative consequences'

Consequences:

- Values and assets that can be impacted by bushfire (people, economy, environment, public administration, social setting).

Likelihood (annual exceedance probability):

- Weather
- Neighbouring fuels
- Topography
- Ignition sources
- Flammability of value
- Suppression capability

Analysing the Bushfire Risk Utilising Bushfire Risk Assessment Modelling (BRAM):

There are a variety of risk assessment processes and systems available, however the BRAM developed and managed by PWS (DPIPWE) has been identified in Tasmania as the most appropriate. It is a computer based geographical information system (GIS) modelling tool that uses a series of inputs (spatial data, fire behaviour equations & climate records etc.) to assess the spatial risk of a bushfire to a specific area. The BRAM has a capacity to produce a series of outputs outlined below and these results have been produced from a detailed run of the model, utilizing 90 percentile BOM reanalysis gridded weather data 2000-2019 (by Chris Emms PWS / DPIPWE on September 30th, 2021).

Bushfire risk has been considered spatially, assessing a combination of likelihood and consequence (PWS 2022). The Bushfire Risk Assessment Model (BRAM) model data was used to analyse the landscape level risk for the plan area. To determine overall risk the National Emergency Risk Assessment Guidelines (NERAG) and Tasmanian Emergency Risk Assessment Guidelines (TERAG) were used. The level of risk is determined by combining consequences and likelihood.

It must be noted that the BRAM and therefore the consequences, likelihood and risk outputs are based on available spatial data. The analysis has been undertaken on a state-wide basis, and maps are presented as complete for Tasmania. Notwithstanding limitations, the model does provide an objective spatial analysis of bushfire risk in a landscape consequence.

Likelihood:

Likelihood is defined as a qualitative method to assess the likelihood rating to the consequences occurring. The likelihood of an event was generated by the average combinations of the output generated from the following spatial information: ignition potential, suppression capabilities and fire behaviour potential, followed by assigning these output values to categories in a likelihood matrix. This is taken to mean the likelihood of a fire occurring in a specific area which surpasses the ability of the fire agencies to contain within the first 24 hours.

Consequences (values at risk):

Consequences are defined as a qualitative rating of damage from fire to values. The consequences were taken directly from the output generated through the Values at Risk spatial layer output. Values at Risk are defined as objects or locations that hold a relative economic, social or environmental worth. These values are further broken down into the following categories:

1. Constructed – values that have been built or constructed by humans including structures both historical and modern.
2. Forestry/Agriculture – this is a relative economic value classification of managed land, research monitoring plots along with locations of production sites.
3. Natural – the items in this classification are specific flora, fauna or geo-conservation locations which have been identified that require special protection from impacts of wildfires.

A representation of risk is developed when you combine the factors of likelihood and consequence. The generated output map of risk shows qualitative areas of risk, not areas of perceived risk. The model assists in objectively defining areas where genuine risk is present.

BRAM Summary for Connorville Estate Pty Ltd – Proposed Development Sites

Site 1: Solar Farm West Site and Site 2: Solar Farm East Site (Including Transmission Line Options)

In summary, the overall risk profile for site 1 ranges from "Low" to "Extreme" category with the average across the block of "Moderate", the 90 percentiles being "Extreme". Site 2 overall risk profile ranges from "Low" to "High "with the average being "Low-Moderate" and the 90 percentiles being "Moderate"

Site 1 risk profile is heavily influenced by two value categories being the constructed values (TasNetworks high voltage transmission lines asset) running through the site as well as Forestry and Agriculture values (predominantly plantation influenced asset – currently being harvested thus removed). Please note that the constructed values will increase the risk profile once the Solar Farm is constructed in this area.

Site 2 risk profile is also predominantly influenced by Forestry and Agriculture values but to a lesser degree than site 1. Please note that the constructed values will increase the risk profile once the Solar Farm is constructed in this area, increasing the overall risk profile comparative to Site 1.

The overall likelihood of ignition across both sites ranges from "Unlikely" to "Possible." The average across both sites is similar being in the "Unlikely to Possible" range with the 90th percentiles being in the "Possible" range.

The mean likelihood values are influenced by the high detection visibility of the area from nearby fire towers as well as relatively good rapid suppression capability for both ground attack crews and water bombing aircraft. Accessing the areas of both sites away from established roads and tracks may be more challenging however there is good support available from aerial waterbombing aircraft having good response times to the site in the event of a fire as well as the availability of good water sources in proximity to the site.

Previous fire ignitions adjacent to the area in question combined with the moderate to highly flammable vegetation type is also influencing the likelihood of ignition towards the "Possible" range.

Overall Bushfire Risk (NERAG): A range of Low to Extreme risk profile across site 1 and Low to Moderate risk profile across site 2. Mean Average BRAM score for site 1 is 1.9 which is a Moderate mean rating. Mean Average BRAM score for the site 2 is 1.3 which is a Low mean rating.

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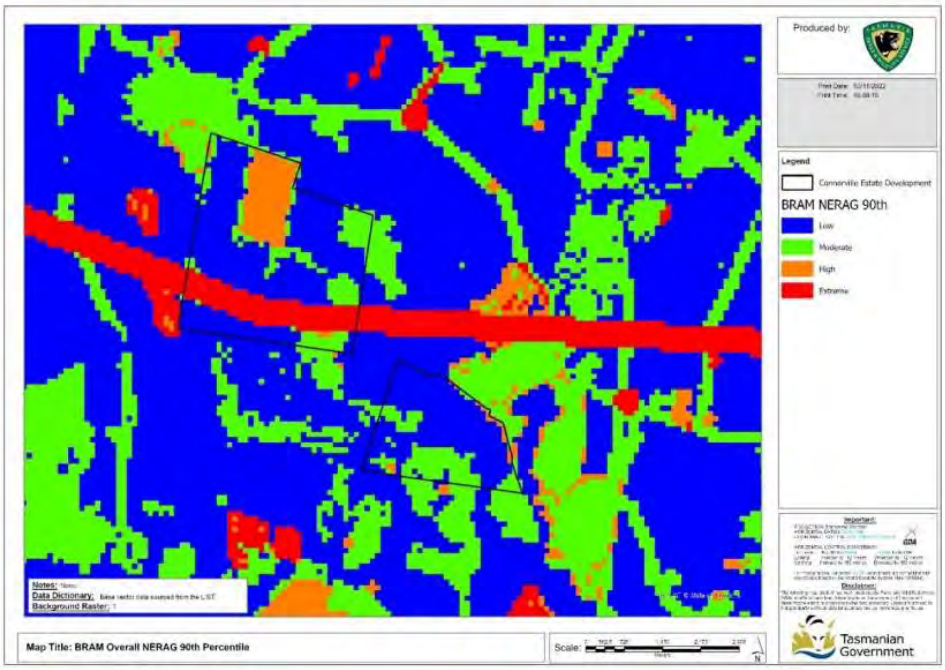

Figure 13: BRAM NERAG Outputs.

Overall Bushfire Risk (TERAG): A range of Insignificant to Extreme risk profile across site 1 and Insignificant to Low risk profile across site 2. Mean Average BRAM score for site 1 is 2.5 which is a Moderate mean rating. Mean Average BRAM score for site 2 is 1.9 which is a Low mean rating.

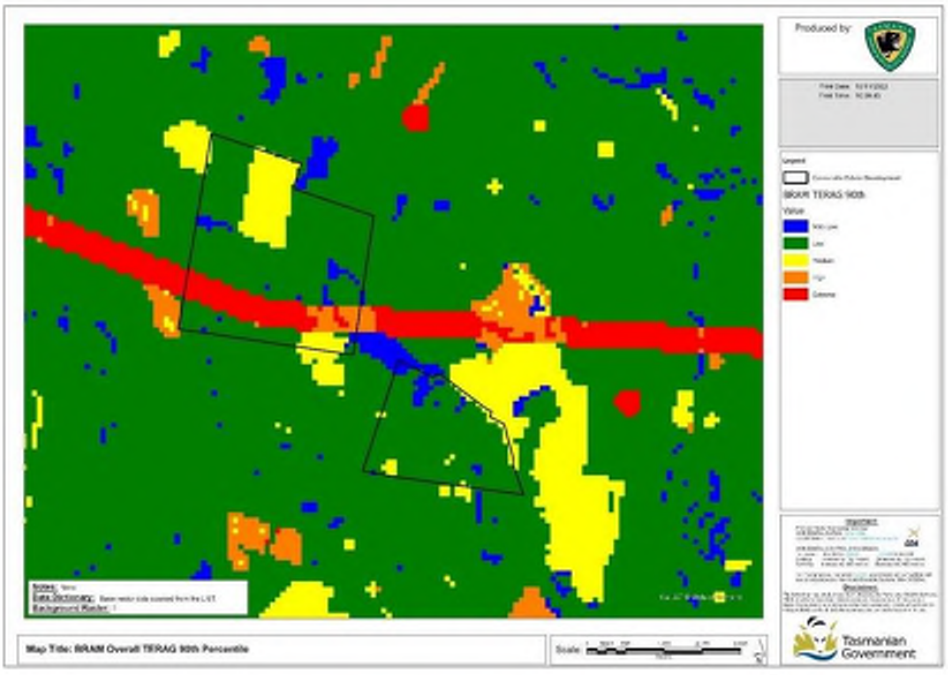

Figure 14: BRAM TERAG outputs.

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Transmission Line Options:

Regardless of options 1, 2.1 and 2.2, these sites all have an overall Extreme risk rating, purely as the areas are deemed as critical infrastructure.

Risk Management Assessment

This section addresses the Occupation Health & Safety (OH&S) requirements for eliminating or at a minimum, reducing the risk so far as reasonably practical, via the following process:

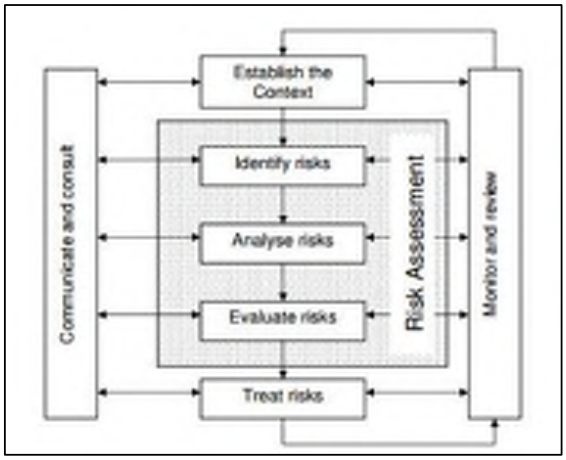

Figure 15: Risk Management Assessment Process.

1. Establish the Context: Manage fire and minimise the risk of wildfires.
2. Identify Risks: Ignition potential, suppression capabilities, fire behaviour & potential values at risk.
3. Analyse Risks: BRAM modelling.
4. Evaluate Risks: Desktop exercise and field surveys and data collection.
5. Treat/Mitigate Risks: Prevention measures, preparedness and operational implementation (BIP, BEPS, Directors Determination Bushfire Hazard-Areas V1.1 2021 and the Tasmanian Planning Scheme - Northern Midlands Local Provision Schedule, and more specifically, C13.0 Bushfire-Prone Areas Code).
6. Communicate and Consult: Internal and external.
7. Monitor and Review: Evaluation of performance and documentation.

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Risk Identification

Onsite hazards are shown in the table below:

Table 5:

Potential Hazards		
Risk Category	Risk Subcategory	Type of Ignition Risk
Onsite Fire Event	• Construction and Assembly • Operation and Maintenance • Other	• Electrical Faults; • Damage; • Technological Failure (Firmware); • Battery Faults; • PV Fire Hazard;
Localised Fire Event	• Construction and Assembly • Operation and Maintenance • Natural Hazard • Other	• Escalation of onsite event; • Human Induced (arson, equipment, machinery etc); • Natural Event (lightning etc);
Landscape Scale Fire Event	• Construction and Assembly • Operation and Maintenance • Natural Hazard • Other	• Human Induced (arson, equipment, machinery etc); • Natural Event (lightning etc);

Risk Analysis, Evaluation & Mitigation

The following table breaks evaluates the identified risks and outlines specific mitigation measures/strategies, to effectively mitigate the threat by either eliminating the risk, or completely or modifying the risk level to an appropriate level.

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Table 6:

Risk Category	Ignition Risk	Potential Consequence(s)	Risk Assessment Matrix (Refer to Risk Matrix Table)			Recommended Mitigation Measures
			People	Environment	Infrastructure	
Onsite Fire	Electrical Fault	• Localised fire • Landscape scale fire • Loss of revenue • Reduced output • Injury and/or death • Adverse environmental impacts • Community infrastructure damage	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B1)	Moderate Chance of Occurrence (C2)	• Appropriate Personal Protective Equipment (PPE) • All employees to ensure safe work practices are being implemented • Operational, maintenance and routine checks of relevant equipment to be undertaken by suitably qualified staff • Equipment to be checked and serviced regularly • Familiarity with BEMS and BEP • Ensure all staff on site have undergone appropriate training • Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority
	Structural Damage	• Electrical fire • Injury and/or death • Loss of revenue • Reduced output • Onsite infrastructure damage	Low Chance of Occurrence (B3)	Never Occurs (A0)	Moderate Chance of Occurrence (C2)	• Appropriate Personal Protective Equipment (PPE) • All employees to ensure safe work practices are being implemented • Equipment to be checked and serviced regularly • Ensure all staff on site have undergone appropriate training • Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority • Familiarity with BEMS and BEP • Familiarity with Emergency Management Plan

		• Community infrastructure damage • Adverse environmental impacts				
	Equipment failure (including technical failure)	• Electrical fire • Injury and/or death • Loss of revenue • Reduced output • Onsite infrastructure damage • Community infrastructure damage	Low Chance of Occurrence (B3)	Never Occurs (A0)	Low Chance of Occurrence (B3)	• Appropriate Personal Protective Equipment (PPE) • All employees to ensure safe work practices are being implemented • Equipment to be checked and serviced regularly • Ensure all staff on site have undergone appropriate training • Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority
	Battery Fault	• Injury and/or death • Equipment failure • Onsite fire • Landscape scale fire • Loss of revenue • Reduced output	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B3)	• Appropriate Personal Protective Equipment (PPE) • Operation of all equipment to be undertaken by qualified staff • All employees to ensure safe work practices are being implemented • Equipment to be checked and serviced regularly • Ensure all staff on site have undergone appropriate training • Familiarity with BEMS and BEP • Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority

	PV System Failure	• Onsite fire • Landscape scale fire • Injury and/or death • Onsite infrastructure damage • Community infrastructure damage • Loss of revenue • Reduced output	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B3)	• Employing safe work practices • Equipment to be checked and serviced regularly • Operation of all equipment to be undertaken by qualified staff • Ensure all staff on site have undergone appropriate training • Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority • Familiarity with BEMS and BEP
	Structural Fire	• Electrical fault • Battery fault • PV system fault • Onsite infrastructure damage • Community infrastructure damage • Landscape scale fire • Localised fire • Onsite fire	Low Chance of Occurrence (B1)	Never Occurs (A0)	Low Chance of Occurrence (B3)	• Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority • Familiarity with BEMS and BEP • Review and revision of the BEP on an annual basis prior to the fire season • Ensure vegetation is managed in a 'low threat' condition at all times as per the BMP & BHMP to ensure that fuel for any potential fire is minimised • Implementation of HMA's as per BMP & BHMP to ensure fire can be contained on site. • Ensure vegetation is always managed in a 'low threat' condition under the PV panels as per the BMP & BHMP to ensure that the spread of any fire event is not promoted • Provision of water and access as per the BMP & BHMP for firefighting purposes

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		• Equipment failure • Injury and/or death • Closure of site				
Localised Fire Event	Grassfire (natural event i.e., lightning strike)	• Battery fault • PV system fault • Onsite infrastructure damage • Community infrastructure damage • Landscape scale fire • Equipment failure • Injury and/or death • Closure of site	Moderate Chance of Occurrence (C3)	Moderate Chance of Occurrence (C3)	Moderate Chance of Occurrence (C3)	• Equipment to be checked and serviced regularly • Appropriate Personal Protective Equipment (PPE) • Ensure all staff on site have undergone appropriate training • Familiarity with BEMS and BEP • Review and revision of the BEP on an annual basis prior to the fire season • Monitor conditions, radio and emergency applications during period of fire danger • Ensure vegetation is always managed in a 'low threat' condition as per the BMP & BHMP to ensure that fuel for any potential fire is minimised • Implementation of HMA's as per BMP & BHMP to ensure fire can be contained on site. • Ensure vegetation is always managed in a 'low threat' condition under the PV panels as per the BMP & BHMP to ensure that the spread of any fire event is not promoted • Provision of water and access as per the BMP & BHMP for firefighting purposes
	Spread of fire from onsite event	• Electrical fault • Battery fault • PV system fault	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B3)	Low Chance of Occurrence (B3)	• Familiarity with BEMS and BEP • Review and revision of the BEP on an annual basis prior to the fire season • Ensure vegetation is always managed in a 'low threat' condition as per the BMP & BHMP to ensure that fuel for any potential fire is minimised

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						• Implementation of HMA's as per BMP & BHMP to ensure fire can be contained on site. • Ensure vegetation is always managed in a 'low threat' condition under the PV panels as per the BMP & BHMP to ensure that the spread of any fire event is not promoted • Provision of water and access as per the BMP & BHMP for firefighting purposes • Monitor conditions, radio and emergency applications during period of fire danger
Landscape Scale Fire Event	Grassfire	• Onsite infrastructure damage • Community infrastructure damage • Injury and/or death • Loss of revenue • Reduced output • Equipment failure • Closure of site • Arson	Moderate Chance of Occurrence (C3)	Moderate Chance of Occurrence (C3)	Moderate Chance of Occurrence (C3)	• Equipment to be checked and serviced regularly • Ensure all staff on site have undergone appropriate training • Appropriate Personal Protective Equipment (PPE) • Familiarity with BEMS and BEP • Review and revision of the BEP on an annual basis prior to the fire season • Ensure vegetation is always managed in a 'low threat' condition as per the BMP & BHMP to ensure that fuel for any potential fire is minimised • Implementation of HMA's as per BMP & BHMP to ensure fire can be contained on site. • Ensure vegetation is managed in a 'low threat' condition at all times under the PV panels as per the BMP & BHMP to ensure that the spread of any fire event is not promoted • Provision of water and access as per the BMP & BHMP for firefighting purposes
	Bushfire	• Onsite infrastructure damage	Moderate Chance of Occurrence (C3)	Moderate Chance of Occurrence (C3)	Moderate Chance of Occurrence (C3)	• Equipment to be checked and serviced regularly • Ensure all staff on site have undergone appropriate training • Appropriate Personal Protective Equipment (PPE)

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		• Community infrastructure damage • Injury and/or death • Loss of revenue • Reduced output • Equipment failure • Closure of site • Arson				• Report all potential hazards, damage, accidents and/or injuries and unsafe work practices to relevant authority • Familiarity with BEMS and BEP • Review and revision of the BEP on an annual basis prior to the fire season • Ensure vegetation is always managed in a 'low threat' condition as per the BMP & BHMP to ensure that fuel for any potential fire is minimised • Implementation of HMA's as per BMP & BHMP to ensure fire can be contained on site. • Ensure vegetation is always managed in a 'low threat' condition under the PV panels as per the BMP & BHMP to ensure that the spread of any fire event is not promoted • Provision of water and access as per the BMP & BHMP for firefighting purposes

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Risk Matrix Table

Table 7:

Consequences				Likelihood				
Severity	People	Environment	Infrastructure	A Never Occurs	B Low Chance of Occurrence	C Moderate Chance of Occurrence	D High Chance of Occurrence	E Very High Chance of Occurrence
0	No Impact	No Impact	No Impact					
1	Slight Impact	Slight Impact	Slight Impact					
2	Minor Impact	Minor Impact	Minor Impact					
3	Major Impact	Major Impact	Major Impact					
4	Fatalities	Fatalities	Massive Impact					

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