Brewongle Solar Farm Scoping Report

Brewongle, NSW

Request for Secretary's Environmental Assessment Requirements (SEARs)

November 2023

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Abbreviations

ACHA	Aboriginal Cultural Heritage Assessment
AEMO	Australian Energy Market Operator
AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
LALC	Local Aboriginal Land Council
BAM-C	Biodiversity Assessment Method Calculator
BC Act	*NSW Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
BSAL	Biophysical Strategic Agricultural Land
CLM Act	*NSW Crown Land Management Act 2016*
CMA	Catchment Management Authority
DA	Development Application
DIRN	Defined Interstate Rail Network
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment
DRG	NSW Department of Resource & Geoscience
DISR	NSW Department of Industry, Science and Resources
EMP	Environmental Management Plan
EIS	Environmental Impact Statement
EMS	Environmental Management System
EP&A Act	*NSW Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority
EPBC Act	*Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
ETL	Electricity Transmission Line
GW	Gigawatt
ICNG	Interim Construction Noise Guideline
LEP	Local Environmental Plan
LGA	Local Government Area
LLS	Local Land Services
LCVIA	Landscape Character and Visual Impact Assessment
MNES	Matters of National Environmental Significance
MW	Megawatt
MVA	Megavolts
MWh	Megawatt Hour
NSW	New South Wales
O&M	Operations and Management
OEH	NSW Office of Environment and Heritage
PAC	Planning Assessment Commission
PCT	Preliminary plant community type
POEO Act	NSW *Protection of the Environment Operations Act 1997*
PV	Photovoltaic
RAP	Registered Aboriginal Parties
REAP	Renewable Energy Action Plan
RF Act	*NSW Rural Fires Act 1997*
RFS	Rural Fire Service
RMS	NSW Roads and Maritime Service
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIA Worksheet	Social Impact Assessment Worksheet
SPIC	State Power Investment Corporation
SSD	State Significant Development
TEC	Threatened Ecological Community
TIA	Traffic Impact Assessment
TSR	Travelling Stock Reserve
WM Act	*NSW Water Management Act 2000*

1 Introduction

1.1 Project Overview

Edify Energy Pty Ltd (ABN 85 606 684 995; Level 1 34-35 South Steyne Manly 2095) proposes to develop a Solar Farm in the suburb of Brewongle, Bathurst of New South Wales, to be known as the Brewongle Solar Farm (referred to as the Project). The objective of the Project is to generate new and dispatchable carbon-free electricity supply for NSW. Subject to necessary approvals, Edify Energy (Edify) anticipates construction to commence in 2026.

The Study Area encompasses an area of approximately 299 hectares (ha) of rural land currently used for livestock grazing. The indicative Development Area (Impact Area) will be a portion of the 299ha Study Area, allowing the balance of land to continue current agricultural usage. The Project is expected to have a generation capacity of 90-Megawatt Alternating Current (AC), coupled with an associated battery energy storage system on site. The site is located approximately 12 kilometres (km) south-east of Bathurst, located within the Central West and Orana region and outside of the southern edge of the Central-West Orana Renewable Energy Zone. Figure 1 illustrates the Study Area in relation to Bathurst and Newcastle of New South Wales (NSW), and the Central-West Orana REZ.

Figure 1 - Study Area in Regional Setting

The Study Area is approximately 299 ha, involving three (3) separate lot parcels, which have been secured under an Option agreement by Edify. Approximately 170 ha constitutes the indicative Impact Area, based on suitable geological and biodiversity factors. The surveyed lots are Lot 1 in Deposit Plan 1236901, Lot 2 on Deposit Plan 1236901 and Lot 1 on Deposit Plan 1206130 which is known as 'Euarra' at 315 Tarana Road, Brewongle.

The proposed Lot 1 on Deposit Plan 1236901 is host to an existing 132 kilovolt (kV) transmission line which extends east-west through the northern section of the Study Area (Figure 2).

The overhead 132kV transmission line runs from Wallerawang to Panorama, with the line owned and operated by Transgrid.

The Project intends to connect into the existing transmission line (Line #94X) via an overhead line as seen in the indicative design in Appendix M, established as part of an easement over Saltwater Creek, north of the Impact Area. This will require a new T-connection into the existing transmission line, and the construction of a new step-down substation from 132kV to 33kV. The substation will be located within the Indicative Impact Area.

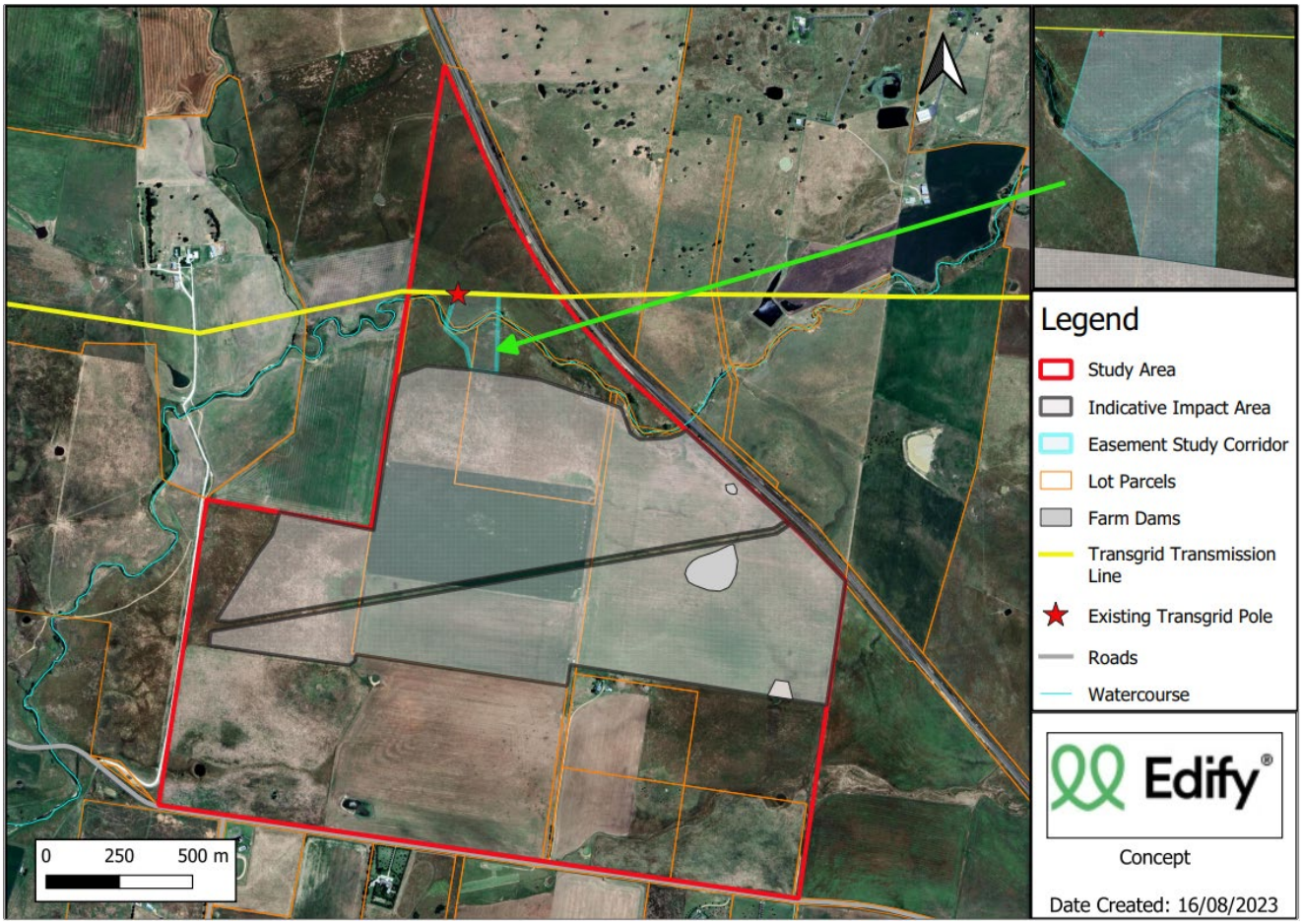

Figure 2 – Transgrid's 132kV line (#94X) in relation to Study Area and Easement Study Corridor

The Project includes infrastructure such as solar panel arrays, inverters, transformers, overhead lines, underground cabling, an integrated battery storage system (up to 90MW / 360MWh), site office and maintenance building, access tracks, road and electrical easement crossings, perimeter security fencing, and a substation to connect the Solar Farm to Transgrid's existing 132kV transmission line.

The Project represents Edify's continued investment in renewable energy projects throughout regional NSW. Similar to Edify's prior undertakings in the State, the development will be consistent with the *NSW Large-Scale Solar Energy Guideline for State Significant Development* (NSW Government, 2022) and is expected to deliver several benefits including:

- the creation of local employment opportunities, including approximately 250 full-time equivalent jobs during the peak construction period
- approximately five permanent jobs during the operation of the Project (>30 years)
- direct local investment via a Community Benefit Fund
- increased electricity generation capacity and grid support, via the solar asset
- increased dispatchable electricity, firming and system strength services, via the battery energy storage system; and
- a Voluntary Planning Contribution to be negotiated with the Bathurst Regional Council

The Project will have a capital investment of greater than $30 million and therefore is considered a State Significant Development (SSD) under the *State Environmental Planning Policy (State and Regional Development) 2021* (SRD SEPP). Edify will prepare a Development Application (DA) for the Project that is supported by an Environmental Impact Statement (EIS). This will be submitted in accordance with Part 4, Division 4.1 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The NSW Minister for Planning or the Minister's delegate is the consent authority.

1.2 Purpose

The Australian Government Department of Climate Change, Energy, the Environment and Water and the NSW Government State Significant Infrastructure Guidelines (Appendices A and B), detail the requirement for developments to follow an impact mitigation hierarchy. The hierarchy is mainly viewed as the following three step process:

1. Avoid
2. Minimise and/or mitigate
3. Offset

This scoping report illustrates findings of preliminary social, economic, and environmental investigations, such as the Preliminary Ecological Assessment (Appendix J). Potential impacts identified from this scoping report and supporting technical studies allows Edify to begin to address the first step in this hierarchy by avoiding potential impact areas/matters. Detailed studies undertaken as part of the EIS will further refine Edify's understanding of the Study Area and continue to inform our application of the hierarchy.

The Scoping Report has been prepared to support a request to the Department of Planning and Environment (DPE) for the SEARs. The SEARs would guide the preparation of an Environmental Impact Statement (EIS) for the Project under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). It identifies the main issues and information requirements for the assessment, considering the values of the site, the nature and extent of potential impacts, planning and regulatory requirements and the results of early consultation. This allows the assessment to efficiently focus on the most important issues.

This Scoping Report intends to:

- Justify the development in relation to policy and market frameworks (Section 2)
- Describe the Project and the site (Section 3 and 4)
- Identify statutory approval requirements (Section 5)
- Provide a summary of consultation undertaken to date and proposed further engagement (Section 6)
- Identify key potential environmental issues associated with the Project (Section 7)
- Conclude with remarks and identification of key issues raised in preparation of the Scoping Report.

1.3 Applicant – Edify Energy Pty Ltd

Edify Energy is a market leading, Australian-owned renewable energy company with significant experience in developing and project financing renewable projects across New South Wales and Australia. Edify has financed six large-scale solar generation projects (773MWp), an 84MVA synchronous condenser and two utility-scale battery energy storage systems (175MW / 350MWh) and is a leading developer of utility-scale renewable energy projects in Australia. Edify has broad energy expertise, covering project development, project design and engineering, financing, asset management and construction management.

Edify's management team has in excess of 150 years' experience in the power and renewables sector internationally, raised and deployed around $3 billion in capital bringing over 40 solar and wind projects into commercial operation, advised on over 10GW (around $25 billion of projects during development, construction and operation and managed an operational portfolio of more than 1.7GW).

Edify supports the full life-cycle of renewable energy projects during development, construction and operation, including greenfield development, project structuring and financing, construction management and a full asset management offering, including trading and operations.

Edify's philosophy is to ensure that its interests are closely aligned with its investment partners and community stakeholders. In addition to providing long-term asset management services, Edify seeks to maintain a long-term equity interest in its projects, ensuring that Edify's long-term project view is aligned with that of its investors and host community, resulting in best-in-class assets. This long-term business model is a distinguishing feature of Edify and should further instil confidence that the community is entering into a credible, long-term partnership. This also makes an important difference in our community engagement approach, due to the fact that we are establishing relationships with various local stakeholders during the development phase. These relationships will endure for the lifetime of the Projects, with Edify acting as Asset Manager once the Project is operational.

2 Strategic Context

2.1 Strategic Justification

2.1.1 Technical Feasibility

The Study Area comprises predominantly flat and cleared terrain, making it a suitable location for a utility-scale solar project. The Project site on the involved landholder property 'Euarra' was also selected based on proximity to the existing overhead transmission line, which is an integral component of any electricity generator, to ensure energy produced is exported into the NSW transmission network with the least amount of electrical losses and network augmentation.

The Project will utilise proven and mature solar and battery technologies. The Study Area is well suited to efficient and high-yielding output of solar generation. Battery storage would also aid in storing and managing energy flows to the grid during times of grid constraints (charging) and peak electricity demand (discharging). This dispatchable capability allows the Project to de-couple its output from typical, weather dependent generation profiles, for example by allowing the Project to service periods of high demand during the evening (post sunlight) hours.

Furthermore, the NSW electricity market is undergoing significant change, with a number of major energy generators scheduled to reach the end of their lifespan and are likely to be retired. The first of such large generators to retire occurred recently at the Liddell coal-fired power station which was decommissioned earlier in 2023. This closure will likely be followed by Vales Point, Eraring and other major generating units later this decade. There is a risk that without new investment in sufficient generation capacity, these retirements have the potential to lead to interruptions in energy security.

The proposed investment's connection would be achieved by 'cutting' into the 132 kV line (TransGrid owned) crossing the northern boundary of the site, with a high proportion of generation likely exported north-west towards Bathurst and Orange electricity customers. A substation would be constructed in the Impact Area.

It is noteworthy that the electricity grid in New South Wales can present challenges in terms of having the capacity to connect utility scale renewable energy projects. The Project benefits from having good connection options within the site, with sufficient capacity and system strength in the transmission network to allow power generated at the Brewongle site to be exported to the regional NSW power system. The site also has relative proximity to Wallerawang and Panorama transmission substations, with complementary works proposed at both substations, as outlined further in Section 7.2.7.

2.1.2 Contributions to Federal and State Climate Change Targets

Electricity generation is the largest individual contributor of greenhouse gas emissions in Australia, accounting for 47.6 per cent of emissions in the 2020-21 reporting year (Australian Government Clean Energy Regulator, 2023). This proposal contributes to the decarbonisation of this emissions intensive sector, with bulk supply of firmed and dispatchable renewable energy sources, all of which are required to replace traditional, thermal electricity generators that are approaching their intended design-life.

2.1.2.1 Renewable Energy Target

The Clean Energy Regulator (CER) introduced the Renewable Energy Target in 2001, which is an Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources.

In the context of this proposal, the Renewable Energy Target works by allowing large-scale generators to create large-scale generation certificates for every megawatt hour (MWh) of energy they generate. Certificates are then purchased by electricity retailers (who supply electricity to householders and businesses) and submitted to the Clean Energy Regulator to meet the retailers' legal obligations under the Renewable Energy Target.

The COP21, also known as the 2015 Paris Climate Conference, achieved a legally binding and universal agreement on climate, with the aim of keeping global warming below 2°C, chiefly by reducing greenhouse gas emissions (Australian Government, Department of Industry, Science, Energy and Resources, 2020). The Project would form part of the Australian effort to help meet this binding, international target.

2.1.2.2 NSW Net Zero Plan Stage 1: 2020-2030

The NSW Department of Planning and Environment (NSW DPE) *Net Zero Plan Stage 1: 2020– 2030* is a commitment to taking decisive and responsible action on climate change. The *Plan* has the goal of reducing the State's emissions by 35% by 2030, compared to 2005 levels, whilst supporting regional investments that total $7 billion and create approximately 1,700 regional employment opportunities (NSW Government 2020).

The NSW Government has also set a broader goal of net zero emissions by 2050 and has released these policies to fast-track emissions reduction over the next decade and prepare the State to take further action in the decades to follow. The Brewongle Solar Farm proposal would contribute towards both the Renewable Energy Target and the *New South Wales Electricity Strategy* and *Net Zero Plan.*

Due to the proximity of the Project to one of the priority Renewable Energy Zones, the Central West and Orana REZ in New South Wales, the Project will support the four goals of the NSW Electricity Strategy, which includes:

- delivering various Renewable Energy Zones
- saving energy, especially for times of peak demand
- supporting the development of new electricity generators
- setting a target to bolster the state's energy resilience

2.1.3 Electricity Market Benefits

Australian Energy Market Operator (AEMO 2020) forecasts that grid-supplied electricity consumption will remain flat for the next 20 years, despite projected 30% growth in population. Although not required to meet projected electricity demand, the Project would benefit the network by shifting electricity production closer to local consumption and regulating inputs to the grid using a Battery Energy Storage System.

The electricity network was designed to deal with a small number of very large power generating stations. The increasing localisation of power generation helps the grid to cope with the supply from diversified renewable energy projects, such as intended via this proposal.

The proposal is also proximate to an open Regulatory Investment Test for Transmission (RIT-T) process, which is a regulatory process undertaken by the transmission network authority, Transgrid. This RIT-T process seeks to procure options for maintaining reliable supply to the Bathurst, Orange and Parkes areas of central west New South Wales[1]. The Brewongle Solar Farm proposal is well placed to provide non-network solutions, whereby the project's BESS can rapidly provide system strength, voltage regulation and other network benefits. The proposal can be considered as a credible alternative to traditional network investments, such as new transmission lines or synchronous condensers.

[1] See link for RIT-T (Transgrid, 2023)

2.1.3.1 Electricity prices

According to Deloitte, Australian households will pay $510 million more for power in 2020 without renewable growth through the RET and up to $1.4 billion more per year beyond 2020.

Renewables increase competition in the wholesale energy market – and, as in any market, more competition means lower prices. This is particularly true in the case of the dispatchable capability provided by the battery energy storage system, which will increase competition and capacity to satisfy peak demands and place downward pressure on electricity prices.

2.1.4 Socio-economic Benefits

2.1.4.1 Employment

In 2018/19, 26,850 Australians were directly employed in the renewable energy sector with an additional 5,770 jobs created since the 2017/18 financial year (ABS 2020). This data is yet to be updated to present industry employment figures from 2022.

This proposal would generate a significant number of new jobs (up to approximately 250 full-time employees) during the peak construction phase in regional NSW, in addition to indirect employment opportunities supported from the ancillary supply chain.

The Project will create a range of permanent employment opportunities (approximately five employees) and indirect full time equivalent staff during the operation and maintenance phase (expected to be approximately 30 years).

The employment benefits for construction extend through the local supply chains to fuel supply, vehicle servicing, uniform suppliers, hotels/motels, cafés, pubs, catering and cleaning companies, tradespersons, tool and equipment suppliers and many other businesses.

Further extension of employment benefit extends through the operation of the Project, such as panel cleaning and maintenance, electrical maintenance, fence supplies and maintenance, road grading, plus the grazing and shearing of sheep.

2.1.4.2 Economic diversification

The Project would diversify the use of land in the area, with the predominant land use in the area being agricultural usage. The Project would add to that and provide both local land holders and businesses in the broader area with an additional source of income and economic activity. The income created in the locality from the Project would be consistent and stable. This income will be of greater security being removed from the normal cycle and risks of agricultural activity (like flood and drought).

2.1.5 Land Use

It is also important to note that Solar Farms do not preclude the use of land for agriculture. Some agricultural activity is still possible whilst a Solar Farm is operating (e.g. grazing). The deliberate combination of solar and agricultural activities through design are referred to as Agri-Solar.

The Brewongle Project intends to co-locate the renewable facility with the grazing of sheep, in particular Merino sheep. As the involved landholder has historically grazed Merino sheep on the subject land, this sheep breed is the current preference. This co-location ensures agricultural land is not isolated nor fragmented. Additionally, the degree of permanent land disturbance in the construction and operation of Solar Farms is small, limited to the substation footprint, and it is expected that agricultural activities that were occurring before the Solar Farm was constructed would be able to be continued once the Project is decommissioned and removed. Further detail on this practice and Edify's own experience in Agri-Solar is provided in Appendix L.

2.1.6 Site Suitability

Key considerations for site selection are detailed within the NSW Large-scale Solar Energy Guideline for State Significant Development (DPE 2022). The key site constraints with justification as to why the site is suitable is detailed in Table 2 below:

Table 1 - Key Site Constraints with Justification

Areas of constraint	Site justification
Alternative area of involved property – Where a Project is located on a portion of a substantially sized property, options analysis of site suitability, in particular constructability and environmental planning factors are assessed across the entire property.	The Project is proposed to be located in the northern portion of the larger 'Euarra' property. This site was selected based on the following key factors: - Establishes a setback distance >625m from the nearest residential receiver - Generally flat topography - Little to no clearing of native vegetation - Lower number of sensitive receptors within 1km of the Impact Area (5 receptors) - Accessibility for construction - Proximity for connection into existing transmission line (within the subject land) - Outside of mapped hazard areas such as flood or bushfire prone land. The southern portion of 'Euarra' was assessed but set aside, due to the following key issues: - Highly undulating terrain, with rises in 60m elevation over short distances in majority of the areas. This will lead to significant cut and fill earth works. This also reduces the PV generation output due to horizon shading impacts, and challenging construction and maintenance requirements for the arrays. - The southern portion has a higher amount of vegetation that would require clearing, potentially resulting in impacts to threatened flora and/ or fauna. - The indicative impact area in the southern portion of this property, with or without micro-siting infrastructure to avoid various environment and planning risks, will have a higher number of sensitive receptors within 1km of the Impact area (25+ receptors). - The indicative impact area in the southern portion at its closest point is approximately 3km from the existing Transgrid transmission line (which is the closest point of network interconnection). This significantly increases cost, results in constructability inefficiencies and may require easements through additional neighbouring landholders as well as the local Council Road.

Areas of constraint	Site justification
	- The southern portion of the property has significantly more watercourses indicating construction on the land could impact hydrology both on site and surrounding the site, especially with the earthwork required due to the steeper topography. - The southern portion of the property has minor areas mapped as bushfire prone land, as well as a large swathe of bushfire prone land adjacent the southern boundary shared with O'Connell Road. Whilst this risk can be managed with management plans and selection of infrastructure, it is a better outcome to avoid site selection within or directly adjacent hazard prone land.
Visibility and topography - Sites with high visibility, such as those on prominent or high ground positions, or sites which are located in a valley with residences with elevated views looking towards the site. This is particularly important in the context of significant scenic, historic or cultural landscapes.	The Study Area encompasses a relatively flat area increasing gradually in elevation from West to East. Further rises in elevation and the presence of ridges towards the north, north-east, east and south-east of the site may ameliorate views of receptors in those areas (Figure 8). The nearest non-involved residential receivers are located 625m or more south and northwest of the Impact Area. This setback distance was adopted to allow for reduced potential impacts to these receivers, however community sentiment toward rural land and the views it offers is highly valued and has been raised to the previous (uninvolved) developer with interest in the land. Early and continued engagement with the surrounding community will form part of the in-depth assessment into the potential amenity impacts. Edify have completed a Preliminary Landscape and Visual Impact Assessment, including viewshed analyses (Appendix K) to guide early discussions with stakeholders and identify viewpoints requiring further detailed assessment. Edify will prepare a detailed Landscape Character and Visual Impact Assessment as a part of the EIS to illustrate the potential viewpoints of the Project from the proximate neighbours and other potential viewpoints for local motorists. Mitigation measures recommended by the LCVIA report to reduce any potential visual impact, such as planting vegetation screening, will be discussed with affected landholders.

Areas of constraint	Site justification
Biodiversity - Areas of native vegetation or habitat of threatened species or ecological communities within and adjacent to the site, including native forests, rainforests, woodlands, wetlands, heathlands, shrublands, grasslands and geological features.	The Study Area has largely been used for current and historic agricultural activities (grazing and cropping). The Study Area was mapped during the preliminary field investigation to be dominated by exotic pastures and cropping. Only a small corridor of mapped PCT *Southern Tableland Grassy Box Woodland* occurred in the western portion of the Study Area, with on-site observation noting it held minimal habitat value due to the degraded condition of the vegetation and high exotic species cover. Saltwater Creek was assessed with findings noting riparian vegetation is minimal and generally exotic, and due to the continual access by stock the banks are eroded and generally degraded. Edify will select a suitable cable-crossing location, to minimise impacts to the Saltwater Creek ecosystem, noting that the creek must be crossed by an overhead electrical cable to enable network connection to Transgrid's overhead 132kV line. For installation of this overhead line, a temporary access track will be constructed across the creek. Saltwater Creek is mapped as NSW Biodiversity Values, Category 2 Vulnerable Regulated Land and as Crown Land therefore requiring in depth assessment of any temporary or permanent impacts as a result of the Project. Four threatened fauna species had a moderate likelihood of occurrence. Edify will prepare a Biodiversity Development Assessment Report as part of the EIS process to inform micro-siting of infrastructure. The Project will consider the small area streamlined assessment module as the Project is likely to clear less than 3ha (as set by the 100ha minimum lot size) of vegetation.
Residences - Residential zones or urbanised areas.	The Project is within land zoned RU1, Primary Production under the Bathurst Regional Council's Local Environmental Plan (LEP). The Study Area does not conflict with any residential zones or urbanised areas. Desktop assessment utilising the 'Bathurst Region Structure Plans' within the Bathurst Region Local Strategic Planning Statement, noted the Study Area does not occur within planned future residential or commercial expansion areas in the Bathurst LGA. Edify has prepared a register of all neighbours within 4km of the Project boundary, noting the closest residences are setback between 625m or more from the southern and northwest boundary of the Impact Area. Many of these

Areas of constraint	Site justification
	landholders have already been consulted initially by providing information packs in the mail and then via calls/emails (Appendix C). Major concerns raised with the previous (uninvolved) developer with interest in the land included potential visual impact and infrastructure proximity to the closest landowners, and as such will be a major focus for assessment and engagement throughout this Project.
Agriculture - Important agricultural lands, including Biophysical Strategic Agricultural Land (BSAL), irrigated cropping land, and land and soil capability classes 1, 2 and 3. Consideration should also be given to any significant fragmentation or displacement of existing agricultural industries and any cumulative impacts of multiple developments.	Biophysical Strategic Agricultural Land is mapped to partially encroach into the western and northern sections of the Study Area. The Impact Area is mapped on land classed as Soil Capability Class 3, 4 and 5 land. However, the Project: • Is not expected to adversely affect the biophysical nature of the land. • Would positively affect soils by providing many of the benefits of long-term fallow, including increasing soil moisture, building soil carbon levels, allowing structural recovery and improving soil biota. • Will not result in the permanent removal of agricultural land. • Would not result in rural fragmentation, as the Project intends to continue the historical land use (grazing) in combination with the proposed electricity generation works. • Adjacent farming operations are compatible. • Strategic sheep grazing is intended to be used within the Impact Area. Grazing would be used to reduce vegetation biomass and put grazing pressure on weeds adjacent to the solar panels. Edify engaged a soil scientist consultant to undertake soil sampling and laboratory testing to verify the Soil Capability. Results are presented, along with a Soil and Agricultural Impact Assessment report in section 3.2.1 and Appendix L. Recommendations and mitigations will be further considered throughout the EIS process. The Project is not considered likely to fragment or isolate agricultural land as the intention is to introduce a co-location with an agricultural land use (Agri-solar). Agri-solar involves land proposed for solar farms introducing an agricultural use following construction, such as sheep grazing with Dorper or Merino sheep. As the involved landholder has historically grazed Merino sheep on the subject land, this sheep breed is the current preference.

Areas of constraint	Site justification
	Some benefits found with introducing Merino sheep to a solar farm for example include: - Merino Sheep are one of the most common breeds of sheep involved in 'agri-solar' grazing, having a reputation for a docile temperament and are not prone to jumping on equipment or damaging electrical cables. - Merino Sheep growth rate and fertility are potentially higher due to the shade provided by solar panels, as well as lower temperatures particularly during summer months. - The micro-climate under the solar panels lead to better soil quality and water retention, ultimately providing a higher quality grass for sheep to graze on.
Natural Hazards – Areas subject to natural hazards, such as flooding and land instability.	The site has not been identified as flood prone in the Bathurst Regional Council's LEP. The site is not identified as bushfire prone (refer to Appendix H). Regardless, Edify will engage with Rural Fire Service and NSW Fire & Rescue when preparing the Preliminary Hazards Assessment to ensure the Project's design and water supply infrastructure is located and installed in accordance with fire authority requirements.
Resources - Prospective resources developments, including areas covered by exploration licences and mining and petroleum production leases, Solar development applicants should seek advice from the Department of Planning, Division of Resources and Geoscience (GSNSW) about the coverage of resources related licences.	The Impact Area is not covered by any exploration or mining leases.
Crown Lands – If any part of the Project or associated transmission or distribution infrastructure will cross Crown Lands, it may be subject to legislative requirements that restrict access to the land.	A section of Saltwater Creek is mapped as Crown Land, occurring along the Northern border of the Study Area. A temporary access and easement will be required across this Crown Land parcel to allow installation of an overhead connection into the existing transmission line (Appendix I). Edify will engage with Crown Lands following the Secretary Environmental Assessment Requirements to ensure suitable measures are implemented by the Project, as required.

3 Project

3.1 Location

The Project is located within the NSW Central West and Orana region in the Bathurst Regional Local Government Area (LGA), approximately 12km south-east of Bathurst. The Impact Area is accessible via Tarana Road, via O'Connell Road. The Project aims to connect to an existing Transgrid 132 kV line crossing the site (line 94X), via a new 132 kV substation.

The Study Area is located within the Bathurst IBRA Subregion (South Eastern Highlands IBRA region).

3.2 The Impact Area

An area of 299ha has been selected for assessment ('Study Area'), with the indicative Impact Area as illustrated below in Figure 3. The final footprint area will be decided during the EIS phase and based partly on the conclusions of this report and the subsequent feedback from the SEARs. The Impact Area is zoned RU1 - Primary Production under the *Bathurst Regional Council's Local Environmental Plan* (LEP)[2], with a minimum lot size of 100 ha.

An underground gas pipeline (Young to Lithgow, Licence #17), owned and operated by APA Group, traverses East to West within the Study Area as seen in Figure 3. Preliminary communication with APA has been initiated to ensure a full understanding of Project requirements with regards to the APA asset are considered from early in the planning phase. The EIS will consider this easement and continue to liaise with the operator during relevant technical studies.

Figure 3 below demonstrates the preliminary design footprint of the Project, with the preferred access option off Tarana Road through an easement on Lot 1 Deposit Plan 1206130. During the Biodiversity Development Assessment Report (BDAR), Traffic Impact Assessment (TIA), and other technical studies to be undertaken as part of the Environmental Impact Statement (EIS), this access location and easement will be investigated to identify the potential environmental and planning impacts as well as provide recommendations for construction.

The Impact Area is agricultural land comprising a large agricultural property, which includes paddocks that are generally flat and largely cleared, primarily for agricultural (grazing or cropping) purposes (Figure 4 to Figure 7). There is varying topography north, east and south of the site that could soften the views of the facility for receptors in the locality (Figure 8).

Within the Impact Area, there are three (3) farm dams and a drainage line that intersects the southern boundary, with a watercourse that straddles the Northern border of the Impact Area. The dams and watercourse will be avoided by development, excluding an easement required to connect the Project substation into the transmission line over the watercourse. Saltwater Creek is the watercourse mapped as Category 2 vulnerable regulated land which limits allowable activities and will require consideration under the *Land Management (Native Vegetation) Code 2018.* The creek is also mapped on the NSW Biodiversity Values map which triggers assessment under the Biodiversity Offsets Scheme if native vegetation is cleared or the development is a prescribed impact under the *Biodiversity Conservation Regulation 2017.* The Project is an SSD and as such is already required to be assessed under the Biodiversity Offsets Scheme, including any impacts to the watercourse.

[2] https://www.planningportal.nsw.gov.au/publications/environmental-planning-instruments/bathurst-regional-local-environmental-plan-2014

During the preliminary ecological assessment, the Impact Area was observed as likely to meet the criteria for Category 1 exempt land as the land was cleared prior to 1990 and only contains low conservation value groundcover (>95% introduced). The identification of native vegetation in the Study Area and confirmation of its degraded condition state will be considered further in the EIS to guide refinement of the Impact Area and to determine the assessment method.

The full extent of final impacts will be assessed via the small area streamlined assessment module as part of the Biodiversity Development Assessment Report (BDAR) during the Environmental Impact Statement (EIS).

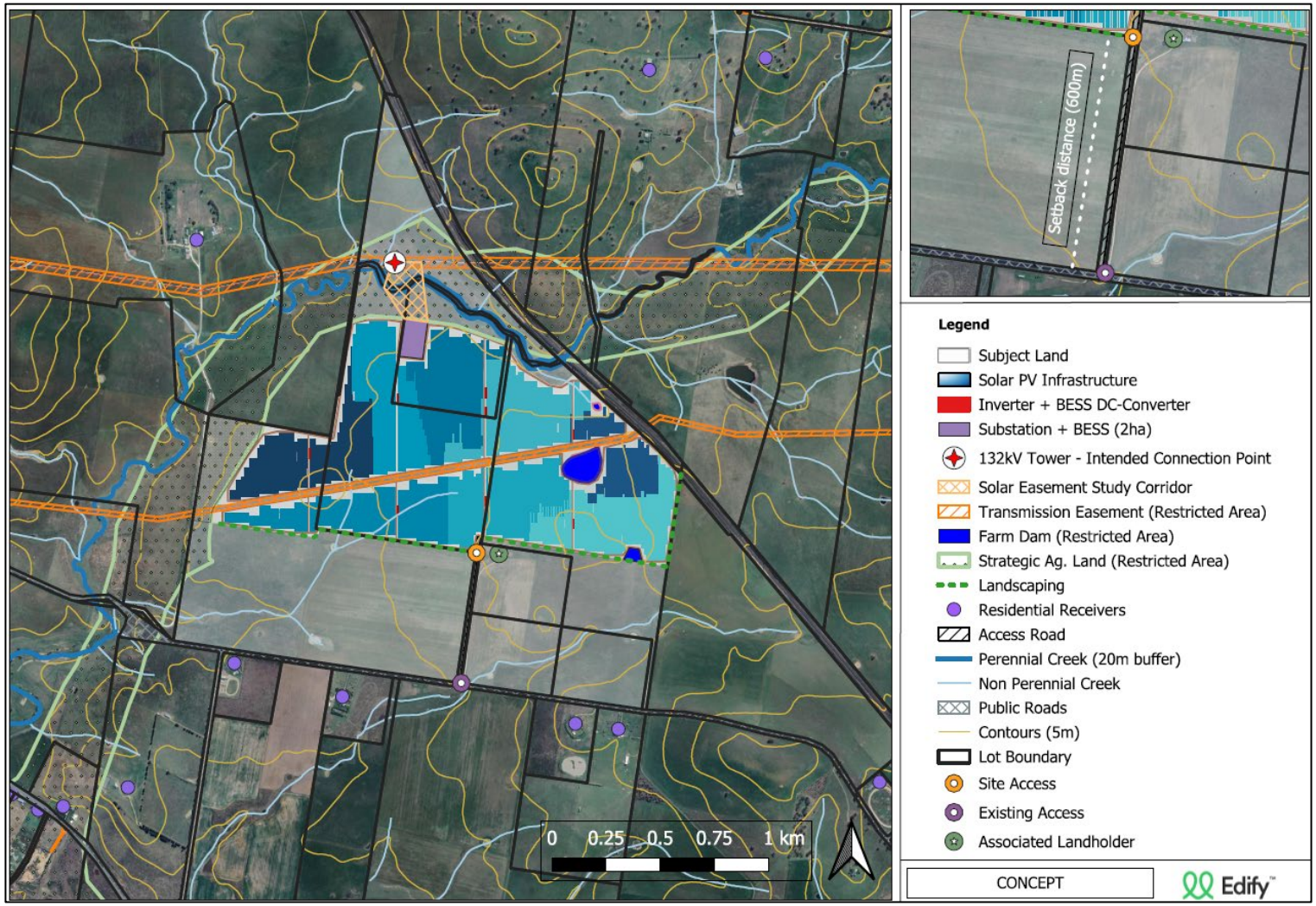

Figure 3: Concept Site Layout Plan (Impact Area)

Figure 4: Artificial Dam within Study Area

Figure 5: Grazed landscape within Study Area

Figure 7: Cropped and Grazed Landscape within Study Area

Figure 6: Degraded PCT within Study Area

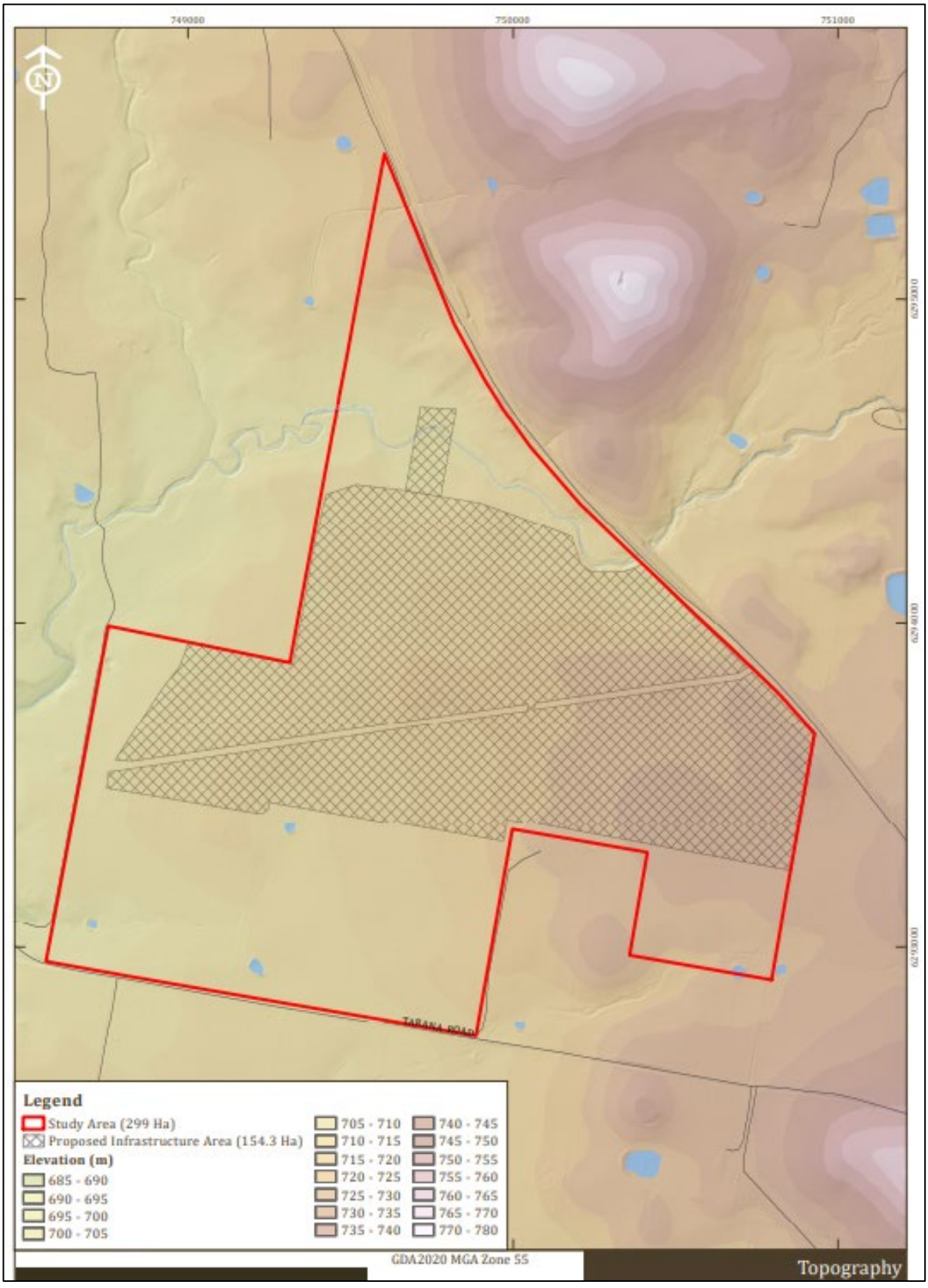

Figure 8: Elevation of Study Area and Surrounds

3.2.1 Project Land and Soils

Desktop Mapped Project Land and Soils

The Impact Area is mapped as Class 3 Soil Capability Land under the Land and Soil Capability Assessment Scheme (Figure 9), with Class 2 intersecting a portion of the western and northern boundary of the impact area associated with the Biophysical Strategic Agricultural Land (BSAL) layer. These classes are defined as:

- Class 2 Land has slight limitations that can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
- Class 3 Land has moderate limitations that must be managed to prevent soil and land degradation. However, the limitations can be overcome by a range of widely available and readily implemented land management practices. Also included are lands that can be subject to wind erosion when cultivated and left bare. It includes a large proportion of the major agricultural producing areas of the State.

This suggests that agricultural land use can be readily used for a range of crops including cereals, oilseeds and pulses, however productivity will vary with soil fertility and across each of the two classes (OEH 2012).

Appendix A of the Large-scale Energy Solar Guideline (DPE, 2022) notes site verification is required where rural zoned land is mapped to have LSC and BSAL occurring in or adjacent to the site. Figure 3 illustrates a corridor of Biophysical Strategic Agricultural Land is mapped to occur along the Western edge of the Study Area and continuing along the Northern edge. Figure 9 maps LSC 2 and LSC 3 within and adjacent the Study Area also.

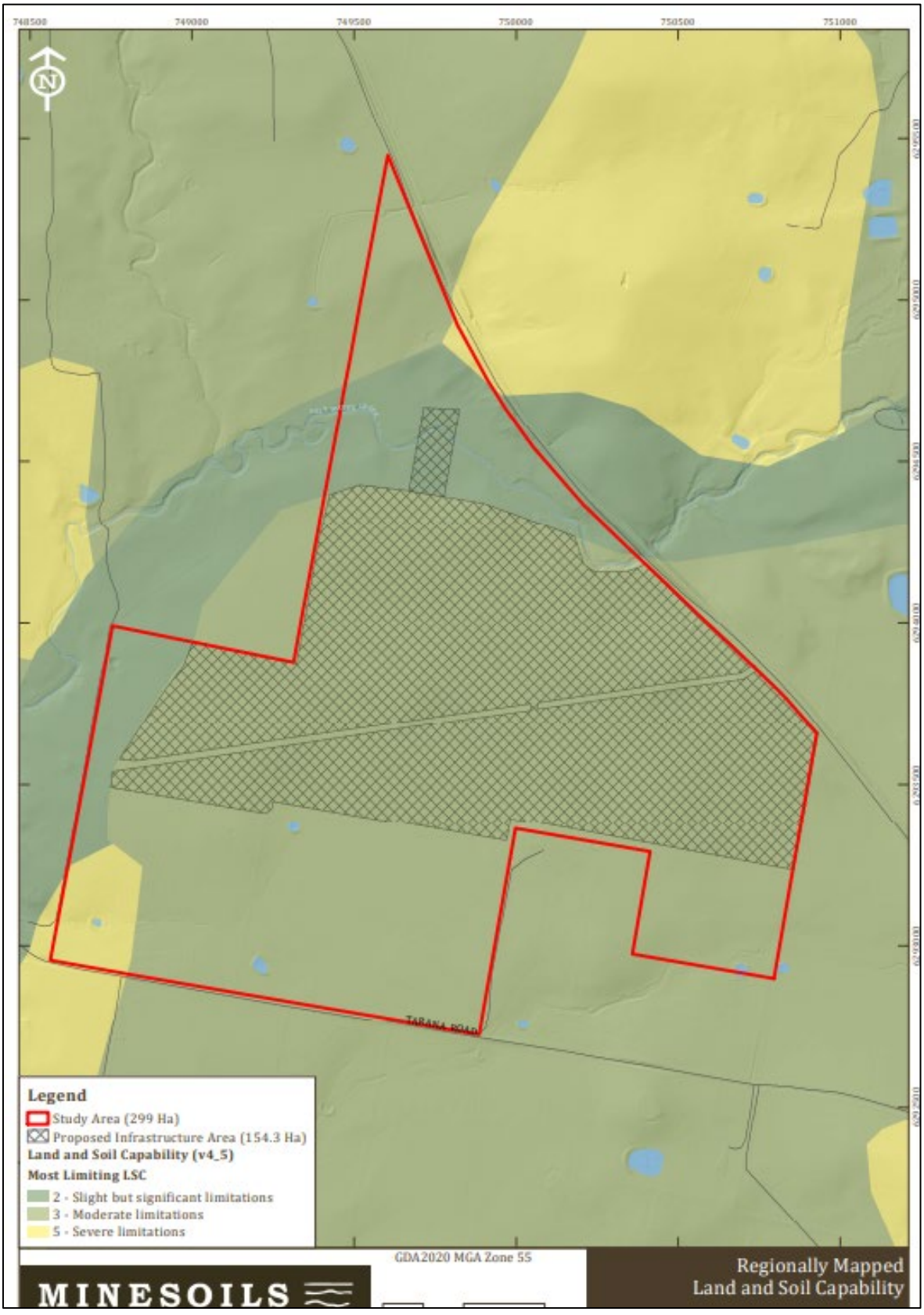

Figure 9: Mapped Land and Soil Class for Study Area

Site Verified Project Land and Soils

A Soil and Agricultural Impact Assessment (Appendix L) was undertaken for the site to ground truth the LSC mapping for the Impact Area, which is displayed in Figure 10. Soil testing and laboratory analysis was undertaken for samples collected at varying depths at 13 separate sites in the Study Area. The Study Area was subject to a site verification assessment of land and soil capability as per the LSC guideline, accounting for the soil survey results, which found the following four LSC classes to occur on site:

- LSC Class 2: very high capability land covering approximately 20ha of the Study Area. The Project Impact Area will avoid all verified Class 2 land.

- LSC Class 3: high capability land covering approximately 130ha of the Study Area. The Project Impact Area will cover approximately 119ha of verified Class 3 Land.

- LSC Class 4: moderate capability land covering approximately 58ha of the Study Area. The Project Impact Area will cover approximately 50ha of verified Class 4 Land.

- LSC Class 5: moderate-low capability land covering approximately 91ha of the Study Area. The Project Impact Area will cover approximately 44ha of verified Class 5 Land.

Verification of the soils on site will allow early design, construction and decommissioning considerations when managing the soils and rehabilitating them to the current condition state. Influences on design, construction and decommissioning of the Project can include but is not limited to:

- Micro-siting infrastructure so as not to disturb the higher capability LSC Class 2 soils,
- Minimising earthworks in higher capability soils
- Leaving excavated soils in-situ where possible
- Erosion, sediment and drainage controls to ensure soils remain on site and are adequately stabilised
- Assisted natural revegetation of the groundcover to stabilise the soils.

Biophysical Strategic Agricultural Land Assessment Requirements

The BSAL layer is mapped under the NSW Environmental Planning Policy (Resources and Energy) 2021. The layer triggers consideration for mining and coal seam gas activity proposals, to assess their effects on strategic agricultural land and its associated water resources.

As per Appendix A of the Large-scale Solar Energy Guideline, Project's mapped to have BSAL occurring within or adjacent to the Project Area are triggered for an Agricultural Impact Assessment. Under the guideline, the Office of Environment and Heritage's Land and Soil Capability Assessment Scheme is the sole site verification methodology recommended which is complemented by site soil testing results.

The Brewongle Solar Farm's intended use is for a renewable energy facility, with no mining or coal seam gas activity proposed. Site verification for LSC has been completed utilising laboratory analysis of the site soil samples and the Land and Soil Capability Assessment Scheme, therefore indicating no further testing or assessment, in line with the Large-scale Solar Energy Guideline, is required for the BSAL mapped to occur within and adjacent the Study Area.

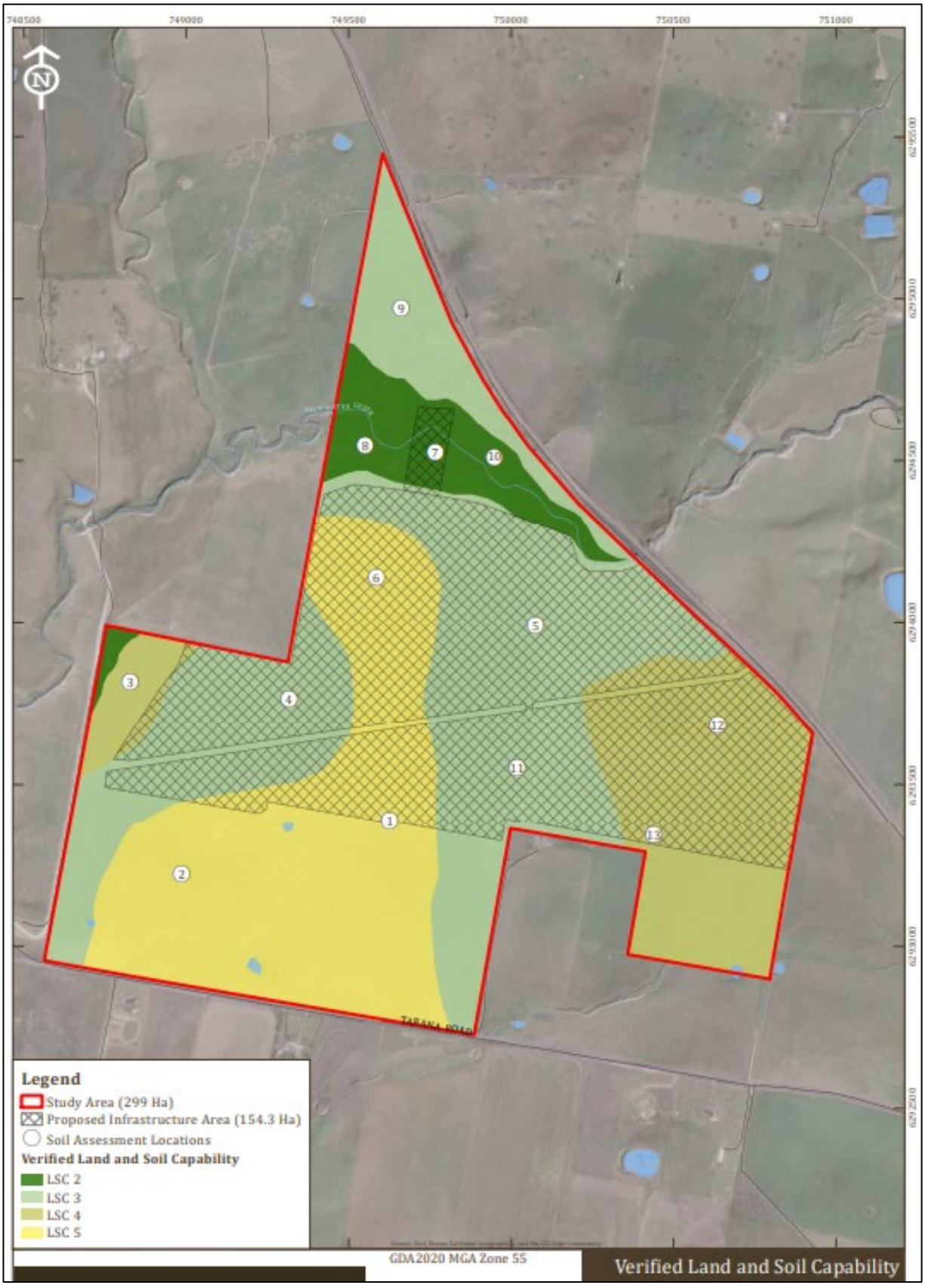

Figure 10: Verified Land and Soil Class for Study Area

3.2.2 Project Sensitive Receivers

The land is owned by one private landholder. The family resides proximate to the Study Area (with the residence identified in the Preliminary Visual Impact Assessment as a 'associated residence') and continues to utilise the site for agricultural purposes. In line with the *Technical Supplement- Landscape and Visual Impact Assessment* document, public and private viewpoints within 4km of the Project found 68 non-associated dwellings, 8 public receivers and no industry stakeholders (Table 2 and Figure 11). Results of the Preliminary Landscape and Visual Impact Assessment are presented in Section 7.2.4 of this report and Appendix K.

Landscape Character Zones (LCZ), assessed across a 5km study area from the Project via desktop, found four landscape Character Zones for the locality. These included *settlement*, *riparian/floodplain*, *undulating rural* and *plateau*. These LCZ's will be refined and assessed further as part of the EIS.

Table 2 - Project Neighbouring Receivers

Receiver	Distance from Survey Area (m)	Receiver	Distance from Survey Area (m)	Receiver	Distance from Survey Area (m)
R1	625	**R25**	1686	**R47**	2758
R2	745	**R26**	1737	**R48**	2828
R3	772	**R27**	1771	**R49**	2837
R4	778	**R28**	1860	**R50**	3102
R5	807	**R29**	1888	**R51**	3115
R6	1149	**R30**	1979	**R52**	3173
R7	1195	**R31**	2001	**R53**	3180
R8	1241	**R32**	2006	**R54**	3297
R9	1276	**R33**	2074	**R55**	3328
R10	1394	**R34**	2111	**R56**	3334
R11	1406	**R35**	2178	**R57**	3369
R12	1432	**R36**	2230	**R58**	3432
R13	1472	**R37**	2275	**R59**	3447
R14	1542	**R38**	2285	**R60**	3483
R15	1550	**R39**	2363	**R61**	3733
R16	1581	**R40**	2369	**R62**	3789
R17	1619	**R41**	2508	**R63**	3808
R18	1641	**R42**	2520	**R64**	3844

Receiver	Distance from Survey Area (m)	Receiver	Distance from Survey Area (m)	Receiver	Distance from Survey Area (m)
R19	1648	**R41**	2508	**R65**	3511
R20	1649	**R42**	2520	**R66**	3223
R21	1649	**R43**	2536	**R67**	3600
R22	1651	**R44**	2609	**R68**	3577
R23	1668	**R45**	2647		
R24	1678	**R46**	2658		

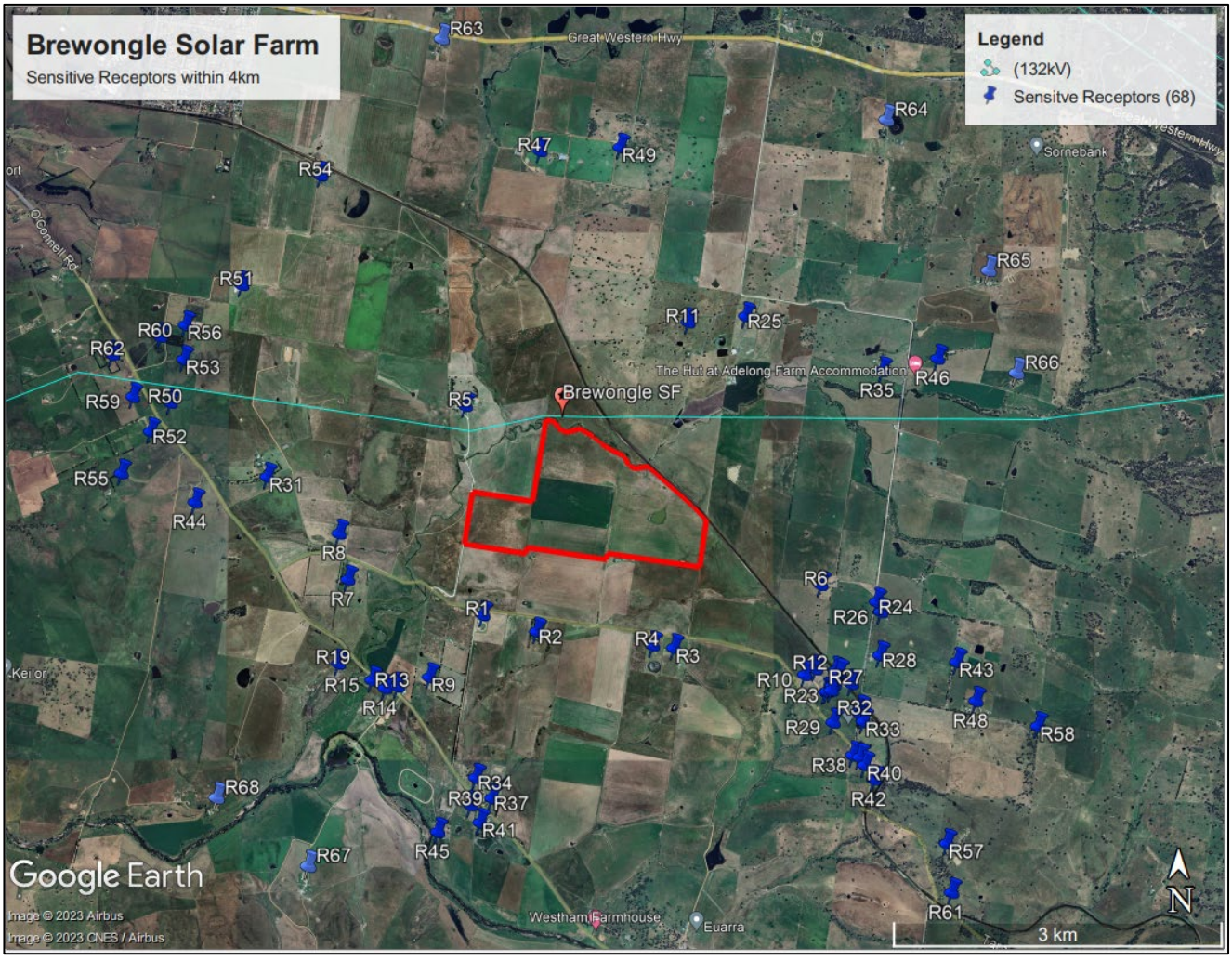

Figure 11: Study Area in relation to nearby receivers (4km)

3.3 The Locality

The Project is located within the Bathurst Regional Council LGA, in the Central West and Orana region of New South Wales, approximately 12km southeast of the major regional centre of Bathurst. The region has several small townships including Blayney, Rockley and Georges Plains. The LGA is 3,818 km² with a population of 43,567 as at the 2021 Census (ABS 2021).

3.3.1 Bathurst

The major town of Bathurst is located approximately 12km North-west of the proposed project, with a population of 36,230 as at the 2021 Census (ABS 2021). Bathurst's major employment sectors include hospitals, social assistance services, government administration, aged care services and grocery stores. The distinct competitive advantages of Bathurst and the surrounding regional council localities includes the skilled workforce, well known region for large recreational events and the central location from Sydney.

Figure 12 illustrates the Project site in red in relation to Bathurst.

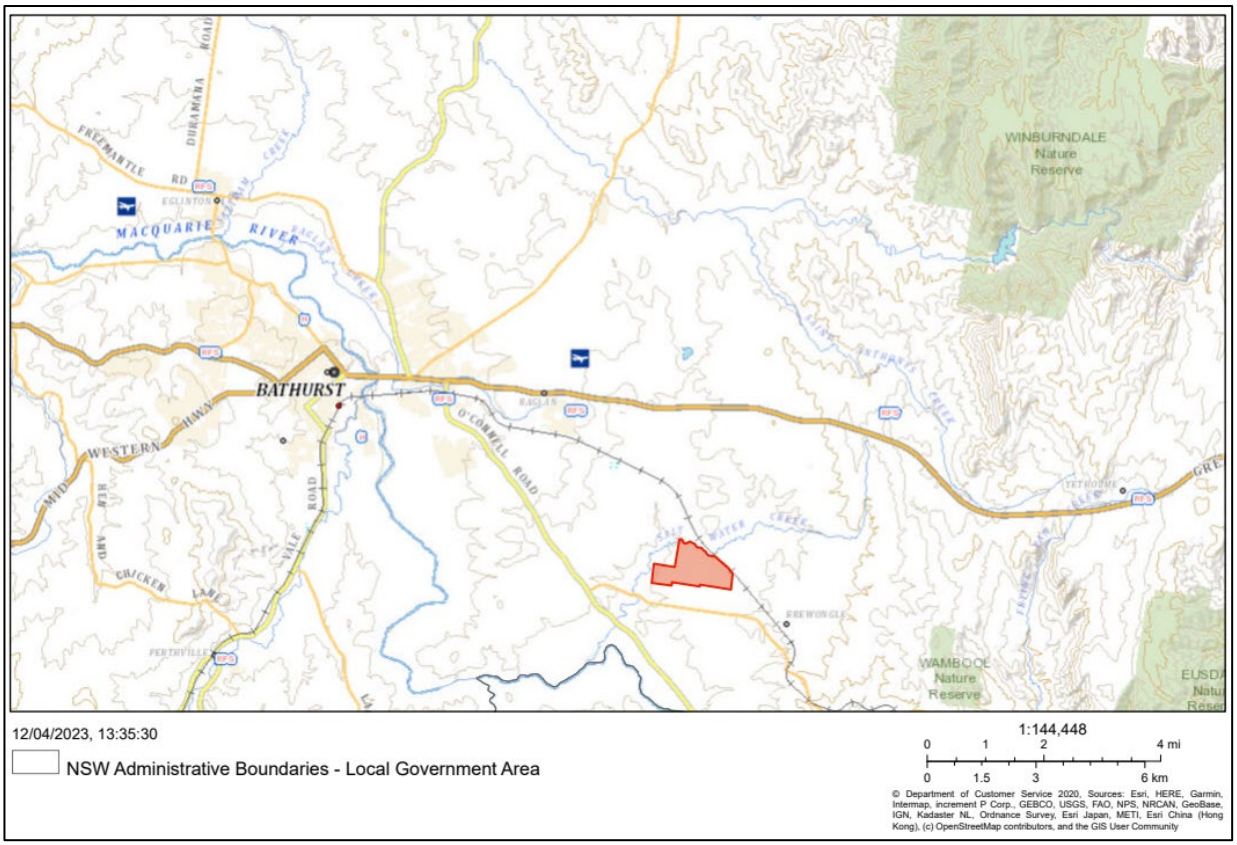

Figure 12: Project Locality within Bathurst Regional Council LGA

3.3.2 Population

The median age of persons in Bathurst Regional LGA is 38, which is in line with the Australian average of 38 (ABS 2021). The 2021 census records state that 7.2% of the population are Aboriginal and Torres Strait Islander people (ABS 2021). A large portion, 84.7% of the community were born in Australia. In addition, the community hosts a very low unemployment rate, with median household incomes averaging $1,585 per week.

3.3.3 Climate

The BOM (2021) climate records available from the nearest climate station at Bathurst Airport (Station number 063291) consists of data recorded since 1991. The station indicates a mean summer maximum of 28.9°C (January) and a mean winter minimum of 0.8°C (July).

Rainfall records from the station show a mean annual rainfall of 624 mm, and that rainfall is generally greatest over summer and spring, with the mean number of days of rain being 126 (Figure 13).

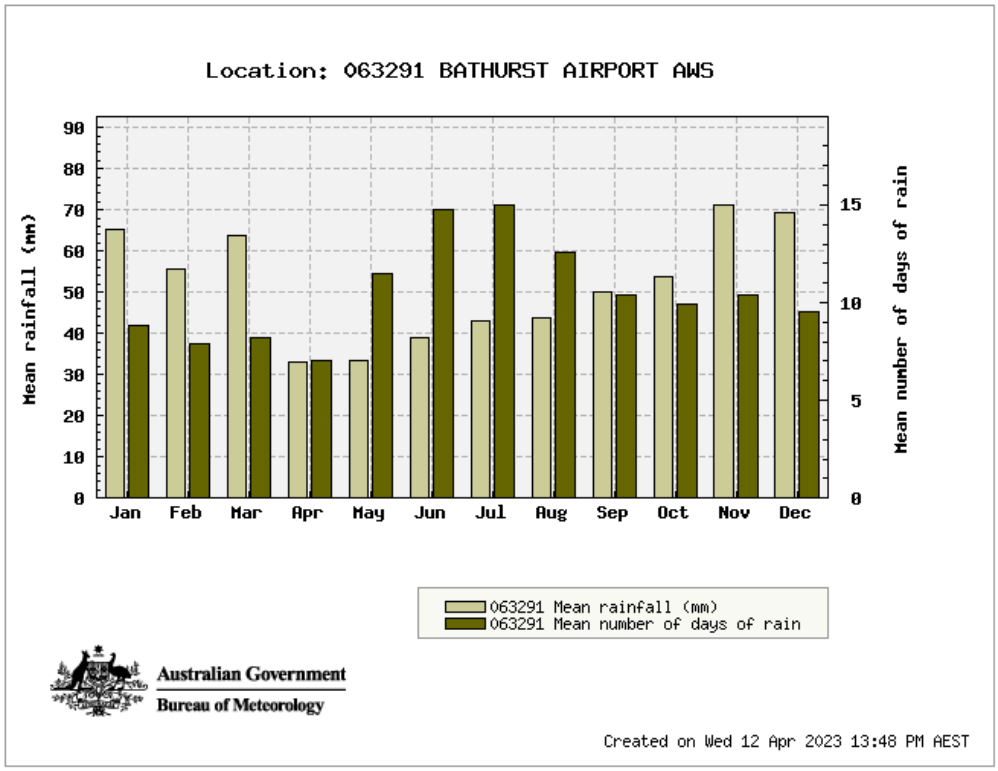

Figure 13: Average Annual Rainfall for Bathurst Airport Station

3.3.4 Geology and Vegetation

The geological characteristics for the Bathurst subregion of the South Eastern Highlands Bioregion comprises carboniferous granite with limited areas of Tertiary basalt caps and Quaternary sands along the Macquarie River[3].

In addition, the typical vegetation can include Apple Box, Yellow Box, White Box and Red Stringybark. Ribbon gums may occur on lower slopes with Brown Barrel occurring in the east. Patches of Black Cypress likely to occur in the rocky outcrop areas, with River Oak the predominant vegetation along watercourses.

The Study Area as confirmed by the Preliminary Ecological Assessment contains a thin band of structural (wooded) vegetation in poor condition and overrun by exotic species in the southwestern corner of Lot 1 DP1236901, classified by NSW mapping as Southern Tableland Grassy Box Woodland (PCT 3376). The remainder of the Impact Area consists of exotic species or pastures.

3 https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Animals-and-plants/Bioregions/bioregions-south-eastern-highlands.pdf

4 Proposed Works

4.1 Site Selection

The site of the Project has been selected for the following reasons:

- Excellent solar exposure.
- Excellent access to local and major roads, plus regional city resources.
- Excellent access to the overhead grid transmission networks.
- Likely low level of environmental impact – the site has been largely cleared and heavily disturbed by agricultural grazing activities.
- Suitable topography, land size and land zoning, whereby the use of the site would be based on a lease agreement between Edify and the landowner for the life of the Project.

4.2 Project Components

4.2.1 Proposed Infrastructure

The Project involves the construction of a ground mounted photovoltaic solar array which would have capacity to generate up to 90MW of renewable energy. The Solar Farm proposes to connect into an existing 132 kV TransGrid transmission line (line 94X) that traverses the northern boundary of the Project. The Project would consist of the following components:

- Single axis tracker photovoltaic solar panels mounted on steel frames over most of the site (maximum tilt up to 4.5m in height).
- Battery energy storage systems with a rating of up to 90MW / 360MWh.
- Underground and overground electrical conduits and cabling to connect the arrays to the inverters and transformers.
- Systems of invertor units and voltage step-up throughout the arrays.
- On site substation, connecting to the existing 132 kV TransGrid transmission line.
- Site office and maintenance building, vehicle parking areas, internal access tracks and perimeter security fencing.
- Site access track off Tarana Road.

The Solar Farm arrangement is flexible and adaptable and would be designed to avoid impacts where feasible and minimise and mitigate environmental impacts if avoidance is not possible. The design would consider the results of the Scoping Report, consultation with relevant stakeholders and the EIS to be prepared. The EIS would detail how these studies have been used to produce the final proposal design.

The proposed infrastructure footprint is shown in Figure 3. This includes all land likely to be directly impacted by the construction, operation and decommissioning of the Project, including auxiliary construction facilities (site compound, laydown, stockpiling, etc.) and all considered options. It is noteworthy that the proposed footprint is indicative only and will be refined as part of the EIS process (considering environmental constraints and engineering studies), with project infrastructure layout to be detailed in the EIS.

4.2.1.1 Solar Array Areas

The development will consist of a number of solar array areas or blocks comprised of photovoltaic modules arranged in a series of long rows. The modules are mounted on frames with tracking systems which follow the sun to optimize energy generation. The frames are fixed to piles driven into the soil. The rows interconnect

to form a single array block of up to 4 MW (AC) or 8 MW (AC), depending on the MV enclosure design. In each block there will be a prefabricated, containerized inverter and integrated transformer to convert and step up the voltage level. Electrical connections will also be constructed between the PV arrays, as well as associated monitoring and protection equipment and central inverters via underground or frame secured cabling.

The solar module frames and inverter stations will be installed on piles and sit above ground level, with a maximum height of approximately 4.5m at full tilt. This ensures retention of existing grassland vegetation and habitats in situ with a minimal level of ground disturbance. Regrowth of groundcover will be enabled following temporary disturbance during installation/construction.

4.2.1.2 Medium Voltage Reticulation

Each inverter will be connected to the central 33kV switchboard by underground medium voltage cable reticulation. The cables will be installed in trenches not below 1m in depth and typically 1m in width. The excavation will comply with the Soil and Erosion Sediment Control Report and Regulations for construction within New South Wales. The medium voltage switchboard will be connected through a step-up transformer and connect to the overhead 132 kV transmission line, owned and operated by Transgrid. This connection into the existing transmission line will be facilitated via an easement over Saltwater Creek, hosting an overhead connection line.

Temporary disturbances to groundcover from the underground installation of the cables will rehabilitate naturally.

4.2.1.3 Solar Substation

A high voltage substation will connect the Solar Farm to the national transmission network. The substation footprint will be approximately 100m x 50m. The substation will provide switching and protection of the electrical network and will be fenced separately from the Solar Farm for safety reasons. The T-connection into the existing transmission line will be owned and operated by the Network Operator, Transgrid. This will form part of the National Electricity Network (NEN).

4.2.1.4 Battery Energy Storage System (BESS)

Based on an economic and technical assessment that will be undertaken during the Project's Connection Application phase with Transgrid and the Australian Energy Market Operator (AEMO), the BESS would be located either:

- adjacent to the substation in the Impact Area (centralised configuration); or
- dispersed in modular enclosures throughout the site (decentralised configuration), which is similar to the typical solar inverter enclosures.

The Project will utilise hermetically sealed, lithium-ion batteries housed in a secure, climate-controlled Battery Energy Storage System (BESS). Subject to economic and technical considerations, the Project would include an approximate 90MW / 360MWh rated capacity battery storage system, with an enclosure design similar to Figure 14 below.

Figure 14: Example Battery Energy Storage System Design, Edify's Gannawarra Solar Farm and Battery Project (Kerang, VIC)

4.2.1.5 Operation and Maintenance Facility

The proposed Operation and Maintenance (O&M) building will be a prefabricated design approx. 10m by 8m and single story. The facility will provide a working area for staff, ablutions and amenities including:

- Office
- Toilet
- Kitchen
- First Aid area
- Meeting room
- Reception area.

4.2.2 Construction

The Project is expected to operate for 30 to 50 years. The construction phase of the Project is expected to take 12 – 18 months. During the peak construction period, a workforce of up to approximately 250 personnel will be required onsite.

Minor earthworks would be required for the preparation of the site, including minimal site levelling, laying of access track and site drainage works. Due to the relatively flat terrain of the Project area, minimal site preparation and civil works are anticipated prior to construction. The PV arrays and site office components will largely be built off-site and transported to the site in modulated sections. Construction on-site will be limited to the unloading and joining together of the modulated sections and trenching of electrical and control cabling to

the electricity grid and control room. Construction activities are planned to occur during daylight hours only, although there may be some works during the winter months where light/visibility will be poor during twilight. Access to the site will be from Tarana Road.

4.2.3 Operation

During the operational phase of the Project, approximately five full-time jobs and a number of full-time equivalent roles that support the Project's operation will be required. These additional roles will be defined closer to construction commencing.

The primary activities conducted on site will include day-to-day routine operations, maintenance of infrastructure, and general site maintenance and security. Operation of the Solar Farm will also likely be supported by local contractors for tasks such as repairs, minor works, weed/vegetation management, fencing and cleaning.

The operational lifespan of the facility is expected to be 30 to 50 years, depending on the nature of solar PV and battery technology and energy markets.

4.2.4 End of Life

After the initial operating period, a decision will be made to either decommission or re-power the facility, subject to approval requirements.

If the Project is to be decommissioned, all infrastructure shall be removed from site, including buried (cable) infrastructure) and the site will be rehabilitated to return to its existing land capability. The disposal and recycling of project infrastructure will be completed in accordance with contemporary waste management legislation and practices at the time of decommissioning. As far as possible, efforts will be made to reduce wastes disposed to landfill, in line with best practice sustainability principles.

Alternatively, the Project may be upgraded and re-powered with new PV equipment. If re-powering the Project is agreed, an appropriate stakeholder consultation process will be undertaken, and all necessary approvals will be sought and aligned with relevant legislation at such time.

4.2.5 Capital Investment

The Project would have an estimated capital investment in excess of $30 million, identifying the Project as a State Significant Development under Part 4 of the EP&A Act. The actual value of the Project will be in excess of $250 million, with the total investment value largely determined by the duration of the battery energy storage system, which will be determined during the EIS stage of the development. A quantity surveyor's report would be prepared during the EIS process as part of the Project, which would confirm the capital investment cost.

4.2.6 Subdivision

Engagements with Transgrid will be undertaken with respect to how the switchyard infrastructure is to be owned and operated. The area of land to be subdivided at the switchyard site is yet to be finalised, however initial plans contemplate a location along the northern boundary of Lot 2 on Deposit Plan 1236901 as seen in Figure 3. The land is zoned RU1 Primary Production with a minimum lot size of 100 ha therefore any proposed subdivision will require the approval of the Minster for Planning under the provisions of section 4.38 of the EP&A Act.

When land is leased from a landowner and the lease affects part of a lot or lots in a current plan, a subdivision under s.7A *Conveyancing Act 1919* (formerly s.327AA *Local Government Act 1919*, which is now repealed) is required when the total of the original term of the lease, together with any option for renewal, is more than

five years. When the lease affects the whole lot in a current plan, the body of the lease identifies the area by lot and DP number with a subdivision not required.

As the Project will be executed via a long-term lease arrangement, subdivision for the purpose of the internal substation and battery facility may be required. An easement may be created by means of an appropriate dealing registered in the NSW Land Registry Service or by the inclusion in a Section 88B instrument lodged with a new deposited plan.

4.3 Alternatives to the Project

4.3.1 Alternative Sites

Edify understands that alternative sites have been proposed within the southern sections of the landholder's property, by consultants, *Anthony Daintith Town Planning* (November 2017). Options analysis of the most suitable site on the involved landholder's property 'Euarra' considers the following:

- Proximity to the overhead transmission line, which is an integral component of any electricity generator, to ensure energy produced is exported into the NSW transmission network with the least number of electrical losses. It is noted that the alternative site is located approximately 2,900m south of Transgrid's 132kV network. This compares with Edify's proposed site, which is approximately 200m south of the overhead line (-93% distance), setback 200m to avoid Saltwater Creek and higher quality soils that run along the creek line.
- The alternative site would result in construction over terrain approximately 3.5 times greater in undulations in the ground elevation contours. This increased slope gradient would result in a significant amount of cut and fill earthworks to achieve a levelled surface required to install the solar arrays, as opposed to the current Impact Area which will require little, if any, cut and fill to achieve an even surface.
- The potential alternative impact area, honouring the minimum 625m buffer from neighbouring landholder residences as the current impact area does, continues to result in a significantly higher number of adjacent landholders within 1km of the development, with potential to be visually or otherwise impacted by the Project. The current footprint has five (5) sensitive receptors within 1km of the Impact Area, however the alternative site on the property would result in 25 or more sensitive receptors within 1km of the Impact Area.
- The current impact footprint will achieve the intended 90MW PV generation without impact to native vegetation or significant watercourses. The alternative impact area on the property would require impacts to vegetation and watercourses. This could not only impact on native and/or threatened flora and fauna, but with the significant level of cut and fill required, could impact on the hydrology of the property and surrounding land.

After considering the above and other alternatives that offer viable capacity and available access to the transmission network (such as Wallerawang to the east of this subject land), it was concluded that the proposed site remains most suitable.

Edify has also reviewed the solar generation potential of many areas in NSW using a combination of computer modelling and analysis, on the ground surveying and observation, and experience of Edify in successfully developing projects in NSW and across Australia. The site was selected because it provides the optimal combination of:

- Low environmental constraints (predominantly cleared grazing and cropping land)
- Level terrain for cost-effective construction
- High quality solar resource
- Suitable planning context
- Acceptable flood risk

- Road access
- Access to the transmission network, and
- Available capacity on the grid transmission system.

The site is of a scale that allows for flexibility in design, allowing Edify to avoid ecological and other constraints that may be identified during the EIS process. The factors that determine the final design area would be detailed in the EIS.

4.3.2 Alternative Technologies

Photovoltaic solar technology was chosen because it is cost effective, low profile, durable and flexible regarding layout and siting. It is a proven and mature technology that is readily available for broad scale deployment at the site.

Battery technology was selected over mechanical, thermal or physical storage methods because it enables modular installation without major infrastructure or specialised landform features. Batteries also generally have lower weight and physical volume and better scalability compared to other technologies.

4.3.3 The 'Do Nothing' Option

Not proceeding with the Project would forgo the benefits of the Project, resulting in:

- The loss of a source of renewable energy that would assist the Australian and NSW Governments to reach their targets,
- The loss of cleaner energy and reduced greenhouse gas emission,
- The loss of additional electricity generation and supply into the grid, and
- Loss of social and economic benefit through the provision of direct and indirect employment.

The 'do nothing' option may avoid any potential impact. However, the likelihood of significant negative impacts is considered low to moderate. It is considered the benefit of the proposed Solar Farm outweighs any potential impact whilst contributing to ecologically sustainable development. In addition, the proposed development would bring broader community advantages, including enhancing the efficiency of the electricity supply and transmission network. It also has the potential to reduce costs for consumers, align with national and state renewable energy goals, and foster increased competition in the electricity supply market. Moreover, it would contribute to lowering greenhouse gas emissions by decreasing dependence on coal-fired power stations.

5 Statutory Context

5.1 NSW Legislation

The relevant statutory requirements for the Project are summarised in Table 3. This table has been set out in accordance with the *State Significant Development Guidelines - Preparing a Scoping Report (Appendix A)* and *State Significant Development - preparing an environmental impact statement (Appendix B)* to the state significant development guidelines (DPIE 2022) (EIS Guidelines). The following matters are considered:

- Power to grant consent (i.e., approval pathway);
- Permissibility;
- Other approvals consistent with the Project;
- Commonwealth approvals;
- Approvals not required (pursuant to Section 4.41 of the EP&A Act); and

- Mandatory matters for consideration.

Table 3 - Statutory Requirements

Approval	Requirement
Power to grant approval	
State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems EPP) *Environmental Planning and Assessment Act 1979* (EP&A Act).	Section 20 of Schedule 1 of the Planning Systems SEPP states that the following is considered a SSD: *Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, biofuel, distillate, waste, hydro, wave, solar or wind power) that:* *(a) has a capital investment value of more than $30 million, or* *(b) has a capital investment value of more than $10 million and is located in an environmentally sensitive area of State significance.'* The Project would have a capital investment cost estimate of more than $30 million. Therefore, the Project is classified as "State Significant Development" under division 4.7 of the EP&A Act. The Minister for Planning and Public Spaces is the consent authority for SSD, and SSD applications are assessed by DPE (unless specific conditions occur or the local council has objected to the application; and/or the applicant has disclosed a reportable political donation, whereby the Independent Planning Commission (IPC) would be the consent authority.
Permissibility	
State Environmental Panning Policy (Transport and Infrastructure) 2021 (TISEPP)	Division 4, Section 2.35 and 2.36(1)(b) of the TISEPP states development for the purpose of electricity generating works may be carried out by any person with consent on any land in a prescribed rural, industrial or special use zone. Therefore, the Project is permissible with consent. Division 4, Section 2.42 of the TI SEPP provides detail on determination of development applications for solar or wind electricity generating works on certain land. This section applies to development in a regional city for the purposes of electricity generating works using a solar or wind energy source that is – a) State significant development, or b) Regionally significant development. Development consent must not be granted unless the consent authority is satisfied that the development – a) Is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the development, and b) Is unlikely to have a significant adverse impact on the regional city's- i) Capacity for growth ii) Scenic quality and landscape character In determining whether to grant development consent, the consent authority must consider measures proposed to be included in the development to avoid or mitigate conflicts referred to in subsection (2)(a) or adverse impacts referred to in subsection (2)(b). The Project site falls within the land identified as 'subject land' on the regional cities map under the State Environmental Planning Policy (Infrastructure) 2007.
Other State and Environmental Planning Policies that may be relevant	State environmental planning policy provisions will take precedence over the local provisions. However, local provisions will be considered by Edify during the EIS. Other relevant State and Environmental Planning Policies that may be relevant include: – SEPP (Primary Production) 2021 (Part 2.2 addresses State Significant Agricultural Land, not yet confirmed in Schedule 1 of the SEPP) – SEPP No. 33 – Hazardous and Offensive Development – SEPP No. 55 – Remediation of Land.

Approval	Requirement
Electricity Infrastructure Investment Act (2020)	The Study Area is outside of the Southern boundary of the Central West Orana Renewable Energy Zone.
Consistent approvals	
Overview	Section 4.42 of the EP&A Act outlines that the approvals listed below cannot be refused if necessary for carrying out an approved SSD and are to be consistent with the terms of the development consent for the SSD.
An environment protection licence under Part 3 of the NSW Protection of the *Environment Operations Act 1997*	Section 48 of the *Protection of the Environment Operations Act 1997* requires an environment protection licence to undertake scheduled activities at any premises. Scheduled activities are defined in Schedule 1 of the *Protection of the Environment Operations Act 1997* and include the following premise-based activities that apply to the Project: *17 Electricity generation* *(1) ...general electricity works, meaning the generation of electricity by means of electricity plant that, wherever situated, is based on, or uses, any energy source other than wind power or solar power.* *(2) Each activity referred to in Column 1 of the Table to this clause is declared to be a scheduled activity if it meets the criteria set out in Column 2 of that Table.* The table referred to in Schedule 1, Clause 17 specifies 'general electricity works' with capacity to generate more than 30 megawatts of electrical power'. The Project will have a capacity that is greater than 30 MW and will therefore require an environment protection licence.
An approval under Section 138 of the *NSW Roads Act 1993*	Under Section 138 or Part 9, Division 3 of the *Roads Act 1993*, a person must not undertake any works that impact on a road, including connecting a road (whether public or private) to a classified road, without approval of the relevant authority, being either Transport for NSW or local council, depending upon the classification of the road. The interaction of the Project with the local and regional road network will be addressed in the EIS.
Commonwealth approvals	
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act aims to protect matters of national environmental significance (MNES). If an action will, or is likely to, have a significant impact on any MNES, it is deemed to be a 'controlled action' and requires approval from the Commonwealth Environment Minister or the Minister's delegate. A search of the Commonwealth Protected Matters Search Tool indicates that there are no World Heritage Properties or National heritage places within the vicinity of the site (Table 4). The Preliminary Ecological Assessment indicates there is potential for listed threatened species to occur within the Study Area, and as such targeted surveys may be required pending further investigations into habitat suitability. Preliminary field surveys have indicated one PCT identified on site has potential to be representative of a threatened ecological community (TECs) listed under the EPBC Act, however it does not meet the criteria for the EPBC listed TEC and as such will not require further consideration under the EPBC Act.
Native Title Act 1993	The Commonwealth *Native Title Act 1993* recognises and protects native title rights in Australia. It allows a native title determination application (native title claim) to be made for land or waters where native title has not been validly extinguished, for example, extinguished by the grant of freehold title to land. Claimants whose native title claims have been registered have the right to negotiate about some future acts, including mining and granting of a mining lease over the land

Approval	Requirement
	covered by their native title claim. Where a native title claim is not registered, a development can proceed through mediation and determination processes, though claimants will not be able to participate in future act negotiations. There are currently no native title determinations over the Study Area.
Approvals not required	
Overview	Section 4.41 of the EP&A outlines the following approvals, permits etc are not required for an approved SSD.
Fisheries Management Act 1994	A permit under the *Fisheries Management Act 1994* to block fish passage or dredge or carry out reclamation work on water land will not be required pursuant to Section 4.41 of the EP&A Act. The Project may require works in the watercourse to establish new crossings and/or install the T-connection line into the existing transmission line from the substation within the Study Area. These works will be undertaken in accordance with NSW DPI *Policies and Guidelines on Fish-Friendly Waterway Crossings* (undated), *Policy and Guidelines for Fish Habitat Conservation and Management* (DPI 2013), and NSW *Guidelines for Controlled Activities*.
Heritage Act 1977	An approval under Part 4, or an excavation permit under Section 139, of the *Heritage Act 1977* will not be required pursuant to Section 4.41 of the EP&A Act. Further, there are no listed heritage items within the Study Area. There are 12 locations within 5km of the Study Area listed under the Bathurst Regional LEP as heritage, including 1 site listed under the State register as well.
National Parks and Wildlife Act 1979	An Aboriginal heritage impact permit under Section 90 of the *National Parks and Wildlife Act 1974* will not be required pursuant to Section 4.41 of the EP&A Act. There is potential for Aboriginal sites to occur within the Study Area. Any Aboriginal heritage sites identified within the Study Area will be avoided as far as practicable through the design process.
Rural Fires Act 1997	A bushfire safety authority under Section 100B of the *Rural Fires Act 1997* will not be required pursuant to Section 4.41 of the EP&A Act. However, a bushfire assessment in accordance with NSW Rural Fire Service *Planning for Bushfire Protection 2019* will be carried out to inform the EIS.
Water Management Act 2000	A water use approval under Section 89, a water management work approval under Section 90 or an activity approval (other than an aquifer interference approval) under Section 91 of the *Water Management Act 2000* pursuant to Section 4.41 of the EP&A Act. There are no watercourses occurring within the Impact Area, and as such construction works in a watercourse is not likely. Any works near or within the watercourse on the northern boundary of the Impact Area will be carried out in accordance with DPIE's various guidelines for controlled activities.
Other NSW approvals	
Conveyancing Act 1919	The final Impact Area will require a separate lease from the owner of the affected land. Lease of a solar farm site is treated as a lease of premises, regardless of whether the lease will be for more or less than 25 years. The plan, which illustrates the Impact Area (Figure 4) will not constitute a 'current plan' within the meaning of Section 7A of the *Conveyancing Act 1919* and therefore will not require subdivision consent under Section 23G Conveyancing Act. Section 23G of the Conveyancing Act may also apply if subdivision for the purpose of construction, operation and maintenance of a substation is required.
Section 1.3 of the EP&A	Relevant objectives of the EP&A Act are:

Approval	Requirement
Act	*(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,* *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,* *(c) to promote the orderly and economic use and development of land,* *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,* *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),* *(g) to promote good design and amenity of the built environment,* *(j) to provide increased opportunity for community participation in environmental planning and assessment.* The above will all be considered in the EIS.
Section 4.15 of the EP&A Act	Pursuant to Section 4.15 of the EP&A Act the consent authority must consider the following relevant matters for consideration: Relevant environmental planning instruments for the Project including: – State Environmental Planning Policy No. 33 Hazardous and Offensive Development; – State Environmental Planning Policy No 55 Remediation of land; – State Environmental Planning Policy (Infrastructure) 2007; – State Environmental Planning Policy (Koala Habitat Protection) 2020; – Bathurst Regional Local Environmental Plan 2012 (LEP); – Vision Bathurst 2040-Bathurst Region Local Strategic Planning Statement. Relevant development control plans for the Project including: – Bathurst Regional development control plan 2014 the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality; the suitability of the site for the development; and the public interest. The above will all be considered in the EIS.
Mandatory considerations - Considerations under other legislation	
Biodiversity Conservation Act 2016	The likely impact of the Project on biodiversity values as assessed in the biodiversity development assessment report. The Minister for Planning and Public Spaces may (but is not required to) further consider under that Act the likely impact of the Project on biodiversity values.
Mandatory considerations - Environmental planning instruments	
State Environmental	As the development will involve a change of use on land on which development for a

Approval	Requirement
Planning Policy No 55 – Remediation of Land, Clause 7	purpose referred to in Table 1 of the contaminated land planning guidelines (agriculture) is being, or is known to have been, carried out, a report will be required specifying the findings of a preliminary investigation of the land carried out in accordance with the Managing Land Contamination Planning Guidelines (*DUAP 1998*).
State Environmental Planning Policy No 33 – Hazardous and Offensive Development, Clause 8	The EIS will consider the following relevant departmental guidelines: - Applying State Environmental Planning Policy No. 33 Hazardous and Offensive Development - HIPAP No. 3 – Risk Assessment - HIPAP No. 12 – Hazards
Bathurst Regional Council LEP (2012)	The EIS will consider: - the relevant objectives and land uses for RU1 zone - Part 4 and relevant details for minimum lot sizes for subdivisions in Zone RU1 - Clause 6.3 Earthworks - Clause 6.4 Groundwater vulnerability - Clause 6.9 Essential Services, relating to the supply of electricity and suitable road access

5.2 Local Government

5.2.1 Bathurst Regional Council's Local Environmental Plan 2014

The Project is in the Bathurst Regional Council's LGA and is subject to the *Bathurst Regional Council's Local Environmental Plan 2014* (LEP). The aims of the LEP are:

(a) to protect and promote the use and development of land for arts and cultural activity, including music and other performance arts,

(b) to deliver growth and development in the city of Bathurst and rural localities,

(c) to promote development that is consistent with the principles of ecologically sustainable development and the management of climate change and water resources,

(d) to enhance and protect the region's unique Aboriginal and European cultural heritage as key social and economic assets,

(e) to identify, protect, enhance and manage areas of high biodiversity conservation value as a means to-

(i) preserve and improve the ecosystem services they provide, and

(ii) protect the region's significant vegetation and scenic quality, and

(iii) respond to and plan for climate change by identifying and protecting habitat corridors and links through the local government area,

(f) to facilitate rural housing choice through sustainable rural settlement growth that includes rural village living and strategic rural lifestyle living opportunities,

(g) to provide greater housing choice within the city of Bathurst through sustainable urban settlement growth that includes greater opportunities for medium density housing and the minimisation of the city's environmental footprint,

(h) to promote the well-being of the people of the region by encouraging living, vibrant and growing rural settlement areas, urban villages and suburbs that generate a sense of community and place,

(i) to protect the region's key transport assets and to promote opportunities for sustainable transport, particularly public and active transport,

(j) to provide a secure future for the region's recreation assets, in particular, the Mount Panorama and the Macquarie River precincts,

(k) to minimise risk to the community in areas subject to environmental hazards, particularly flooding and bush fires and to minimise cumulative impacts on environmentally sensitive areas,

(l) to encourage the dynamic and innovative development and growth of the region's primary resources,

(m) to protect and enhance the region's landscapes, vies, vistas and open spaces,

(n) to create a land use framework for controlling development in the region that allows detailed provisions to be made in any development control plan made for that purpose.

The proposed development is classified as electricity generating works and is located on land zoned RU1 – Primary Production under the LEP 2014.

While solar farm developments are not specifically referenced as a development permitted with consent, solar developments are not inconsistent with the objectives and principles of the LEP. Whilst the development will impact the availability of the land for primary production, it will sustainably harness a natural resource, namely solar energy, and will provide for a diversified economic stimulus and support to rural communities.

5.2.2 Bathurst Regional Council Strategies and Plans

As noted in Table 3, the Project falls within the 'subject land' area on the regional city map for Bathurst, relating to Division 4, Section 2.42 of the State Environmental Planning Policy (Infrastructure) 2007 as seen in Figure. As such, it is subject to scrutinization for its location and whether it *conflicts with existing or approved residential or commercial uses of land surrounding the development*, as well as its potential *to have a significant adverse impact on the regional city's capacity for growth or scenic quality and landscape character*.

A Land Use Conflict Risk Assessment (LUCRA) and Landscape Character and Visual Impact Assessment (LCVIA) will be prepared during early planning phases to achieve a high-level understanding of the Project's potential conflicts and impacts in relation to the legislation listed above.

The EIS will interrogate the various applicable Bathurst Council strategies and plans in depth to detail the Project aspects against the triggered legislation, which will be supported by the LUCRA and LCVIA. Plans and strategies that will lead this analysis include:

- Vision Bathurst 2040- Bathurst Region Local Strategic Planning Statement
- Bathurst Community Strategic Plan 2022
- Bathurst Regional Development Control Plan 2014

- Bathurst Region Rural Strategy 2008
- Bathurst 2036 Housing Strategy Volume 2- The Implementation Plan
- Bathurst Region Vegetation Management Plan 2019

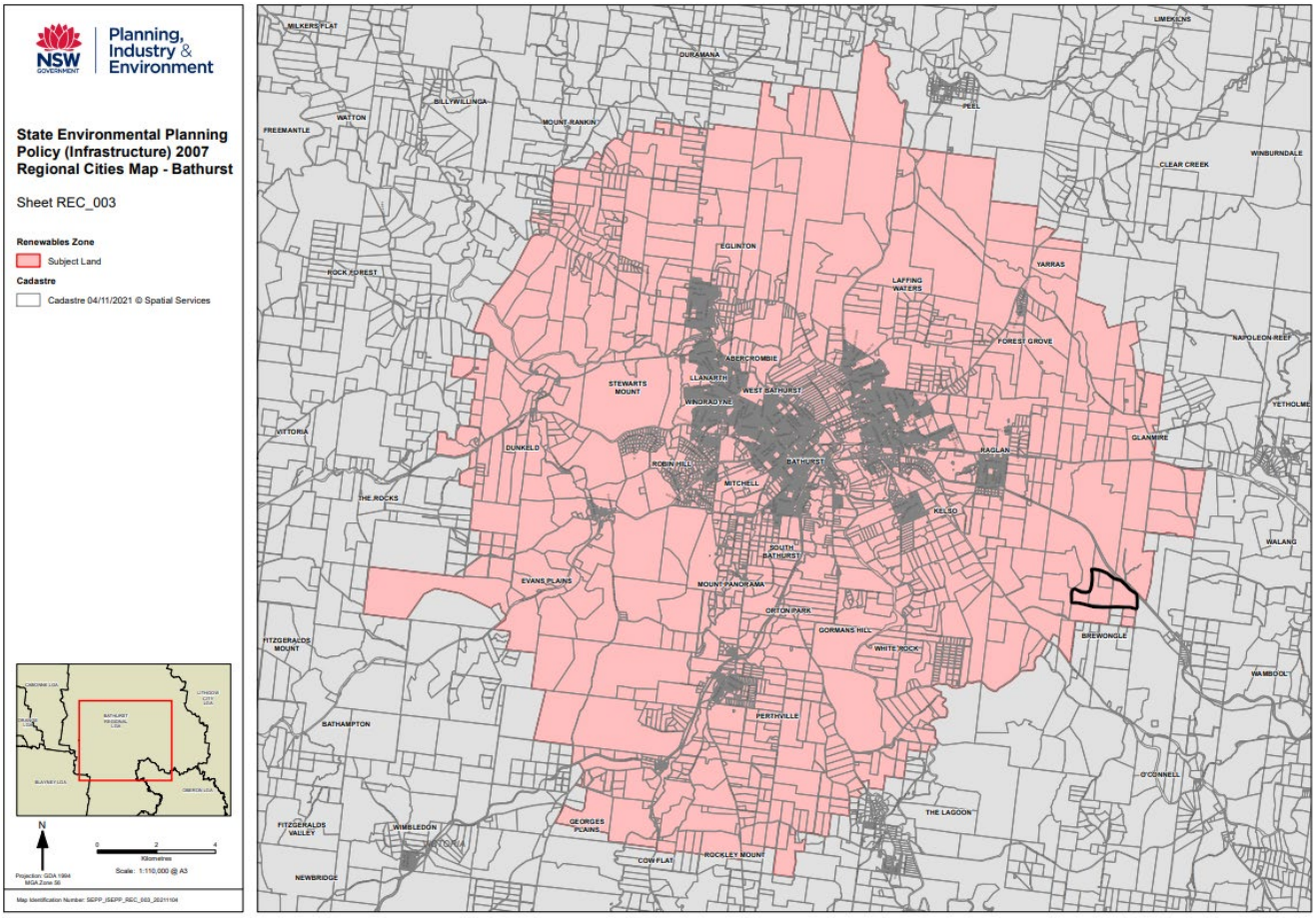

Figure 15: Regional Cities Map

5.3 Commonwealth Legislation

5.3.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act provides an assessment and approval process for actions likely to cause a significant impact on Matters of National Environmental Significance (MNES). These include:

- World Heritage properties.
- National Heritage places.
- Wetlands of international importance (listed under the Ramsar Convention).
- Listed threatened species and ecological communities.
- Migratory species protected under international agreements.
- Nuclear actions (including uranium mines).

- Commonwealth marine areas.
- The Great Barrier Reef Marine Park.
- A water resource, in relation to coal seam gas development and large coal mining development.

Approval by the Commonwealth Environment Minister is required if an action is likely to have a significant impact on a MNES. Assessments of significance based on criteria listed in Significant Impact Guidelines 1.1 issued by the Commonwealth (Commonwealth of Australia 2013) are used to determine whether the proposed action is likely to have a significant impact (i.e. is likely to be considered a 'controlled action').

A search of the Commonwealth Protected Matters Search Tool (refer to Preliminary Ecological Assessment in Appendix J) indicated two threatened ecological communities, 47 threatened species and 12 migratory species in the search area (5km buffer of Study Area). Studies to determine the presence and likelihood of impact to these species/communities would be undertaken during the preparation of the EIS.

A summary of the EPBC Act search report is provided in Table 4 and the full search results can be found in the Preliminary Ecological Assessment in Appendix J.

Table 4 - Summary of EPBC Protected Matters Search Report

Protected Matter	Entities within the search area
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Significance (Ramsar)	4
Threatened Ecological Communities	2
Threatened Species	47
Migratory Species	12
Listed Marine Species	19
Commonwealth lands	1
Commonwealth Heritage places	None
Critical habitats	None
Commonwealth reserves (terrestrial)	None
State and Territory reserves	None
Regional Forest Agreements	None
Nationally Important Wetlands	None
EPBC Act Referrals	2
Bioregional Assessments	None

Bilateral Agreement

The NSW Assessment Bilateral Agreement (the Agreement) streamlines the assessment process for major projects that require both NSW and Australian Government environmental approvals. It is made under the Commonwealth's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Under the Agreement, the NSW Government assesses development applications on behalf of the Australian Government. The Australian Government remains the decision-maker for the EPBC Act approval, considering the assessment report prepared by NSW's Department of Planning and Environment.

This process will be investigated following further targeted ecological surveys of the site and as part of the EIS process.

5.3.2 Native Title Act 1993

The *Native Title Act 1993* provides a legislative framework for the recognition and protection of common law native title rights. Native title is the recognition by Australian law that Indigenous people had a system of law and ownership of their lands before European settlement. Where that traditional connection to land and waters has been maintained and where government acts have not removed it, the law recognises this as native title.

People who hold native title have a right to consult or continue to practise their law and customs over traditional lands and waters while respecting other Australian laws. This could include visiting to protect important places, making decisions about the future use of the land or waters, hunting, gathering and collecting bush medicines.

Further, when a native title claimant application is registered by the National Native Title Tribunal, the people seeking native title recognition gain a right to consult or negotiate with anyone who wants to undertake a project on the area claimed. Where native title does exist in relation to the Study Area, Edify will comply with the provisions of the *Native Title Act 1993*. A search of the National Native Title Tribunal website (NNTT 2018) indicates no native title claims, land use agreements, applications or determinations within the Impact Area.

6 Engagement

Edify is a long-term owner and operator of projects. This makes an important difference in our community engagement approach since we are establishing relationships with communities during the development phase that will endure for the lifetime of the Projects.

Community and stakeholder consultation will be integral to the Project. Edify has begun consultation with a wide range of relevant Local Government and State government agencies, neighbours, community groups and other interested parties.

In accordance with the NSW DPE Social Impact Assessment Guidelines, Edify has conducted the first phase of the SIA. This involved SIA scoping and initial assessment, as well as refining and planning for further engagements with local stakeholders. The SIA Worksheet is provided in Appendix B.

Refer to Appendix C for copies of correspondence with stakeholders. In addition, Table 5 summarises Edify's consultation and community engagements.

Table 5 - Consultation and Community Engagement

Consultation Guide		
Phase	**Actions/Tools**	**Stakeholders**
Pre-lodgement and development of EIS	FAQ's Meetings – one on one Presentations (working party with Bathurst Council) Drop in session Project email address Project Website Letterbox drop Feedback collation and mitigation options	Community Landowners Council Government departments Neighbours Local businesses Media
EIS public exhibition and determination	FAQ's Drop in session Letters Letterbox drop status update	Community Neighbours Landowners
Post approval (assuming approval granted)	Letters Letterbox drop status update Local Contractor Presentation and EOI Register	Community Local businesses Neighbours Landowners Council
Construction and commissioning	Local consultation with landowners and neighbours Local Contractor Presentation and EOI Register Local Council Presentations FAQ's Drop in session Letters Letterbox drop status update Support to landowner team	Community Neighbours Landowners Council

Edify will prepare a Community Engagement Plan (CEP) during early phases of the EIS to provide a framework to further engage with the community and stakeholders about the Project and ensure opportunities to provide input into the assessment and development process are understood. Stakeholders were identified as those potentially being impacted by the Solar Farm or having an interest in the Project itself. The CEP will set out the Project's community engagement approach and minimum requirements with interested parties including representative bodies (e.g. Bathurst Regional Council, Local Aboriginal Land Council group, community groups, and neighbours to the site).

As the CEP is implemented, the following activities will occur:

- Keep the Brewongle residents and broader community informed in all stages of the Project through media avenues including advertisements in local radio, television and newspaper.
- Face to Face meetings with adjacent landholders, stakeholders and concerned local residents as required.
- A project website that will be updated at each project milestone and email address to inform the broader community.
- Preparation and dissemination of a feedback form to better understand the community's sentiment toward solar development and the development of the Brewongle solar and battery proposal. This will be made available at meetings and on Edify's project website.
- Hold an information session during the Project stage providing access to specialists and project information.
- Develop and implement a benefit sharing scheme in consultation with the community.
- Establishment of a register to record contact with stakeholders including potentially affected landholders.

The CEP would aim to ensure that there is effective, ongoing liaison with the community.

Measures to reduce adverse impacts and promote positive impacts would be identified in the EIS and appropriate management plans developed for the Project. Agency consultation would also take place in accordance with any requirements of the SEARs.

6.1 Aboriginal Community Consultation

Edify Energy recognises the Wiradjuri People as the original custodians of the lands throughout Brewongle and Bathurst, and as such will be invited to undertake an Aboriginal cultural heritage assessment as part of this proposal's EIS.

The NSW DPE, Office of Environment, Energy and Science (formerly OEH), acknowledges that Aboriginal people are the primary determinants of the significance of their heritage. It is acknowledged that Aboriginal people should be involved in the Aboriginal heritage planning process and are the primary source of information about the value of their heritage. This includes the best management and conservation measures for Aboriginal heritage and the way in which their cultural information (particularly sensitive information) is used (OEH 2011:2). Edify considers that proactive engagement and consultation with the local Aboriginal community is regarded as an integral part of the process of investigating and assessing Aboriginal cultural heritage.

As the Project's SEARs are being requested to inform the forthcoming EIS process, consultation with the Aboriginal community will be commenced under the due legislative process and accordingly undertaken as part of EIS studies. Aboriginal community consultation undertaken for this project will follow the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010) (Consultation Requirements). The Consultation Requirements outline a four stage Aboriginal consultation process and mandate specific timeframes for each stage.

6.2 Consultation to date

Adjacent landowners and those situated within 4.0 km of the Study Area have been initially contacted via registered mail containing Project specific materials such as an introductory letter, concept site map and FAQ's, to inform them about the Project and offer them the possibility to meet. Following the registered mail, various calls and emails have been shared with the neighbouring landholders. Additional one on one meetings will be proposed with adjacent landholders or community groups that wish to discuss the Project more and raise any opportunities or concerns.

During Edify's planned site visit in August and throughout the remainder of 2023 and 2024, Edify's Project Manager will be aiming to meet with the majority of these stakeholders and any others who are available.

Edify has provided initial answers to community enquiries, with key areas of discussion including:

- Visual amenity changes to the site;
- Fragmentation and isolation of agricultural land;
- Site access roads and their usage;
- The viability of grazing sheep within the solar farm ('Agri-solar');
- Implications for neighbouring landholders regarding insurance or property values; and
- Alternative sites and other potential projects occurring in the area;

During the EIS phase, Edify plans to meet with all neighbours within 4km of the Project and will maintain regular emails, calls and letters with non-associated receivers within 4km of the Project. Furthermore, Edify will identify and maintain regular contact with any non-associated receiver or community group that wishes to be updated on a regular basis. All stakeholders will be encouraged to visit Edify's dedicated project website, to receive regular updates once the website is established during the EIS phase.

6.2.1 Bathurst Local Aboriginal Land Council (LALC) and other Representative Aboriginal Groups

In advance of the submission of this Scoping Report, Edify Energy have consulted with the Bathurst LALC and provided information on the proposed Project. An initial call was shared 25 May 2023 to introduce the Edify Project Manager and the Brewongle Solar Farm site, followed by regular emails with Project updates. Details of this communication are provided in Appendix C.

Edify briefly met with members of the Gunhigal Mayiny Wiradyuri Dyilang Enterprise in August 2023 to discuss the Project in its current phase and open to up a line of communication to allow sharing of Project updates.

6.2.2 TransGrid

Discussions with TransGrid started in H1-2023, regarding the Regulated Investment Test for Transmission, which aims to maintain reliable supply in the Bathurst, Orange and Parkes regions. Discussions are ongoing as Edify commenced connection application studies in the second half of 2023.

6.2.3 Bathurst Regional Council

Edify shared a preliminary introductory meeting with Bathurst Regional Council representatives on 5 December 2022. This meeting was held prior to entering the Option agreement with the landholder, to understand the local context and general considerations towards solar and battery project proposals in the region. Further meetings were held with Council representatives on 17 May 2023 and 9 August 2023, to provide Council with an introduction of Edify Energy and the Brewongle Solar Farm, and gather feedback on

the initial planning efforts that support this Scoping Report. Edify will continue to share correspondence with Council as the planning process matures. The main matters raised were:

- Community concern and objections for previous and nearby renewable facilities;
- Consideration of the site zoned for agricultural purposes;
- Traffic volumes and access routes;
- Potential visual impact from adjacent neighbours; and
- Potential cumulative impacts from nearby developments (as outlined in Section 7.2.7).

In addition, Edify and Council held an in-person 'Working Party' with various Council representatives on 23 August 2023, to present details of the Project and Scoping Report as well as the supporting technical studies completed. The meeting acted as a 'pre-lodgement meeting' to introduce the Project and gain feedback from the Council on the content and further requirements. Council's queries raised and feedback during this meeting included:

- Results of soil testing completed for the Agricultural Impact Assessment. Implications on the soil verification for the Project, such as for the footprint and siting of infrastructure. Implications of the Project development on LSC Class 3 soils.
- Visual impact on neighbouring landholders. Edify's visual consultant prepared viewshed analyses demonstrating a 'worst case' scenario for viewpoints of landholders within 4km of the Project which was presented alongside 3D artistic impressions of the development from three different locations proximate to site.
- Community and stakeholder engagement. Council questioned what effort has been completed to date and further efforts that are proposed. Council noted the various active Community Action Groups and also various Traditional Owner groups within the Bathurst region that must be consulted.
- Impacts to the road network and traffic. Council noted Tarana Road and its associated structures were impacted recently by flooding and has since been remediated.
- Potential implications on neighbouring landholder insurances.

6.2.4 State and Federal Members

In conjunction with community member engagements, a letter of information was sent on 10 July 2023 to the office of the Federal Member for the Calare Electorate as well as the Member of Parliament of NSW for the Bathurst electorate (See Appendix C).

The Federal Member's office noted via phone that a meeting would be initiated at the request of Edify later into the EIS phase.

The State Member responded via email to note that a firm stance on behalf of the community would be taken for this Project. A meeting has been initiated with the State Member for Bathurst on 27 September to discuss the community views further as well as share the Project plans in greater detail.

6.2.5 Industry

There are no identified industrial operations existing on the lands proximate to the Impact Area.

6.3 Community Investment

As a leading renewable energy developer, Edify Energy is committed to supporting the communities that host our clean energy projects with positive and lasting social, environmental and economic benefits.

During early consultation with Bathurst Regional Council, Edify has acknowledged the need for a voluntary planning agreement which may establish an appropriate committee to oversee the delivery of a portion of revenue from the proposed Brewongle Solar Farm back into the local community each year, for the life of the Solar Farm. These conversations will progress as the Project moves through the EIS process.

A Community Engagement Plan will also be created to support the EIS phase of the Project's development.

7 Preliminary Ecological Assessment

7.1 Methodology

A preliminary environmental risk assessment has been conducted to assist in the identification of key environmental matters that would require detailed assessment within the EIS. Risks were identified for both the construction and operation phase of the Project and analysed in relation to their possible consequence and likelihood of occurrence. From this analysis, some environmental matters were deemed to be key issues on the basis that they had the potential, without suitable mitigation, to have a significant impact on the environment.

The assessment is based on a desktop review and preliminary site inspection (involving initial flora and fauna surveys) to identify potential high-level constraints and major risks to the Project. A preliminary constraints map is provided in Figure 15, showing the vegetation composition of the Study Area. This will be used to guide further detailed investigations and ultimately the site infrastructure layout. Constraints mapping will also be refined based on these investigations prior to submission of the EIS.

A summary of the key environmental impacts is provided in Section 7.2. The intent of the discussion is to demonstrate an understanding of the issues that require further environmental assessment and likely mitigation measures for these key issues. The potential impacts and management of other (less significant) issues are discussed in Section 7.3.

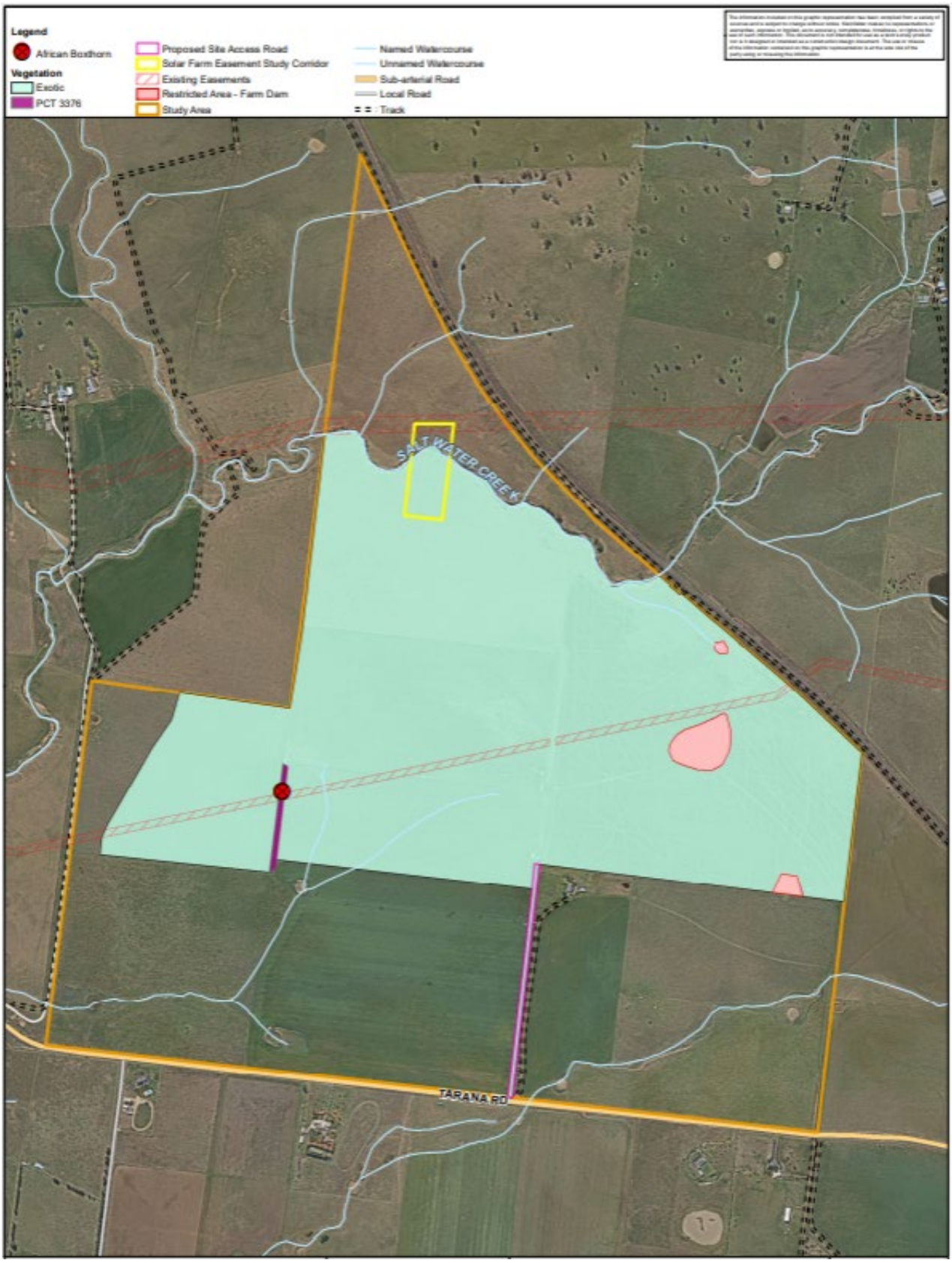

Figure 16: Preliminary Environmental Constraints Mapping for Impact Area

7.2 Proposed Assessment of Impacts

7.2.1 Biodiversity

Partly based on the results of the Preliminary Ecological Assessment (PEA), the Impact Area has been selected on the basis that it avoids native vegetation and regions with higher land and soil capability (class 2). The Study Area has been extensively cleared and used for agricultural purposes, such as grazing, over a long period of time. The proposed development site contains no hollow-bearing trees, exposed rock, wooded debris, riparian corridors, or other suitable fauna habitat.

The primary constraints are associated with a small corridor of degraded woodland mapped as PCT 3376 and Saltwater Creek. The small corridor of degraded woodland will be investigated during further studies to confirm its potential status as a NSW listed TEC and its low biodiversity value, and subsequently aim to clear it for development. An easement will be required over Saltwater Creek for connection of the substation into the transmission line, which will include an access track and an overhead line (Appendix M).

The proposed access to the site, off Tarana Road, will largely disturb exotic species or pasture and as such be of low impact to biodiversity.

Methodology

Edify Energy has undertaken a preliminary desktop assessment of the Project to identify potential high-level constraints and major risks to the Project. Edify engaged Kleinfelder Australia to undertake a Preliminary Ecological Assessment (PEA) of the Study Area. In addition, Kleinfelder was also commissioned to undertake a Land Category Assessment, to distinguish potential Category 1-exempt land within the Study Area. Kleinfelder completed these reports by undertaking desktop database searches, in addition to conducting a preliminary field assessment across two days, including 30 and 31 May 2023. A copy of the Preliminary Ecological Assessment inclusive of the assessment of the presence of Category 1 land can be found in Appendix J.

A Biodiversity Development Assessment Report (BDAR) will be completed after the SEARs have been received and a final Impact Area is determined. The BDAR will aim to follow the small- area streamlined assessment module under the BAM, as clearing of native vegetation is likely to be under the 3ha limit for a 100ha minimum lot size property.

The following is a summary of the desktop and field surveys completed to-date, featuring key biodiversity matters that may pose constraints within the Survey Area that include:

- Plant Community Types listed as threatened under the NSW *Biodiversity Conservation Act 2016* (BC Act) or Commonwealth *Environment Protection and Biodiversity Act 1999* (EPBC Act).
- Likelihood of occurrence for threatened species listed under the BC or EPBC Act.
- Habitat for threatened species listed under the BC or EPBC Act.
- Prescribed biodiversity impacts under the Biodiversity Assessment Methodology (BAM).
- Biodiversity Values mapped under the BC Act.
- Serious or Irreversible Impacts (SAII).
- Riparian and/or terrestrial corridors and connectivity and wetland inundation areas
- Groundwater Dependent Ecosystems

7.2.1.1 Flora

Plant Community Types

Under the NSW Department of Planning and Environment (DPE) Biodiversity Conservation and Sciences (BCS) Plant Community Type's (PCTs) are the lowest level of classification and the accepted standard for describing plant communities. One small patch of vegetation likely to be commensurate of a PCT was present

within the Study Area in a low condition state. The vegetation persists in a degraded state with trees exhibiting dieback or stunted growth and featuring a highly disturbed understorey and groundcover largely of exotic species.

State and Federal Threatened Ecological Communities

The EPBC Act Protected Matters Search undertaken indicated two listed threatened ecological communities (TEC) had potential to occur within the 5km of the Subject Land (refer to Preliminary Ecological Assessment in Appendix J):

- Natural Temperate Grassland of the South Eastern Highlands
- White Box- Yellow Box- Blakely's Red Gum Grassy Woodland and Derived Native Grassland.

An assessment against the EPBC criteria for the White Box- Yellow Box- Blakely's Gum Grassy Woodland and Derived Native Grassland TEC, found the patch of vegetation on site had the key diagnostic overstory species of Blakely's Red Gum and Yellow Box however it does not have a predominantly native understorey with over 50% cover of native perennial species.

The degraded PCT on site relates to NSW White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered), a TEC listed under the NSW BC Act. An assessment against the NSW CEEC criteria found the patch of woodland is likely to be the above TEC as the condition thresholds do not specify tree cover or species diversity and the degraded patch has potential to respond to assisted natural regeneration.

The BDAR, and in discussion with BCD, will determine the status of this PCT as a TEC during the EIS phases. It is noted that this potential NSW listed TEC would not be at risk of Serious and Irreversible Impacts.

State and Federal Threatened Flora Species

Six candidate flora species derived from the PCT 3376 mapping were preliminarily assessed for further surveys, with only two requiring potential surveys due to potential presence of habitat constraints.

Desktop searches utilising the EPBC protected matters search and BioNet Atlas of NSW wildlife indicated 11 threatened flora species have potential to occur within 5km of the Study Area. No threatened flora species were identified within the Study Area during the preliminary field assessment, with Appendix A of the PEA illustrating a nil-low likelihood of occurrence for all 11 flora species provided by the desktop searches.

Future Phase Targeted Survey Requirements

The NSW listed candidate flora species are not at risk of Serious and Irreversible Impacts and as such do not require targeted surveys under the small-area assessment module unless they are incidentally sighted during further field assessments.

If surveys are deemed to be required, optimal timing for the two species with potential to occur would be between October to December for the *Lepidium hyssopifolium* and September to April for the *Leucochrysum albicans subsp tricolor.*

EPBC listed threatened flora will be surveyed and assessed as required during the EPBC Referral process.

7.2.1.2 Fauna

State and Federal Threatened Species

A search of the BioNet Atlas of NSW Wildlife returned a list of ten threatened fauna species that have previously been recorded within 5km of the Study Area.

Seventeen candidate species, derived from PCT 3376, that may require further assessment under a BDAR has been generated from the BAM-C (BAM Calculator).

Of the seventeen species, four species may require targeted surveys as outlined in Table 6 of the PEA, due to potential presence of habitat constraints including:

- Pink-tailed Legless Lizard (*Aprasia parapulchella*)
- Striped Legless Lizard (*Delma impar*)
- Bathurst Grassland Earless Dragon (*Tympanocryptis mccartneyi)*
- Key's Matchstick Grasshopper (*Keyacris scurra)* (Insect)

Other BC Act threatened fauna requiring further assessment, based on the BioNet desktop search results, as determined by the likelihood of occurrence assessment in Appendix A of the PEA, include:

- Diamond Firetail (*Stagonopleura guttata*)
- Booroolong Frog (*Litoria booroolongensis*)
- Green and Golden Bell Frog (*Litoria aurea*)

Only the Bathurst Grassland Earless Dragon is at risk of Serious and Irreversible Impacts, and as such will require targeted surveys as part of the small-area streamlined BDAR. If any other NSW listed threatened species are incidentally recorded during further surveys, they will required suitable targeted surveys and potential offsets.

The EPBC Act search indicated 35 threatened fauna species within a 5km radius from the Study Area. No threatened fauna species were recorded during the preliminary field survey.

Targeted surveys will be completed in line with Federal guidelines to allow for a referral to the Department of Climate Change, Energy, the Environment and Water.

SEPP (Koala Habitat Protection) 2020

The subject land is zoned RU1 within the Bathurst LGA; consequently, Chapter 3 of the SEPP applies. No Koala Plan of Management exists for this region.

Two species of Koala use tree of the Central Southern Koala Management Area, as per the Biodiversity and Conservation SEPP 2021, were recorded onsite in the small patch of Grassy Box Woodland (Blakely's Red Gum and Yellow Box) making this patch potential Koala habitat. Although the patch contains >15% of Koala use trees there are no recent Koala records within 2.5 km of the site (closest record >5 km). This parcel of vegetation is therefore not considered as core Koala habitat. The patch is highly isolated from other Koala habitat.

7.2.1.3 Groundwater Dependent Ecosystems (GDEs)

The Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems identified a single high-potential aquatic GDE associated with Saltwater Creek adjacent the Northern boundary of the Impact Area. There is low-potential terrestrial GDE within 1km of the Study Area, associated with the mapped PCT 3376 North of the Main Western railway line.

There is a low potential for groundwater to be encountered during excavations and earthwork for the construction. This is likely to be highly localised and no inception of groundwater is considered. The Project does not include the extraction of groundwater; however, contamination from construction operations, could impact on the quality of groundwater if adequate mitigation measures are not taken.

7.2.1.4 Potential Impacts

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

- Clearing, removal and disturbance of vegetation,
- Disturbance within the watercourse,
- Introduction and spread of invasive species and weeds;
- Disturbance or displacement of fauna;
- Microclimate impacts due to shading, water availability, temperature, etc.; and
- Movement barrier and collision hazard by perimeter fencing.

7.2.1.5 Further assessment

The Project will pursue a small area streamlined assessment module due to the little to no clearance of native vegetation, thereby resulting in little to no impact on BAM listed fauna and flora species.

Alternatively, if a full BDAR is deemed required by the SEARs, a list of the species that will require surveys and the specified survey period to confirm presence/absence and for the purpose of quantifying credits has been developed by the ecologists. Additional species may be identified during the BAM assessment and targeted survey process. Further detailed information on the existing fauna habitat values and potential impacts associated with the proposed development will be contained in the BDAR that will accompany the EIS. A complete list of candidate species, derived from PCT 3376, that may require further assessment has been generated from the BAM-C (BAM Calculator). A full floristic plot survey is required to determine the floristic composition, condition and EEC status of the small patch of vegetation at the Project site. This would include the calculation of any biodiversity offset required for the Project.

7.2.2 Aboriginal Heritage

The Project area is within the Wiradjuri Region, whose people are the largest Aboriginal Nation in NSW. Wiradjuri people are originally from the land that spans a vast area in central New South Wales, on the plains running north and south to the west of the Blue Mountains Snowy Mountains.

A search of the Aboriginal Heritage Information Management System (AHIMS) on 27 March 2023 identified no Aboriginal sites and no Aboriginal places within the Study Area and 1km buffer area. Refer to AHIMs search results in Appendix D.

Landforms, vegetation and soils over much of the Project site have been heavily disturbed by paddock levelling, grazing and clearing for agriculture. This is likely to reduce the potential for Aboriginal heritage places of significance in the affected areas. It is noted that field assessment is required to confirm this and that any Aboriginal heritage sites/items/etc. identified would be a moderate to high constraint, requiring impact mitigation.

7.2.2.1 Aboriginal consultation

Edify have consulted with the Bathurst LALC and provided information on the proposed Project. An initial call was shared 25 May 2023 to introduce the Edify Project Manager and the Brewongle Solar Farm site, followed by regular emails with Project updates. Edify briefly met with members of the Gunhigal Mayiny Wiradyuri Dyilang Enterprise in August 2023 to discuss the Project in its current phase and open up a line of communication to allow sharing of Project updates.

During the EIS phase, additional consultation with Aboriginal stakeholders would be undertaken in accordance with clause 80C of the *National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010* following the consultation steps outlined in the Aboriginal Cultural Heritage Consultation Requirements for Proponents provided by OEH/NSW Heritage. A summary of the consultation process includes:

1. Registration and initial consultation and registration of Aboriginal community members.
2. Review of survey methodology by Registered Aboriginal Parties (RAPs).
3. Completion of field work and reporting.
4. Review of report by RAPs.
5. Report finalisation.

7.2.2.2 Potential Impacts and Further Assessment

Construction has the potential to disturb unknown sites of Aboriginal cultural heritage significance. Impacts during operation and decommissioning are expected to be minimal.

An Aboriginal cultural heritage assessment report (ACHAR) and associated stakeholder consultation will be completed as part of the EIS. This would include further consultation with the Wiradjuri people as well as any other relevant stakeholders in accordance with the *Aboriginal Cultural Heritage Requirements for Proponents* (DECC 2010). Should any Aboriginal heritage sites be identified that may be potentially affected by the Project, mitigation measures will be determined in accordance with the *Guide to Investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH 2011).

The required mitigation measures will be implemented during construction activities through a specific Cultural Heritage Management Plan (CHMP) as part of the Construction and Environmental Management Plan (CEMP) that would be prepared for the Project. Similarly, any ongoing management and mitigation measures would be implemented through an Operational Environmental Management Plan (OEMP).

7.2.3 Access, Traffic and Transport

The preferred access route to the Impact Area is via Tarana Road, which is a designated Local Road Council asset. Further technical studies completed as part of the EIS, will investigate the utilisation of O'Connell Road (State listed road) and Tarana Road for accessing the site, to inform management measures to mitigate impacts to the environment or road users.

For additional intrastate logistics, which illustrate the approved highway networks between Bathurst and the Study Area, see Appendix E for the NSW Combined Higher Mass Limits (HML) and Restricted Access Vehicle (RAV) maps.

7.2.3.1 Potential Impacts and Further Assessment

During construction there will be a temporary increase in traffic along O'Connell Road and Tarana Road as components are brought to site and construction workers travel to/from the site. This will indirectly lead to some increase in localised noise levels during the main construction period. Traffic management during construction will also need to consider activities during key agricultural activities such as harvesting periods, peak tourism seasons and the associated vehicle movements and their timing. In addition, site access will require the establishment of a new access track to accommodate the delivery of materials to site.

Traffic impacts during operations will be minimal, with approximately five full-time staff at the Solar Farm. Traffic is predicted to be limited to employee vehicle movements for full-time staff, plus a small number of daily vehicle movements associated with ongoing maintenance and associated activities performed by local contractors/consultants.

During the decommissioning phase, a temporary increase in construction traffic would be expected as infrastructure is removed.

A detailed Traffic Impact Assessment (TIA) will be included as part of the EIS, implementing the SEARs requirements provided by Bathurst Regional Council and Transport for NSW Department. The TIA will identify the impacts and assess the significance of any impacts on the road network and community during construction, operation and decommissioning phases. The TIA will also consider the requirement for road upgrades, including turn treatments for main access off Tarana Road and potential intersection upgrades for O'Connell Road. The required mitigation measures would be implemented during construction and operational activities through implementation of detailed Traffic Management Plan (TMP) that would be prepared for the Project for each relevant phase.

7.2.4 Visual Amenity and Landscape Character

The Project has potential to result in visual impacts to neighbouring houses and traffic accessing Tarana Road or public users of the Main Western Railway line. However, the Project infrastructure is unlikely to be visible to road users accessing O'Connell Road. The site is located within an undulating rural area with large rural-homestead lots and lots for agricultural production.

There are 68 potentially sensitive receivers within 4km of the Study Area (Figure 11). The closest sensitive receptor is located approximately 625m south (R1) from the Study Area (Table 2). The intermittent tree cover on neighbouring properties as well as raised elevations to the north and east of the Study Area will act to limit long range views in the locality, in addition to the flat terrain of the Study Area itself.

A preliminary assessment has been undertaken to consider potential impacts of the development on public or private viewpoints, in line with Section 3.1 of the NSW Technical Supplement: Landscape and Visual Impact Assessment. In addition to this assessment, early development of viewshed analyses and project infrastructure 3D artistic impressions to support preliminary assessment and stakeholder communications was also completed. The Preliminary Assessment tool is used to identify where consultation with potentially affected landowners and local community should be focussed, and designed to eliminate the need to assess viewpoints that are likely to experience very low impacts. The assessment is based on the vertical and horizontal view that a development is likely to occupy when viewed from each viewpoint, influenced by distance, height elevation changes and width of a project. The tool identifies all viewpoints from public roads and rail lines within 2.5km and other public or private viewpoints from within 4km of the proposed development for assessment.

A ZTV analysis and reverse ZTV analysis were undertaken for the solar farm, as seen in Figures 4.1 and 4.2 of the Preliminary Landscape Visual Impact Assessment in Appendix K. The ZTV reveals a patchwork of visibility spanning across the extent of study area (4km from Project Impact Area), in response to the gently undulating terrain. Some key receivers not located within the viewshed include much of the Brewongle settlement, clusters of residences along O'Connell Road, and much of the Great Western Highway. The reverse ZTV analysis reveals that the southern and central portion of the Project is theoretically visible to a larger number of receivers when compared to the northern part of the Project. Due to this finding, Edify have sought to refine the Impact Area by establishing a setback distance from the southern extent of the Project, along Tarana Road, to minimise the potential impact and to provide over 625m setback from the nearest southern receivers. The ZTV analysis results were used as criteria for the preliminary visual assessment.

A preliminary visual assessment was undertaken in accordance with the approach and parameters outlined in the Preliminary Visual Impact Assessment (Appendix K). Of the 75 receivers included in the analysis, eleven (11) have been identified as requiring a detailed visual assessment as part of the EIS. Of the eleven receivers, ten (10) are private residences and one a public location along the Main Western Railway Line north of the Project.

It is noted that solar panels are designed to absorb as much sunlight as possible, with the use of anti-reflective coating boosting energy yield whilst decreasing normal incidence reflectance to less than 1% (generally 4% per Fresnel's equation, when anti-reflective coating is not used). They therefore reflect a very low percentage

of the light and are not considered likely to result in glare or reflections that would affect traffic or nearby receivers.

7.2.4.1 Further assessment

A detailed Landscape Character and Visual Impact Assessment will be undertaken as part of the EIS, which would include photomontages at viewpoints nominated by the Preliminary Landscape Visual Impact Assessment as requiring detailed assessment. The EIS would also consider the potential for the Solar Farm to affect local landscape character. Additional consultation following this report with specific affected residences would be undertaken to identify the nature and significance of impacts and the need for mitigation measures. The level terrain in the Study Area improves the potential effectiveness of vegetation plantings as screening around the site.

7.2.5 Noise

Existing background noise levels within and surrounding the Impact Area are likely to be low and typical of the rural setting. Sources of background noise would include vehicle use along O'Connell Road, Tarana Road and the Main Western railway line, in addition to equipment used on adjacent rural landholdings.

There are 68 potentially sensitive receivers within 4 km of the Impact Area (Figure 11). Noise impacts, for the most part, only occur during construction (generated by construction vehicles and machinery), with minimal noise likely to be generated during operation. Edify and the construction contractor will adopt best practice mitigation measures during construction such as standard work hours and regular vehicle and machinery maintenance to reduce the risk of adverse noise impacts.

During the operation of the Project, low level noise would be potentially produced by the solar tracking system, the substation and switchgear, battery (HVAC), and any maintenance works undertaken at the site. Noise impacts during operation of the Solar Farm are expected to be very low or, in any case, not expected to be discernibly different than those existing in the surrounding rural environment.

7.2.5.1 Further assessment

A construction and operational noise assessment would be undertaken as part of the EIS to assess potential noise impacts. The assessment would be undertaken in accordance with the *Interim Construction Noise Guideline* (DECC 2009) and *NSW Noise Policy for Industry* (NSW EPA 2017).

7.2.6 Land Use and Resources

The rural land within the region is used primarily for agricultural grazing and homesteads. The Impact Area comprises multiple large rural paddocks which has been largely cleared for pastures and grazing. Land and agricultural activities like those of the Study Area are widespread in the region.

There are no mining or exploration leases over the Study Area.

The *Mining, Petroleum, Production and Extractive Industries State Environmental Planning Policy 2007* (the Mining SEPP) extends across the Project. Part of the Study Area is classed as BSAL in the Mining SEPP Strategic Agricultural Land Map; BSAL has been described as land with high quality soil and water resources capable of sustaining high levels of productivity and is required to be assessed for projects involving mining or coal seam gas activities.

The land and soils are mapped as Class 3, with smaller portions of Class 2 under the *Land and Soil Capability Assessment Scheme* (OEH 2012), which has slight to moderate limitations for high impact land uses. Limitations can be managed by specialised management practices with a high level of knowledge, expertise, inputs, investments and technology. The Soils and Agricultural Assessment undertaken confirmed the Study Area mainly consists of Class 3, 4 and Class 5 land, with the smallest portion of land in the Study Area verified as Class 2 which is to be avoided by the solar farm infrastructure (Figure 10).

The intention for this Project site will be to retain the current 'agricultural' land use through a re-introduction of sheep grazing to the facility following a rest period after construction is completed. This intended co-location of agri-solar, has been introduced by Edify to the operational Gannawarra Solar Farm in Kerang[3], Victoria with an initial success of 500 head within approximately 125 hectares. Additional information can be found via Edify's website, with further elaboration provided by the Clean Energy Council[4]. As such, the quantity of sheep carrying capacity at Brewongle is likely to be greater than 500 head, which will be investigated further throughout the EIS planning phase.

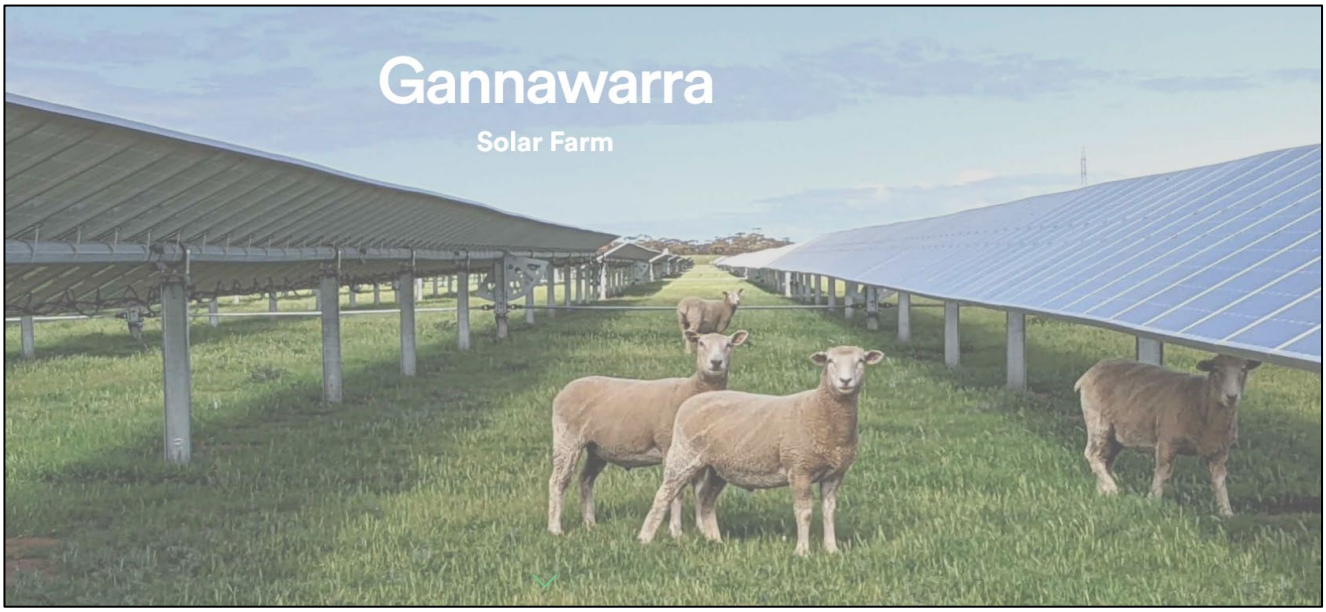

Figure 17 - Edify's Gannawarra Solar Farm with merino sheep

7.2.6.1 Further assessment

For the construction period, there would be a complete reduction in agricultural activities within the Impact Area. During the operational phase, not all agricultural activities would be precluded, as the colocation of sheep grazing is anticipated to continue. This would be further explored in the EIS and the Construction Environment Management Plan.

The Project would be decommissioned at the end of its operational life, removing all above and below-ground infrastructure. It is expected that the land would be returned to its prior production uses, as Solar Farms and battery projects typically do not have significant permanent impacts to soil and landform. Overall, the adverse impacts related to alienation of resources are expected to be low and restricted only to the period of operation.

The impact on agricultural production in the locality and region was determined to be low, temporary and limited to the Impact Area only. Further detail is provided in the Soils and Agricultural Impact Assessment (Appendix L).

7.2.7 Cumulative Impacts

Cumulative impacts, for the purpose of this assessment, relate to the combined potential effects of different types of impacts (e.g. traffic combined with noise, reduction in available accommodation, etc.) as well as the

[3] See Edify's Gannawarra Solar Farm and 'Agri-solar' practices, with 500 merino sheep

[4] See Clean Energy Council's 'Australian Guide to Agrisolar for Large-scale Solar Farms'

potential for combined impacts with other significant projects either under construction or already established land uses in the local area.

A review of the NSW Major Project database for the Bathurst Regional LGA and surrounding region was undertaken and identified the following major projects that may be relevant to the proposed Brewongle Solar Farm project.

Ongoing energy related proposals:

1. The proposed 60MW Glanmire Solar Farm, proposed by Elgin Energy, has submitted the EIS (SSD-21208499) and is currently in the response to submissions (and project amendment) phase. The project is ~2km north of the Study Area. Edify will monitor this project and will consider cumulative impacts.

2. The 100MW/200MWHr Panorama Battery Energy Storage System, proposed by Panorama BESS SubCo (Canadian Solar), is ~14km north-west of the Study Area. This Project has received SEAR's and is preparing an EIS (SSD-50587460). Edify will monitor this project and will consider cumulative impacts.

3. The Central West Pumped Hydro Project, involves 325 MW / 2,600 MWh pumped hydro energy storage and generation, proposed by ATCO Australia. This Project is approximately 8km south-east of the Study Area and is in the process of developing an EIS (SSD-32286107) under a Bilateral agreement between the Federal and NSW Government. Edify will monitor this project and will consider cumulative impacts.

4. The proposed 500MW Great Western battery energy storage facility, by Neoen Australia, has submitted an EIS (SSD-12346552) and is in the response to submissions stage. The project is ~35km east of the Study Area, located in the Lithgow City LGA. Edify will monitor this project and will consider cumulative impacts.

5. Tallawang Solar Farm is a 500MW Solar Farm with 200MW battery energy storage, proposed by RES Australia. The project is in response to submissions phase of the EIS (SSD-23700028) and is ~130km north of the Study Area. This project is not likely to utilise the same council resources and routes as the Brewongle Solar Farm, however the cumulative impacts will still be considered.

6. The Stubbo Solar Farm, proposed by UPC Renewables Australia, is a 400MW solar farm that received a determination on June 2021 for its EIS (SSD 10452). This project is ~130km north of the Study Area. This project is not likely to utilise the same council resources and routes as the Brewongle Solar Farm, however the cumulative impacts will still be considered. Edify understands that construction of the project has commenced and is likely to conclude before Brewongle construction efforts commence. Therefore it is unlikely that cumulative impacts will arise between the projects.

7. The McPhillamys Gold Project, owned by Regis Resources Limited, received an approved EIS in June 2019 [SVC-10008]. The Project referred to the NSW Independent Planning Commission in 2022 and was granted consent in March 2023. The Project is located approximately 30km to the west of the Study Area. Edify will continue to monitor and consider this project for potential cumulative impacts to the Project.

8. The Wallerawang Battery Energy Storage System, developed by Greenspot Wallerawang Pty Ltd, received an approved EIS in August 2022 (SSD-14540514). In January 2023, Shell Energy acquired the development rights associated with the permitted 500MW / 1000MWh BESS. The project is located approximately 50km east of the Study Area, within the Lithgow City LGA. Edify has assumed this project may commence construction around 2025-26, representing a significant and proximate

demand source that will complement the generation output of the proposed project. Edify will continue to monitor and consider this project for potential cumulative impacts to the Project.

It is unlikely that all projects will eventuate and/or enter the same construction period. Notwithstanding, Edify will continue to monitor and consider these projects for potential cumulative impacts to the Project.

7.3 Other Environmental Issues

There are a range of potential environmental issues associated with the Project which are not considered to be key issues. These are considered secondary issues for investigation, given the characteristics of the Project and the availability of appropriate safeguards for mitigation. These issues are outlined in Table 7 below. The impacts and any required mitigation relating to these issues would be addressed at an appropriate level of detail in the EIS, and in response to relevant requirements outlined in the SEARs.

Table 6 - Other Environmental Issues

Existing Environment	Potential Impacts	Management and Mitigation
Soils		
The nearest eSpade soils profiles (OEH, 2023) are 2 profiles ~6km West of the Study Area on the banks of the Macquarie River (Survey Number: *1000587*). This notes a soil type of alluvial, with moderately permeable and well-drained hydrology. The soils from 0 to 60cm depth range from silty loam to fine sandy clay loam, with massive structure and a neutral to lightly acidic pH as depth increases. The elevation at this site is similar to the Study Area, being about 700m. Soil profiles (numbers 176 and 177) from sites ~6km east along Timber Ridge Road at ~900m elevation (Survey Number: 1004750) noted siliceous sand. The hydrology of the soil is well drained, with coarse sand present until 45cm depth. A steady lightly acidic pH level is present as depth increases also.	Construction activities would include minor excavations and vegetation removal which have the potential to cause soil erosion and sedimentation and dust issues, if there is presence of pre-existing erosion and poor soil composition.	The design would provide all weather access at the site during construction and operation to avoid erosion/sedimentation impacts and tracking of soil, in particular after rain events. Soil surveys have been undertaken and an Agricultural Impact Assessment completed for the Scoping Report. Recommendations and mitigations will be highlighted in the EIS with thorough consideration of soil impacts, runoff and potential for erosion and proposed mitigation measures during construction and operation.
Historic Heritage		
A search of the Australian Heritage Database on 31 May 2023 identified no records in the Brewongle suburb of Bathurst Regional LGA. The closest records from the Australian Heritage Database are along the Great Western Highway in the suburbs of Glanmire and Walang, 5km and 6.5km away respectively. (Appendix F). *There are 2 registered Indigenous*	Edify considers there to be a low risk of impact to heritage items.	The heritage status of the site would be assessed during fieldwork undertaken as part of the archaeological assessment. Appropriate management measures would be implemented if required.

Existing Environment	Potential Impacts	Management and Mitigation
Places in the Bathurst LGA, which do not include a specific location. A search of the NSW state and local heritage register noted 369 heritage listings in Bathurst Regional Council LGA. Eight heritage listings under the LEP within the suburb of Brewongle, however none are within the Study Area (Appendix F).		
Contamination		
The EPA contaminated land register identified three contaminated sites within the Bathurst Regional LGA (Appendix G). These sites are more than 5km from the Study Area. Contamination associated with agricultural activities (e.g. pesticides, petrochemicals) or asbestos construction or insulation materials may still be present on the site.	There is potential that contaminants may be uncovered during excavation activities at the site.	Risks associated with contamination at the site are considered low and therefore no detailed investigation is likely to be required within the EIS. The mitigation measures would require a CEMP to be prepared to manage any contamination identified during site construction.
Air quality		
The air quality in the Study Area is expected to be good and typical of rural settings in NSW with low population density and few industrial pollution sources. Existing sources of air pollution are expected to include vehicle emissions, dust from industrial (mining) practices and smoke from seasonal stubble burning. During colder months, solid fuel heating may result in a	The construction of the Project is not anticipated to have a significant impact on air quality and would mostly be related to dust during dry periods and vegetation removal. Impacts to air quality during operation would be negligible.	The mitigation measures would require a CEMP to be prepared to manage air quality impacts during the construction phase. There is an opportunity to improve local air quality by maintaining ground cover vegetation under the panels. Water tanks will also be utilised during the Project's construction phase, in order to suppress potential dust impacts.

Existing Environment	Potential Impacts	Management and Mitigation
localised reduction in air quality, particularly if temperature inversions operate overnight.		
Hazard and risk – electric and magnetic fields (EMF)		
Existing powerlines produce EMF at the site. Additional infrastructure which forms part of the Project such as connecting powerlines and substation would produce additional electromagnetic emissions at the site.	The substation, battery storage and network connection would be located in the Impact Area. The powerlines constructed as part of the Project would not pass through any neighbouring properties. The EMF that would be generated by the proposed powerlines, battery storage and substation is expected to be below the guideline for public exposure and would not be expected to have an adverse impact on human health.	The EMF levels of the proposed powerlines, battery storage and substation would be assessed as part of the EIS.
Battery storage is proposed to integrate with the Solar Farm's solar PV generator	Batteries pose a potential fire or contamination risk to the site.	An assessment of hazard and risk would be assessed in the EIS as per SEPP 33 – Hazardous and Offensive Development. A Preliminary Hazards Assessment would be undertaken to assess SEPP 33 requirements. Proactive engagement with both Rural Fire Service NSW and NSW Fire & Rescue will be undertaken during the EIS preparation phase.
Hazard and risk - bushfire		
The Impact Area has been predominantly cleared for agriculture. The site has not been identified as being within a bushfire prone area on NSW Rural Fire Service mapping (Appendix H).	The Project is unlikely to be affected by bushfire or pose a significant bushfire risk.	In addition to the Preliminary Hazards Assessment described above, the impacts and risks of a bushfire or gas explosion or leak would be assessed in the EIS. Risk of fire from

Existing Environment	Potential Impacts	Management and Mitigation
		proposed infrastructure will also be addressed in the EIS.
Social and economic impacts		
The Project is located within the Bathurst Regional Council's LGA. In 2021 the Bathurst LGA had a population of 36,230. The main industries of employment include: health and aged care, government and agriculture. Workforce accommodation would be required for approximately 250 workers during peak construction periods. A large majority of these would already reside locally. For visiting workers, accommodation can be sought from Bathurst, Orange or other towns within a 100 km radius. Edify will monitor and engage with hospitality and accommodation facilities and monitor if there is community concern that the Project will reduce agricultural employment in the area for the life of the Project and put current employers out of work.	The Project may temporarily reduce the availability of agricultural land, but would generate economic benefits during construction and operation, including local direct and indirect employment opportunities outside of agricultural activities. Other socio-economic impacts would include traffic and access, noise, air quality and visual impacts. From a positive standpoint, the development of new electricity generation that is located proximate to industrial (mining) loads will be of benefit to the mining sector, which is a major employment sector for the region.	The EIS would assess potential social and economic impacts of the Project, such as engaging with local accommodation providers, local Chamber of Commerce, hospitality providers and local members of the community.
Utilities		
Transmission Network Service Provider (TNSP) Transgrid and Distribution Network Service Provider (DNSP) Essential Energy, manage and operate the high voltage electricity network in this region of NSW. Both Transgrid and Essential Energy have restrictions on development within powerline easements. For	The proposed works would involve works adjacent to the Transgrid utility. The Solar Farm proposes to connect to the TransGrid electricity network.	The EIS would assess the Project against the setback and approval requirements of Transgrid. The Solar Farm would be designed to comply with required setback, approval and consultation requirements of both network operators.

Existing Environment	Potential Impacts	Management and Mitigation
example, Transgrid guidelines state that activities and encroachments are prohibited within a transmission line easement, including 'the installation of fixed plant or equipment', and 'the placing of obstructions within 30 metres of any part of a transmission line structure or supporting guy wire'. Roads or tracks within 20 metres of the centreline of a transmission line 132 kV are prohibited, although roads that cross the transmission line as a thoroughfare may be permitted.		
Waste Management		
The Project would generate several waste streams and utilise a variety of materials during the construction phase.	During construction, general office and refuse materials would be generated as waste. Packaging from panels and other components would require disposal. Limited operational waste would be associated with the Project.	A Concept Waste Management Plan would be incorporated into the CEMP, applying the principles to avoid, re-use and recycle to minimise wastes. Whilst efforts have been taken to limit the quantity of vegetation disturbance, any cleared trees would be repurposed as fauna habitat where possible. Excavated soils for facilities and cable trenches would be re-used to level areas of depressions or rehabilitate any degraded areas on site.
Watercourses and Hydrology		
One minor creek is mapped within the South-western portion of the Study Area that splits into two branches. Aerial mapping shows these waterlines have been	The Project does not include the extraction of groundwater; however, contamination from construction operations could impact on the	The EIS would assess the impacts to hydrology during construction and operation and include a

Existing Environment	Potential Impacts	Management and Mitigation
highly modified with farm dams created within the water path. The PEA noted these ephemeral watercourses were no longer present in the remnant form and likely only acted as drainage lines. Saltwater Creek is mapped as perennial and straddles the northern boundary of the Study Area. Saltwater Creek, part of the Murray Darling Basin North, is mapped as Key Fish Habitat by the Department of Primary Industries – Fisheries. Development is not proposed within this watercourse, however temporary access within it may be required to support the overhead connection of the Solar Farm into the Transgrid line. The PEA noted Saltwater Creek to have minimal, exotic riparian vegetation with only small pools of water. The banks were highly degraded and eroding, likely due to stock traversing the watercourse. Artificial dams occur within the subject land. One was nearly dry and has no wetland vegetation surrounding it making it primarily suitable for foraging birds. Similarly, the second dam held no surrounding native vegetation but was holding more water and is a likely water source for various transient native fauna. The Bureau of Meteorology Atlas of Groundwater Dependent Ecosystems identifies low-potential terrestrial GDE's north-east of the Study Area associated with patches of PCT 3376. Saltwater Creek is mapped as a high-potential aquatic GDE.	quality of groundwater if adequate mitigation measures are not taken. The Project may require temporary access through Saltwater Creek to facilitate the connection of the Project substation into the transmission line. The Project may remove the artificial farm dams as part of detailed design of the facility.	flood impact assessment and appropriate mitigation measures as required. The dams within the site will be retained. Access across Saltwater Creek would factor in all requirements of DPI-Fisheries and DPIE.

8 CONCLUSION

The Preliminary Ecological Assessment has outlined the proposed Brewongle Solar Farm and established the environmental and planning context of the Project. The Project would be assessed under State Environmental Planning Policy (Planning Systems) 2021 (Planning Systems EPP).

The report has been prepared to assist the development of the SEARs for the Project, which will guide the preparation of the EIS. The report identifies the following key environmental issues associated with the Project, based on the preliminary investigations:

- Biodiversity
- Aboriginal Heritage
- Access, Traffic and Transport
- Visual amenity & Landscape Character
- Noise
- Agricultural Impact Assessment
- Land use and Resources; and
- Cumulative Impacts

These aspects will be assessed in detail in the EIS. It is likely that other issues such as soil values, traffic impacts and natural hazards can be readily addressed by appropriate mitigation and management measures. The relevance and importance of issues would be reviewed throughout the EIS process.

9 References

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Appendix A Scoping Report Summary

Level of Assessment	Matter	CIA	Engagement	Relevant government plans, policies, and guidelines	Scoping report reference
Detailed					
	Biodiversity	Y	General	• Biodiversity Assessment Method (DPIE 2020) • Commonwealth EPBC 1.1 Significant Impact Guidelines – Matters of National Environmental Significance (Commonwealth of Australia, 2013); • Commonwealth EPBC 1.2 Significant Impact Guidelines – Actions on, or Impacting upon Commonwealth Land and Actions by Commonwealth Agencies (Commonwealth of Australia, 2013); • Commonwealth Department of the Environment – Survey Guidelines for Nationally Threatened Species (various);	Section 7.3
	Heritage – Aboriginal	Y	Specific	• Guide to investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011); • Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010); • Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010);	Section 7.2.2
	Traffic	Y	Specific	• *Guide to Traffic Management – Part 3 Traffic Studies and Analysis* (Austroads, 2013)	Section 7.2.3
	Amenity - Visual	N	Specific	• *Technical Supplement- Landscape and Visual Impact Assessment. Large- scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022)	Section 7.2.4

				• Guidance Note for Landscape and Visual Assessment (Australian Institute of Landscape Architects 2018).	
	Hazards and risks	No	Specific	• Hazardous Industry Planning Advisory Paper No. 6 – Guideline for Hazard Analysis (DoP, 2011a); • Multi-Level Risk Assessment (DoP, 2011b); • Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (DoP 2011);	Section 7.3
Standard					
	Amenity – Noise and vibration	Yes	General	• NSW Interim Construction Noise Guideline (DECC 2009); • NSW Noise Policy for Industry (EPA 2017); • NSW Road Noise Policy (DECCW 2011); and • Assessing Vibration: A Technical Guideline (DECC 2006)	Section 7.2.5
	Stakeholder Engagement	Yes	Specific	• Social Impact Assessment Guideline for State Significant Projects 2022 (DPIE 2022)	Section 6.0
	Heritage – Historical	Yes	General	• Historical Archaeology Code of Practice (Heritage Council 2006)	Section 7.3
	Land resources	No	General	• Land Use Conflict Risk Assessment Guideline (DPI 2011) • Managing Land Contamination: Planning Guidelines State Environmental Planning Policy No 55 Remediation of land (Department of Urban Affairs and Planning and Environment Protection Authority, 1998)	Section 7.2.6
	Water resources	No	General	• Managing Urban Stormwater: Soils and Construction Volume 1 (Landcom, 2004) • Managing Urban Stormwater: Soils and Construction Volume 2 (Department of Environment and Climate Change, 2008);	Section 7.3

				• Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC / ARMCANZ, 2000); • Guidelines for instream works on waterfront land (NOW 2012) • Guidelines for riparian corridors on waterfront land (NOW 2012) • Guidelines for watercourse crossings on waterfront land (NOW 2012)	
	Air quality	No	General	• N/A	Section 7.3

Appendix B Social Impact Assessment (SIA) Scoping Worksheet

Appendix C Consultation Records

Neighbouring Landholders (4km)

Receiver	Distance From Site (m)	Engagement Comments
R1	625	Provided introductory letter, Project details, map and FAQ's. Project Manager shared phone conversation and email with family member of landholder (son), requesting further engagement from family at earliest convenience.
R2	745	Provided introductory letter, Project details, map and FAQ's. Phone conversation shared noting general concerns and objection, wanting to understand why the other portion of landholder's property was not selected.
R3	772	Provided introductory letter, Project details, map and FAQ's. Phone conversation shared general concerns and objection, particularly regarding co-location with sheep grazing and visual impacts associated with project.
R4	778	Provided introductory letter, Project details, map and FAQ's. Project Manager notes that property recently conducted a sale process (auction), with settlement pending as of November 2023. Project Manager has contacted Agent responsible for administering auction and settlement process. Agent has been requested to provide Edify's details to seller and potential incoming buyer.
R5	807	Provided introductory letter, Project details, map and FAQ's. Phone conversation shared general concerns, seeking project infrastructure to be set back from lot boundary fenceline, rather than setback distances considered from residential location.
R6	1149	Provided introductory letter, Project details, map and FAQ's. Phone conversation shared general concerns regarding continual development proposals in the Glanmire and Brewongle region. Advised that substantial effort has been undertaken to scrutinise prior solar farm proposals in region.
R7	1195	Provided introductory letter, Project details, map and FAQ's. Phone number does not appear in public domain. Neighbouring residents have been unable to provide private contact details for this residence.
R8	1241	Provided introductory letter, Project details, map and FAQ's. Project Manager has attempted contact via online social media (LinkedIn).
R9	1276	Provided introductory letter, Project details, map and FAQ's. Mobile number identified appears to be disconnected. Project Manager to continue to establish contact with landholder.
R10	1394	Provided introductory letter, Project details, map and FAQ's. Phone conversation shared, requesting general details on potential impact to surrounding land values. Email also reshared introductory letter, FAQ.
R11	1406	Provided introductory letter, Project details, map and FAQ's.
R12	1432	Provided introductory letter, Project details, map and FAQ's.

		Phone conversation and provision of personal email to be kept up to date with Project planning.
R13	1472	Provided introductory letter, Project details, map and FAQ's.
R14	1542	Provided introductory letter, Project details, map and FAQ's.
R15	1550	Provided introductory letter, Project details, map and FAQ's.
R16	1581	Provided introductory letter, Project details, map and FAQ's.
R17	1619	Provided introductory letter, Project details, map and FAQ's.
R18	1641	Provided introductory letter, Project details, map and FAQ's.
R19	1648	Provided introductory letter, Project details, map and FAQ's.
R20	1649	Provided introductory letter, Project details, map and FAQ's.
R21	1649	Provided introductory letter, Project details, map and FAQ's.
R22	1651	Provided introductory letter, Project details, map and FAQ's.
R23	1668	Provided introductory letter, Project details, map and FAQ's.
R24	1678	Provided introductory letter, Project details, map and FAQ's.
R25	1686	Provided introductory letter, Project details, map and FAQ's.
R26	1737	Provided introductory letter, Project details, map and FAQ's.
R27	1771	Provided introductory letter, Project details, map and FAQ's.
R28	1860	Provided introductory letter, Project details, map and FAQ's.
R29	1888	Provided introductory letter, Project details, map and FAQ's.
R30	1979	Provided introductory letter, Project details, map and FAQ's.
R31	2001	Provided introductory letter, Project details, map and FAQ's.
R32	2006	Provided introductory letter, Project details, map and FAQ's.
R33	2074	Provided introductory letter, Project details, map and FAQ's.
R34	2111	Provided introductory letter, Project details, map and FAQ's after sharing phone conversation.
R35	2178	Provided introductory letter, Project details, map and FAQ's.
R36	2230	Provided introductory letter, Project details, map and FAQ's.
R37	2275	Provided introductory letter, Project details, map and FAQ's.
R38	2285	Provided introductory letter, Project details, map and FAQ's.
R39	2363	Provided introductory letter, Project details, map and FAQ's.
R40	2369	Provided introductory letter, Project details, map and FAQ's.
R41	2508	Provided introductory letter, Project details, map and FAQ's.
R42	2520	Provided introductory letter, Project details, map and FAQ's.
R43	2536	Provided introductory letter, Project details, map and FAQ's.
R44	2609	Provided introductory letter, Project details, map and FAQ's.
R45	2647	Provided introductory letter, Project details, map and FAQ's.

R46	2658	Provided introductory letter, Project details, map and FAQ's.
R47	2758	Provided introductory letter, Project details, map and FAQ's.
R48	2828	Provided introductory letter, Project details, map and FAQ's.
R49	2837	Provided introductory letter, Project details, map and FAQ's.
R50	3102	Provided introductory letter, Project details, map and FAQ's.
R51	3115	Provided introductory letter, Project details, map and FAQ's.
R52	3173	Provided introductory letter, Project details, map and FAQ's.
R53	3180	Provided introductory letter, Project details, map and FAQ's.
R54	3297	Provided introductory letter, Project details, map and FAQ's.
R55	3328	Provided introductory letter, Project details, map and FAQ's.
R56	3334	Provided introductory letter, Project details, map and FAQ's.
R57	3369	Provided introductory letter, Project details, map and FAQ's.
R58	3432	Provided introductory letter, Project details, map and FAQ's.
R59	3447	Provided introductory letter, Project details, map and FAQ's.
R60	3483	Provided introductory letter, Project details, map and FAQ's.
R61	3733	Provided introductory letter, Project details, map and FAQ's.
R62	3789	Provided introductory letter, Project details, map and FAQ's.
R63	3808	Provided introductory letter, Project details, map and FAQ's.
R64	3844	Provided introductory letter, Project details, map and FAQ's.
R65	3511	Provided introductory letter, Project details, map and FAQ's.
R66	3223	Provided introductory letter, Project details, map and FAQ's.
R67	3600	Provided introductory letter, Project details, map and FAQ's.
R68	3577	Provided introductory letter, Project details, map and FAQ's.

Bathurst Local Aboriginal Land Council

From: Patrick Dale
To: Tonilee Scott
Subject: RE: Edify Energy- Brewongle Solar Farm - Updates
Date: Tuesday, 22 August 2023 9:22:04 PM
Attachments: image579478.png
image050043.png
image197946.png
image099123.png
image538959.png
image733298.png
image611044.png

Sounds good. See you tomorrow afternoon.

Patrick Dale

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From: Tonilee Scott <CEO@Bathurstlalc.com>
Sent: Tuesday, August 22, 2023 6:27 PM
To: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: Re: Edify Energy- Brewongle Solar Farm - Updates

Hi Patrick,

I'll be in the office until 10:30 tmoz or after 1 if you wanted to pop in

Sent from my iPhone

> On 22 Aug 2023, at 4:29 pm, Patrick Dale <Patrick.dale@edifyenergy.com> wrote:
>
> Good afternoon Tonilee,
>
> As a reminder, Alyx and I will be in Bathurst tomorrow afternoon, as well as Thursday 24th August. We hope to visit your office and share a coffee and quick introduction if your schedule permits.
>
> Please let us know if you have time for a 30min catch up.
>
> Best wishes,

Patrick Dale

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From: Patrick Dale <Patrick.dale@edifyenergy.com>
Sent: Friday, July 28, 2023 3:14 PM
To: ceo@bathurstlalc.com
Cc: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Subject: FW: Edify Energy- Brewongle Solar Farm - Updates

Good afternoon Tonilee,

Pleased to meet you, albeit via mail. I hope this mail finds you well.

In the emails below, my colleague, has attempted to contact your office recently regarding a new Solar Farm development opportunity that Edify Energy is exploring in the Bathurst region (315 Tarana Road, Brewongle). We received your 'ceo' email details from Bathurst Council today, as we were unsure if the below mail was sent to the correct address.

As Alyx mentioned below, we will be travelling to Bathurst on *Wednesday 23rd August* and welcome the chance to meet with you for a coffee and introduction. If you prefer, we could share a call at an alternative time to discuss the attached details further. We are in the very early stages of planning, so thought it a great opportunity to share our intentions with you before our planning application and survey efforts commence. We hope to lodge a planning application (environmental impact statement) to the NSW Department of Planning in late 2024 and hope to understand your local perspective and experiences during this early phase of engagement.

We look forward to hearing from you and welcome a chance to introduce our proposed development to you and the Bathurst LALC.

Best wishes and enjoy the weekend,

Patrick Dale

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From: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Sent: Monday, July 24, 2023 11:51 AM
To: bathlalc2@bigpond.com
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: RE: Edify Energy- Brewongle Solar Farm - Updates

Good Morning,

Hope the first half of the year has been treating the Bathurst LALC well.

I first shared a call and reached out in May then June to discuss the Brewongle Solar Farm Project Edify Energy are proposing near Bathurst. We have progressed this Project and will look to lodge the Scoping Report with the Department of Planning and Environment in September 2023.

We will be presenting this Project to the Bathurst council on August 23rd in-person and would like to drop in to your local office to meet the team and discuss the Project updates further.

Feel free to contact me for any queries.

Alyx Vandermast
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From: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Sent: Thursday, June 15, 2023 10:46 AM
To: bathlalc2@bigpond.com
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: RE: Edify Energy- Brewongle Solar Farm Introduction and Information

Good Morning,

As an update for the Brewongle Project, following on from the email below, the Project has commenced preliminary technical studies (Ecological and Soils) to support the Scoping Report. We are also planning out early community engagement for the coming months.

I am reaching out just to follow up if there were any queries on the Project based on the information provided, and if the Bathurst LALC would be interested in an online call or meeting for introductions in July?

Feel free to contact me if this is possible,

Alyx Vandermast

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From: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Sent: Thursday, May 25, 2023 4:46 PM
To: bathlalc2@bigpond.com
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: Edify Energy- Brewongle Solar Farm Introduction and Information

Good Afternoon,

I am excited to introduce a new opportunity we are pursuing in the Bathurst LALC area - the Brewongle Solar Farm.

By way of background, I work as the Project Development Manager at Edify Energy, an Australian owned Independent Power Producer that has successfully delivered around $1.7 billion of solar and battery projects across Australia, with our most recent success also within regional New South Wales. This includes:

1. one of the largest solar farms in Australia, located in Darlington Point (NSW);
2. the largest battery project in NSW, which completed construction last month;
3. four large solar farms in northern Queensland (Collinsville, QLD); and
4. the first and only hybrid solar + battery project in Australia, at Gannawarra (VIC).

We recognise the Wiradjuri People as the largest Aboriginal party in NSW and have collaborated with several Local Aboriginal Land Councils within Wiradjuri country, such as Forbes and Narromine.

I shared a brief call this morning with Toni to introduce myself and the Project, so I am following up that call to provide additional context to support your understanding of the Project. The attached documents include:

1. Concept Brewongle Solar Farm Site Map
2. Brewongle Solar Farm FAQ's
3. Presentation about Edify Energy

The Brewongle Solar Farm is in the Brewongle suburb of Bathurst Regional Local Government Area, approximately 12 kilometres (km) South-east of Bathurst. Site access is likely to be via an existing access off Tarana Road, via O'Connell Road. At this stage, the project is anticipated to have a rating of approximately 100MW solar PV generation capacity, coupled with an integrated battery energy storage system with approximately 100MW/200MWh energy storage capacity.

At this point we are only in the early stages of planning, compiling a Scoping Report and undertaking early engagement with the surrounding community.

I am hoping to visit Bathurst and meet with yourself in person over the coming months, with a plan to lodge the scoping report in September.

Looking forward to hearing from you and building a relationship throughout the development of this Project,

Alyx Vandermast

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Bathurst Regional Council

From:	Patrick Dale
To:	David Flude; neil.southorn@bathurst.nsw.gov.au
Cc:	Alyx Vandermast
Subject:	Brewongle SF - Councillor Presentation and Introduction
Date:	Friday, 25 August 2023 5:11:09 PM
Attachments:	image470541.png image658053.png image459321.png image606065.png image044651.png image603700.png image298280.png Artistic Impression Locations - Aug 2023.pdf

Hi Davi, Neil,

Alyx and I wanted to thank you and Council again for allowing us to present the Brewongle SF opportunity to you on Wednesday.

Regarding the computer generated and indicative views of the project, we are happy to share this with you both but intentionally did not provide these images for wider audiences, as they are conceptually only and have not been created based on more accurate photomontages, which we will undertake in 2024 as part of the Environmental Impact Statement. Please see the **attached** Artist Impressions from x3 viewpoints surrounding the proposal.

We greatly enjoyed spending time in Bathurst, visiting the site, meeting the LALC, Wiradjuri Elders and associates at Charles Sturt University, as well as sharing a lunch with the project's ongoing landholder. These and other local engagements are invaluable and we look forward to continuing this effort over the coming months.

Best wishes,

Patrick Dale

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From:	Patrick Dale
To:	neil.southorn@bathurst.nsw.gov.au; richard.denyer@bathurst.nsw.gov.au; daniel.dwyer@bathurst.nsw.gov.au; David Flude
Cc:	Alyx Vandermast
Subject:	Brewongle Solar Farm - Pre-lodgement meeting - Edify Energy
Date:	Tuesday, 8 August 2023 5:25:00 PM
Attachments:	image821981.png image044429.png image569203.png image958454.png image020687.png image028618.png image702923.png Edify Energy - Brewongle SF - Pre-Lodgement Meeting - Aug 2023.pdf

Good evening all,

Alyx and I look forward to sharing a discussion with you all tomorrow. Ahead of this, please see **attached**.

This includes background on Edify Energy, with slides 8-16 focused on details specific to our proposal.

In addition, we can discuss further details during my time with you on 23rd August, during the *Bathurst Council Working Party*.

Best wishes,

Patrick Dale

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State and Federal MP

From:	Alyx Vandermast
To:	andrew.gee.mp@aph.gov.au
Cc:	Patrick Dale
Subject:	FW: Brewongle Solar Farm - Edify Energy"s New Project Introductions - State Significant Development
Date:	Thursday, 14 September 2023 10:32:31 AM
Attachments:	image163246.png image275752.png image389148.png image402833.png image936969.png image329891.png image866261.png image149502.png image091840.png image503299.png image949642.png image552247.png image526218.png Edify Energy - Brewongle SF - Pre-Lodgement Meeting - Aug 2023 (1).pdf

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To the Honourable Andrew Gee,

I am sending a follow up email regarding the below email and Edify's Brewongle Solar Farm project in the Bathurst region.

In speaking with a member of your office in July, we understood your availability for an introductory meeting was very limited and likely still is. In lieu of a meeting, could we request an acknowledgement on the information below and the original presentation (re-attached with updated information), before looking to arrange a meeting in the new year following our submission to the Department of Planning and Environment.

We look forward to hearing from you.

Alyx Vandermast

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From: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Sent: Monday, July 10, 2023 1:25 PM
To: andrew.gee.mp@aph.gov.au
Cc: Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: Brewongle Solar Farm - Edify Energy's New Project Introductions - State Significant Development

To the Honourable Andrew Gee,

I hope you and your office have enjoyed the first half of 2023.

I am writing to advise that Edify Energy have commenced planning efforts for the Brewongle Solar Farm project, located in your electorate and specifically in the suburb of Brewongle, approximately 12km southeast of Bathurst. The Brewongle Solar Farm is a State Significant Development which will provide significant and complementary benefits to regional NSW.

By September 2023, we aim to lodge the *Brewongle Solar Farm's* Scoping Report with NSW DPE. This Scoping Report helps to inform the preparation of our Planning Application throughout the remainder of 2023 and into 2024, as we aim to commence construction in 2026.

In summary, the *Brewongle Solar Farm* project will have the technical ability to:

- Improve the resilience of regional NSW power system
- Expand the flexible and dispatchable electricity supply with up to 100MW solar generation and storage capacity,
- Improve energy security for the Bathurst region, and
- Support the NSW State Government's Electricity Strategy

From a commercial and community standpoint, the hybrid solar + battery project aims to:

- Invest approx. $250m in Capital Expenditure
- Employ approx. 250 direct and indirect staff during construction
- Employ approx. 8 direct and indirect staff during operation
- Support and finance Bathurst Council initiatives each year, via a Voluntary Planning Agreement; and
- Establish a Community Benefit Fund that supports local initiatives each year

To underpin the development, we recently secured around 299 hectares of land under an Option to Lease, with the extensively cleared land currently used largely for grazing and cropping. The property also hosts a TransGrid 132kV transmission line (see **attached** slide 10) in its Northern portion. We believe the site is well suited to comply with the *2022 NSW Large Scale Solar Energy Guidelines* and expect the growing electricity demands in regional NSW will be supportive of this generation and storage investment.

We understand you are busy and although we would prefer a meeting prior to our submission of the Scoping Report in September, we would welcome a meeting following the submission to suit your availabilities. In the absence of a meeting, we have attached a presentation introducing Edify Energy and the Brewongle Solar Farm and welcome your thoughts on the details provided.
In addition, we will also be presenting to key stakeholders such as Bathurst Local Aboriginal Land Council, Bathurst Regional Council and Hon. Paul Toole (MP).

We look forward to hearing from you.

Alyx Vandermast

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Edify Energy

From: Patrick Dale
To: Paul.Toole@parliament.nsw.gov.au
Subject: RE: Response - Office of Paul Toole MP
Date: Wednesday, 27 September 2023 9:38:09 AM
Attachments: image001.png
image002.png
image003.png
image004.png
image005.png
image006.png
image709120.png
image736202.png
image580152.png
image561159.png
image192291.png
image295224.png
image500766.png

Good morning Minister,

Please let me know if you wish to reschedule our meeting this morning (9:30am).

As a suggestion, we'd be happy to reschedule for anytime this Friday 29th. Please feel free to suggest an alternative time.

With thanks,

Patrick Dale
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From: ElectorateOffice Bathurst <ElectorateOffice.Bathurst@parliament.nsw.gov.au>
Sent: Thursday, August 31, 2023 9:52 AM
To: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Subject: RE: Response - Office of Paul Toole MP

Happy to arrange meeting in September to hear your proposal, but once again I reiterate I will stand by my communities concerns which have been highlighted since you've sent your letter out to residents.

Please contact my office to arrange a meeting.

Yours sincerely

Paul Toole MP
Member for Bathurst
1/229 Howick Street
BATHURST NSW 2795
Phone: 02 6332 1300

From: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Sent: Wednesday, 30 August 2023 9:29 AM
To: ElectorateOffice Bathurst <ElectorateOffice.Bathurst@parliament.nsw.gov.au>
Cc: Jan Hudson <Jan.Hudson@parliament.nsw.gov.au>; Patrick Dale <Patrick.dale@edifyenergy.com>
Subject: RE: Response - Office of Paul Toole MP

To the Honourable Mr Paul Toole,

We would welcome an opportunity to discuss the community views and concerns at a suitable time in September, as engagement with the surrounding Brewongle community and the wider Bathurst stakeholders is a high priority for the Project. Edify would also welcome sharing the planning updates for the Project, including findings from the initial technical studies, such as the Land and Agricultural Impact Assessment. In addition, we have also prepared a preliminary Landscape Viewshed Analyses in an attempt to represent the potential visual impacts to neighbouring landholders. We have chosen to 'front end' some of the potentially contentious technical studies, not only for the preparation of the Scoping Report that will be submitted to NSW Dept. of Planning and Environment, but also to guide our continuing discussions and considerations with the local community.

Alyx Vandermast
M +61 488 059 812

Edify Energy
Queensland
Gurrumbilbarra Country
www.edifyenergy.com

From: Jan Hudson <Jan.Hudson@parliament.nsw.gov.au>
Sent: Thursday, July 13, 2023 10:47 AM
To: Alyx Vandermast <alyx.vandermast@edifyenergy.com>
Subject: Response - Office of Paul Toole MP

Alyx Vandermast
Edify Energy

By Email: alyx.vandermast@edifyenergy.com

Dear Alyx,

Thank you for your recent email outlining the Edify Energy proposal for a solar farm at Brewongle.

Please note that in moving forward with this proposal, I will be representing the views of my community that may be forthcoming.

Yours Sincerely
Paul Toole MP
Member for Bathurst

Appendix D AHIMS Searches

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : Brewongle
Client Service ID : 767666

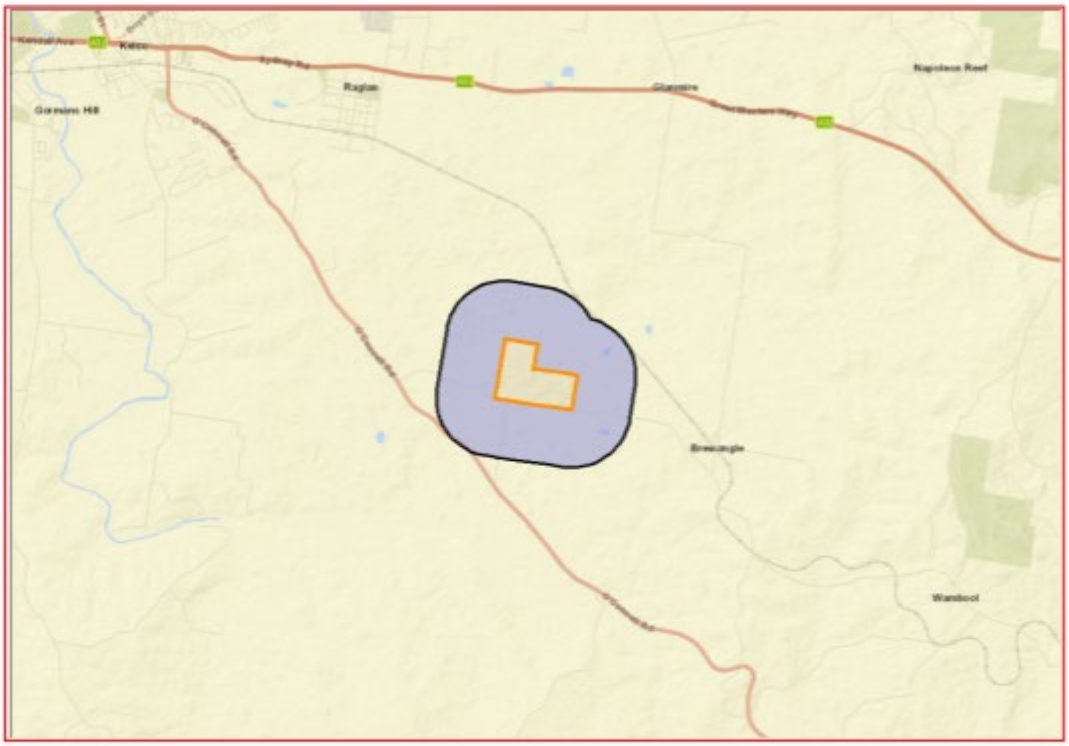
Patrick Dale
Charlotte Street Brisbane
Brisbane Queensland 4000
Attention: Patrick Dale
Email: patrick.dale@edifyenergy.com

Date: 27 March 2023

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 1, DP:DP1206130, Section : - with a Buffer of 1000 meters, conducted by Patrick Dale on 27 March 2023.

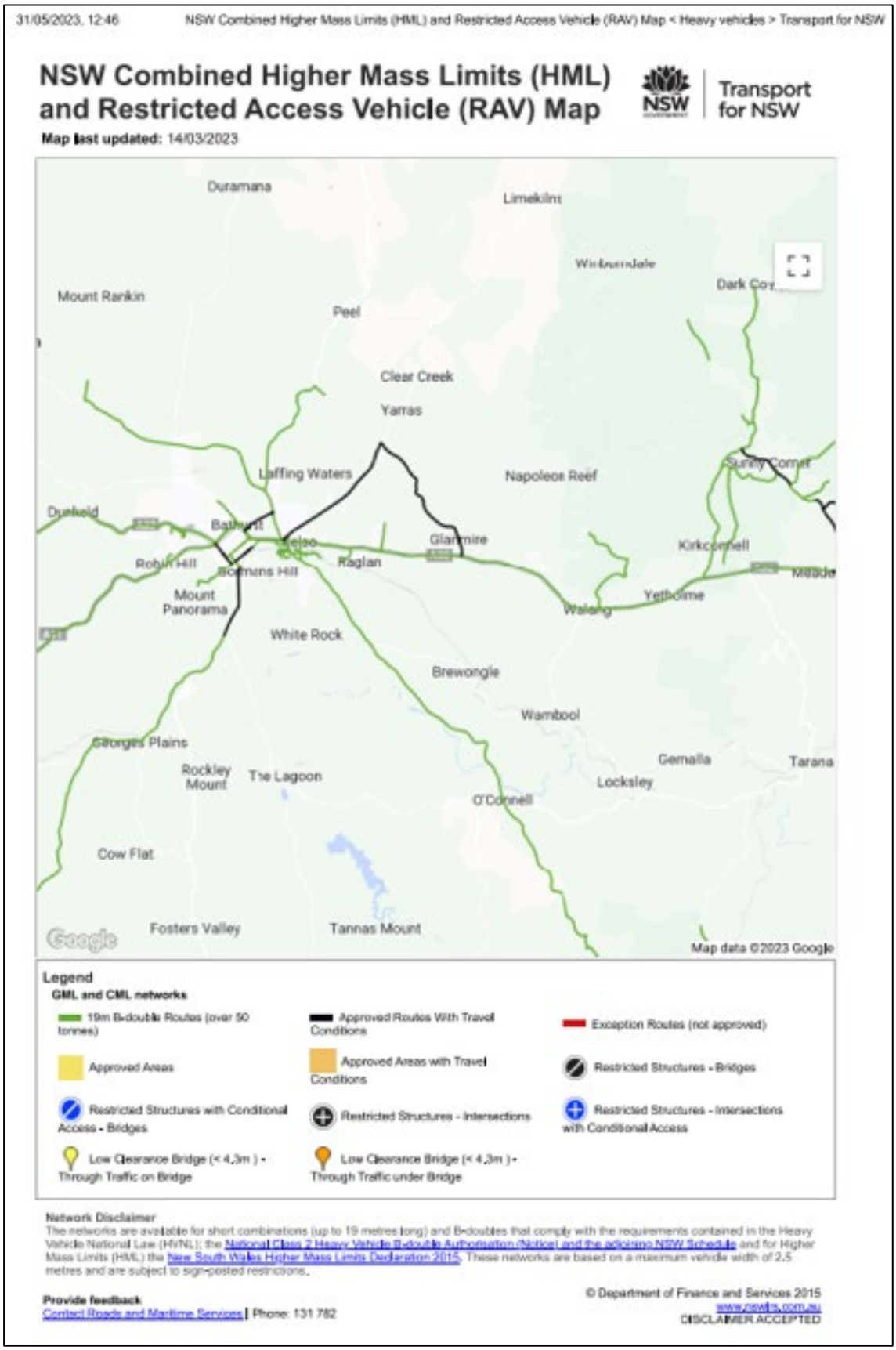
The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

Appendix E NSW Transport map – for potential access route/s to site



NSW Combined Higher Mass Limits (HML) and Restricted Access Vehicle (RAV) Map

Transport for NSW

Map last updated: 14/03/2023

Legend

HML network

- 25/26m B-double Routes
- Approved Routes With Travel Conditions
- Exception Routes (not approved)
- Restricted Structures - Bridges
- Restricted Structures with Conditional Access - Bridges
- Restricted Structures - Intersections
- Restricted Structures - Intersections with Conditional Access

Network Disclaimer

The networks are available for short combinations (up to 19 metres long) and B-doubles that comply with the requirements contained in the Heavy Vehicle National Law (HVNL): the National Class 2 Heavy Vehicle B-double Authorisation (Notice) and the adjoining NSW Schedule and for Higher Mass Limits (HML) the New South Wales Higher Mass Limits Declaration 2015. These networks are based on a maximum vehicle width of 2.5 metres and are subject to sign-posted restrictions.

Provide feedback

Contact Roads and Maritime Services | Phone: 131 782

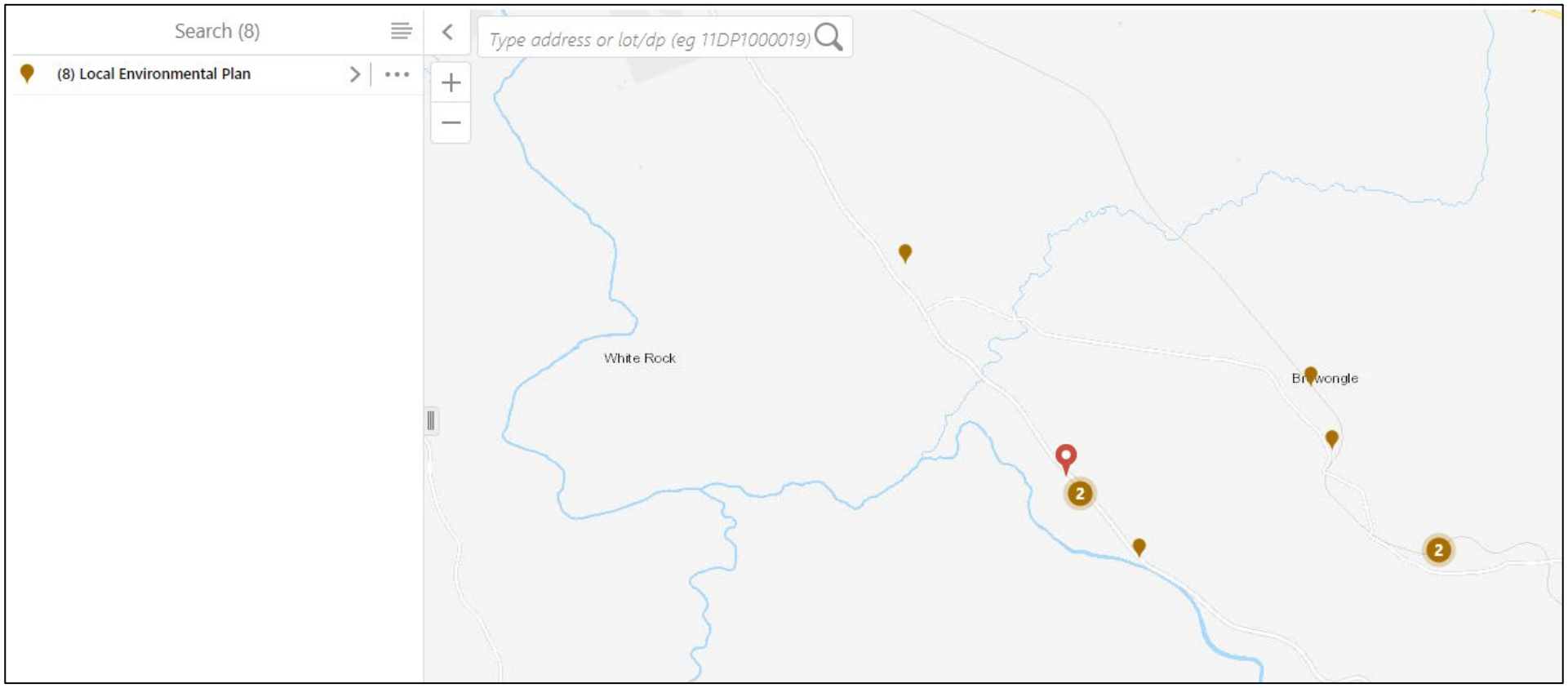
Appendix F Australian, State and Local Historic Heritage database search result

new search edit search

2 results found.

Green Swamp Inn Great Western Hwy	Walang, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)
Portable Ballroom (former) Great Western Hwy	Glanmire, NSW, Australia	(Indicative Place) Register of the National Estate (Non-statutory archive)

Report Produced: Wed May 31 12:26:20 2023



Appendix G Contaminated Land Register search result

Search results

Your search for: LGA: BATHURST REGIONAL COUNCIL

Matched 9 notices relating to 3 sites.

Search Again Refine Search

Suburb	Address	Site Name	Notices related to this site
BATHURST	71 Russell STREET	Former Gasworks	4 former
BATHURST	Corner of William Street and Durham STREET	Former Police Station	2 former
YETHOLME	351 Eusdale ROAD	Yetholme CCA Timber Treatment Plant	3 former

Page 1 of 1

14 April 2023

Appendix H NSW Rural Fire Service – Bushfire prone land search result

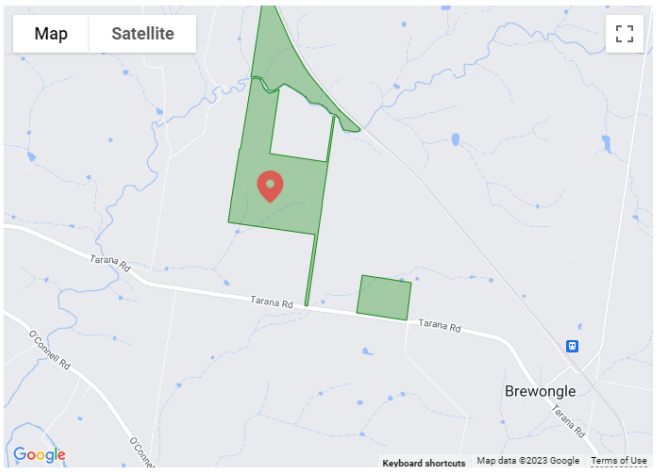
Your Property

Your search result

You have conducted a search of the online bush fire prone land tool for the land in the map above. This search result is valid for the date the search was conducted. If you have any questions about the Bush Fire Prone Land Tool please contact bushfireprone.mapping@rfs.nsw.gov.au

The parcel of land selected is not identified as bush fire prone however you could still be affected by a bush fire.

Your Property

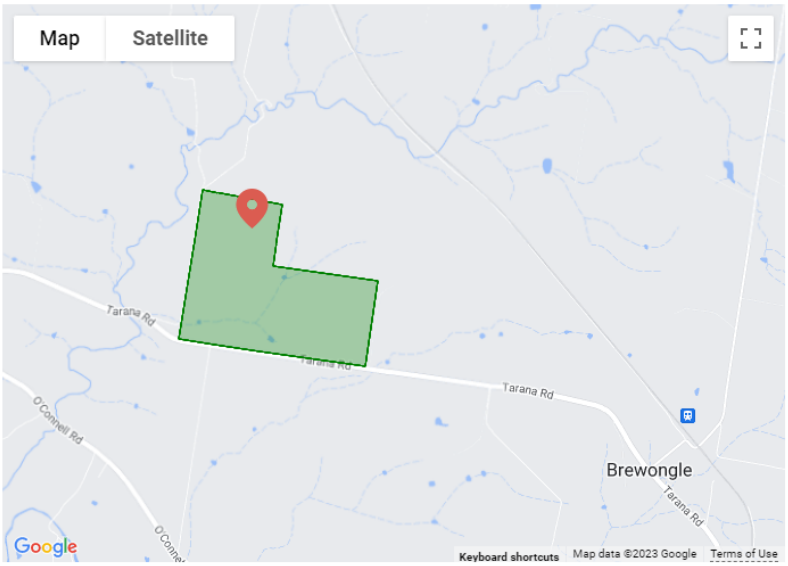


Your search result

You have conducted a search of the online bush fire prone land tool for the land in the map above. This search result is valid for the date the search was conducted. If you have any questions about the Bush Fire Prone Land Tool please contact bushfireprone.mapping@rfs.nsw.gov.au

The parcel of land selected is not identified as bush fire prone however you could still be affected by a bush fire.

Your Property

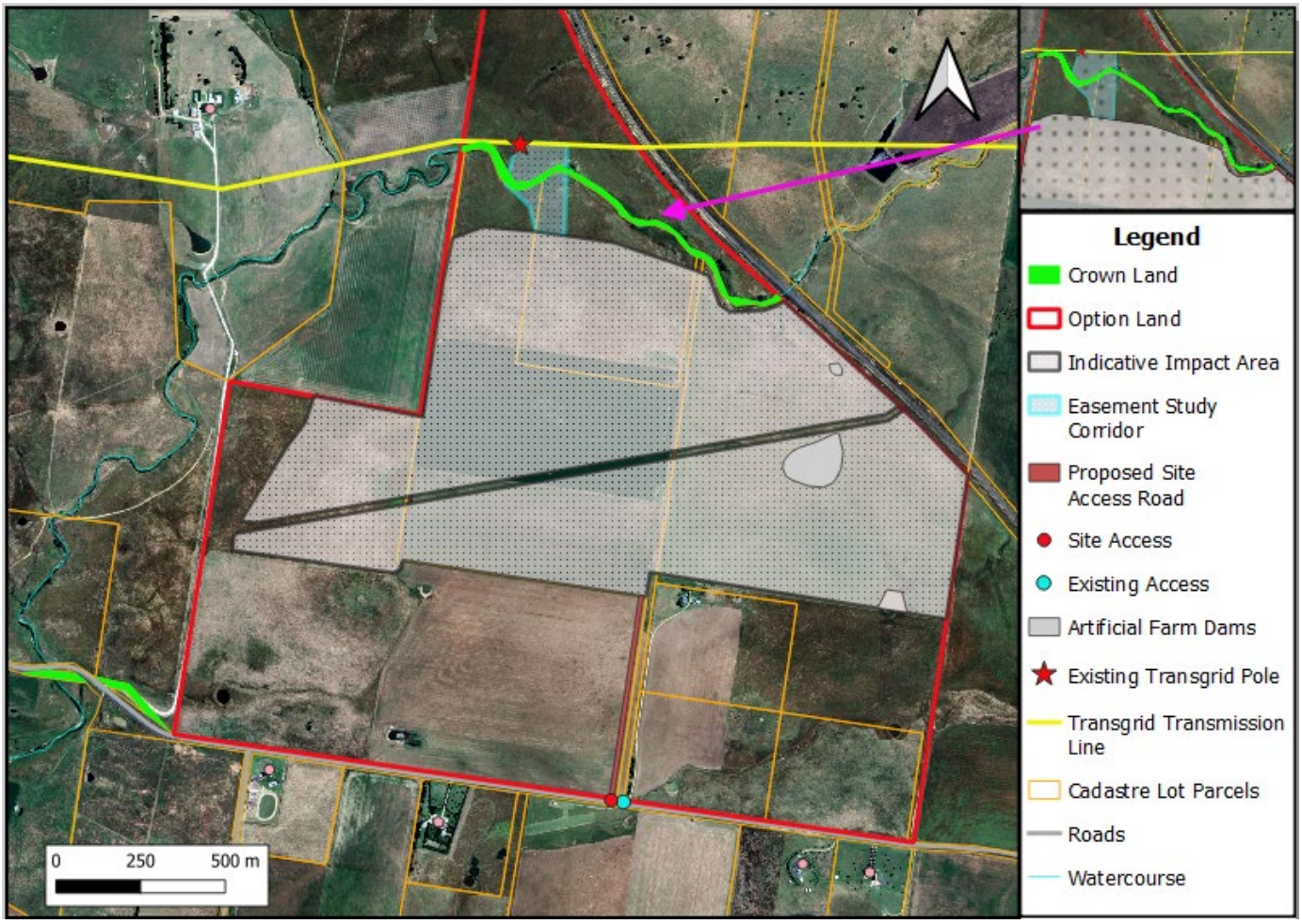


Your search result

You have conducted a search of the online bush fire prone land tool for the land in the map above. This search result is valid for the date the search was conducted. If you have any questions about the Bush Fire Prone Land Tool please contact bushfireprone.mapping@rfs.nsw.gov.au

The parcel of land selected is not identified as bush fire prone however you could still be affected by a bush fire.

Appendix I Crown Roads/Lands within Proximity to Impact Area



Appendix J Preliminary Ecological Assessment

Preliminary Ecological Assessment

Brewongle Solar Farm

NCA23R154440

09 August 2023

KLEINFELDER
Bright People. Right Solutions.

Suite 3, 240-244 Pacific Highway,
Charlestown, NSW 2290

Phone: +61 2 4949 5200

Preliminary Ecological Assessment

Brewongle Solar Farm

Kleinfelder Document: NCA23R154440

Prepared for:
Edify Energy Pty Ltd

Level 1 33-35 Palmer Street
South Townsville
QLD 4810
Gurrumbilbarra Country

Prepared by:
Kleinfelder Australia Pty Ltd

Suite 3, 240-244 Pacific Highway, Charlestown, NSW 2290
Phone: +61 2 4949 5200
ABN: 23 146 082 500

Document Control:

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2.0	Final	07 July 2023
3.0	Final	09 August 2023
Prepared	Reviewed	Endorsed
D Milburn	J Brown	R Townsend

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FIGURES

APPENDICES

1 INTRODUCTION

1.1 PROJECT BACKGROUND

Edify Energy Pty Ltd (Edify) is proposing to develop a hybrid solar farm and battery energy storage system in Brewongle, Bathurst NSW. The 100MW solar farm will occupy approximately 203ha of land and will be considered as a State Significant Development (SSD). Edify are preparing a scoping report for submission to the Department of Planning and Environment (DPE) and require a Preliminary Ecological Assessment (PEA) as a part of the submission.

Kleinfelder Australia Pty Ltd (Kleinfelder) was engaged by Edify to conduct the PEA to identify potential ecological constraints associated to development of the site, to ascertain probable pathways for development approvals, and understand further site investigations that may be required.

1.2 PROPOSED SITE LOCATION AND DESCRIPTION

The proposed site is located approximately 12km southeast of Bathurst at 315 Tarana Rd, Brewongle. The site is zoned as RU1 Primary Production and is currently managed for agricultural purposes which include grazing and cropping. The minimum lot size for development purposes is 100 ha.

The site is situated over three lots / part lots:

- Lot 1 DP1206130
- Lot 1 DP1236901
- Lot 2 DP1236901.

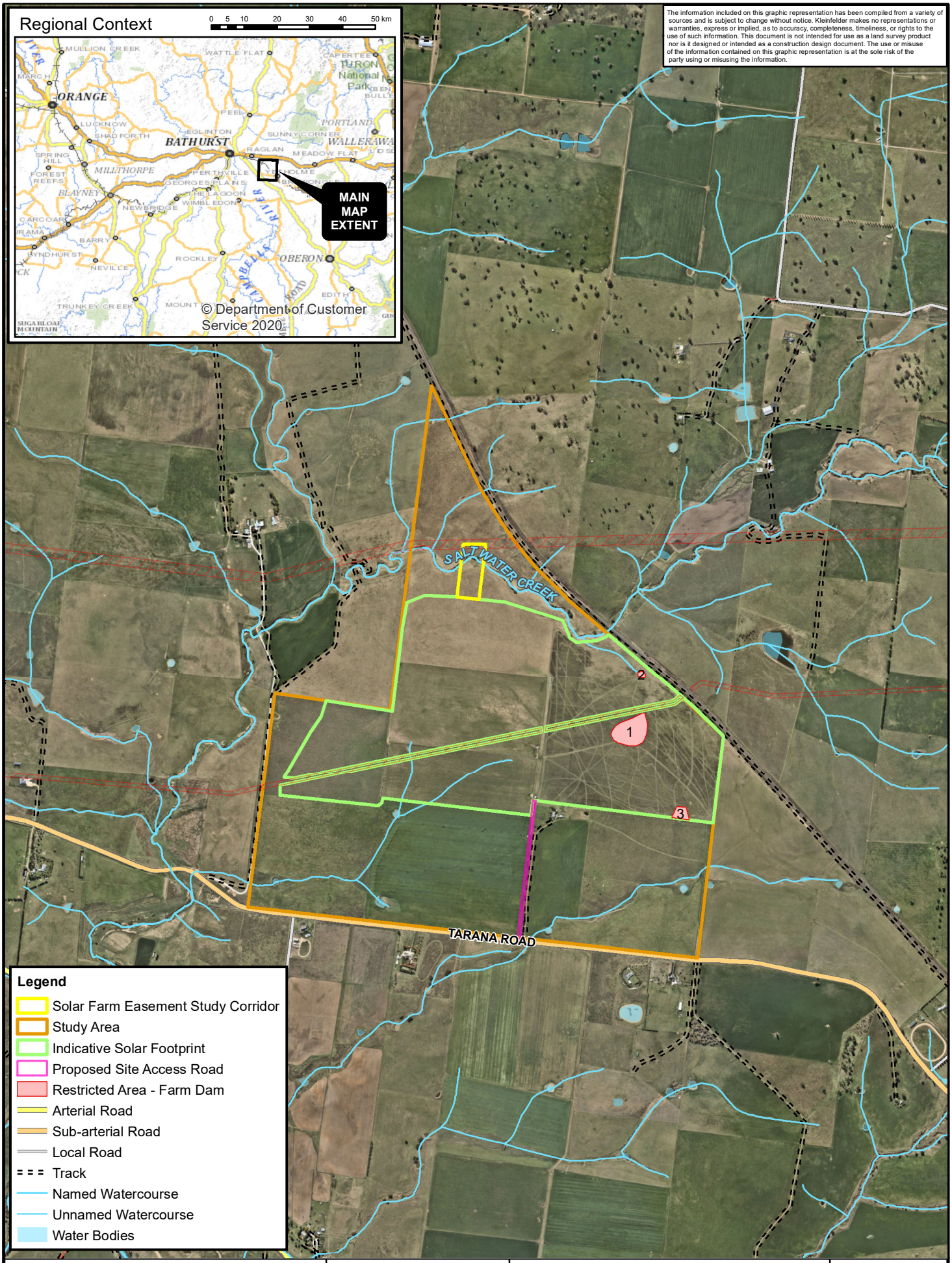
Collectively these Lots, along with an appropriate buffer area, form the Study Area (**Figure 1**). The Study Area includes the access track from Tarana Rd, as well as Salt Water Creek, a potential receiving environment which contains high biodiversity value (Biodiversity Values Mapping) and forms potential habitat for listed threatened fauna recorded in the locality. A buffer area along this watercourse has been mapped Strategic Agricultural Land by DPE. Other water features of relevance in the Study Area include three dams / waterbodies that exist on the property. The site lies over a predominantly granite geology and associated landform.

A thin band of structural (wooded) vegetation exists in the southwestern corner of Lot 1 DP1236901; this has been classified by DPE's State Vegetation Type Mapping (SVTM) as Southern Tableland Grassy Box Woodland (PCT 3376). This PCT is associated to the NSW and the Commonwealth Critically Endangered Ecological Community (CEEC) White Box Yellow Box Blakely's Red Gum Woodland. Grasslands within the Study Area have the potential to be derived from this PCT.

1.3 REPORT OBJECTIVES

The focus of the PEA is to identify key biodiversity values and ecological constraints within the Study Area. Individual reporting objectives include the following:

- Complete a desktop assessment including of relevant threatened biota and regional vegetation mapping
- Describe the flora and fauna (and their habitats) present on, or likely to occur in the Study Area
- Identify the extent of native vegetation, noting the extent of Plant Community Types (PCTs), as well as the presence, condition and extent of any threatened ecological communities, including consideration for Groundwater Dependent Ecosystems
- Assess the relevance and value of the site for threatened species and ecological communities (and their habitats) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act)
- Comment on the likely occurrence and relevance of Matters of National Environmental Significance listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Assessment for potential Biodiversity Offset Scheme (BOS) triggers and Category 1- Exempt Land criteria
- Identify suitable access track locations based on potential ecological and other environmental constraints.



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1.4 LEGISLATION

This PEA was developed in consideration of, and accordance with, the following legislation and planning instruments:

Commonwealth:

- *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act).

State:

- *Environmental Planning and Assessment Act 1979* (EP&A Act)
- *Biodiversity Conservation Act 2016* (BC Act)
- *Coastal Management Act 2016* (CM Act)
- *Water Management Act 2000* (WM Act)
- *Biosecurity Act 2015* (Biosecurity Act)
- *National Parks and Wildlife Act 1974* (NP&W Act)
- *Local Land Services Act 2013* (LLS Act)
- State Environmental Planning Policy (Biodiversity and Conservation) 2021.

Local planning instruments:

- Bathurst Region Local Environmental Plan 2014
- Bathurst Region Development Control Plan 2014.

1.5 ASSESSABLE MATTERS

Assessable matters relevant to the Proposal are defined as follows:

- Matters referred to in the BC Act where a development or an activity is "likely to significantly affect threatened species or an ecological community".
- Impacts on matters identified by the BC Act and its regulation as constituting a "Serious and Irreversible Impact (SAII)".
- Matters of National Environmental Significance (MNES) listed under Section 18 and 18A (threatened species and ecological communities) of the EPBC Act.

It is understood that the Proposal is to be assessed as development regulated under Part 4 of the EP&A Act. The first tier of assessment (i.e. thresholds tests) for 'local development' assessed under Part 4 of the EP&A Act initially focuses on 'triggers' that otherwise indicate a requirement, or not, for a second tier of assessment performed under Part 7 of the BC Act. Threshold tests are applied to determine if a development or activity is "likely to significantly affect threatened species" as listed below:

- Impacts exceed the Biodiversity Offsets Scheme thresholds (Section 7.2 of the BC Act); or
- Impacts are likely to significantly affect threatened species or ecological communities, or their habitats (Section 7.3 of the BC Act); or
- Impact on a declared area of outstanding biodiversity value.

Exceedance or triggering any of the above results in a requirement for an impact assessment performed in accordance with the NSW Biodiversity Assessment Method (BAM) by an Accredited Person (Section 7.7 of the BC Act). Otherwise, evidence to the contrary is to be documented and preferably provided as part of the Development Application to show why the second tier of assessment is not required. The process involved is outlined in the following flowchart (**Figure 2**).

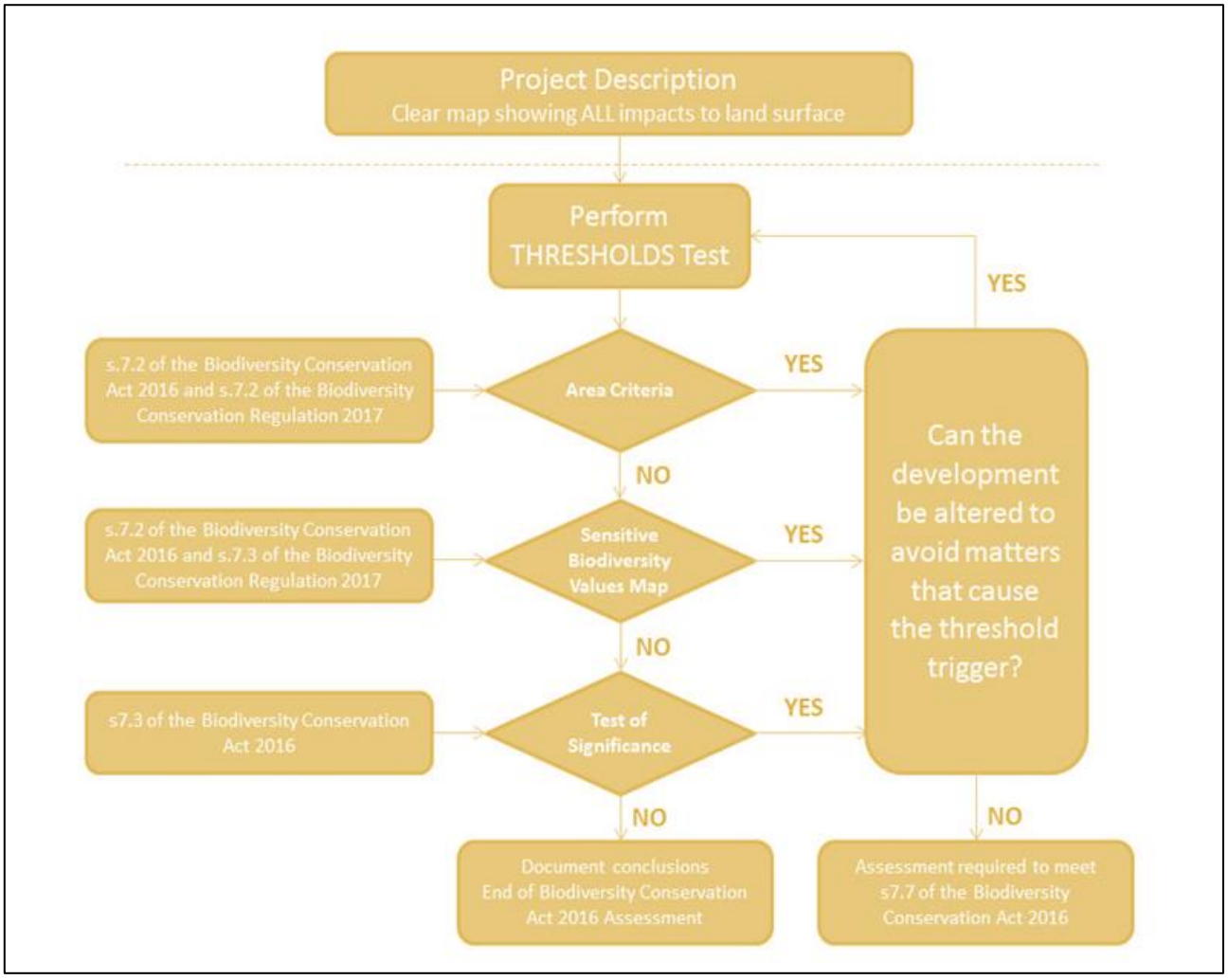


Figure 2: Assessment Framework for Evaluating Biodiversity Impacts

1.6 SERIOUS AND IRREVERSIBLE IMPACTS

It is important to be aware of matters classed as 'serious and irreversible impacts' (SAII) and the potential for associated approval issues generated by these matters (DPIE 2019). Where present, and impacted, the consent authority is unable to issue statutory approvals where a project will or is likely to impact an SAII. An impact avoidance outcome is required in these circumstances.

1.7 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The purpose of the Commonwealth EPBC Act is to ensure that actions likely to cause a significant impact on Matters of National Environmental Significance (MNES) undergo an adequate assessment. Under the EPBC Act, an action includes a proposal, undertaking, development or activity that may impact MNES. An action that '*has, will have or is likely to have a significant impact on a MNES*' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Commonwealth Minister:

MNES categories listed under the EPBC Act relevant to the Study Area include:

- Threatened species and ecological communities (Section 18 and 18A)
- Migratory species

A self-assessment performed in accordance with the *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (DoE 2013) is required to determine if there is likelihood for an action to have a significant impact on MNES. Where a significant impact is likely, a referral to the Commonwealth Minister must be undertaken.

2 METHODOLOGY

2.1 DESKTOP ANALYSIS

A review of relevant information on local biodiversity values pertaining to the Study Area, including relevant threatened biota was obtained via desktop analysis from:

- State Vegetation Type Mapping (DPE 2023)
- The BioNet Atlas of NSW Wildlife (DPE 2023) – database search for previous records of threatened species, populations and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act) within a 5 km radius of the site
- NSW Department of Planning and Environment Biodiversity Values Map and Threshold Tool
- The Department of Climate Change, Energy, the Environment and Water Protected Matters Search Tool – database search for matters of national environmental significance predicted to occur within a 5 km radius of the site
- Threshold tests will be reviewed for triggers that require entry into the BOS
- Review of the LLS Act for consideration of exemptions pertaining to Category 1 lands
- Review of NSW Native Vegetation Regulatory Map and Land Use Map
- Relevant published literature on threatened biota (see References).

The results of the database searches were used to compile a list of threatened species, populations and communities, as listed under the BC Act and EPBC Act that could potentially occur within the Study Area, and their likelihood of occurrence (**Appendix A**).

2.1.1 Vegetation Assessment

A vegetation assessment was conducted during site inspections performed over 30 & 31 May 2023. Exotic or highly modified native vegetation was defined based on structure and species composition. Plant Community Types (PCTs) were identified based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers). Boundaries of vegetation types and communities (ecotones) were marked with a hand-held GPS and mapped using geographical information system (GIS) software.

Vegetation and habitats were compared with descriptions provided in the BioNet Vegetation Classification to identify PCTs. Vegetation types were also assessed against identification criteria for NSW and Commonwealth listed threatened ecological communities (DCCEEW 2023b; DPE 2023d).

Four 400 m² floristic plot/transects were sampled across the Study Area in accordance with Section 5.3.4 of the NSW Biodiversity Assessment Method (BAM) (DPIE, 2020). Plot locations were representative of the dominant vegetation / land use onsite:

- two plots were undertaken on areas predominantly used for agriculture (in both grazing and cropping)
- one plot was undertaken within the area of native trees
- one plot was undertaken along the proposed primary access track.

Percentage cover and relative abundance was recorded for all plant species within each plot/transect. Plot sampling was supported by several Rapid Data Points (RDPs) captured across the site; RDPs record the primary species dominant in each vegetation strata and are used to support vegetation mapping. Additional information was captured as relevant whilst traversing (meandering) the site.

Plant identification and nomenclature were based on species descriptions presented within The Flora of New South Wales Volumes 1 to 4 (Harden, 1993) and with reference to taxonomic updates in PlantNET - The Plant Information Network System of Botanic Gardens Trust, Sydney, Australia (Botanic Gardens Trust, 2023). The locations of all floristic plot / transects and RDPs are presented in **Figure 3**.

2.1.2 Fauna Habitat Assessment

The locations of any important habitat features, such as microbat roosting habitat, hollow-bearing trees, terrestrial refugia and nests/burrows were captured with a handheld device and photographed where appropriate.

Searches for potential habitat for threatened fauna species included but were not limited to:

- Koala use trees
- Foraging trees for threatened birds
- Hollow-bearing trees
- Potential roosts for microbats
- Ponds and dams / waterbodies (vegetated or otherwise), riparian vegetation and drainage lines
- Woody debris, leaf litter and bush rock.

Diurnal opportunistic and incidental observations of fauna species were recorded during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces.

2.2 SURVEY LIMITATIONS

Field surveys were undertaken during a single site visit. While a moderate diversity of native and exotic flora species were recorded, additional surveys using various techniques across seasons would likely result in the detection of a greater diversity of species. Recent grazing limited the ability to accurately identify several plants to the species level.

No night surveys were conducted.

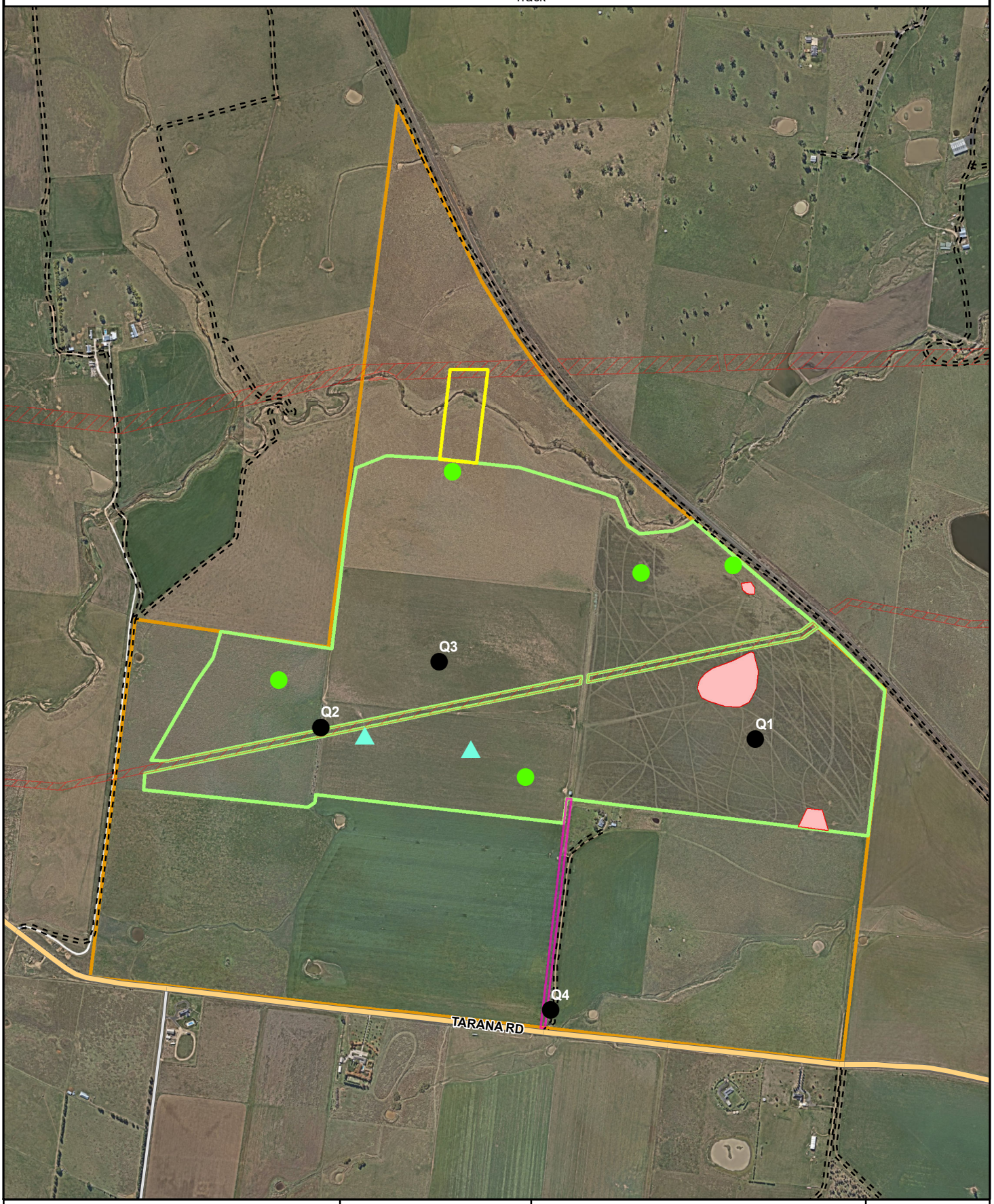
Whilst threatened flora species were considered during site meander surveys, targeted floras surveys in accordance with The NSW Guide to Surveying Threatened Plants (DPIE 2020) or relevant threatened species profiles were not conducted. Information on suitable habitat for threatened flora to occur was recorded.

A comprehensive habitat survey was not conducted as part of this assessment, however, notably very minimal habitat was recorded onsite due to agricultural practices. Further habitat assessments / targeted threatened fauna surveys may be required to inform a Development Application.

Due to current survey limitations, priority was given to habitat assessment for relevant threatened biota. A ‘likelihood of occurrence’ assessment was applied to all species previously recorded or predicted to occur within the locality based on State and Commonwealth information sources.

Legend

- Rapid Data Point
- Floristic Plot
- Watercourse Inspection
- Proposed Site Access Road
- Solar Farm Easement Study Corridor
- Existing Easements
- Restricted Area - Farm Dam
- Indicative Solar Footprint
- Subject Area
- Sub-arterial Road
- Local Road
- Track



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KLEINFELDER
Bright People. Right Solutions.
www.kleinfelder.com

PROJECT REFERENCE: 24000418

DATE DRAWN: 7/5/2023 15:03 Version 1

DRAWN BY: JCBrown

DATA SOURCE:
NSW Government - 2023
Edify - 2023
Nearmap - 2023

Survey Effort

Brewongle Solar Farm
Preliminary Ecological Assessment
Edify

FIGURE:

3

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3 RESULTS

3.1 PLANT DIVERSITY

A total of 37 plants were identified during the assessment, these were comprised of 26 exotic species and 11 native species. These plants are divided into the growth forms identified in **Table 1**. A complete list of flora species is listed in **Appendix B**.

Table 1: Brewongle plant diversity growth forms

Form	Number of species
Trees	2
Shrubs	2
Grass and grasslike	5
Forbs	2
Ferns and allies	0
'Other' growth forms	0
Exotics (High Threat Exotics[1])	26 (1)

3.2 VEGETATION

3.2.1 Plant Community Types

Two vegetation communities were identified on site. The small patch of vegetation within the development site is likely to be commensurate with PCT 3376 - *Southern Tableland Grassy Box Woodland*. The vegetation persists in a degraded state; trees are stunted, exhibiting dieback, and there has been mortality of several trees. Diagnostic material was primarily from epicormic growth impacted by disease and moth larvae however identifications of the primary species of this PCT, *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box), are confident. The understorey is highly disturbed and dominated by exotic grasses, although native forbs and shrubs were recorded. Anecdotally, this vegetation has been planted (pers. comms 2023). A review of historical imagery demonstrates this area was previously cleared and suggests it was prepared for planting in 1993 (**Plate 3** and **Plate 4**).

All other areas within the development site have been high modified by agricultural practices including cropping and have been classified as exotic and do not align with a PCT. Plant species within these areas are primarily exotic (pasture, cropping, and weed species) with very minimal native species occurrence. No other native trees or shrubs occur within the development site.

The two vegetation communities are further detailed below (**Table 2** and **Table 3**). Vegetation mapping is illustrated in (**Figure 4**).

[1] Listed under the Biodiversity Assessment Method

3.2.1.1 Native vegetation

Plate 1 ***PCT 3376 - Southern Tableland Grassy Box Woodland (low condition)***

Table 2: PCT 3376 - Southern Tableland Grassy Box Woodland

PCT 3376 - Southern Tableland Grassy Box Woodland	
Vegetation Formation and Class	Grassy Woodlands Southern Tableland Grassy Woodlands
Survey Effort	**Conducted: 1** plot/transect (#2).
Mitchell landscapes	Bathurst granites
Floristic description	This community is characterised by two species; *Eucalyptus blakelyi* (Blakely's Red Gum) and *Eucalyptus melliodora* (Yellow Box). Shrubs in this PCT are generally scarce, however *Acacia decora* (Western Silver Wattle) plants were detected in the undergrowth. One other shrub was recorded, a single stunted acacia with minimal foliage, most likely *Acacia implexa* (Hickory Wattle). The understorey was highly disturbed, dominated by *Phalaris aquatica* (Phalaris), *Bromus catharticus* (Prairie Grass), and exotic forbs including *Hirschfeldia incana* (Shortpod Mustard). Small patches of the native *Einadia nutans* (Climbing Saltbush) were recorded at the base of some of the trees.
Condition within Study Area	The vegetation is degraded and in low condition. The trees present are all exhibiting crown dieback and dead trees are present (**Plate 2**). Although some dbh measurements

PCT 3376 - Southern Tableland Grassy Box Woodland	
	reached approximately 10 – 15cm, tree heights are generally only 2 – 3m. Historical imagery suggests the age of this vegetation is between 15 and 19 years of age (**Plate 3**). Epicormic regrowth is prevalent although the foliage has been impacted by Autumn Gum Moths (*Mnesampela privata*) and disease. The understorey cover is primarily exotic (>95%) and dominated by Phalaris which is prominent in biomass; cattle have been excluded from the vegetation.  **Plate 2: Dieback and tree mortality within the patch**
Justification for PCT selection	Vegetation within this community is considered to be most commensurate with PCT 3376 based on the follow criteria: • The dominant presence of Blakely's Red Gum and Yellow Box • Presence of Climbing Saltbush and (likely) Hickory Wattle • Consistent with mapping undertaken by DPE (extant and pre-clearance) • Lack of other diagnostic species to suggest otherwise.
Vegetation Integrity Score	13
Groundwater Dependent Ecosystem	No
Conservation Status	**BC Act:** Relates to NSW White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions (Critically Endangered). **EPBC Act**: Relates to Commonwealth White Box Yellow Box Blakely's Red Gum Woodland (Critically Endangered).
SAII	Yes (Principles 1 and 2).
PCT % Cleared	93%

Plate 3: Native vegetation absent in 1993, potential site preparation evident

Plate 4: Native vegetation present in 1998

3.2.1.2 Exotic vegetation

Plate 5 ***Exotic pastures and cropping***

Table 3: Exotic pastures and cropping

Exotic pastures and cropping	
Vegetation Formation and Class	-
Survey Effort	**Conducted:** 3 plot/transects (#'s 1, 3, and 4) and site meander (observations).
Floristic description	Pastures are dominated by species such as Phalaris, Prairie Grass, *Lolium perenne* (Perennial Rye Grass), and *Festuca arundinacea* (Tall Fescue). Areas of recent cropping are dominated by *Cichorium intybus* (Chicory) *Medicago sp.* cultivar (Lucerne), *Trifolium repens* and *T. michelianum* (clovers), along with pasture grasses and weeds including Perennial Rye Grass, Prairie Grass, and *Taraxacum officinale* (Dandelion). A native *Cyperaceae* sp. (likely *Schoenus apogon*) was recorded in one plot, and observed in proximity to Waterbody 1. No other native species were recorded in areas of cropping. Assessment of the primary access track revealed similar species compositions and a row of planted exotic cypress (*Cupressus sempervirens / macrocarpa*). Small patches of the native *Cynodon dactylon* (Green Couch) were recorded within the plot; Green

Exotic pastures and cropping	
	Couch is not a species associated with NSW White Box Yellow Box Blakely's Red Gum Woodland. Two other native grasses were recorded here, albeit individual plants – *Chloris truncata* and *Eragrostis trachycarpa*. Native cover in the plot conducted along the access track was 5.7%.
Condition within Study Area	-
Justification for PCT selection	-
Vegetation integrity score	0.6 (Based on PCT 3376)
Groundwater Dependent Ecosystem	-
Conservation Status	**BC Act:** NA
	EPBC Act: NA
SAII	-
PCT % Cleared	-

3.2.2 Threatened Ecological Communities – BC Act

PCT 3376 *Southern Tableland Grassy Box Woodland* relates to the NSW White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions Critically Endangered Ecological Community (CEEC). The NSW National Parks and Wildlife Service Identification Guidelines for White Box Yellow Box Blakely's Red Gum Woodland, and the NSW Threatened Species Scientific Committee's Final Determination were consulted to determine if the patch met the criteria for the Critically Endangered Ecological Community. The assessment is detailed below in **Table 4**.

Table 4: NSW White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC determination

Determination steps	Assessment
The site is in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands or NSW South Western Slopes Bioregions.	The site is in the South Eastern Highlands Bioregion.
There are no native species in the understorey, and the site is unlikely to respond to assisted natural regeneration.	There are native species in the understorey, the site may respond to assisted natural regeneration.
The site has trees.	Trees were recorded.
White Box, Yellow Box or Blakely's Red Gum, or a combination of these species, are or were present.	Yellow Box and Blakely's Red Gum are present.
The site is predominantly grassy.	The site is predominantly grassy, albeit dominated by exotic species.
Outcome:	The site is likely to be White Box Yellow Box Blakely's Red Gum Woodland.

The NSW Threatened Species Scientific Committee's Final Determination does not specify condition thresholds (i.e., tree cover or species diversity) which are indicative of loss of function for various reasons. Rather it focuses on the ability of likely sites to be recover through assisted natural regeneration.

The assessment, in general, meets the NSW White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC determination. Considering that regeneration has been attempted onsite without overall success could warrant further investigation.

3.3 FLORA AND FAUNA

3.3.1 Threatened Flora Species

A search of the BioNet Atlas of NSW Wildlife returned no records of threatened plant species within a 5 km radius of the Study Area. An EPBC Protected Matters Search returned 12 species that may occur through species or species habitat modelling.

A "likelihood of occurrence' assessment determined that no threatened flora species are likely to occur in the Study Area. A complete list of the likelihood of threatened flora occurring within the Study Area is presented in **Appendix A**. No threatened flora species were identified during the site assessment.

3.3.2 Fauna Habitat

The mapped *Southern Tableland Grassy Box Woodland* held minimal habitat value due to the low condition of the vegetation and high exotic cover. The trees are too young to develop hollowing and no avian nests were observed, although there is potential for the trees to be used for nest building. The thick exotic cover may provide refugia for small mammals (primarily exotic species) and potentially small reptiles. The exotic cypress down the access track have the potential to be used by small to medium sized birds for nesting, otherwise provide no other habitat values. Possums (Ringtail / Brushtail) are unlikely to utilise these trees due to a lack of connectivity with preferred browsing trees.

Two waterbodies held water; WB1 & WB3 (**Plate 6**) (**Figure 4**). WB1 was nearly dry and has no wetland vegetation surrounding it making it primarily suitable for foraging birds; a pair of Black-fronted Dotterel (*Elseyornis melanops*) were observed feeding on the periphery of the waterbody. This species and similar birds are unlikely, but may, use such habitat for breeding. Similarly, WB3 held no surrounding native vegetation but was holding more water and is a likely water source for various transient native fauna.

Plate 6: WB1 (left) and WB3 (right)

Salt Water Creek was inspected where it ran within the Lot boundary to the north of the proposed development site. This area was inspected as a potential receiving environment and due to the presence of listed threatened amphibians in the locality. Water quality appears moderate (qualitative) however riparian vegetation is minimal, and generally exotic with small patches of Willow (*Salix* sp.) and *Veronica anagallis-aquatica* (Water Speedwell)

which is common is shallow sections within the stream (**Plate 7**). Water pools do exist and amphibians are present with the Common Eastern Froglet (*Crinum signifera*) frequently heard. Numerous Pacific Black Ducks (*Anas superciliosa*) were observed flushing from the pools. Cattle are not excluded from the creek and the banks are eroded and generally degraded. Wombat (*Vombatus ursinus*) burrows were observed in close proximity to the creek.

Plate 7: Salt Water Creek

3.3.3 Threatened Fauna Species

A search of the BioNet Atlas of NSW Wildlife returned a list of ten threatened fauna species that have previously been recorded within 5 km of the Study Area. An EPBC Protected Matters Search returned a list of 35 threatened fauna species known or predicted to occur (potential habitat) within the locality of the Study Area.

A "likelihood of occurrence" assessment (**Appendix A**) determined a moderate likelihood of occurrence for three fauna species within the Study Area based on the occurrence of (broadly) suitable habitat and recent records within 5km of the Study Area. These species are:

- Diamond Firetail *Stagonopleura guttata*
- Booroolong Frog *Litoria booroolongensis*
- Green and Golden Bell Frog *Litoria aurea.*

Suitable habitat for the Diamond Firetail includes *Southern Tableland Grassy Box Woodland* as well as highly disturbed areas - road verges, table drains, road embankments, and ploughed paddocks along with waterbodies and streams where it forages on a variety of grass and forb seeds as well as insects. The site is not consistent with suitable breeding habitat although the potential for nest development in the patch of Grassy Box Woodland does exist.

There are records of the Booroolong Frog (*Litoria booroolongensis*) along Fish River near the junction with Salt Water Creek, approximately 8.5 km from the proposed Salt Water Creek easement crossing (distance along stream). Further records occur downstream on Macquarie River closer to Bathurst. These sites were inspected for reference of suitable habitat. The Study Area, and Salt Water Creek in general, lacks the rocky habitat that the Booroolong Frog requires; the primary habitat requirements for the Booroolong Frog are extensive rock bank structures along permanent rivers (Gillespie 1999, Hunter and Smith 2006). The key feature of these rock structures are rock crevices in relatively shallow, slow to medium-flowing sections of stream (Hunter 2007). The species is relatively sedentary and tends to remain in close proximity to suitable habitat; maximum movements of 250 m have been recorded (Hunter 2001). Indirect impacts to this species are possible through water quality degradation, primarily as a result on increased sedimentation on downstream habitat, should it occur.

Records of the Green and Golden Bell Frog (GGBF) exist on the Macquarie River approximately 15 km downstream from the proposed Salt Water Creek easement and 6 km direct distance, noting the frogs ability to cross terrestrial lands. The population is likely to be considered important due its location on the western extent

of the species' distribution. Salt Water Creek and WB 2 represent marginal to broadly suitable habitat for this species.

An additional species was assessed as 'may occur'. The Bathurst Grassland Earless Dragon (*Tympanocryptis mccartneyi*) is a data deficient species with a very small predicted distribution confined to the plains around Bathurst, this modelled distribution includes the Study Area. Only three formal records of the species exist. The species has been found along railway tracks with weedy Paspalum grass thickets, and in vacant paddocks with tall pasture grass. The Bathurst – Lithgow rail corridor borders the northern extent of the Study Area and tall pasture grasses are present within the development site.

Thirteen fauna species were identified during the site assessment including one amphibian and 12 species of bird (**Appendix B**), no threatened fauna was recorded during the site inspection.

Legend

African Boxthorn

Vegetation

Exotic

PCT 3376

Proposed Site Access Road

Solar Farm Easement Study Corridor

Existing Easements

Restricted Area - Farm Dam

Study Area

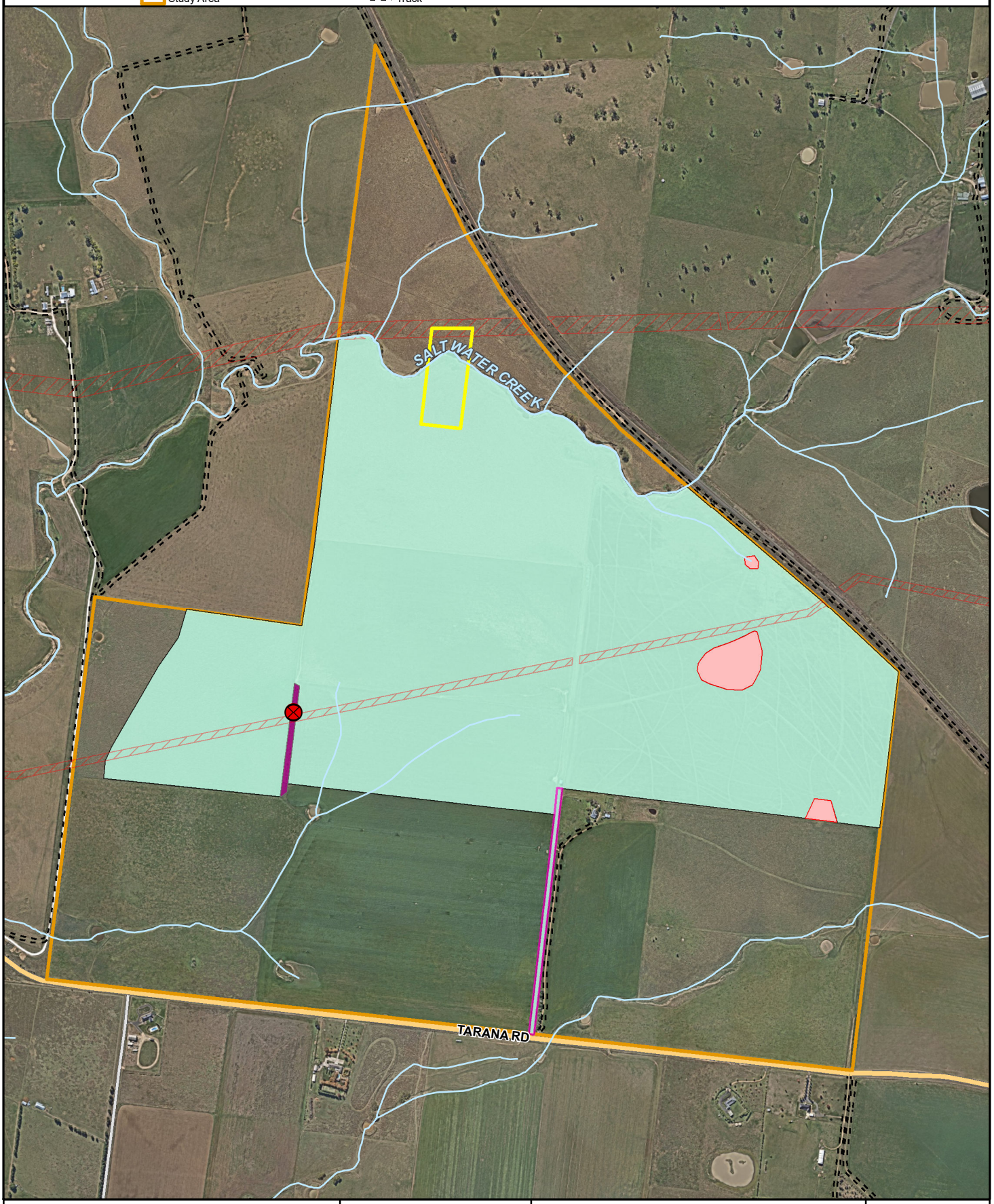
Named Watercourse

Unnamed Watercourse

Sub-arterial Road

Local Road

Track



Metres

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PROJECT REFERENCE: 24000418

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DRAWN BY: JCBrown

DATA SOURCE:

NSW Government - 2023

Edify - 2023

Nearmap - 2023

Vegetation Mapping and Habitat Features

Brewongle Solar Farm

Preliminary Ecological Assessment

Edify

FIGURE:

4

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3.4 BIODIVERSITY VALUES, NATIVE VEGETATION, AND LAND USE MAPPING

Salt Water Creek is included on the NSW Biodiversity Values Map for Biodiverse Riparian Land. No land within the development site is triggered by the map, however the development site borders Salt Water Creek in the north east corner.

Salt Water Creek is also classified as Category 2 Vulnerable Regulated Land on the Native Vegetation Regulatory Map. No land within the development site is otherwise currently classified but it is noted Statewide mapping is in a transitionary period and subject to change (incomplete). However, historical imagery suggests the land was free of woodland vegetation prior to 1990 which is a criterion for Category 1 exempt land, an image of the Study Area in 1964 illustrating agricultural land use is provided below in **Plate 8**. This is further supported by the NSW Land Use Map (2017) that denotes the site as cropping land (**Plate 9**).

Plate 8: Study Area in 1964

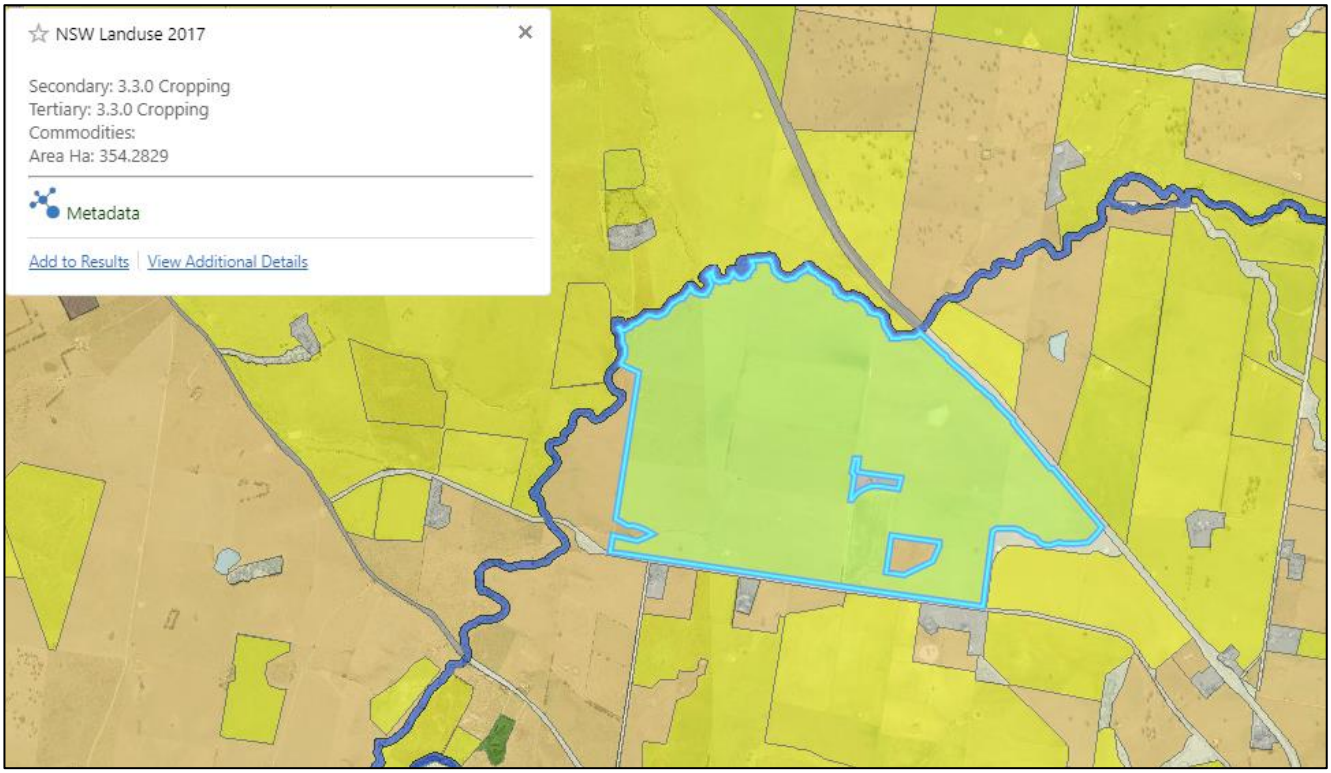

Plate 9: NSW Land Use Map

The area mapped as Biophysical Strategical Agricultural Land (BSAL) around Salt Water Creek to the north of the development site (within the Study Area and south of the Creek) was traversed during the assessment of the watercourse. Whilst no floristic plots were undertaken, observations and images of floristic composition were undertaken during the meander of the area.

The vegetation in this area was generally consistent with the RDPs conducted in northern locations of the development site, characterised by pasture grasses and dominated by Phalaris which is known to be more productive in areas of higher fertility (generally commensurate with alluvial soils). Tall Fescue was also present, along with Prairie Grass and Perennial Rye Grass. *Cirsium vulgare* (Spear Thistle) was also common throughout. No native trees or shrubs were observed. Images taken within the BSAL areas have been provided below in **Plate 10** and further images closer to Salt Water Creek can be seen in **Plate 7**.

Plate 10: Pastures within BSAL area

Two ephemeral watercourses are depicted to occur within the development site on NSW DPE mapping (**Figure 4**). These watercourses were inspected and no visible remnants remain (**Plate 11**) although they are likely to act as a drainage line.

Plate 11: Mapped watercourse within development site

3.5 KOALA HABITAT

The proposed development intents to avoid the small parcel of eucalypt vegetation within the study area, however for information purposes:

- The Study Area is zoned as RU1 Primary Production within the Bathurst Regional Council Local Government Area. As per Schedule 2 Local Government Areas, the State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Chapter 3) on Koala habitat protection applies. Before consent may be granted to a development application to carry out development on the land, the consent authority must assess whether the development is likely to have any impact on Koalas or Koala habitat.
- Two species of Koala use tree of the Central Southern Koala Management Area, as per the Biodiversity and Conservation SEPP 2021, were recorded onsite in the small patch of Grassy Box Woodland (Blakely's Red Gum and Yellow Box) making this patch potential Koala habitat.
- Although the patch contains >15% of Koala use trees there are no recent Koala records within 2.5 km of the site (closest record >5 km). This parcel of vegetation is therefore not considered as core Koala habitat.
- The patch is highly isolated from other Koala habitat.

3.6 WEEDS

One weed of significance was identified within the Study Area, as detailed in **Table 5**. Weeds of significance include Priority Weeds of the Central Tablelands (Department of Primary Industries 2023), High Threat Weeds (Biodiversity Assessment Method) and Weeds of National Significance (DCCEEW 2023). The species was sporadically recorded in the Grassy Box Woodland.

Table 5: Weeds of significance

Species	Priority Weed	High Threat Weed	Weed of National Significance
Lycium ferocissimum African Boxthorn	✓	✓	✓

Plate 12: African Boxthorn

3.7 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

PCT 3376 *Southern Tableland Grassy Box Woodland* relates to the Commonwealth White Box Yellow Box Blakely's Red Gum Woodland Threatened Ecological Community (TEC). In determining whether the patch met the condition criteria for the TEC (White box - yellow box - Blakely's red gum grassy woodlands and derived native grasslands - Nationally threatened species and ecological communities guidelines 2006), it found:

- Key diagnostic overstorey species are present (Blakely's Red Gum and Yellow Box)
- The patch does not have a predominantly native understorey, assessed as >50% cover of native perennial understorey species.

Therefore it was determined that the vegetation did not meet the condition criteria to be commensurate with the listing advice for the Commonwealth White Box Yellow Box Blakely's Red Gum Woodland TEC.

No EPBC Act listed threatened or migratory species were identified within the Study Area during the site assessment.

A ‘likelihood of occurrence’ assessment was conducted for all threatened species and migratory species returned by the EPBC Protected Matters Search (**Appendix A**). Three species listed under the Act were identified as having a moderate likelihood of occurring or may occur. These species are:

- *Diamond Firetail (Stagonopleura guttata)*
- *Booroolong Frog (Litoria booroolongensis)*
- *Green and Golden Bell Frog (Litoria aurea).*

Similarly with **Section 3.3.3**, the Bathurst Grassland Earless Dragon has been included due to a lack of available information in which to make an informed decision and due to the survey limitations; this species ‘may occur’. Impacts to this species and any other relevant Matters of National Environmental Significance will require further assessment in accordance with the EPBC Act Significant Impact Guidelines (DoE 2013) as part of any Development Application within the Study Area.

4 SUMMARY

4.1 SUMMARY OF FINDINGS AND CONSTRAINTS

A summary of key ecological findings and constraints relating to the Study Area have been detailed and discussed below.

- The development site is zoned RU1 Primary Production within the Bathurst LGA. The minimum lot size for the site is 100 ha, therefore the BOS area clearing threshold is 1 ha of native vegetation.
- One PCT, *PCT 3376 Southern Tableland Grassy Box Woodland*, was identified onsite based on recorded diagnostic species.
    - This PCT relates to the NSW White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland CEEC, however it is understood this vegetation will be avoided and retained by the proposed development.
    - The patch does not meet the condition criteria outlined under the EPBC Act.
    - Historical aerial imagery and anecdotal evidence suggests the vegetation commensurate with this PCT was planted sometime after 1993.
- The remainder of the development site is a mixture of paddocks containing a high proportionate coverage of exotic pasture grasses and cropping species.
- Three waterbodies were assessed onsite, two were retaining water and would provide suitable foraging habitat and water supply for native fauna species. The three waterbodies are proposed to be avoided and retained.
- The proposed development site contains no hollow-bearing trees, exposed rock, wooded debris, riparian corridors, or other suitable fauna habitat. The patch of *Southern Tableland Grassy Box Woodland* may provide refuge for small mammals (primarily exotic species) and reptiles under the exotic grassy biomass. The eucalypt trees may provide habitat for small nest building bird species.
- Three threatened species were assessed to have a moderate chance of occurring within the Study Area:
    - Diamond Firetail *Stagonopleura guttata* (Endangered). Broadly suitable foraging habitat present, no suitable breeding habitat. One record within the locality.
    - Booroolong Frog *Litoria booroolongensis* (Endangered). Marginal habitat in Study Area only; no suitable habitat within development site. Two records in locality occur in the vicinity of where Salt Water Creek meets Fish River. The population of the Fish and Macquarie Rivers is one of several remaining populations and may be of significance. Habitat for this species downstream could be indirectly impacted.
    - Green and Golden Bell Frog *Litoria aurea*. Marginal habitat suitability in Salt Water Creek and WB2, both of these habitat features will be avoided although could be indirectly impacted. No records within the locality, although proximate records occur downstream in Macquarie River.
- A fourth species was assessed as 'may occur' and was included under the precautionary principle:
    - Bathurst Grassland Earless Dragon *Tympanocryptis mccartneyi* (Critically Endangered). A data deficient species with only three records, it is predicted to occur within a very small area on the plains around Bathurst, which includes the Study Area. Broadly suitable habitat, including PCT association and paddocks with tall pasture grasses.
- Vegetation within the development site (excluding PCT 3376) meets the criteria of Category 1 exempt land:
    - The land was cleared prior to 1990. Historical aerial imagery dating back to 1964 suggests that the land has been cleared prior to this and has been managed for agricultural and cropping purposes since this time.
    - The land contains only low conservation value ground cover.
- Biophysical Strategic Agricultural Land is mapped to occur to the west and the north of the development site. Vegetation within the areas assessed (observations during meander) is consistent with pasture

composition recorded in the north of the development site (Phalaris dominant). No native trees or shrubs were recorded in this area. Additional biodiversity constraints are unlikely outside those described in this report. Any impacts to land in this zone should consider BSAL site verification through the agronomy studies for the Project.

- Koala use trees are present within PCT 3376, however the patch does not meet the definition of core Koala habitat. This area will be avoided and retained by the proposed development.
- One significant weed was recorded onsite, African Boxthorn. This weed is a priority weed of the Central Tablelands, a BAM high threat weed, and a Weed of National Significance.
- Matters of National Environmental Significance include the four aforementioned threatened species only.

4.2 APPROVALS PATHWAYS

The threshold tests conducted against the proposed development do not trigger the requirement for entry into the BOS or the requirement for a Biodiversity Development Assessment Report (BDAR). Additionally, vegetation to be impacted by the development meets the classification for Category 1 exempt land. Thus, a BDAR is not required to assess the impacts of any clearing of native vegetation and loss of habitat, other than impacts 'prescribed' in clause 6.1 of the *Biodiversity Conservation Regulation 2017*. Prescribed impacts may include habitat for threatened species which are species credit species (candidate species).

The BC Act requires that a Sate Significant Development application must be accompanied by a BDAR unless the Planning Agency Head (or delegate) and the Environment Agency Head (or delegate) determine that the proposed development is not likely to have any significant impact on biodiversity values. This determination is known as a BDAR waiver. Edify have the opportunity to conduct further assessment and apply for a BDAR waiver should it be determined that the development is unlikely to have significant impact on biodiversity values, in this case to threatened species[2]. Potential impacts to threatened species will require an assessment of significance at a minimum.

Otherwise, a BDAR will be required to address candidate species, a streamlined BDAR for small areas may be applicable. An assessment on impacts to vegetation would not be required, given the Department is satisfied with the assessment in determining the proposed site as Category 1 exempt land.

A self-assessment for the described Matters of National Environmental Significance would be required in accordance with relevant Commonwealth Significant Impact Assessment guidelines to determine whether a referral to the Minister should be considered necessary.

4.3 CANDIDATE SPECIES

A complete list of candidate species, derived from PCT 3376, that may require further assessment under a BDAR has been generated from the BAM-C (BAM Calculator) (**Table 6**). Ecosystem credit species are not relevant to Category 1 exempt land. Suitable justification will be required where further surveys are not considered necessary, including for reasons associated to habitat degradation.

[2] Where there is reasonable doubt about potential impacts, or where information is not made available to the Department, a BDAR will be required. If a BDAR waiver is not granted, there is no appeal mechanism and a BDAR must be submitted with the SSD environmental impact assessment.

Table 6: Candidate species list and potential further survey requirements

Candidate Species	Recommended Survey Period	Comment
Threatened Flora		
Caladenia attenuata Duramana Fingers	Oct - Nov	Predicted to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping are unlikely to be suitable for this species. Further surveys not likely required.
Eucalyptus aggregata Black Gum	Jan - Dec	No wooded vegetation is to be impacted by the proposed development. Further surveys not likely required.
Eucalyptus pulverulenta Silver-leafed Gum	Jan - Dec	No wooded vegetation / potential habitat is to be impacted by the proposed development. Further surveys not likely required.
Lepidium hyssopifolium Aromatic Peppercress	Oct - Dec	Known to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping could be suitable for this species; it is described has potentially being a disturbance opportunist. **Potential for further surveys required.**
Leucochrysum albicans subsp. tricolor Hoary Sunray	Sept - Apr	Predicted to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping may be suitable for this species; can occur in modified habitats however highly dependent on bare ground for germination. **Potential for further surveys required.**
Swainsona sericea Silky Swainson-pea	Sept - Nov	Predicted to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping are unlikely to be suitable for this species. Further surveys not likely required.
Threatened Birds		
Anthochaera phrygia Regent Honeyeater	-	No wooded vegetation / potential habitat is to be impacted by the proposed development. Further surveys not likely required.
Calyptorhynchus lathami Glossy Black-Cockatoo	Jan - Sept	No wooded vegetation / potential habitat is to be impacted by the proposed development. No hollows present. Further surveys not likely required.
Haliaeetus leucogaster White-bellied Sea-Eagle	Jul - Dec	No wooded vegetation / potential habitat is to be impacted by the proposed development. Further surveys not likely required.
Lathamus discolor Swift Parrot	-	No wooded vegetation / potential habitat is to be impacted by the proposed development. Further surveys not likely required.
Threatened Mammals		

Candidate Species	Recommended Survey Period	Comment
Miniopterus orianae oceanensis Large Bent-winged Bat	Dec - Feb	No wooded vegetation / potential habitat is to be impacted by the proposed development. Habitat constraints – no caves tunnels or mines present on site or in the immediate vicinity. Further surveys not likely required.
Petaurus norfolcensis Squirrel Glider	Jan - Dec	No wooded vegetation / potential habitat is to be impacted by the proposed development. Further surveys not likely required.
Phascogale tapoatafa Brush-tailed Phascogale	Dec - June	No wooded vegetation / potential habitat is to be impacted by the proposed development. No hollows present. Further surveys not likely required.
Phascolarctos cinereus Koala	Jan - Dec	No Koala habitat is to be impacted by the proposed development. Further surveys not likely required.
Pteropus poliocephalus Grey-headed Flying-fox	Oct - Dec	No wooded vegetation / potential habitat is to be impacted by the proposed development. Further surveys not likely required.
Threatened Amphibians		
Litoria aurea Green and Golden Bell Frog	Nov - March	No aquatic habitat is to be impacted by the proposed development. Further surveys not likely required.
Litoria booroolongensis Booroolong Frog	Oct - Dec	No aquatic habitat is to be impacted by the proposed development. Further surveys not likely required.
Litoria castanea Yellow-spotted Tree Frog	Nov - Dec	No aquatic habitat is to be impacted by the proposed development. Further surveys not likely required.
Litoria raniformis Southern Bell Frog	Oct - Jan	No swamp / aquatic habitat is to be impacted by the proposed development. Further surveys not likely required.
Threatened Reptiles		
Aprasia parapulchella Pink-tailed Legless Lizard	Sept - Nov	Predicted to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping unlikely to be suitable for this species and habitat constraints are present. **Potential for further surveys required.**
Delma impar Striped Legless Lizard	Sept - Dec	Predicted to occur in the Bathurst IBRA sub-region, the closest record lies approximately 150 km to the south near Goulburn. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping may be suitable for this species; sometimes present in modified grasslands with a significant content of exotic grasses. **Potential for further surveys required.**

Candidate Species	Recommended Survey Period	Comment
Tympanocryptis mccartneyi Bathurst Grassland Earless Dragon	Oct - Apr	Predicted to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping may be suitable for this species; has been found in paddocks with tall pasture grasses. **Potential for further surveys required.**
Threatened Insects		
Keyacris scurra Key's Matchstick Grasshopper	Mar – May, Aug - Dec	Known to occur in the Bathurst IBRA sub-region. Associated to Southern Tableland Grassy Box Woodland. Habitats degraded by cropping could be suitable for this species. **Potential for further surveys required.**

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APPENDIX A THREATENED SPECIES 'LIKELIHOOD OF OCCURRENCE' TABLE

A list of threatened species, populations and ecological communities that have been reported or modelled to occur from within a five-kilometre radius of the Study Area was obtained from the following databases:

- NSW DPIE BioNet Atlas: (http://www.bionet.nsw.gov.au/); and
- Commonwealth DAWE Protected Matters search tool: (https://www.environment.govSPRAT.au/epbc/protected-matters-search-tool).

Further resources used to inform the threatened species database search included:

- The BAM – Calculator (BAM Calculator (nsw.gov.au)), and
- NSW DPIE BioNet Threatened Biodiversity Profiles: (NSW BioNet Quick Guides and Manuals | NSW Environment, Energy and Science*l*).
- DAWE (2021b). *Species Profile and Threats Database (SPRAT)*. Available at: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

An assessment was then made of the likelihood of the threatened species, populations, and ecological communities reported or modelled to occur in the locality occurring within the Development Site or using the habitat within the Development Site as an essential part of a foraging range.

The table below summarises the likelihood of threatened species and EPBC Act listed migratory species occurring within the Development Site based on the habitat requirements of each species.

A brief definition of the likelihood of occurrence criteria is provided below:

- Known – species identified within the site during surveys;
- High – species known from the area (DPIE BioNet Atlas records), suitable habitat (such as roosting and foraging habitat) present within the site;
- Moderate – species may be known from the area, potential habitat is present within the site;
- Low – species not known from the area and/or marginal habitat is present within the site; and
- Nil – habitat requirements not met for this species within the site.

Note: Strictly aquatic / marine species listed in the Commonwealth Protected Matters Search Tool have been omitted from the below table based on obvious habitat constraints

Table A1 'Likelihood of Occurrence' table

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Flora								
1.	***Dichanthium setosum*** Bluegrass	V	V	P	PMST	Occurs on the New England Tablelands, North West Slopes and Plains and the Central Western Slopes of NSW, as well as in Queensland and Western Australia. It occurs widely on private property, including in the Inverell, Guyra, Armidale and Glen Innes areas. Often found in moderately disturbed areas such as cleared woodland, grassy roadside remnants and highly disturbed pasture.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
2.	***Eucalyptus aggregata*** Black Gum	V	V	P	PMST	Found in the NSW Central and Southern Tablelands, with small isolated populations in Victoria and the ACT. Has a moderately narrow distribution, occurring mainly in the wetter, cooler and higher parts of the tablelands in the lowest parts of the landscape, on alluvial soils, on cold, poorly-drained flats and hollows adjacent to creeks and small rivers. Also occurs as isolated paddock trees in modified native or exotic pastures.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
3.	***Eucalyptus pulverulenta*** Silver-leaved Mountain Gum, Silver-leaved Gum	V	V	P	PMST	Found in two quite separate areas, the Lithgow to Bathurst area and the Monaro (Bredbo to Bombala).Grows in shallow soils as an understorey plant in open forest, typically dominated by brittle gum, red stringybark, broad-leaved peppermint, silvertop ash and apple box.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
4.	***Euphrasia arguta***	CE	CE	P	PMST	Occur in eucalypt forest with a mixed grass and shrub understorey within Nundle State forest. Sites have either been logged in the last few decades, or appear to have regrown from past clearing.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
5.	***Lepidium aschersonii*** Spiny Peppercress	V	V	P	PMST	Found on ridges of gilgai clays dominated by brigalow, with wallaby and spear grasses in the understorey. The species grows as a component of the ground flora, in grey loamy clays. Vegetation structure varies from open to dense brigalow, with sparse grassy understorey and occasional heavy litter.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
6.	***Lepidium hyssopifolium*** Basalt Pepper-cress, Peppercress, Rubble Pepper-cress, Pepperweed	E	E	P	PMST	The species occurs in a variety of habitats including woodland with a grassy understorey and grassland. In NSW, there is a small population consisting near Bathurst, two populations near Bungendore, and one near Crookwell. Historical records also exist from near Armidale and possibly Cooma.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
7.	***Leucochrysum albicans subsp. tricolor*** *Hoary Sunray, Grassland Paper-daisy*	-	E	P	PMST	Hoary Sunray occurs in a wide variety of grassland, woodland and forest habitats, generally on relatively heavy soils. Plants can be found in natural or semi-natural vegetation and grazed or ungrazed habitat. Bare ground is required for germination. In NSW, the species is often found in association with yellow box, Blakely's red gum and red box.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
8.	***Rhizanthella slateri*** Eastern Underground Orchid	V, EP	E	P	PMST	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
9.	***Swainsona recta*** Small Purple-pea, Mountain Swainson-pea, Small Purple Pea	E	E	P	PMST	Before European settlement, this species occurred in the grassy understorey of woodlands and open-forests dominated by Blakely's red gum, yellow box, candlebark gum and long-leaf box. Grows in association with understorey dominants that include kangaroo grass, poa tussocks and spear-grasses.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
10.	***Thesium austral*** Austral Toadflax, Toadflax	V	V	P	PMST	Grows in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Occurs in grassland or grassy woodland. Grows on kangaroo grass tussocks but has also been recorded within the exotic coolatai grass.	Low	Marginal habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
11.	***Zieria obcordata*** Granite Zieria	-	E	P	PMST	Grows in eucalypt woodland or shrubland dominated by species of Acacia on rocky hillsides. Also occurs in Eucalyptus and Callitris dominated woodland with an open, low shrub understorey, on moderately steep, mainly west to north-facing slopes in sandy loam amongst granite boulders. The altitude range of sites is 500 to 830 metres.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
Birds								
1.	***Anthochaera Phrygia*** Regent Honeyeater	CE	CE	P	PMST	The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. The distribution of the species has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. In some years flocks converge on flowering coastal woodlands and forests.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Aphelocephala leucopsis*** Southern Whiteface	-	V	P	PMST	The southern whiteface is a small stocky thornbill-like bird with a brown dorsum, white belly, dark brown wings and a black tail with narrow white tip. Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both. These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Southern whiteface forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover. Birds mainly feed on insects, spiders, and seeds, largely gleaned from the bare ground or leaf litter.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**
3.	***Botaurus poiciloptilus*** Australasian Bittern	E	E	P	PMST	The Australasian Bitterns is widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes and spikerushes.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
4.	***Callocephalon fimbriatum*** Gang-gang Cockatoo	V,P, 3	E	1	BioNet, PMST	In summer, occupies tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. Also occur in subalpine snow gum woodland and occasionally in temperate or regenerating forest. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, particularly in box-ironbark assemblages, or in dry forest in coastal areas. It requires tree hollows in which to breed.	Nil	No suitable habitat within the Study Area. One record within the locality. **Not recorded during site assessment.**
5.	***Calyptorhynchus lathami lathami*** South-eastern Glossy Black-Cockatoo	-	V	P	PMST	South-eastern glossy black cockatoos are uncommon but widespread. They can be found from Mitchell, Queensland, through eastern New South Wales to East Gippsland, Victoria. South-eastern glossy black cockatoos feed almost exclusively on the seeds of sheoaks (*Allocasuarina* spp. and *Casuarina* spp.). South-eastern glossy black cockatoos are hollow nesters, utilising large hollows in both living and dead eucalypt trees.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
6.	***Climacteris picumnus victoriae*** Brown Treecreeper (south-eastern)	V	V	P	PMST	Found in eucalypt woodlands (including box-gum woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and river red gum forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**
7.	***Falco hypoleucos*** Grey Falcon	E	V	P	PMST	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey.	Low	Broadly suitable foraging habitat, no suitable breeding habitat. **Not recorded during site assessment.**
8.	***Grantiella picta*** Painted Honeyeater	V	V	P	PMST	The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits boree, brigalow and box-gum woodlands and box-ironbark forests.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**
9.	***Lathamus discolor*** Swift Parrot	E	CE	P	PMST	The Swift Parrot occurs in woodlands and forests of NSW from May to August, where it feeds on eucalypt nectar, pollen and associated insects . The Swift Parrot is dependent on flowering resources across a wide range of habitats in its wintering grounds in NSW . This species is migratory, breeding in Tasmania and also nomadic, moving about in response to changing food availability.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
10.	***Leipoa ocellata*** Malleefowl	E	V	P	PMST	Predominantly inhabit mallee communities, preferring the tall, dense and floristically-rich mallee found in higher rainfall (300 - 450 mm mean annual rainfall) areas. Utilises mallee with a spinifex understorey, but usually at lower densities than in areas with a shrub understorey. Less frequently found in other eucalypt woodlands, such as inland grey box, ironbark or bimble box woodlands with thick understorey, or in other woodlands such dominated by mulga or native cypress pine species.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
11.	***Melanodryas cucullata cucullate*** South-eastern Hooded Robin, Hooded Robin (south-eastern)	V	E	P	PMST	Occupy a wide range of eucalypt woodlands, Acacia shrublands and open forests.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**
12.	***Neophema chrysostoma*** Blue-winged Parrot	-	V	P	PMST	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones. The species can also be seen in altered environments such as airfields, golf-courses and paddocks. Pairs or small parties of blue-winged parrots forage mainly near or on the ground for seeds of a wide range of native and introduced grasses, herbs and shrubs.	Low	Marginal habitat suitability. No records within the locality. **Not recorded during site assessment.**
13.	***Polytelis swainsonii*** Superb Parrot	V	V	P	PMST	The Superb Parrot is found throughout eastern inland NSW. On the South-western Slopes their core breeding area is roughly bounded by Cowra and Yass in the east, and Grenfell, Cootamundra and Coolac in the west. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers. Inhabits box-gum, box-cypress-pine and boree woodlands and river red gum forest.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
14.	***Pycnoptilus floccosus*** Pilotbird	-	V	P	PMST	The pilotbird is found from the Wollemi National Park and Blue Mountains National Park in New South Wales through to the Dandenong Ranges, near Melbourne in Victoria.[9] Its natural habitat is temperate wet sclerophyll forests and occasionally temperate rainforest, where there is dense undergrowth with abundant debris.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
15.	***Rostratula australis*** Australian Painted Snipe	E	E	P	PMST	In NSW, this species has been recorded at the Paroo wetlands, Lake Cowell, Macquarie Marshes and Hexham Swamp. Most common in the Murray-Darling Basin. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds.	Low	Marginal habitat suitability. No records within the locality. **Not recorded during site assessment.**
16.	***Stagonopleura guttata*** *Diamond Firetail*	V	V	1	BioNet, PMST	Feeds exclusively on the ground, on ripe and partly-ripe grass and herb seeds and green leaves, and on insects (especially in the breeding season). Found in grassy eucalypt woodlands, including box-gum woodlands and snow gum woodlands. Also occurs in open forest, mallee, natural temperate grassland, and in secondary grassland derived from other communities.	**Moderate**	Broadly suitable foraging habitat present, no suitable breeding habitat. One record within locality. **Not recorded during site assessment.**
Mammals								
1.	***Petauroides Volans*** *Greater Glider (southern and central)*	-	E	P	PMST	The Greater Glider occurs in eucalypt forests and woodlands. Utilise tree hollows	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Petaurus australis australis*** Yellow-bellied Glider (south-eastern)	V	V	P	PMST	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
3.	***Phascolarctos cinereus*** Koala	E1, P	E	1	BioNet, PMST	Inhabits eucalypt forests and woodlands. The suitability of these forests for habitation depends on the size and species of trees present, soil nutrients, climate and rainfall .	Low	Marginal low condition habitat present (Koala use trees). Poor connectivity and highly modified surrounds. **Not recorded during site assessment.**
4.	***Pteropus poliocephalus*** Grey-headed Flying-fox	V, P	V	2	BioNet, PMST	This species is a canopy-feeding frugivore and nectarivore of rainforests, open forests, woodlands, melaleuca swamps and banksia woodlands. Bats commute daily to foraging areas, usually within 15 km of the day roost although some individuals may travel up to 70 km.	Nil	No suitable habitat within the Study Area. Two records within the locality. **Not recorded during site assessment.**
Amphibians								
1.	***Litoria aurea*** Green and Golden Bell Frog	E	V	P	PMST	Inhabits a very wide range of water bodies including marshes, dams and streams, particularly those containing emergent vegetation such as bullrushes or spikerushes. It also inhabits numerous types of man-made water bodies including quarries and sand extraction sites. Optimum habitat includes water-bodies that are un-shaded, free of predatory fish such as Plague Minnow, have a grassy area nearby and diurnal sheltering sites available.	**Moderate**	Marginal habitat suitability. No records within the locality, although proximate records occur in Fish River. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Litoria booroolongensis*** Booroolong Frog	E1, P	E	2	BioNet, PMST	The Booroolong Frog is found along permanent western flowing streams of the Great Dividing Range through most of NSW and down into northern Victorua. Streams range from small slow-flowing creeks to large rivers and the adults are found on or near cobble banks and other rock structures within stream margins and shelter under rocks or amongst vegetation near the ground on the stream edge. The species occurs along streams in both forested areas and open pasture, but has been affected by the presence of the introduced willow tree. Booroolong Frogs sometimes basks in the sun on exposed rocks near flowing water during summer.	**Moderate**	Marginal habitat in Study Area. Two records in locality occur where Salt Water Ck meets Fish River. **Not recorded during site assessment.**
3.	***Litoria castanea*** Yellow-spotted Tree Frog, Yellow-spotted Bell Frog	-	CE	P	PMST	There is only a single known extant population of the Yellow-Spotted Bell Frog, which occurs on the Southern Tablelands, although it is possible that other scattered population are present within the region. The species was previously found up as far as the Armidale region in northern NSW. This frog is found in association with large permanent ponds or slow flowing streams that contain emergent vegetation such as bullrushes which is uses as basking sites. The species may prove to be simply a subpopulation of the more widespread Southern Bell Frog.	Low	Marginal habitat suitability. No records within the locality. **Not recorded during site assessment.**
Reptiles								
1.	***Aprasia parapulchella*** Pink-tailed Legless Lizard	E	V	P	PMST	Inhabits sloping, open woodland areas with predominantly native grassy groundlayers, particularly those dominated by kangaroo grass. Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks.	Low	Marginal to nil habitat suitability. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
2.	***Delma impar*** Striped Legless Lizard	V	V	P	PMST	Found mainly in natural temperate grassland but has also been captured in grasslands that have a high exotic component. Also found in secondary grassland near natural temperate grassland and occasionally in open box-gum woodland. Sometimes found in grasslands with significant amounts of surface rocks, which are used for shelter.	Low	Lacks suitable habitat for protection and burrow formation (i.e., no rocky substrate, timbers or other material). Closest record approximately 150 km south of Study Area. **Not recorded during site assessment.**
3.	***Tympanocryptis mccartneyi*** Bathurst Grassland Earless Dragon	CE	CE	P	PMST	*Tympanocryptis mccartneyi* is endemic to New South Wales (NSW), Australia where it is restricted to the grasslands and open country on the alluvial plains around Bathurst in the Central Tablelands of NSW (Melville et al. 2019). The grasslands occur at altitudes up to approximately 1200 m and are naturally treeless or sparsely treed, with native tussock grasses being the dominant vegetation. The species has been found along railway tracks, with weedy Paspalum grass thickets, and in vacant paddocks with tall pasture grass.	**May**	Data deficient species. Broadly suitable habitat, including PCT association and paddocks with tall pasture grasses. Predicted to occur from a very small area which includes the Study Area.

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Migratory Species								
1.	***Calidris ferruginea*** Curlew Sandpiper	-	CE	P	PMST	The Curlew Sandpiper is distributed around most of the coastline of Australia. It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes and lagoons on the coast and sometimes the inland	Low	Broadly suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**
2.	***Hirundapus caudacutus*** White-throated Needletail	-	V	1	BioNet, PMST	An aerial species found in feeding concentrations over cities, hilltops and timbered ranges.	Low	Marginal foraging habitat suitability only. No records within the locality. **Not recorded during site assessment.**
3.	***Numenius madagascariensis*** Eastern Curlew, Far Eastern Curlew	-	CE	P	PMST	The Eastern curlew spends its breeding season in northeastern Asia, including Siberia to Kamchatka, and Mongolia. Its breeding habitat is composed of marshy and swampy wetlands and lakeshores. Most individuals winter in coastal Australia, with a few heading to South Korea, Thailand, Philippines and New Zealand, where they stay at estuaries, beaches, and salt marshes. It uses its long, decurved bill to probe for invertebrates in the mud. It may feed in solitary but it generally congregates in large flocks to migrate or roost. Its call is a sharp, clear whistle, cuuue-reee, often repeated.	Nil	No suitable habitat within the Study Area. No records within the locality. **Not recorded during site assessment.**

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
Threatened Ecological Communities								
1.	Natural Temperate Grassland of the South Eastern Highlands	-	CE	P	PMST	The Natural Temperate Grassland of the South Eastern Highlands ecological community is dominated by native tussock grasses with a rich diversity of wildflowers and other grassland plants and animals, with few trees or shrubs.	Absent	**Not recorded during site assessment.**
2.	White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland (Commonwealth listing)	-	CE	P	PMST	This ecological community can occur as either a woodland or derived grassland (a grassy woodland from which trees have been removed). It has a ground layer of native tussock grasses and herbs, and a sparse, scattered shrub layer. White box (*Eucalyptus albens*), Yellow box (*E. melliodora*) or Blakely's Red Gum (*E. Blakelyi*) dominate the ecological community where a tree layer still occurs.	Absent	**Not recorded during site assessment.** Although diagnostic tree species are present, the vegetation lacks key condition requirements.

	Species	Status		Records	Source	Habitat	LoO	Summary
		BC	EPBC					
3.	White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions	CE	-	-	Other	commonly referred to as Box-Gum Woodland, White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland in the NSW North Coast, New England Tableland, Nandewar, Brigalow Belt South, Sydney Basin, South Eastern Highlands, NSW South Western Slopes, South East Corner and Riverina Bioregions is an open woodland community (sometimes occurring as a forest formation), in which the most obvious species are one or more of the following: White Box *Eucalyptus albens*, Yellow Box *E. melliodora* and Blakely's Red Gum *E. blakelyi*. Modified sites include the following: • Areas where the main tree species are present ranging from an open woodland formation to a forest structure, and the groundlayer is predominantly composed of exotic species; and • Sites where the trees have been removed and only the grassy groundlayer and some herbs remain. The Australian Government listing of White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland is slightly different to the NSW listing.	**Present**	**Recorded during site assessment.**

APPENDIX B FLORA AND FAUNA SPECIES LIST

Table B1: Flora species list

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund
1.	**Asteraceae**	*Cichorium intybus*	Chicory	Exotic	25	3000			0.1	2		
2.	**Asteraceae**	*Cirsium vulgare*	Spear Thistle	Exotic	0.2	3					0.5	10
3.	**Asteraceae**	*Conyza bonariensis*	Flaxleaf Fleabane	Exotic			0.1	4				
4.	**Asteraceae**	*Hypochaeris radicata*	Catsear	Exotic							1	40
5.	**Asteraceae**	*Senecio quadridentatus*	Cotton Fireweed	Forb (FG)			0.1	1				
6.	**Asteraceae**	*Silybum marianum*	Variegated Thistle	Exotic					0.1	1		
7.	**Asteraceae**	*Taraxacum officinale*	Dandelion	Exotic	0.1	1			0.1	3		
8.	**Asteraceae**	*Tragopogon porrifolius*	#N/A	Exotic			0.1	2				
9.	**Boraginaceae**	*Echium plantagineum*	Patterson's Curse	Exotic			0.5	10				
10.	**Brassicaceae**	*Hirschfeldia incana*	Buchan Weed	Exotic			1	15			1	40
11.	**Chenopodiaceae**	*Chenopodium album*	Fat Hen	Exotic							0.1	1
12.	**Chenopodiaceae**	*Einadia nutans*	Climbing Saltbush	Forb (FG)			1	20				
13.	**Cupressaceae**	*Cupressus cultivar*	A cyperus	Exotic							30	3

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund
14.	**Cyperaceae**	*Cyperus sp*	A sedge	Grass & grasslike (GG)							0.1	3
15.	**Cyperaceae**	*Cyperaceae sp.*	A sedge	Grass & grasslike (GG)							0.5	100
16.	**Fabaceae (Mimosoideae)**	*Acacia decora*	Western Silver Wattle	Shrub (SG)			0.1	2				
17.	**Fabaceae (Mimosoideae)**	*Acacia sp.*	#N/A	Shrub (SG)			0.5	1				
18.	**Fabaceae (Faboideae)**	*Medicago sativa*	Lucerne	Exotic	15	2000			10	400		
19.	**Fabaceae (Faboideae)**	*Medicago arabica*	Spotted Burr Medic	Exotic							0.5	10
20.	**Fabaceae (Faboideae)**	*Trifolium repens*	White Clover	Exotic	10	1000			5	200		
21.	**Fabaceae (Faboideae)**	*Trifolium michelianum*	0	Exotic							0.5	10
22.	**Malvaceae**	*Modiola caroliniana*	Red-flowered Mallow	Exotic	0.2	10						
23.	**Myrtaceae**	*Eucalyptus blakelyi*	Blakely's Red Gum	Tree (TG)			5	11				
24.	**Myrtaceae**	*Eucalyptus melliodora*	Yellow Box	Tree (TG)			3	5				
25.	**Plantaginaceae**	*Plantago lanceolata*	Lamb's Tongues	Exotic	0.1	2					1	50

Number	Family	Scientific Name	Common Name	Form	Plot 1		Plot 2		Plot 3		Plot 4	
					Cover	Abund	Cover	Abund	Cover	Abund	Cover	Abund
26.	**Poaceae**	*Bromus catharticus*	Praire Grass	Exotic	25	100	20	200			35	1000
27.	**Poaceae**	*Chloris truncata*	Windmill Grass	Grass & grasslike (GG)							0.1	1
28.	**Poaceae**	*Cynodon dactylon*	Common Couch	Grass & grasslike (GG)							5	1000
29.	**Poaceae**	*Dactylis glomerata*	Cocksfoot	Exotic			15	100				
30.	**Poaceae**	*Eleusine tristachya*	Goose Grass	Exotic							0.1	5
31.	**Poaceae**	*Eragrostis trachycarpa*		Grass & grasslike (GG)								
32.	**Poaceae**	*Lolium perenne*	Perennial Ryegrass	Exotic	40				85	1000		
33.	**Poaceae**	*Phalaris aquatica*	Phalaris	Exotic			60	200			2	20
34.	**Polygonaceae**	*Rumex crispus*	Curled Dock	Exotic	0.1	3					1	40
35.	**Rosaceae**	*Sanguisorba minor*	Salad Burnet	Exotic							0.1	1
36.	**Solanaceae**	*Lycium ferocissimum*	African Boxthorn	HTW - Manageable			0.1	1			0.1	1
37.	**Urticaceae**	*Urtica urens*	Small Nettle	Exotic							0.1	3

Table B2 Fauna Species List

No.	Scientific Name	Common Name	Status	
			BC Act	EPBC Act
1.	*Anas superciliosa*	Pacific Black Duck	P	-
2.	*Coturnix ypsilophora*	Brown Quail	P	-
3.	*Elanus axillaris*	Black Shouldered-kite	P	-
4.	*Elseyornis melanops*	Black Fronted Dotterel	P	-
5.	*Eolophus roseicarilla*	Galah	P	-
6.	*Falco cenchroides*	Nankeen Kestrel	P	-
7.	*Grallina cyanoleuca*	Peewee	P	-
8.	*Gymnorhina tibicen*	Magpie	P	-
9.	*Malurus splendens*	Splendid Wren	P	-
10.	*Milvus migrans*	Black Kite	P	-
11.	*Pscphotus haematonotus*	Red-rumped Parrot	P	-
12.	*Rhipidura leucophrys*	Willie Wagtail	P	-
13.	*Crinum signifera*	Common Eastern Froglet	P	-

P – Protected

Appendix K Preliminary Landscape and Visual Impact Assessment

Brewongle Solar Farm

Preliminary Landscape and Visual Impact Assessment

Edify Energy Pty Ltd

12 September 2023

→ The Power of Commitment

Project name		Brewongle Solar Farm						
Document title		Brewongle Solar Farm | Preliminary Landscape and Visual Impact Assessment						
Project number		12616106						
File name		12616106-REP_BrewonglePrelimLIVA.docx						
Status Code	**Revision**	**Author**	**Reviewer**		**Approved for issue**			
			Name	**Signature**	**Name**	**Signature**	**Date**	
[Status code]	A							
S4	0	V Wheatley	L Farrell		L Farrell		12/09/2023	
[Status code]								
[Status code]								

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Acknowledgement of Country

GHD acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.

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Terminology

Terminology	Definition
Impact Area	An indicative area defining the development footprint for the Project.
Impact	The effect of a proposal, which can be adverse or beneficial, when measured against an existing condition.
Landscape	A holistic area comprised of its various parts including landform, vegetation, buildings, villages, towns, cities and infrastructure.
Landscape character	The combined quality of built, natural and cultural aspects which make up an area and provide its unique sense of place.
Landscape character zone	An area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately nearby.
Project	The Brewongle Solar Farm Project
Sensitivity	The capacity of a landscape or viewpoint to absorb the impacts from a proposed land use change and/or built form.
Study area	Consists of land in the vicinity of, and including, the Project site. The study area is a wider area surrounding the Impact Area as defined in this assessment, including land that has the potential to be indirectly impacted by the Project.
View	The sight of a landscape or scene.
Viewpoint	A location within the public or private domain with a potential view of a large-scale solar energy project.
Viewshed	The area within which a project can be seen at eye level above ground. Its extent will usually be defined by a combination of landform, vegetation and built elements.
Visibility	The state or fact of being visible or seen.
Visual impact	The impact on views from private and public places. It is determined by considering the visual magnitude and sensitivity.
Zone of theoretical visibility	A map, usually digitally produced, showing areas of land within which a development is theoretically visible.

[1] Partially adapted from: *Environmental impact assessment practice note EIA-N04 - Guideline for landscape character and visual impact assessment, Version 2.2* (Transport for New South Wales, 2020), and *Technical Supplement – Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022).

Abbreviations

Abbreviations	Definition
AHD	Australian Height Datum
BESS	Battery Energy Storage Systems
BSAL	Biophysical Strategic Agricultural Land
DEM	Digital elevation model
Edify Energy	Edify Energy Pty Ltd
EIS	Environmental Impact Assessment
GHD	GHD Pty Ltd
GIS	Geographic Information System
IBRA	Interim Biogeographic Regionalisation for Australia
km	Kilometre
kV	Kilovolts
LCZ	Landscape character zone
LVIA	Landscape and visual impact assessment
m	Metre
MVA	Megavolt amp
MWac	Megawatt
MWh	Megawatt hours
PCT	Plant Community Type
PV	Photovoltaics
XPT	Express passenger train
ZTV	Zone of theoretical visibility

1. Introduction

The Brewongle Solar Farm Project (the Project) is located approximately 12 kilometres (km) south-east of Bathurst, located within the Central West and Orana region outside of the southern edge of the Central-West Orana Renewable Energy Zone. The Project is expected to have a generation capacity of 90 MWac PV and associated 90 MW/360 MWh Battery Energy Storage System (BESS).

The study area is located within the Bathurst Regional Council Local Government Area and is within the Bathurst Interim Biogeographic Regionalisation for Australia (IBRA) Subregion (South Eastern Highlands IBRA region).

1.1 Project overview

The Project footprint is currently proposed to avoid the farm dams on site, the mapped corridor of Biophysical Strategic Agricultural Land (BSAL) and the stand of mapped Plant Community Type (PCT) in the Western portion of the study area. A gas pipeline easement runs through the centre of the study area in an east to west direction.

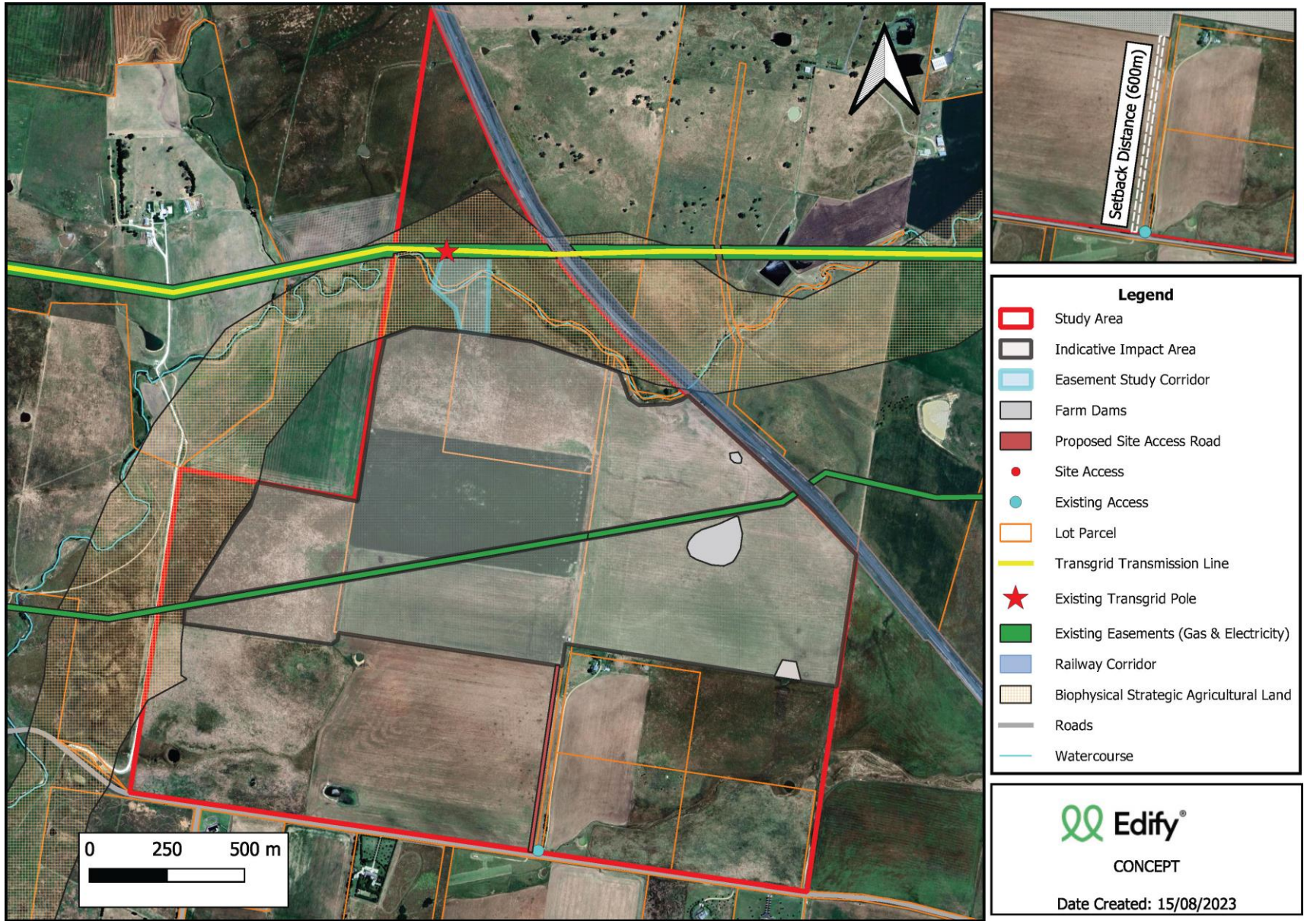
The project is anticipated to connect into the existing TransGrid 132 kV overhead transmission line, running from Wallerawang to Panorama (94X). This will require establishing a new substation and overhead transmission infrastructure to enable the project's connection into the overhead transmission line. The substation will include the establishment of a new step-down transformer from 132 kV to 33 kV. Edify Energy anticipate the total switching station footprint will equate to approximately 150 m x 100 m. The substation design is not yet confirmed; however its preliminary location can be assumed in the centre of Lot 2 DP1236901 along the Western border. Approximately 245 metres of overhead transmission line would be required to connect the Project to existing transmission network to the north of the Project. Four to five overhead 132 kV poles would be required, with the transmission line crossing Salt Water Creek.

The built form on the site would consist of the following:

- Solar power station consisting of 'array blocks' typically of 3 MVA and 6 MVA
- BESS, comprising sealed, lithium-ion batteries housed in enclosures
- Access easement (off Tarana Road) and perimeter tracks
- A High Voltage Substation
- A prefabricated Operations and Maintenance building
- Permanent staff and contractor car parking area
- Perimeter security fencing (approximately two metres high)

The Project is expected to operate for around 30 years and intends to introduce sheep grazing following construction. The construction phase of the Project is expected to take 12 - 18 months. During the peak construction period, a workforce of approximately 250 personnel will be required onsite.

Refer to Figure 1.1 for the Project concept design.



(source: Edify Energy Pty Ltd)

Figure 1.1 Project concept design

1.2 Purpose of this report

The purpose of this report is to prepare a Preliminary Landscape and Visual Impact Assessment (LVIA) for the Project, to be included in the Scoping Report prepared by Edify Energy.

The Preliminary LVIA includes the following:

– A baseline analysis (preliminary)
– A landscape character zone assessment (preliminary)
– Review and updated Preliminary Assessment Tool inputs
– A zone of theoretical visibility (ZTV) analysis map
– A reverse ZTV analysis map

The Preliminary LVIA is required to be undertaken in accordance with the assessment approach outlined in the *Technical Supplement – Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022).

1.3 Scope and limitations

This report: has been prepared by GHD for Edify Energy Pty Ltd and may only be used and relied on by Edify Energy Pty Ltd for the purpose agreed between GHD and Edify Energy Pty Ltd as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than Edify Energy Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

1.4 Assumptions

– The preliminary assessment is based on information provided to GHD at the time of writing
– The preliminary assessment (including ZTV mapping) is based on an indicative concept design only
– Landscape character zones defined in this report are preliminary only and based on a preliminary desktop analysis, therefore may change during the next LVIA stage

2. Methodology

2.1 Standards and guidance

This Preliminary LVIA has been undertaken in accordance with the following guidelines:

– *Technical Supplement – Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022)
– *Environmental impact assessment practice note EIA-N04 - Guideline for landscape character and visual impact assessment, Version 2.2* (Transport for New South Wales, 2020)
– *Guidelines for Landscape and Visual Impact Assessment, 3rd Edition* (Landscape Institute and Institute of Environmental Management & Assessment, 2013)

2.2 Preliminary landscape character analysis

2.2.1 Preliminary baseline analysis

A preliminary desktop review of the baseline landscape and visual environment has been undertaken for a five kilometre study area, using existing information including topography, land use, vegetation, and receiver locations provided by Edify Energy. Any potential landscape receivers have also been identified (e.g., watercourses, topographical features, heritage features).

GHD has sought feedback from Edify Energy regarding any community engagement undertaken for the project, and whether any relevant values have been identified.

Potential public visual receiver locations have been identified (in addition to private residential receivers provided by Edify Energy), including public roads and rail lines within 2.5 kilometres of the proposed solar farm, and other public locations within four kilometres of the proposal.

A preliminary legislation and policy review also accompanies this section, identifying relevant landscape and visual values and objectives within the study area.

2.2.2 Preliminary landscape character zones

Based on the preliminary baseline analysis, preliminary landscape character zones (LCZ) have been defined for a five kilometre study area from the proposed solar farm. As these are based on a desktop analysis only, it is assumed they may be refined during the next stage of the project.

2.3 Preliminary visual assessment

2.3.1 Preliminary assessment tool analysis

The preliminary visual assessment stage is used to identify viewpoints that require a detailed assessment in stage 2. Preliminary Assessment Tools provided in the *Technical Supplement – Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022) have been used to undertake this assessment. The tools are designed to identify where community and landholder consultation should be focused, and to eliminate the need to assess viewpoints that are likely to experience very low impacts. The tools rely on quantitative data collected during the desktop assessment, including:

– '*The vertical and horizontal field of view that a development is likely to occupy when viewed from each viewpoint, and is influenced by distance, height elevation changes, and width of a project*'

The methodology for the preliminary visual assessment, as outlined in the Technical Supplement, is as follows:

– *'Identify all viewpoints from public roads and rail lines within 2.5 km of the proposed development*
– *Identify other public and private viewpoints within 4 km of the proposed development*

– *Calculate the distance of each of these viewpoints from the nearest point of the proposed development*
– *Determine the 'relative height difference' between the proposed development and each viewpoint*
– *Plot each viewpoint on the Preliminary Assessment Tool – Vertical Field of View (Figure 2)* (within Technical Supplement) *to determine the indicative vertical field of view (as either 1,2,3 or 4+ degrees)*
– *Measure the worst-case horizontal field of view of the project from each viewpoint (not considering topography or vegetation)*
– *Compare the vertical and horizontal fields of view using the matrix in Table 1* (within Technical Supplement) *to determine whether detailed visual assessment of each viewpoint is required*

The Preliminary Assessment Tools focus on viewpoints with views to the solar array. Additional viewpoints have been considered for any other infrastructure that have potential to cause impacts beyond the solar arrays.

Refer to the *Technical Supplement – Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022) for a detailed description of the Preliminary Assessment Tools.

2.3.1.1 Parameters used

Refer to Table 2.1 below for the parameters used for each preliminary assessment tool criteria.

Table 2.1 Preliminary assessment tool parameters

Criteria	Source / parameters used
Private receivers	Provided by Edify Energy.
Public receivers	Locations selected within viewshed based on Google street view analysis.
Distance from receiver to nearest point of proposed development (distance to development)	Distance calculated from receiver location to Impact Area boundary.
Elevation at receiver	Digital terrain model (created using one and two meter contour intervals at a resolution of one metre), DEMs were sourced from ELVIS and best resolution was used where available.
Highest point of design	Highest point of digital terrain with addition of 4.2 metres for solar array.
Lowest point of design	Lowest elevation of digital terrain (not including existing farm dam).
Relative height difference	Height of receiver is compared to the low and high points of the array and the respective formula is used from the DPE guidelines.
Horizontal field of view	Angles calculated using Impact Area boundary.
Sector	Distance and relative height formulas from the DPE provided Preliminary Visual Assessment Tool XLSX.

2.3.2 Zone of theoretical visibility

Zone of theoretical visibility mapping is a computer-generated analysis which identifies land from which it is theoretically possible to view the components of the Project. ESRI ArcGIS software was used to model the ZTV of the Project. A digital terrain model was produced using one and two metre contour intervals at a resolution of one metre.

The ZTV was mapped using the following parameters:

– A viewing height of 1.7 metres, which is the average within the typical viewing level range of an adult
– Multiple points aligned in a grid across Impact Area (offset 10 m from boundary), referencing an indicative array layout, using a height of 4.2 metres
– Multiple points within the BESS area, using a height of three metres

The GIS software then digitally determines the likely extent over which the feature would be visible or not visible.

The reverse ZTV was mapped, using the same parameters, however displaying:

– The extent of theoretical visibility of land within the Impact Area, from identified surrounding sensitive receivers within four kilometres of the Project

In interpreting the ZTV, the following issues must be considered:

– It only takes into account the landform and does not include land cover factors such as the presence of buildings and trees, therefore it represents the worst-case scenario of potential visual impact
– It does not take into account the effect of distance. The greater the distance from the Project, the lower the impact, as the development will take up a smaller portion of the view, and atmospheric conditions may reduce the visual prominence of the Project.
– The ZTV is only accurate to the resolution of the elevation model

3. Preliminary landscape character analysis

3.1 Preliminary baseline analysis

3.1.1 Policy and legislation

The five kilometre study area is primarily located within the Bathurst Regional Council area. The Fish River forms the Local Government Area boundary with Oberon Council, and a portion of this land is located to the south-west of the study area. Land uses within the study area include RU1 Primary Production, SP2 Railway, SP2 Classified Road, R1 General Residential, and RE1 Public Recreation. Items of state significance within the study area include The Grange and Macquarie Plains Cemetery, located on O'Connell Road, and the Raglan Railway Station in the village of Raglan. A number of items of local heritage significance are present within the study area, including rural homesteads associated with the early settlement of the area.

The following Table 3.1 provides a summary of relevant landscape and visual values identified in the preliminary policy and legislation review for the study area.

Table 3.1 Summary of legislation and policy review

Legislation / policy	Topic	Relevant value or objective
Central West and Orana Regional Plan 2041	Scenic and cultural landscapes	This plan recognises the role of the regions scenic and cultural landscapes in providing a unique setting for urban areas, and a strong link to its natural and historic landscapes. Part 2: objective 9 of the plan is to *ensure site selection and design embraces and respects the region's landscape, character and cultural heritage*.
Bathurst Regional Local Environmental Plan 2014	Land use	**Zone RU1 Primary Production** '*To maintain the rural and scenic character of the land.'* *'To provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.'* **R1 General Residential** *'To protect and conserve the historic significance and scenic quality of the urban villages of Eglington, Raglan, Perthville.'* **RE1 Public Recreation** *'To protect and enhance the natural environment for recreational purposes.'* *'To protect and conserve the historical and scenic quality of Bathurst's open space areas.'*
	Heritage conservation	*'To conserve the environmental heritage of Bathurst Regional local government area.'* *'To conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views.'* *'To conserve Aboriginal objects and Aboriginal places of heritage significance.'*
Oberon Local Environmental Plan 2013	Aims of Plan	*'To encourage the retention of productive rural land in agriculture.'* *'To identify, protect, conserve and enhance Oberon's natural assets.'* *'To identify and protect Oberon's built and cultural heritage assets for future generations.'*
	Heritage conservation	*'To conserve the heritage significance of heritage items and heritage conservation areas, including associated fabric, settings and views.'* *'To conserve Aboriginal objects and Aboriginal places of heritage significance.'*

3.1.2 Landscape baseline analysis

3.1.2.1 Land use and built form

Land within the five kilometre study area of the Project largely comprises of agricultural land currently used for crop production or livestock grazing, with scattered residences and farm structures. The small village of Raglan is located to the north-western edge of the study area along the Great Western Highway, and comprises a grid network of residential streets, community facilities and an unused railway station. The Bathurst airport is located at Raglan, just beyond the study area. The small informal settlement of Brewongle is located approximately 1.3 kilometres south-east of the Project, made up of a scattering of informally arranged rural residences in the vicinity of the unused railway station. The Great Western Highway, an historical connector between Bathurst and Sydney, traverses the northern part of the study area. The Main Western Railway Line crosses through the study area and forms a border to the Project on the north-eastern side. The XPT uses this line approximately one to two times per day in either direction, between Sydney and Bathurst and destinations further west. O'Connell Road to the west of the study area connect Bathurst to Oberon, and Tarana Road to the south of the Project forms a secondary connection to Lithgow. Existing overhead transmission lines are present along roadsides, and a 132 kV line is present to the north of the Project through rural land.

3.1.2.2 Topography and hydrology

The study area is largely flat to gently undulating open plains, rising in elevation and slope along the eastern edge, influenced by terrain associated with the foothills of the Great Dividing Range. High points include an elevation of 875 m AHD to the east of the study area, and 874 m AHD to the north-east near the Great Western Highway. The Fish River is present to the south, flowing into the Macquarie River just beyond the study area. Salt Water Creek meanders close to the northern and western aspects of the Project, before flowing into the Fish River. Scattered farm dams are present within the Impact Area and surrounding rural landscape.

3.1.2.3 Vegetation

Vegetation within the study area appears to be largely influenced by the rural land use, comprising large paddocks of pastures and crops with few scattered trees. Tree rows along fences and roads are present, with clusters of vegetation associated with residences. Higher elevations to the east appear to be treed, along with parts of the Fish River corridor. Some small isolated remnants of NSW Plant Community Types are present within the study area, including Southern Tableland Grassy Box Woodland, Central and Southern Tableland River Oak Forest, Central West Stony Hills Stringybark-Box Forest, Southern Tableland Red Grass-Spear Grass Grassland, and Central West Creekflat Grassy Woodland (Department of Planning and Environment, 2022).

3.1.2.4 NSW (Mitchell) Landscapes

With reference to the NSW (Mitchell) Landscapes, the majority of the study area lies within Bgr – Bathurst Granites. Areas of Umc – Upper Macquarie Channels and Floodplain are present on either side of Fish River. The upper more treed elevations to the east of the study area are classified as Mhp – Mount Horrible Plateau (Department of Planning and Environment, 2016).

3.1.3 Community engagement

Edify Energy is currently undertaking initial engagement with nearby residents and the indigenous community. As this process is just commencing, no relevant values have been identified. It is expected that this detail will arise during the preparation of the Environmental Impact Assessment (EIS).

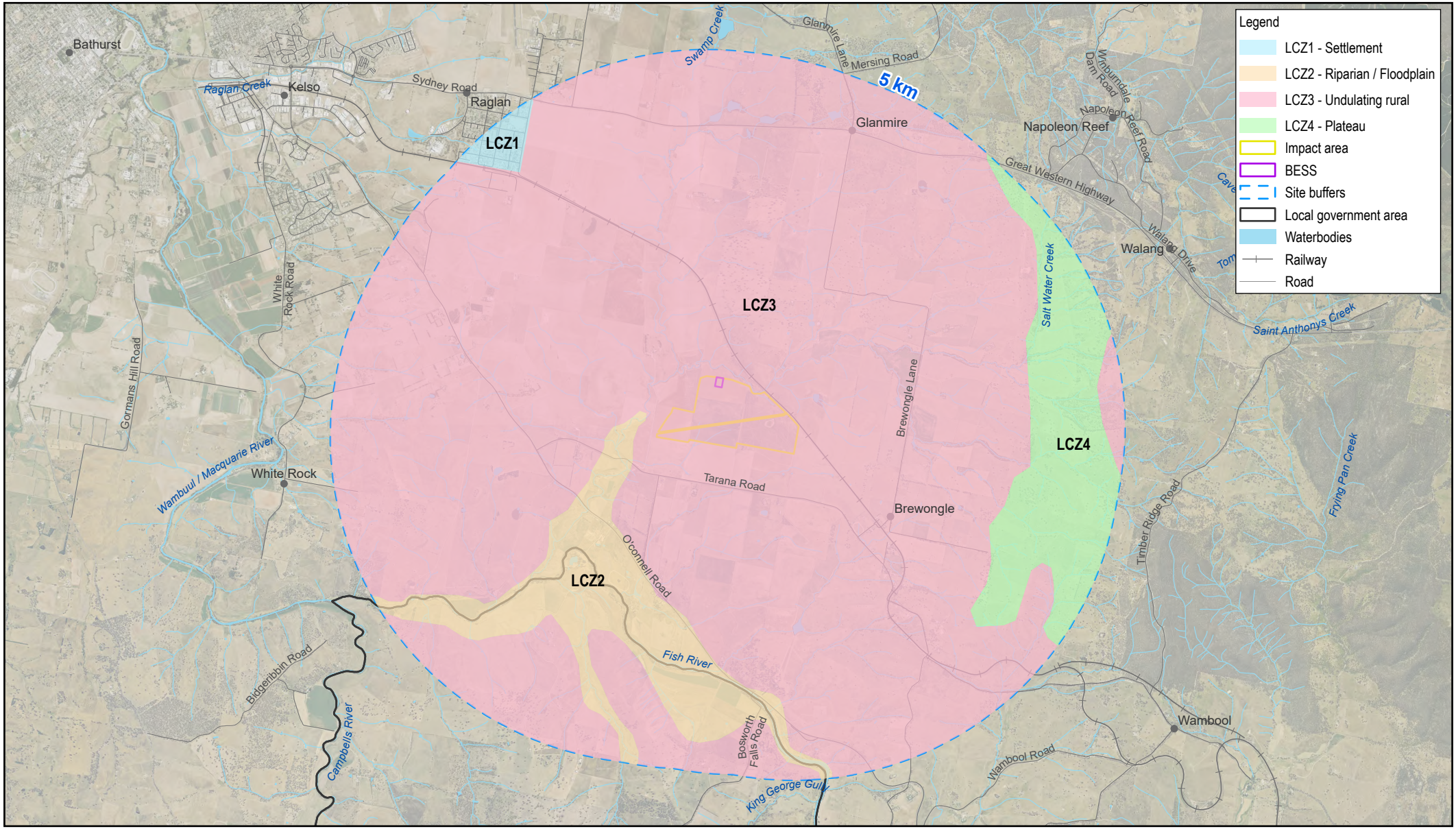
3.2 Preliminary landscape character zones

Preliminary LCZs have been defined for a five kilometre study area, based on the preliminary baseline analysis. In defining these zones, NSW (Mitchell) Landscapes were used as a starting point, with zones further refined and renamed. Refer to Table 3.2 below for preliminary descriptions, and Figure 3.1 for the location of LCZs.

Table 3.2 Preliminary landscape character zones

Preliminary LCZ	Description
LCZ1: Settlement	LCZ1 is located in the north-western part of the study area and includes the village of Raglan.
LCZ2: Riparian / floodplain	LCZ2 is located to the south-west of the study area and is associated with the riparian channels and floodplains of the Fish River (and Macquarie River to the south). NSW (Mitchell) Landscape identifies this area as where the *Macquarie Valley opens wider through the Bathurst granite* (Department of Planning and Environment, 2016).
LCZ3: Undulating rural	The study area largely comprises of LCZ3, which is characterised by undulating rural land on *Carboniferous granites and granodiorite* (Department of Planning and Environment, 2016).
LCZ4: Plateau	LCZ4 is located to the east of the study area and associated with higher treed elevations to the foothills of the Great Dividing Range. NSW (Mitchell) Landscapes defines this as the *Mount Horrible Plateau,* described as *dissected plateau undulating hills and steep wooded ridges in folded Devonian conglomerates, sandstones, and mudstones* (Department of Planning and Environment, 2016).

As the LCZs defined in Table 3.2 are based on a desktop analysis only, it is expected they would be refined, with further supporting description and supporting photographs, after a site visit is undertaken as part of the LVIA for the EIS.



Paper Size ISO A4

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

Edify Energy Pty Ltd
Brewongle Solar Farm
Preliminary LVIA

Project No. **12616106**
Revision No. **0**
Date **12/09/2023**

Preliminary landscape character zones

FIGURE 3.1

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Print date: 12 Sep 2023 - 08:45

Data source: Base data, NSW 2023; Metromap Tile Service: Base Imagery Extracted 12/09/2023. Created by: afoddy

4. Preliminary visual assessment

4.1 Sensitive receivers

As outlined in section 2.3.1, private receiver data was provided by Edify Energy for 4 kilometres from the Project. In addition, a number of public receiver locations were identified by GHD based on a desktop assessment. Refer to Figure 4.1 for receiver locations. The reference numbers for receivers is based on the following:

– ‘R’ receivers: private (residential) receivers named and provided by Edify Energy
– ‘P’ receivers: public receiver locations identified by GHD
– Associated residence: the primary residence of the landholder associated with the Project

A total of 77 receivers were included in the preliminary analysis, including 68 private receivers, eight public receivers, and one associated residence.

4.2 Zone of theoretical visibility

A ZTV analysis (refer to Figure 4.1) and reverse ZTV analysis (refer to Figure 4.2) were undertaken for the solar farm, using parameters outlined in section 2.3.2. The ZTV reveals a patchwork of visibility spanning across the extent of study area, in response to the gently undulating terrain. Some key receivers not located within the viewshed include much of the Brewongle settlement, clusters of residences along O’Connell Road, and much of the Great Western Highway. The ZTV analysis results were used as criteria for the preliminary visual assessment.

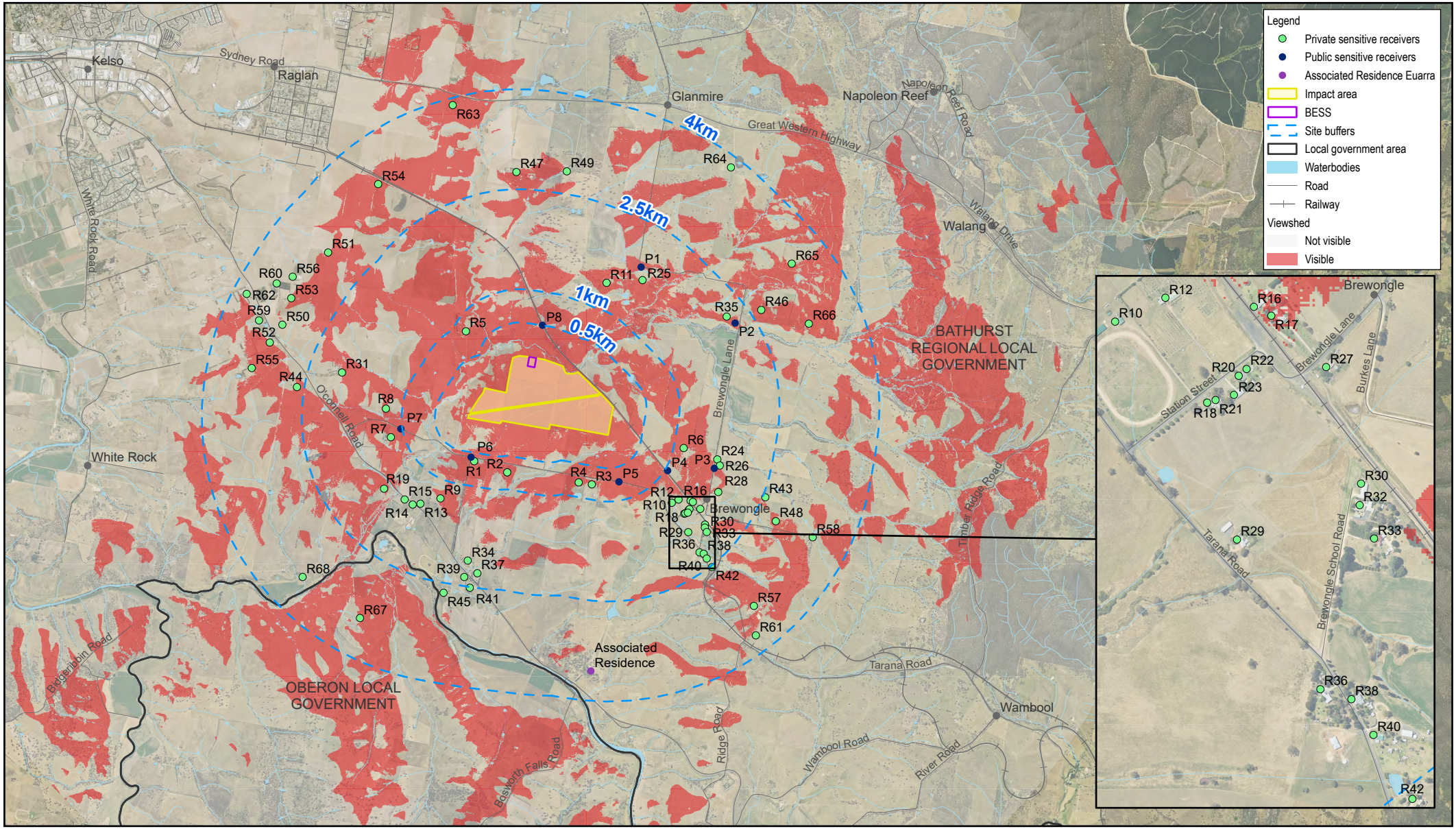
The reverse ZTV analysis reveals that the southern and central portion of the Project is theoretically visible to a larger number of receivers when compared to the northern part of the Project. Due to this finding, it is understood that Edify Energy has sought to refine the Impact Area by establishing a setback distance from the southern extent of the Project along Tarana Road to minimise this potential impact, which would provide a setback distance of over 625 metres to the nearest southern receivers.

4.3 Preliminary visual assessment

A preliminary visual assessment was undertaken in accordance with the approach and parameters outlined in section 2.3. Refer to Table 4.2 for the preliminary visual assessment results. Of the 75 receivers included in the analysis, eleven (11 no.) have been identified as requiring a detailed visual assessment as part of the EIS. Of the eleven receivers, ten are private residences and one a public location. Refer to Table 4.1 for receivers requiring a detailed viewpoint assessment.

Table 4.1 Receivers identified as requiring a detailed viewpoint assessment

Receiver	Location
R1	142 Wests Lane, Brewongle, NSW 2795
R2	264 Tarana Road, Brewongle, NSW 2795
R3	390 Tarana Road, Brewongle, NSW 2795
R4	380 Tarana Road, Brewongle, NSW 2795
R5	155 Tarana Road, Brewongle, NSW 2795
R8	47 Tarana Road, Brewongle, NSW 2795
R9	3306 O’Connell Road, Brewongle, NSW 2795
R11	244 Brewongle Lane, Glanmire, NSW 2795
R17	758 Brewongle Lane, Brewongle, NSW 2795
R19	3443 O’Connell Road, Brewongle, NSW 2795
P8	Main Western Railway Line, north of the Project.



Data Disclaimer

This Zone of Theoretical Visibility illustrates land from which it is theoretically possible to view the solar farm. This is based on the potential maximum visibility of an indicative solar farm layout, with a solar array height of 4.2 m. This analysis does not take into account vegetation or existing built form and is illustrative only. Transmission infrastructure has not been included in this analysis.

Paper Size ISO A4

0 1 2 3

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Edify Energy Pty Ltd
Brewongle Solar Farm
Preliminary LVIA

Project No. **12616106**
Revision No. **0**
Date **12/09/2023**

Zone of Theoretical Visibility

FIGURE 4.1

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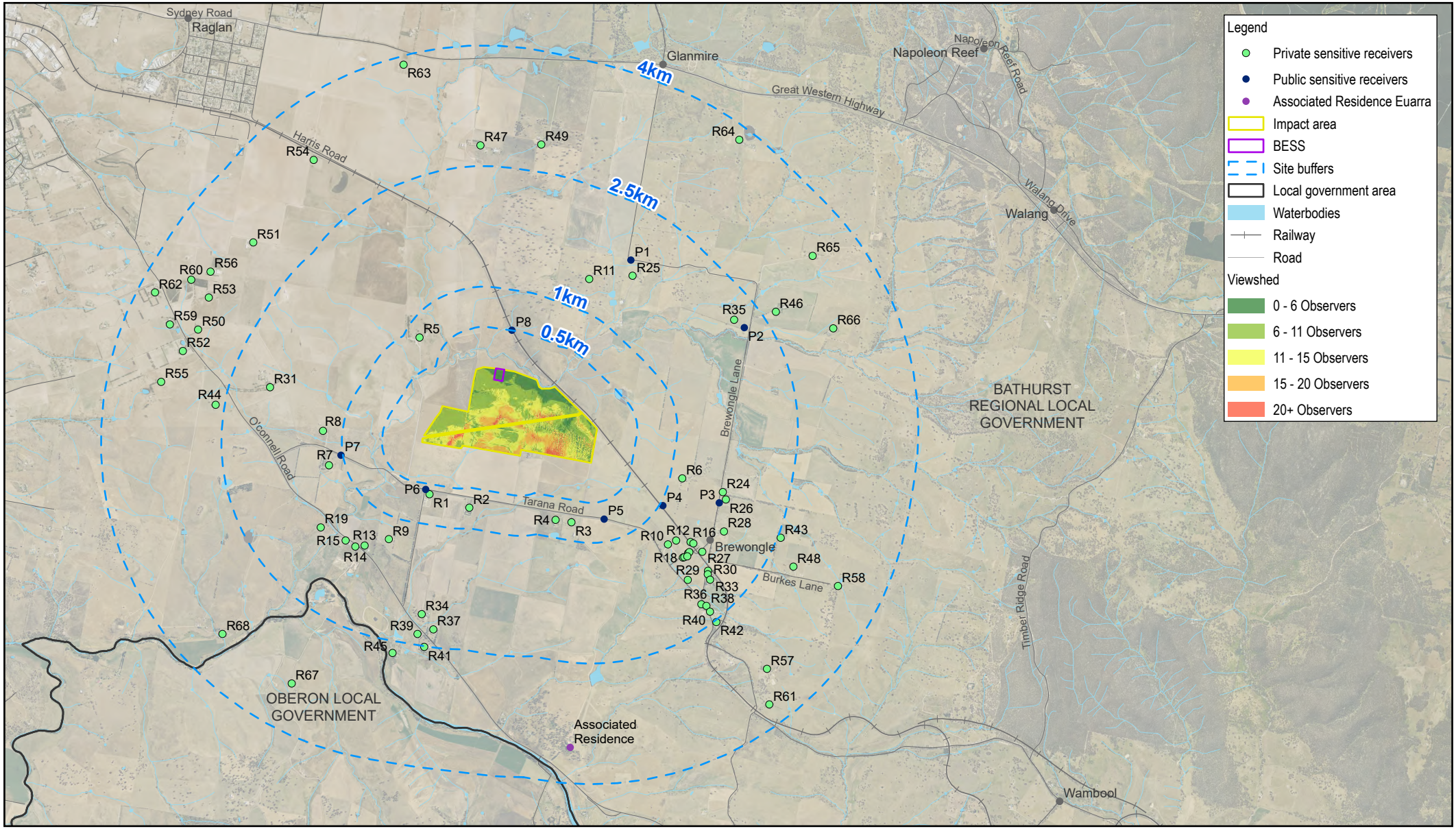
Data source: Base data, NSW 2023; Metromap Tile Service: Base Imagery Extracted 13/09/2023. Created by: afoddy



Data Disclaimer

This Zone of Theoretical Visibility illustrates the degree of visibility of land within the solar farm Available Area from sensitive receivers within 4 kilometres. This is based on the potential maximum visibility of an indicative solar farm layout, with a solar array height of 4.2 m. This analysis does not take into account vegetation or existing built form and is illustrative only. Transmission infrastructure has not been included in this analysis.

Paper Size ISO A4

0 1 2 3

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

Edify Energy Pty Ltd
Brewongle Solar Farm
Preliminary LVIA

Project No. **12616106**
Revision No. **0**
Date **12/09/2023**

Reverse zone of theoretical visibility

FIGURE 4.2

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Print date: 13 Sep 2023 - 10:18

Data source: Base data, NSW 2023; Metromap Tile Service: Base Imagery Extracted 13/09/2023. Created by: afoddy

Table 4.2 Preliminary visual assessment results

Receiver (within 4 km)	Distance to development (m)	Elevation of receiver (mAHD)	Relative height difference	Lowest point of design (mAHD)	Highest point of design (mAHD)	Horizontal field of view (degrees)	Horizontal field of view category	Sector (prelim tool DPE)	Assessment	Within ZTV?	Detailed visual assessment required?
P8	502	722.419	39	703.01	741.58	85	71 - 130	4	Assessment required	Yes	Yes
R5	811	708.297	39	703.01	741.58	70	61 - 70	2	Assessment required	Yes	Yes
R3	772	734.173	39	703.01	741.58	82	71 - 130	2	Assessment required	Yes	Yes
R4	778	740.477	39	703.01	741.58	93	71 - 130	2	Assessment required	Yes	Yes
R1	625	702.687	39	703.01	741.58	89	71 - 130	3	Assessment required for all viewpoints except road/rail	Yes	Yes
R17	1621	759.108	56	703.01	741.58	31	31 - 40	2	Assessment required for all viewpoints except road/rail	Yes	Yes
R11	1406	746.532	44	703.01	741.58	56	51 - 60	2	Assessment required for all viewpoints except road/rail	Yes	Yes
R8	1242	704.125	39	703.01	741.58	31	31 - 40	2	Assessment required for all viewpoints except road/rail	Yes	Yes
R2	745	708.422	39	703.01	741.58	107	71 - 130	3	Assessment required for all viewpoints except road/rail	Yes	Yes
R19	1649	683.096	58	703.01	741.58	34	31 - 40	2	Assessment required for all viewpoints except road/rail	Yes	Yes

Receiver (within 4 km)	Distance to development (m)	Elevation of receiver (mAHD)	Relative height difference	Lowest point of design (mAHD)	Highest point of design (mAHD)	Horizontal field of view (degrees)	Horizontal field of view category	Sector (prelim tool DPE)	Assessment	Within ZTV?	Detailed visual assessment required?
R9	1276	705.2	39	703.01	741.58	52	51 - 60	2	Assessment required for all viewpoints except road/rail	Yes	Yes
P4	1040	745.619	43	703.01	741.58	36	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No
R14	1543	676.64	65	703.01	741.58	40	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No
R13	1472	678.641	63	703.01	741.58	43	41 - 50	2	Assessment required for all viewpoints except road/rail	No	No
R15	1551	677.698	64	703.01	741.58	38	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No
R7	1195	706.598	39	703.01	741.58	34	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No
P7	1023	698.268	43	703.01	741.58	36	31 - 40	2	Assessment required for all viewpoints except road/rail	Yes	No
P6	574	702.126	39	703.01	741.58	87	71 - 130	3	Assessment required for all viewpoints except road/rail	Yes	No
R16	1582	758.009	55	703.01	741.58	32	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No

Receiver (within 4 km)	Distance to development (m)	Elevation of receiver (mAHD)	Relative height difference	Lowest point of design (mAHD)	Highest point of design (mAHD)	Horizontal field of view (degrees)	Horizontal field of view category	Sector (prelim tool DPE)	Assessment	Within ZTV?	Detailed visual assessment required?
P5	720	746.5	43	703.01	741.58	64	61 - 70	3	Assessment required for all viewpoints except road/rail	Yes	No
R10	1395	749.7	47	703.01	741.58	38	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No
R12	1434	752.543	50	703.01	741.58	35	31 - 40	2	Assessment required for all viewpoints except road/rail	No	No
R31	2003	733.464	39	703.01	741.58	27	21 - 30	1	No assessment required	No	No
R62	3793	753.317	50	703.01	741.58	18	11 - 20	1	No assessment required	No	No
R68	3445	675.982	66	703.01	741.58	23	21 - 30	1	No assessment required	No	No
R26	1739	779.371	76	703.01	741.58	24	21 - 30	2	No assessment required	No	No
R21	1650	749.455	46	703.01	741.58	34	31 - 40	1	No assessment required	No	No
R64	3836	789.563	87	703.01	741.58	26	21 - 30	1	No assessment required	No	No
R54	3301	753.948	51	703.01	741.58	27	21 - 30	1	No assessment required	No	No
R57	3371	824.208	121	703.01	741.58	23	21 - 30	1	No assessment required	No	No
R27	1773	756.541	54	703.01	741.58	30	21 - 30	1	No assessment required	No	No
R43	2538	782.166	79	703.01	741.58	20	11 - 20	1	No assessment required	No	No
R55	3330	749.709	47	703.01	741.58	17	11 - 20	1	No assessment required	No	No

Receiver (within 4 km)	Distance to development (m)	Elevation of receiver (mAHD)	Relative height difference	Lowest point of design (mAHD)	Highest point of design (mAHD)	Horizontal field of view (degrees)	Horizontal field of view category	Sector (prelim tool DPE)	Assessment	Within ZTV?	Detailed visual assessment required?
P2	2223	756.052	53	703.01	741.58	34	31 - 40	1	No assessment required	Yes	No
R23	1670	750.409	47	703.01	741.58	33	31 - 40	1	No assessment required	No	No
R60	3486	757.628	55	703.01	741.58	21	21 - 30	1	No assessment required	No	No
R40	2371	754.063	51	703.01	741.58	29	21 - 30	1	No assessment required	No	No
R58	3434	798.876	96	703.01	741.58	18	11 - 20	1	No assessment required	No	No
R32	2008	752.895	50	703.01	741.58	30	21 - 30	1	No assessment required	No	No
R33	2076	757.444	54	703.01	741.58	29	21 - 30	1	No assessment required	No	No
R61	3736	810.141	107	703.01	741.58	23	21 - 30	1	No assessment required	No	No
R63	3891	743.436	40	703.01	741.58	27	21 - 30	1	No assessment required	Yes	No
R37	2275	685.954	56	703.01	741.58	49	41 - 50	1	No assessment required	No	No
R51	3113	770.426	67	703.01	741.58	26	21 - 30	1	No assessment required	No	No
R52	3176	738.984	39	703.01	741.58	19	11 - 20	1	No assessment required	Yes	No
P1	1839	747.756	45	703.01	741.58	45	41 - 50	1	No assessment required	Yes	No
R47	2758	748.744	46	703.01	741.58	35	31 - 40	1	No assessment required	Yes	No
R56	3336	770.68	68	703.01	741.58	22	21 - 30	1	No assessment required	No	No
R45	2648	676.703	65	703.01	741.58	40	31 - 40	1	No assessment required	No	No

Receiver (within 4 km)	Distance to development (m)	Elevation of receiver (mAHD)	Relative height difference	Lowest point of design (mAHD)	Highest point of design (mAHD)	Horizontal field of view (degrees)	Horizontal field of view category	Sector (prelim tool DPE)	Assessment	Within ZTV?	Detailed visual assessment required?
R18	1642	748.635	46	703.01	741.58	34	31 - 40	1	No assessment required	No	No
R49	2841	761.33	58	703.01	741.58	35	31 - 40	1	No assessment required	No	No
R22	1652	752.699	50	703.01	741.58	32	31 - 40	1	No assessment required	No	No
R30	1980	751.626	49	703.01	741.58	29	21 - 30	1	No assessment required	No	No
R38	2286	753.444	50	703.01	741.58	30	21 - 30	1	No assessment required	No	No
R53	3182	764.509	61	703.01	741.58	22	21 - 30	1	No assessment required	Yes	No
R34	2112	685.802	56	703.01	741.58	50	41 - 50	1	No assessment required	No	No
R6	1151	765.389	62	703.01	741.58	30	21 - 30	2	No assessment required	Yes	No
P3	1671	775.846	73	703.01	741.58	25	21 - 30	2	No assessment required	Yes	No
R36	2232	752.685	50	703.01	741.58	31	31 - 40	1	No assessment required	No	No
R59	3450	739.485	39	703.01	741.58	19	11 - 20	1	No assessment required	No	No
R67	3413	696.949	45	703.01	741.58	27	21 - 30	1	No assessment required	Yes	No
R20	1650	751.897	49	703.01	741.58	33	31 - 40	1	No assessment required	No	No
R28	1862	769.901	67	703.01	741.58	26	21 - 30	2	No assessment required	No	No
R24	1679	779.246	76	703.01	741.58	24	21 - 30	2	No assessment required	No	No
R25	1687	747.77	45	703.01	741.58	48	41 - 50	1	No assessment required	Yes	No

Receiver (within 4 km)	Distance to development (m)	Elevation of receiver (mAHD)	Relative height difference	Lowest point of design (mAHD)	Highest point of design (mAHD)	Horizontal field of view (degrees)	Horizontal field of view category	Sector (prelim tool DPE)	Assessment	Within ZTV?	Detailed visual assessment required?
R48	2830	791.034	88	703.01	741.58	20	11 - 20	1	No assessment required	Yes	No
R39	2364	682.084	59	703.01	741.58	46	41 - 50	1	No assessment required	No	No
R50	3105	740.821	39	703.01	741.58	21	21 - 30	1	No assessment required	No	No
R42	2521	754.621	52	703.01	741.58	29	21 - 30	1	No assessment required	No	No
Associated residence	3549	703.923	39	703.01	741.58	32	31 - 40	1	No assessment required	No	No
R35	2179	756.497	53	703.01	741.58	36	31 - 40	1	No assessment required	No	No
R29	1890	744.866	42	703.01	741.58	33	31 - 40	1	No assessment required	No	No
R46	2659	770.27	67	703.01	741.58	30	21 - 30	1	No assessment required	Yes	No
R44	2610	732.243	39	703.01	741.58	20	11 - 20	1	No assessment required	Yes	No
R41	2509	681.04	61	703.01	741.58	44	41 - 50	1	No assessment required	No	No
R65	3439	798.111	95	703.01	741.58	26	21 - 30	1	No assessment required	Yes	No
R66	3194	776.471	73	703.01	741.58	24	21 - 30	1	No assessment required	Yes	No

5. Conclusion

This preliminary LVIA has been prepared for the Project to accompany the Scoping Report. This includes a preliminary baseline assessment based on a desktop analysis, ZTV mapping, and undertaking a preliminary assessment using the tools and approach provided in the *Technical Supplement – Landscape and Visual Impact Assessment, Large-Scale Solar Energy Guideline* (NSW Department of Planning and Environment, 2022).

The baseline assessment lead to the definition of four preliminary LCZs within a five kilometre study area, including LCZ1 settlement, LCZ2 riparian and floodplain, LCZ3 undulating rural, and LCZ4 plateau.

Seventy seven (77 no.) sensitive receivers were identified within a four kilometre study area, comprising of both public and private receiver types. ZTV and reverse ZTV mapping was undertaken, revealing the theoretical visibility of the Project. A preliminary visual assessment was undertaken including all sensitive receivers identified. Parameters included the distance of receiver to the project, the relative height difference, the horizontal field of view, and whether the receiver was in the Project viewshed. The results determined that eleven (11 no.) receivers would require a detailed assessment as part of the EIS.

In response to finding of the reverse ZTV analysis, it is understood that Edify Energy have sought to refine the Impact Area by establishing a setback distance from the southern extent of the Project along Tarana Road to minimise potential impacts to southern receivers.

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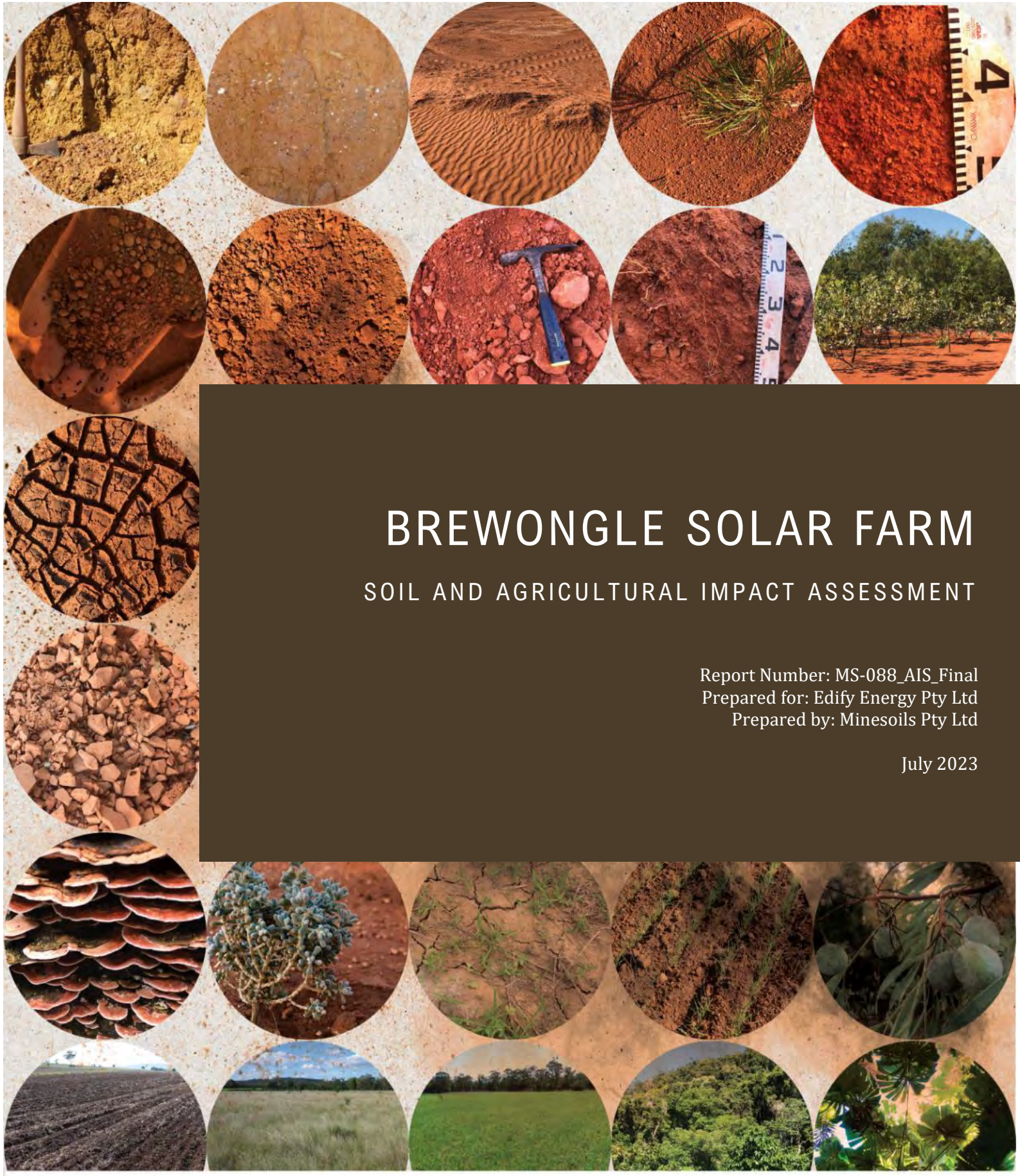
Appendix L Soils and Agricultural Impact Assessment



BREWONGLE SOLAR FARM

SOIL AND AGRICULTURAL IMPACT ASSESSMENT

Report Number: MS-088_AIS_Final
Prepared for: Edify Energy Pty Ltd
Prepared by: Minesoils Pty Ltd

July 2023

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DISCLAIMER

This report has been prepared by Minesoils Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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DOCUMENT CONTROL

Reference	Date	Prepared by	Approved
MS-088_ Draft 1	26 June 2023	Matt Hemingway	Clayton Richards
MS-088_ Draft 2	3 July 2023	Matt Hemingway	Clayton Richards
MS-088_ Final	11 July 2023	Matt Hemingway	Clayton Richards

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EXECUTIVE SUMMARY

Minesoils Pty Ltd (Minesoils) was engaged by Edify Energy Pty Ltd (Edify) to conduct a Soil and Agricultural Impact Assessment of the Brewongle Solar Farm (the Project) located in the Central Tablelands region of New South Wales. The Project will involve the construction, operation and decommissioning of a photovoltaic (PV) solar, Battery Energy Storage System (BESS) and associated infrastructure, with a generation capacity of up to 100MWac PV and associated 90MW/360MWh BESS. The Project will comprise approximately 192,000 photovoltaic (PV) modules (solar panels) and is anticipated to have an operational life of 30 years or more.

The Study Area subject to the Project is located at Tarana Road, Bathurst, NSW, 2795, approximately 12 km from the Bathurst town centre in the Bathurst Regional Council Local Government Area (LGA) (refer Figure 1), and covers an area of 299 ha. A preliminary development footprint covers 170 ha. The Study Area has historically been utilised for agricultural practices with evidence of broad native vegetation modification resulting from extensive clearing and agricultural land use. Current land use comprises grazing land, and is consistent with the surrounding locality, which consists of a range of farming properties and rural living properties.

A soil survey undertaken by Minesoils found the Study Area to contain three dominant soil mapping units:

- Soil Unit 1: Chromosols – covering 210 ha.
- Soil Unit 2: Sodosols – covering 69 ha.
- Soil Unit 3: Dermosols – covering 20 ha.

Based on laboratory analysis results, there is a high potential risk for dispersion where the subsoils of Soil Unit 2 are disturbed within the Study Area. Higher impact activities such as where earthworks are necessary for construction of sub-station pads or site facilities are highly likely to result in increased dispersive behaviour when soil is remoulded, compacted or pulverised. In addition, caution must be taken over the entire Study Area including Soil Units 1 and 3, as these units displays a moderate dispersion risk in subsurface soil horizons. Notwithstanding, there is a high level of confidence regarding the Project activities, surface disturbance requirements and erosion and sediment control management options available to mitigate this risk.

The Study Area was also subject to a site verification assessment of land and soil capability (LSC), in accordance with the LSC Guideline, and was found to contain four LSC classes:

- LSC class 2: very high capability land – covering 20 ha.
- LSC class 3: high capability land – covering 130 ha.
- LSC class 4: moderate capability land – covering 58 ha.
- LSC class 5: moderately-low capability land – covering 91 ha.

The Applicant has made key decisions regarding the Project in response to agricultural and land use considerations, including the design of the proposed infrastructure disturbance footprint to avoid, as much as practicable, LSC class 2 lands.

There is a high level of certainty about the status of agricultural resources and enterprises in the Study Area, locality and broader region, based on the site verification assessment undertaken, consultation and desktop studies carried out. Further, there is a high level of confidence regarding the Project activities and requirements and commitments to returning land to pre-disturbance agricultural status following the life of the Project. Based on these factors, the impacts on agriculture as a result of the Project are determined to be low, temporary, and limited to the development footprint. These impacts can be summarised as the following:

- Temporary removal of 170 ha from agricultural land use within the development footprint of the Study Area for the duration of the Project.

- Temporary removal of potential agricultural primary productivity to the estimated value of up to $70,047 per year for the duration of the Project.
- Temporary removal of potential agricultural secondary productivity to the estimated value of up to $152,618, per year for the duration of the Project.
- Temporary impacts on soil resources within the Study Area where surface disturbance occurs.

The temporary impacts on agriculture listed above are considered a negligible impact in the context of the gross commodity values and land use coverage of the agricultural industries operating within the Bathurst Regional Council LGA. Further, at the scale of the enterprises operating within the Study Area, impacts are considered offset as the involved landowners would be financially compensated and are expected to continue farming practices across the balance of the land unimpacted by the proposed infrastructure area.

Following construction and resting period of approximately one year, subject to the approval of Project stakeholders, Edify anticipates the implementation of agrisolar, the integration of solar panels and livestock grazing. This offers the potential to enable the continuation of agricultural land use within the Study Area and mitigates the above listed temporary impacts of the Project.

It is anticipated that by adopting the principles of impact minimisation and targeted soil and erosion management during Project construction and operation, and implementing effective decommissioning and rehabilitation at the end of Project life, the Project will have no permanent negative impacts on agricultural resources or enterprises.

1. INTRODUCTION

1.1 OVERVIEW

Minesoils Pty Ltd (Minesoils) was engaged by Edify Energy Pty Ltd (Edify) to conduct a Soil and Agricultural Impact Assessment of the Brewongle Solar Farm (the Project) located in the Central Tablelands region of New South Wales. The baseline soil and agriculture resources are detailed within this report. The impacts on these resources from the proposed construction, operation and decommissioning phases of the Project are addressed in this report in accordance with relevant regulatory requirements and guidelines.

This report supports a State Significant Development (SDD) Development Consent approval under Part 4, Division 4.7 of the Environmental Planning and Assessment Act 1979 (SSD-36651552), as part of the Environmental Impact Statement (EIS) for the Project.

Secretary's Environmental Assessment Requirements (SEAR's) will be issued for the Applicant to address following submission of a Scoping Report to the Department of Planning and Environment. The objective of this report is address the following items likely to be included in the SEAR's for the Project and as detailed in the NSW Large-scale Solar Energy Guideline (NSW DPE, 2022):

- *a soil survey to determine the soil characteristics and consider the potential for erosion to occur; and*
- *assessment of impact on agricultural resources and agricultural production on the site and region.*

1.2 PROJECT DESCRIPTION

The Project will involve the construction, operation and decommissioning of a photovoltaic (PV) solar, Battery Energy Storage System (BESS) and associated infrastructure, with a generation capacity of up to 1090 MWac PV and associated 90MW/360MWh BESS. The Project will comprise up to 192,000 photovoltaic (PV) modules (solar panels).

The Project is anticipated to connect into the existing TransGrid 132kV overhead transmission line, running from Wallerawang to Panorama (94X). This will require establishing a new substation to enable the project's connection into the overhead transmission line. The substation will include the establishment of a new step-down transformer from 132kV to 33kV. Edify anticipate the total switching station footprint will equate to approximately 150m x 100m.

The built form on the site will consist of the following:

- Solar power station consisting of 'array blocks' typically of 3MVA and 6MVA;
- Battery Energy Storage System(s);
- Site office and car park;
- Access easement (off Tarana road) and perimeter tracks;
- Security fence surrounding boundary of Development Area;
- Buildings including Operations and Maintenance; and
- High Voltage Substation.

The Project is anticipated to have an operational life of 30 years or more. Following construction and resting period of approximately one year, subject to the approval of Project stakeholders such as Rural Fire Service, Bathurst Regional Council and the Project's insurance providers, Edify anticipates that sheep can be introduced to graze within the Project boundary. This combined land use offers the potential to enable the continuation of agricultural land usage.

1.3 STUDY AREA

The Study Area is located at Tarana Road, Bathurst, NSW, 2795, approximately 12 km from the Bathurst town centre in the Bathurst Regional Council Local Government Area (LGA) (refer **Figure 1)**, and covers an area of 299 ha (refer **Figure 2**).

The Study Area has historically been utilised for agricultural practices with evidence of broad native vegetation modification resulting from extensive clearing and agricultural land use. Current land use comprises grazing land, and is consistent with the surrounding locality, which consists of a range of farming properties and rural living properties. The majority of built structures in the immediate vicinity of the Study Area are rural-residences and agricultural buildings (e.g. hay / machinery shedding).

The indicative Development Area (Impact Area) will be a portion of the 299ha Study Area, being approximately 170 hectares. The final design will confirm the avoidance or removal of farm dams on site and will confirm total amount of avoidance of the mapped corridor of Biophysical Strategic Agricultural Land (refer **Figure 2**).

1.4 ASSESSMENT APPROACH

The assessment has been undertaken in accordance with the *Large-Scale Solar Energy Guidelines* (LSSE Guidelines) (NSW DPIE, 2022) which includes requirements to undertake a soil survey and verify land and soil capability (LSC) in accordance with *Land and Soil Capability Assessment Scheme* (LSC Scheme) (EOH 2012). The results of the site verification, as presented in Section 3.2, determined the level of agriculture impact assessment as Level 3 – Detailed, as per the LSSE Guidelines. The assessment requirement pathway is presented in **Figure 3**. The requirements for this level of assessment, and where these items are addressed in this report, are presented in **Table 1**.

1.5 CONSULTATION

Extensive consultation is being carried out with a range of stakeholder groups and individual stakeholders during the current scoping phase of the Project. These include regulators who have a decision-making role in project approvals, and groups or individuals who may be directly or indirectly affected by the project.

Consultation has included formal and informal engagement with the following as indicated in the Scoping Report:

- NSW Department of Primary Industries;
- NSW Department of Planning and Environment;
- Bathurst Regional Council;
- Bathurst Business Chamber;
- Transgrid;
- Local aboriginal groups;
- Neighbouring landowners; and
- The local community.

Direct consultation to inform this assessment was undertaken with land managers regarding current and historical management of land and agricultural practices on the Study Area and its surrounds, and the potential effects on local industries, support services and agribusinesses as a result to changes to agricultural enterprises in the Study Area.


740000
745000
750000
755000
760000
6305000
6300000
6295000
6290000
6285000
6280000
Site Location
Bathurst
Oberon
BATHURST
KELSO
RAGLAN
SYDNEY ROAD
GREAT WESTERN HIGHWAY
NAPOLEON REEF
WALANG
SUNNY CORNER STATE FOREST
MACQUARIE PLAINS
BREWONGLE
BOSWORTH FALLS
WAMBOOL NATURE RESERVE
LOWES MOUNT STATE FOREST
CLEAR CREEK ROAD
THOMAS DRIVE
ELEVEN MILE DRIVE
SOFALA ROAD
LAFFING WATERS LANE
LIMEKILNS ROAD
YARRAS LANE
MARSDEN LANE
GLANMIRE LANE
MERSING ROAD
WINBURNDALE ROAD
GULF BOUNDARY ROAD
WALANG DRIVE
SIBLEYS ROAD
YETHOLME DRIVE
TIMBER RIDGE ROAD
COLLEGE ROAD
VALE ROAD
GORMANS HILL ROAD
LLOYDS ROAD
LAGOON ROAD
WHITE ROCK ROAD
O'CONNELL ROAD
TARANA ROAD
BREWONGLE LANE
BURKES LANE
RIDGE ROAD
WAMBOOL ROAD
RIVER ROAD
BOSWORTH FALLS ROAD
BIDGERBBIN ROAD
HOLLIS LANE
RYANS ROAD
O'CONNELL PLAINS ROAD
SINCLAIRS LANE
MUTTON FALLS ROAD
BLOOM HILL ROAD
CARLWOOD ROAD
PURDONS LANE
BEACONSFIELD ROAD
GARTHOWEN LANE
RYANS LANE
Legend
Study Area
Water Features
NPWS Reserves
State Forest
GDA2020 MGA Zone 55
0 0.5 1 2
Km
Scale 1:125000 at A4
MINESOILS
LAND & REHABILITATION SPECIALISTS
Project Locality
FIGURE 1
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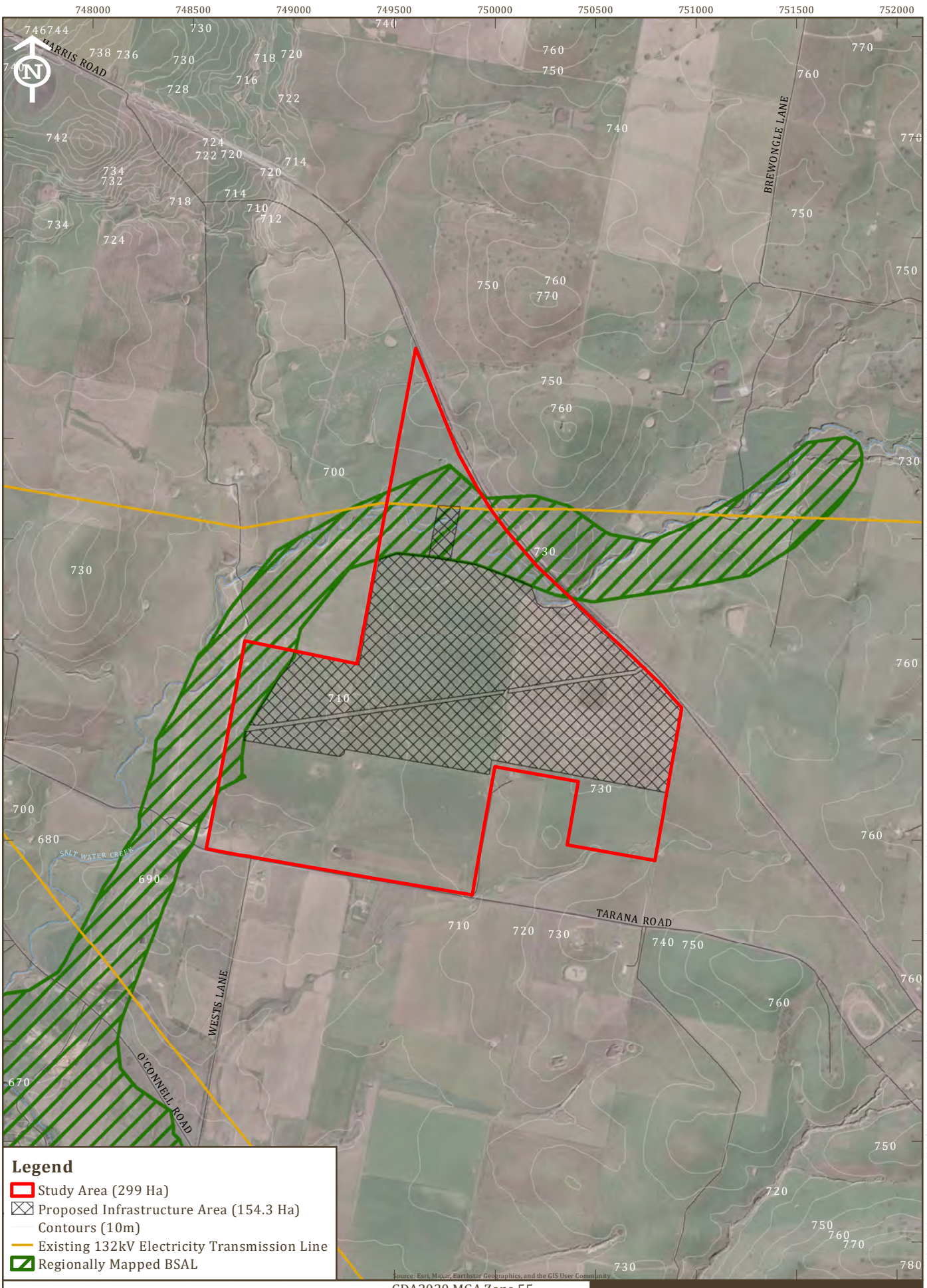

GDA2020 MGA Zone 55

MINESOILS
LAND & REHABILITATION SPECIALISTS

0 125 250 500 Meters

Scale 1:25000 at A4

Brewongle Solar Farm
Project Site

FIGURE 2

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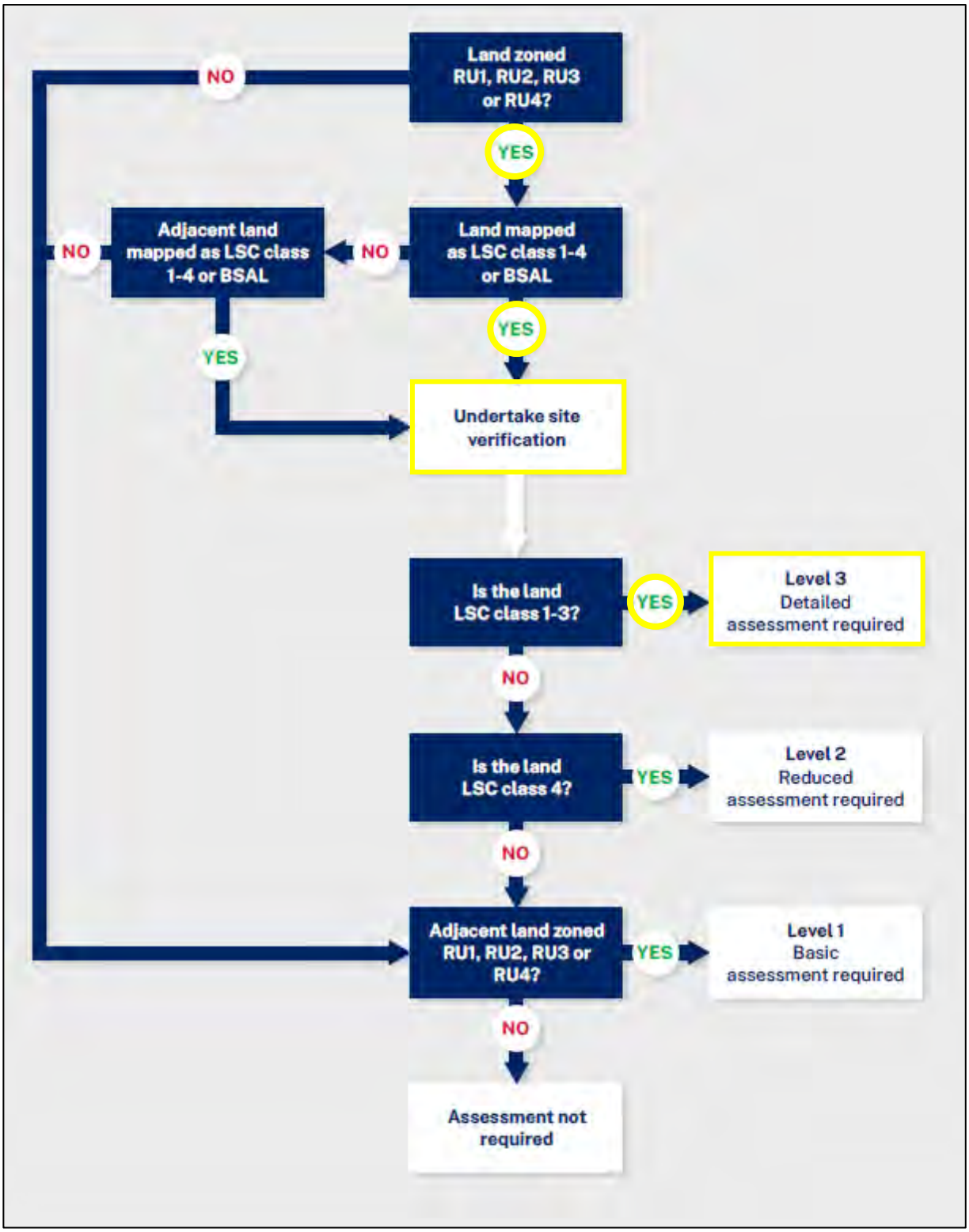
Figure 3. Agricultural Assessment Requirement Pathway



(NSW DPIE, 2022)

Table 1: Requirements of 'Level 3 - Detailed' Assessment and Section Addressed

Assessment	Content and form	Section Addressed
Project description Describe the nature, location, intensity and duration of the project and include a map of the Study Area.	• project description • areas of the site that would be disturbed or temporarily removed from agricultural use • location • duration	**1**
Regional context Describe the regional context.	• property zoning • climate and rainfall • regional landform • regional land use including any significant agricultural industries and/or infrastructure	**2**
Site characteristics and land use description Describe the nature and location of agricultural land with the potential to be impacted by the development. Describe the current agricultural status and productivity of the proposed development area and surrounding locality including the LSC scheme.	• describe the land subject to the Study Area • describe existing agricultural land uses • describe the history of agricultural practices on the Study Area • identify soil type, fertility, land and soil capability • provide a map showing the verified LSC class of the Study Area • provide a map showing topography of the site • describe the agricultural productivity of the site	**3**
LUCRA assessment Conduct an assessment of potential land use conflicts, including completion of an assessment in accordance with the Department of Industries' Land Use Conflict Risk Assessment Guide	• land use compatibility and conflicts • discuss compatibility of the development with the existing land uses on the site and adjacent land (e.g. aerial spraying, dust generation and biosecurity risk) during operation and after decommissioning, with reference to the zoning provisions applying to the land	**4** **(Appendix 1)**
Impacts on agricultural land Identify and describe the nature, duration and consequence of any potential impacts on agricultural land subject to the Study Area and in the wider region	• describe project impacts on identified agricultural productivity and enterprises including but not limited to livestock, cropping activities, orchard production., etc • consider impacts to the agricultural land of the site • consider project potential to temporarily and/or permanently remove agricultural land and/or fragment or displace existing agricultural industries • consider cumulative impacts of multiple solar projects • a detailed assessment of whether the project would significantly impact the local or regional agricultural industry, including production and supply chains	**5**
Mitigation strategies Outline strategies which may be adopted to mitigate potential impacts on agricultural land and minimise land use conflict.	• outline and consider strategies to mitigate project impacts on agricultural land • consider co-location with existing agricultural practices and investigate feasibility of agrisolar where it would result in a meaningful benefit • justification for the project considering other alternatives which would have lesser impacts on agricultural land. Applicants must demonstrate that other project sites and siting options have been considered and state the reasons why the site and layout was chosen over alternative options • an analysis of whether site design could be amended to reduce impacts	**6**

2 REGIONAL CONTEXT

2.1 ZONING

The Proposal would be contained within, Lot 1 DP 1206130, Lot 1 DP 1236901 and Lot 2 DP 1236901. (refer **Figure 4**). The Study Area is zoned as RU1 (Primary Production) under the *Bathurst Regional Local Environmental Plan 2014* (Bathurst Regional LEP) (refer **Figure 4**). The objectives of this zone are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base
- To encourage diversity in primary industry enterprises and systems appropriate for the area
- To minimise the fragmentation and alienation of resource land
- To minimise conflict between land uses within this zone and land uses within adjoining zones
- To maintain the rural and scenic character of the land
- To provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.

Development for the purpose of electricity generation is not specified in item 2 or 3 of the RU1 Primary Production Land Use Table under Part 2 of the LEP, therefore the development is 'Prohibited' according to item 4. However, the provisions of the State Environmental Planning Policy (Transport and Infrastructure) 2021 override the LEP, allowing the proposal to be undertaken with consent under clause 2.36 (1(b)).

2.2 CLIMATE AND RAINFALL

The Study Area is located in the Central Tablelands. this region is often referred to as the High Rainfall Zone (HRZ), has a more-or-less uniform year-round rainfall distribution and an average annual rainfall of more than 600mm. In summer, evaporation exceeds rainfall, reducing pasture growth and this is magnified at lower altitude where rainfall is lower and temperatures higher. In winter rainfall exceeds evaporation, but cooler temperatures slow pasture growth and this impact is greater at the higher altitude (EverGraze, 2023).

The climate around the Central Tablelands is strongly influenced by topography and the movement of cold air. During the cooler months, cooler air drops into the valleys and the concentration of this colder air increases the number of frosts in some areas. The frost period ranges from five to eight months of the year, significantly impacting pasture growth. The Central Tablelands is renowned for their mild summers and cool winters with snow falling in most years, increasing in frequency as elevation increases. There is a strong association between altitude and temperature (EverGraze, 2023).

The closest Bureau of Meteorology (BOM) weather station to the Study Area is the Bathurst Airport Automatic Weather Station (AWS) (063291). This station is located approximately 6 km northwest of the Study Area and has a data range from 1988 to present (BOM, 2023). The average maximum temperature ranges from 28.9°C in January, down to 12.9°C in July, while average minimum temperatures range from 14.0°C in January, down to 0.8°C in July.

The annual average rainfall is 616.4 mm, with the highest average rainfall of 71.2 mm falling in November, and the lowest average rainfall of 33.1 mm falling in April. Rain generally falls over approximately 71 days.

2.3 REGIONAL LANDFORM

2.3.1 REGIONAL LANDFORM CHARACTERISTICS

The Central West comprises an area of 6.3 million ha, stretching from the elevated Central Tablelands on the western side of the Blue Mountains, and extending almost 500km to the Central West Plains.

The region includes the LGAs of Bathurst, Blayney, Cabonne, Cowra, Forbes, Lachlan, Lithgow, Oberon, Orange, Parkes, and Weddin. The Study Area is also captured within the Central West Slopes and Plains Sub Region, an area of 94,215km^2 which incorporated land in both the Lachlan and Macquarie river valleys, including Parkes, Forbes, Weddin, Lachlan, Dubbo, Warrumbungle, Gilgandra, Coonamble, Narromine, Warren and Bogan.

The Central Tablelands sub-region is broadly located in the Upper Lachlan, Lachlan Slopes, Upper Macquarie and Mid Macquarie sub catchments. It covers the western fall of the Great Dividing Range and includes the towns of Lithgow in the east to Cowra in the west, and Gulgong in the north to Oberon in the south.

The Central Tablelands is distinguished from other Australian regions by its dissected ranges, granite basins and once extensive woodlands. The Lachlan and Macquarie Rivers are the major drainage systems. River She-oak (*Casuarina cunninghamiana*) dominates the riparian vegetation at lower elevations while Ribbon Gum (*Eucalyptus viminalis*) is more often encountered higher up. Much of the remaining vegetation occurs on the poorer granitic soils, composing dry sclerophyll forests dominated by eucalypts (NSW Biodiversity Conservation Trust, 2023).

At the scale of the Bathurst Regional Council LGA, the region consists of two physical components, the Bathurst Basin and the tablelands area, which are drained by the Fish, Campbells, Macquarie and Turon Rivers to the north and the Isabella and Abercrombie Rivers to the south. Fertile alluvial soils occur along valley floors and along the Macquarie River through the LGA.

Topography of the region ranges from slightly undulating to rough and very steep country. Approximately 20 km to the east of the Study Area is the folded and faulted sedimentary and metamorphosed formations of the Great Dividing Range which runs roughly north–south.

2.3.2 REGIONAL GEOLOGY

The region occurs in the Lachlan Fold Belt, composed of Cambrian to Early Carboniferous sedimentary and volcanic rocks. Valleys between ranges in this area are generally either granite or softer rocks like shale, phyllite or slate. Granites are common across the Lachlan Fold Belt area, occurring either as basins surrounded by steep hills, or as rock outcrops and plateaus (NSW NPWS, 2003).

The northern section of the Bathurst Regional Council LGA comprises sandstones, conglomerates, greywack, siltstones, limestones and minor volcanos whilst the central basin is comprised predominately of granite soils. The southern section is more complex with siltstones, sandstones, greywacks, shales and chert, basalt and granite intrusions, embedded volcanic and limestones (Watkins et al, 1997). The dominant underlying geology of the Study Area is the Early Carboniferous to Carboniferous Bathurst granite, which consists of coarse-grained, porphyritic biotite granite, porphyritic granite and granodiorite, aplite (refer **Figure 5**).

2.4 REGIONAL LAND USE

2.4.1 AGRICULTURAL LAND USE

The Central Tablelands region covers over 3 million hectares, with 78% of land under agricultural production (BOM and the CSIRO, 2019), containing 3.2% of NSW's agricultural land (NSW Local Land Services, 2023). European settlers first inhabited the region in the early 1820s and found the grassy woodlands and plains on basalt soils attractive for both grazing and cropping.

At the scale of the LGA, Bathurst Regional Council covers an area of 4,720 km^2 and supports a population of approximately 44,000 people, and includes the city of Bathurst and nine rural villages; Georges Plains, Hill End, Peel, Rockley, Sofala, Sunny Corner, Trunkey Creek, Wattle Flat and Yetholme.

Within the LGA, 152,636 ha of land is subject to agricultural activity (ABS, 2022a). The area of land use for of the agricultural types for the Bathurst Regional Council LGA is presented in **Table 2**, which shows grazing as the dominant land use, accounting for approximately 93% of this area (ABS, 2022a).

Table 2: Bathurst Regional Council LGA Agricultural Land Use by Type 2020 - 2021

Agricultural Land Use	Area	
	ha	%
Grazing	142,198	93
Cropping	8,705	6
Forestry	1,001	<1
Other	732	<1
Total	152,636	100

2.4.2 AGRICULTURAL ENTERPRISES

The Central Tablelands region supports a diverse mix of agricultural enterprises. Grazing, predominantly sheep and cattle, and broadacre cropping are the two largest industries, along with vegetables, pome and stone fruit, wine and table grapes and nursery (cut flowers) (BOM and the CSIRO, 2019). The area includes properties that make up 4.2% of NSW's annual value of agricultural production and includes almost 10% of NSW's agricultural business (NSW Local Land Services, 2023).

For the census year of 2020 – 2021, there were 266 livestock grazing businesses and 94 cropping enterprise businesses in the LGA (ABS 2022a). The gross value of agricultural enterprises within the Bathurst Regional Council LGA for 2020-2021 is $72 million (ABS 2022b). As shown in **Table 3**, livestock for slaughter accounts for 52% of the total gross value of agriculture for the LGA. Other key enterprises are cropping and livestock products.

For livestock slaughtered, cattle and calves make up 55% of the gross value with sheep and lambs making up 44% (refer **Table 5**). Within the category of cropping, vegetables and hay are the dominant enterprises (refer **Table 4**), collectively contributing more than two thirds of crop value (ABS, 2022b). For livestock products wool contributes 90% of the gross value (refer **Table 6**) (ABS, 2022b).

Table 3: Bathurst Regional Council LGA Agricultural Commodity Gross Value by Type 2020 - 2021

Agricultural Commodity	Gross Value	
	$	%
Livestock for slaughter	36,957,911	52
Crops	22,789,385	32
Livestock products	11,775,730	16
Total	71,523,026	100

Table 4: Bathurst Regional Council LGA Livestock Gross Value by Type 2020 - 2021

Livestock	Value	
	$	%
Cattle and calves	20,420,052	55
Sheep and lambs	16,159,584	44
Pigs	195,918	1
Other	176,569	0
Poultry	5,788	0
Total	36,957,911	100

Table 5: Bathurst Regional Council LGA Crop Gross Value by Type 2020 - 2021

Crop	Value	
	$	%
Vegetables	7,998,150	35
Hay	7,969,989	35
Nurseries, cut flowers or cultivated turf	3,400,670	15
Wheat for grain	1,675,952	7
Fruit and nuts	599,057	3
Canola	457,176	2
Oats for grain	402,255	2
Total	22,789,385	100

Table 6: Bathurst Regional Council LGA Livestock Product Gross Value by Type 2020 - 2021

Agricultural Commodity	Gross Value	
	$	%
Wool	10,552,103	90
Milk	1,211,619	10
Eggs	12,007	<1
Total	11,775,730	100

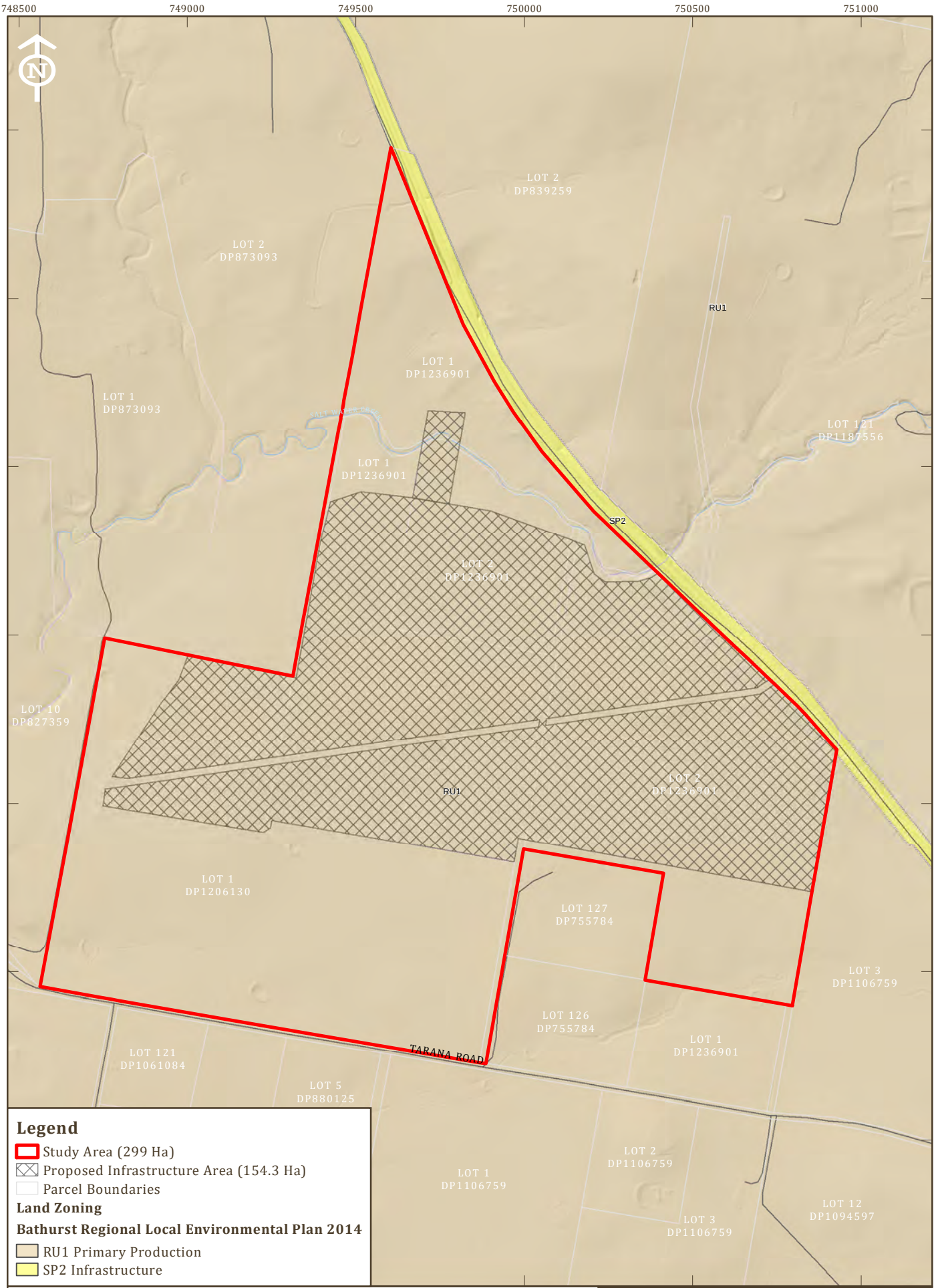
2.4.3 REGIONAL AGRICULTURAL INFRASTRUCTURE

The key infrastructure item assisting agricultural market access and cost of production is the transport network servicing the central west region. Underlining the importance of this issue, total freight costs from farm to port can be as much as 30% of the value of the crop being marketed depending on Australian and world commodity prices in a given season. The Study Area is located approximately 4 km south of the Great Western Highway (A32). The region is traversed by this highway and the Mid Western Highway and Mitchell Highway, as well as the Main Western Railway Line, link agricultural enterprises to Sydney, Newcastle and Brisbane, as well as other regional centres.

In proximity to the Study Area, the large agricultural service centres of Bathurst (approximately 12km north west) and Lithgow (approximately 50km east) allow access to businesses providing agricultural equipment and supplies, including animal fencing, animal vaccinations, livestock ID, stock supplements, seed, fertiliser and crop protection.

The Central Tablelands Livestock Exchange (CTLX), located at Carcoar on the Mid Western Highway, provides the region with a state-of-the-art livestock auction facility. The CTLX opened in 2008 to replace outdated council saleyards at Orange, Bathurst and Blayney.

Other infrastructure critical to agricultural production include energy needs (gas and electricity), telecommunications services, urban water and wastewater services. General agricultural improvements such as stock fences, shedding, dams and access tracks are widespread throughout the locality which reflects the historical and current development of the local lands for agricultural use.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Legend
Study Area (299 Ha)
Proposed Infrastructure Area (154.3 Ha)
Parcel Boundaries
Land Zoning
Bathurst Regional Local Environmental Plan 2014
RU1 Primary Production
SP2 Infrastructure
GDA2020 MGA Zone 55
0 100 200 400
Meters
Scale 1:15000 at A4
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LAND & REHABILITATION SPECIALISTS
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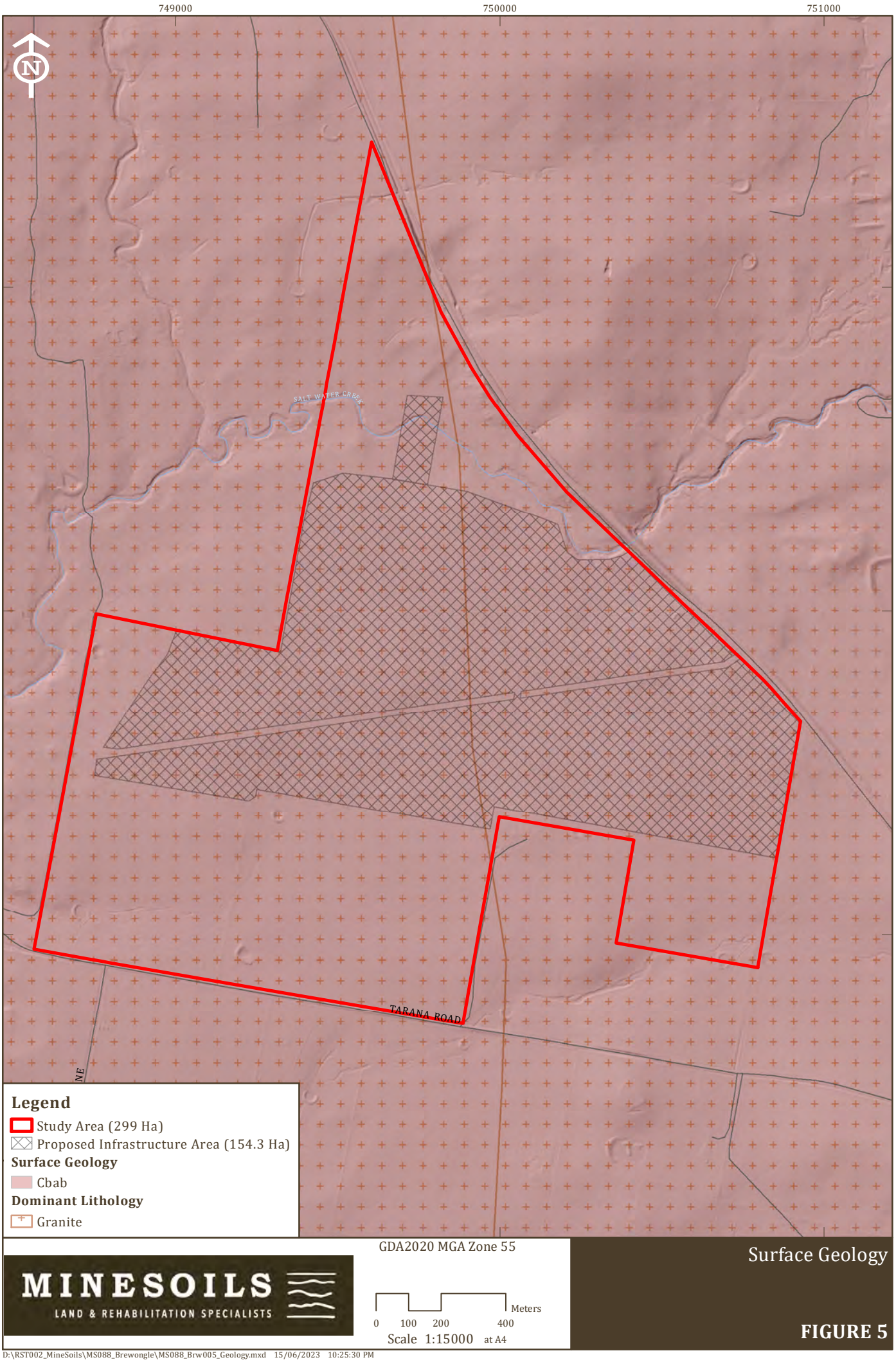
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SALT WATER CREEK
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Study Area (299 Ha)
Proposed Infrastructure Area (154.3 Ha)
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Surface Geology
FIGURE 5
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3 SITE CHARACTERISTICS AND LAND USE

3.1 SITE CHARACTERISTICS

3.1.1 LANDSCAPE

A site inspection was undertaken by Minesoils in May 2023. The Study Area was determined to be a stable, free draining landform with 80 - 100% surface cover in sustainable pasture that has been highly disturbed in the past by land clearing for agriculture (**Plate 1**). The Study Area landscape is characterised by gently undulating low rolling hills and crests, with narrow drainage flats associated with Saltwater Creek. The lowest elevation is approximately 700 m on drainage flats and rises to 750 m on crested areas (refer **Figure 6**).

Isolated exotic trees exist along Saltwater Creek, which runs east to west in the northern part of the Study Area is a tributary of Fish Creek which flows into the Macquarie River approximately 7.5 km south west of the Study Area.

There is an existing Transgrid 132 kV powerline that runs along the creek on the northern extent of the Study Area and also an underground gas line easement that runs through the middle of the site. A rail line that runs to the north of the Study Area, adjoins the northern boundary on the eastern side.

3.1.2 AGRICULTURAL LAND USE

The Study Area is subject to livestock as the primary land-use, supporting sheep, cattle and calves, which are grazed on rotation for breeding and fattening, and are watered through two surface dams and pumped in water. Select paddocks are currently subject to mixed species fodder blend of brassica, oats and barley (**Plate 2**).

The Study Area is not fertilised, and there is no ongoing use of herbicides according to current landholder. General agricultural improvements are present, including troughs and lick feeders (**Plate 3**) a cattle yard (**Plate 4**), stock fences and gates (**Plate 5**), water pumps, tanks and dams, and unsealed access tracks.

Cattle and sheep were observed to be grazing within the Study Area at the time of the site investigation (**Plate 6**).

Based on satellite imagery, site observation, soil and land capability, and anecdotal evidence, it is determined that the Study Area has historically been used for cropping in addition to livestock grazing. Cropping included hay, wheat and canola. Anecedotal evidence priovided by landholder inidicates no cropping has been undertaken in the last seven years.

At the time of inspection, neighbouring properties in the immediate vicinity were observed to be used primarily for livestock grazing, with some cropping also being undertaken within the broader locality. Similar agricultural improvements (e.g. stock fences, dams and existing access tracks) are widespread throughout the locality which reflects the historical and current development of the local lands for these land uses.

No sensitive agricultural activities such as intensive plant or livestock agriculture are being undertaken within the Study Area or its immediate surrounds.

3.1.3 AGRICULTURAL PRODUCTIVITY

Agricultural productivity is subject to long term climate and rainfall variables, as well as changes in economic, social and policy frameworks, often at a scale well beyond the Study Area. There is no set agricultural productivity value for land under agricultural use.

The NSW Department of Primary Industries (2019, 2022) Gross Margin Budgets for Livestock can be used to provide a broad estimation of the productivity of the land for grazing within the Study Area. Based on the DPI cattle and sheep enterprise options of 'Growing-out Steers (240 – 460 kgs)' and 'Merino Ewes (20 micron) – Merino Rams,' the estimated productivity ranges from $119,525 to $123,200 per annum for the Study Area, and $67,958 to $70,047 per annum for the development footprint, as summarised in **Table 7**.

Plate 1: Lands cleared for grazing on sustainable pastures with presence of exotic trees along Saltwater Creek

Plate 2: Lands cleared for grazing on mixed species fodder blend of brassica, oats and barley.

Plate 3: Agricultural infrastructure within the Study Area includes troughs and lick feeders.

Plate 4: Agricultural infrastructure within the Study Area includes cattle yards.

Plate 5: Agricultural infrastructure includes fencing and gates.

Plate 6: Cattle observed during the site investigation.

Table 7: Estimated Productivity of Grazing Land within the Study Area

		Study Area		Development Footprint	
Enterprise	**Estimated Gross Margin ($/ha/year)**	**Grazing Land (ha)**	**Study Area Gross Margin ($/year)**	**Grazing Land (ha)**	**Development Footprint Gross Margin ($/year)**
Growing-out Steers 240 – 460kg	412.04	299	123,199.96	170	70,046.80
Merino Ewes (20 micron) – Merino Rams	399.75	299	119,525.25	170	67,957.5

The related economic activity arising from the Study Area enterprises is referred to as the secondary productivity. The value of secondary productivity can be calculated using an economic multiplier. Agricultural economic multipliers provide annual estimates of employment and output effects of trade in agricultural products on the economy. When expressed as multipliers, these effects reflect the amount of economic activity and jobs generated by agricultural exports.

There are a range of upstream and downstream employment roles associated with agricultural production in the Project locality and wider region. These include:

- Agronomy services.
- Input providers (chemical, fertilisers, etc).
- Machinery sales and mechanical support.
- Grain and livestock transport.
- Production marketing.
- Fencing, harvest and other contractors.

Upstream activities for the current Study Area enterprises include contractors, farm input and service providers. Downstream activities for the current landowners' enterprises include distribution and processing (value adding). The related economic activity from the proposed solar farm area can be calculated using the economy multiplier of 2.1788, as used by ABS.

By applying the economic multiplier of 2.1788 to the estimated productivity, the value to the broader economy equates to an estimated $260,421 to $268,428 per year of the Project for the Study Area and $148,066 to $152,618 per year for the development footprint.

3.2 SOIL SURVEY AND SITE VERIFICATION

3.2.1 EXISTING SOILS INFORMATION

The following section presents the NSW state government regional mapping data for soil landscapes, soil types, inherent soil fertility and LSC as applied to the Study Area (NSW and Department of Planning, Industry and Environment, 2022).

Soil Landscapes

The Study Area lies within the *Soil Landscapes of the Bathurst 1:250 000 Sheet Report* (Kovac et al, 2010). Soil landscapes are an inventory of soil and landscape information with relatively uniform land management requirements, allowing major soil and landscape qualities and constraints to be identified.

The soil landscapes within the Study Area are shown on **Figure 7** and described below**.**

Raglan

This landscape comprises the gently undulating to undulating rises on the Bathurst Plains. Red Solodic Soils are the dominant soils with Yellow Solodic Soils commonly found on lower slopes and in drainage depressions. Some Non-calcic Brown Soils are associated with Bathurst soil landscape on upper slopes. Massive Red Earths and Yellow Earths are also present.

Macquarie

This soil landscape includes the alluvial plains and terraces of the Macquarie, upper Belubula and Campbells Rivers, as well as Summer Hill, Flyers and Saltwater Creeks. Prairie Soils are the dominant soils on the floodplain. Other soils include earthy loams, Siliceous Sands and loams, Wiesenboden and Black Earths. Terraces have a variety of soils including Red Podzolic Soils and Red Earths on the upper levels, with Yellow Podzolic Soils and Yellow Solodic Soils on middle and lower levels.

Bathurst

The Bathurst soil landscape is located on hills around Bathurst and has Non-calcic Brown Soils with Yellow Solodic Soils on the lower slopes and in drainage lines. Sands and mottled Yellow Solodic Soils also occur.

Soil Types

The NSW regional soil mapping indicates the dominant soil types within the Study Area are Chromosols, Sodosols and Dermosols, as per Australian Soil Classification (ASC) (Isbell, R. F.,2021) (refer **Figure 8**).

Chromosols are defined as soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) is not sodic and not strongly acid. Soils with strongly subplastic upper B2 horizons are also included even if they are sodic.

Sodosols are soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) is sodic and not strongly acid.

Dermosols are soils other than Vertosols, Hydrosols, Calcarosols and Ferrosols which:

1. Have B2 horizons that have grade of pedality greater than weak throughout the major part of the horizon, and
2. Do not have clear or abrupt textural B horizon.

Inherent Soil Fertility

NSW regional mapping provides an estimation of the inherent fertility of soils in NSW. It uses the best available soils and natural resource mapping developed for LSC dataset. The mapping describes soil fertility in NSW according to a five-class system: Low (1), Moderately low (2), Moderate (3), Moderately high (4), High (5).

Soils with 'Low' fertility, due to their poor physical and/or chemical status, only support limited plant growth. Soils with 'Moderately Low' fertility can generally only support plants suited to grazing; large inputs of fertiliser are required to make the soil suitable for arable purposes. Soils with 'Moderate' fertility usually require fertilisers and/or have some physical restrictions for arable use. Soils with 'Moderately High' fertility have a high level of fertility in their virgin state which is significantly reduced after a few years of cultivation (Murphy *et al.*, 2007).

The Study Area is dominated by soils with Moderately Low (2), Moderate (3) and Moderately High (4) fertility (refer **Figure 9**).

Land and Soil Capability

Land capability, as detailed in LSC Scheme, is the inherent physical capacity of the land to sustain a range of land uses and management practices in the long term without degradation to soil, land, air and water resources. Failure

to manage land in accordance with its capability risks degradation of resources both on and off-site, leading to a decline in natural ecosystem values, agricultural productivity, and infrastructure functionality.

The scheme uses the biophysical features of the land and soil to derive detailed rating tables for a range of land and soil hazards. The scheme consists of eight classes, which classify the land based on the severity of long-term limitations. The LSC classes are described in **Table 8** and their definition has been based on two considerations:

- The biophysical features of the land to derive the LSC classes associated with various hazards.
- The management of the hazards including the level of inputs, expertise and investment required to manage the land sustainably.

The biophysical features of the land that are associated with various hazards are broadly soil, climate and landform, specifically noted as slope, landform position, acidity, salinity, drainage, rockiness; and climate. The eight hazards associated with these biophysical features that are assessed by the LSC scheme are:

1. Water erosion
2. Wind erosion
3. Soil structure decline
4. Soil acidification
5. Salinity
6. Water logging
7. Shallow soils and rockiness
8. Mass movement

Each hazard is assessed against set criteria tables, as described in the LSC Guideline, with each hazard ranked from 1 through to 8 with the overall ranking of the land determined by its most significant limitation.

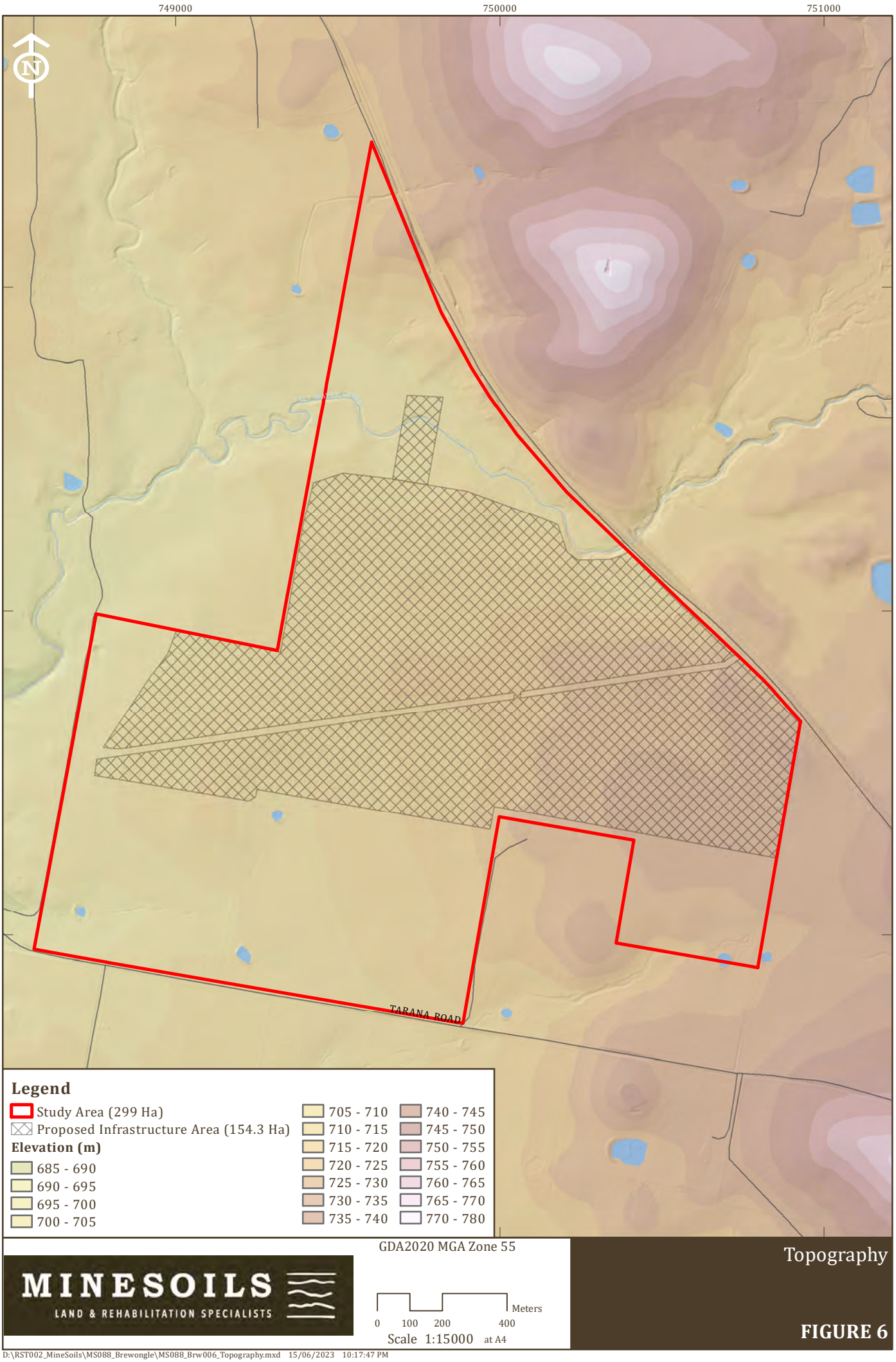
Table 8: Land and Soil Capability Classification

Class	Land and Soil Capability
Land capable of a wide variety of land uses (cropping, grazing, horticulture, forestry, nature conservation)	
1	**Extremely high capability land**: Land has no limitations. No special land management practices required. Land capable of all rural land uses and land management practices.
2	**Very high capability land**: Land has slight limitations. These can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation.
3	**High capability land**: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.
Land capable of a variety of land uses (cropping with restricted cultivation, pasture cropping, grazing, some horticulture, forestry, nature conservation)	
4	**Moderate capability land**: Land has moderate to high limitations for high-impact land uses. Will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology.
5	**Moderate–low capability land**: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.
Land capable for a limited set of land uses (grazing, forestry and nature conservation, some horticulture)	
6	**Low capability land**: Land has very high limitations for high-impact land uses. Land use restricted to low-impact land uses such as grazing, forestry and nature conservation. Careful management of limitations is required to prevent severe land and environmental degradation.
Land generally incapable of agricultural land use (selective forestry and nature conservation)	
7	**Very low capability land**: Land has severe limitations that restrict most land uses and generally cannot be overcome. On-site and off-site impacts of land management practices can be extremely severe if limitations not managed. There should be minimal disturbance of native vegetation.
8	**Extremely low capability land**: Limitations are so severe that the land is incapable of sustaining any land use apart from nature conservation. There should be no disturbance of native vegetation.

The NSW regional based maps of LSC indicate the Study Area consists of land capable of a variety of land uses and characterised by LSC class 2: Very high capability land, LSC class 3: High capability land and LSC class 4: Moderate capability land (refer **Figure 10**).

Strategic Regional Land Use Policy Mapping

The 'NSW Government's Strategic Regional Land Use Policy' (the Policy) defines and identifies strategic agricultural land across NSW. Strategic agricultural land includes land with unique natural resource characteristics, known as biophysical strategic agricultural land (BSAL), and clusters of significant agricultural industries known as critical industry clusters (CICs). The Policy has been developed to achieve balanced land use outcomes, particularly between mining, coal seam gas and agriculture. There is a stretch of BSAL in close association with Salt Water Creek within the northern extent of the Study Area (refer **Figure 2**).



MINESOILS
LAND & REHABILITATION SPECIALISTS

Topography

FIGURE 6

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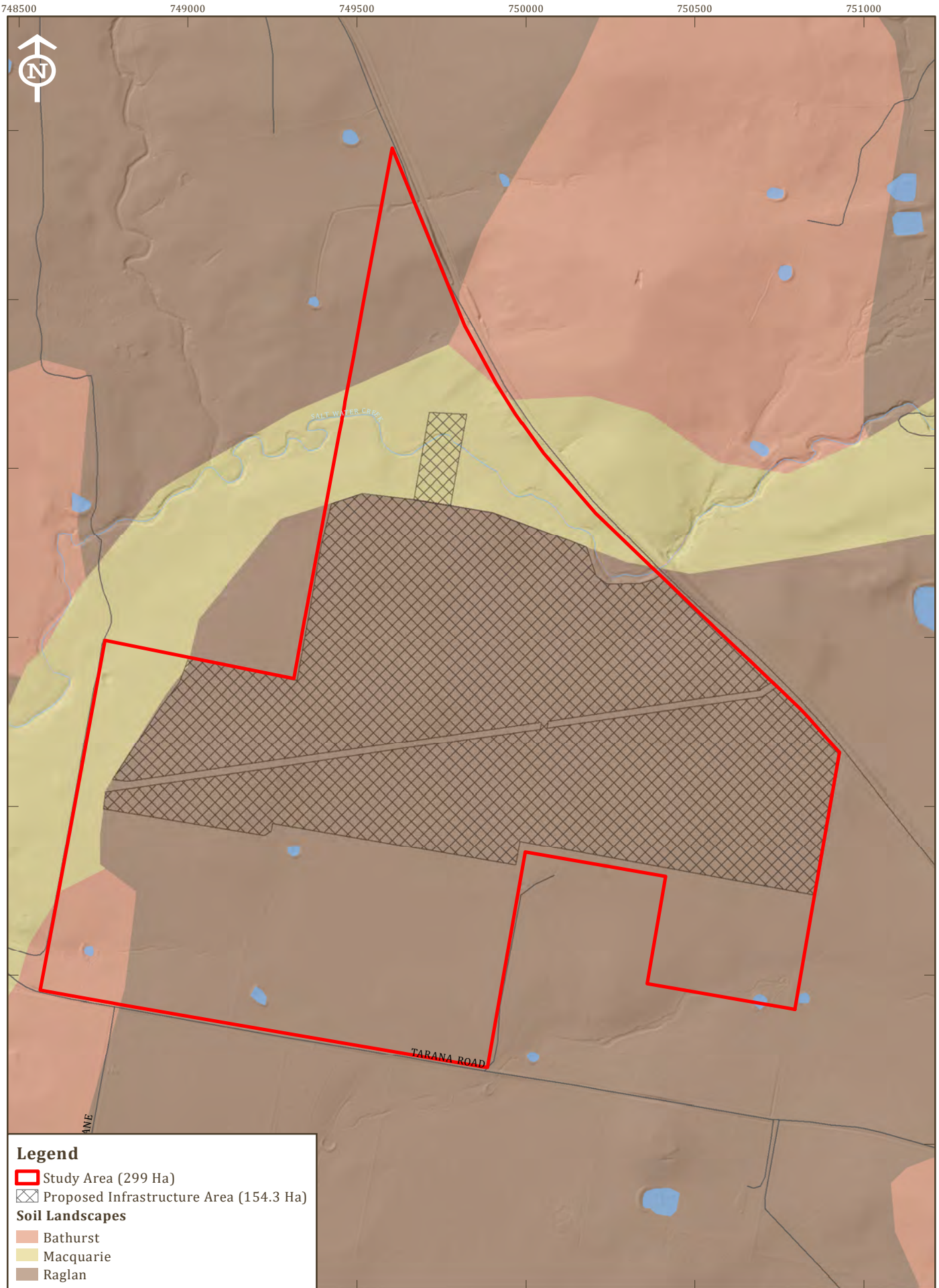
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N
SALT WATER CREEK
TARANA ROAD
Legend
Study Area (299 Ha)
Proposed Infrastructure Area (154.3 Ha)
Soil Landscapes
Bathurst
Macquarie
Raglan
GDA2020 MGA Zone 55
Meters
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MINESOILS
LAND & REHABILITATION SPECIALISTS
Regionally Mapped
Soil Landscapes
FIGURE 7
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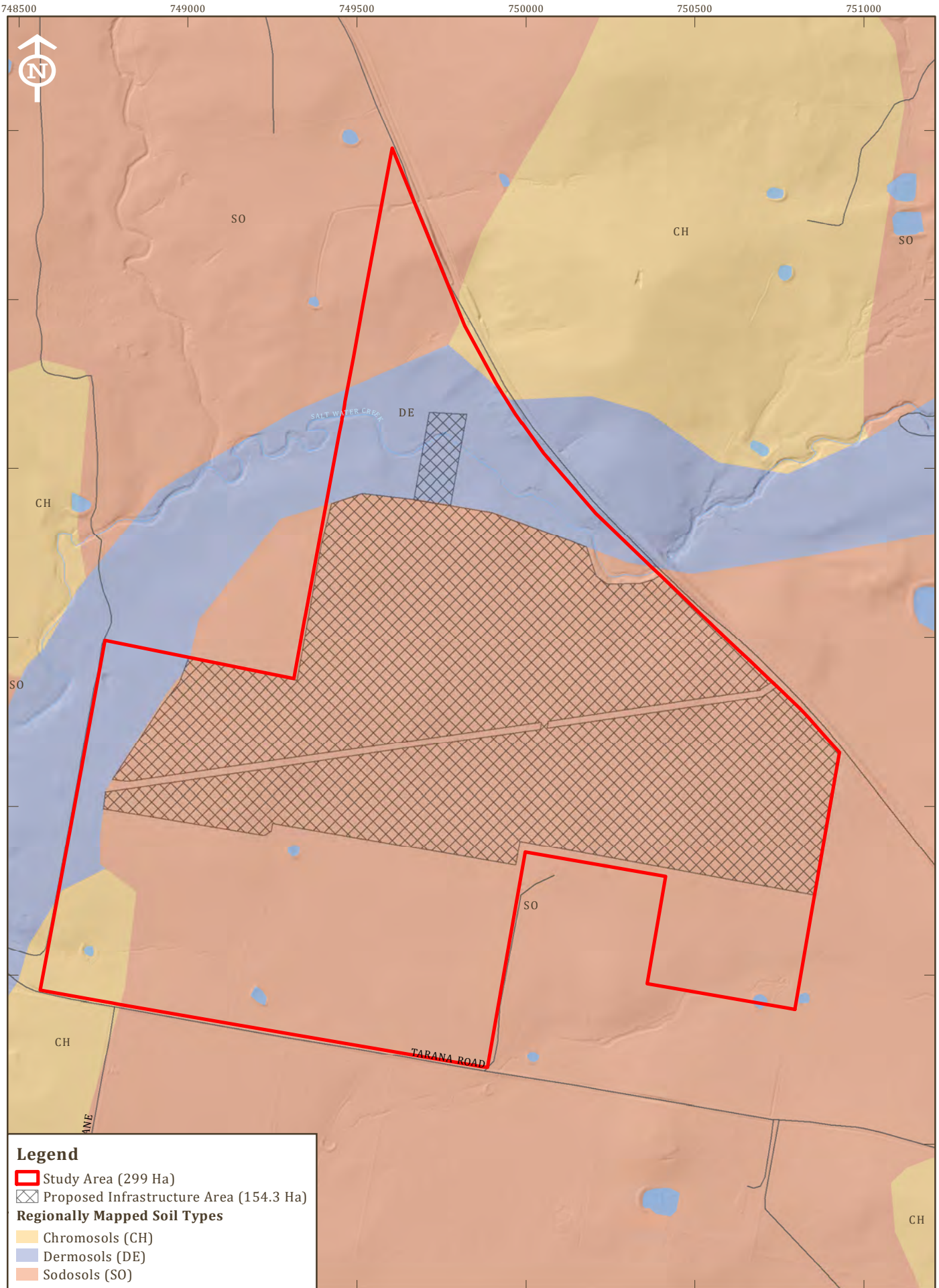

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MINESOILS
LAND & REHABILITATION SPECIALISTS

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Regionally Mapped Soil Types

FIGURE 8

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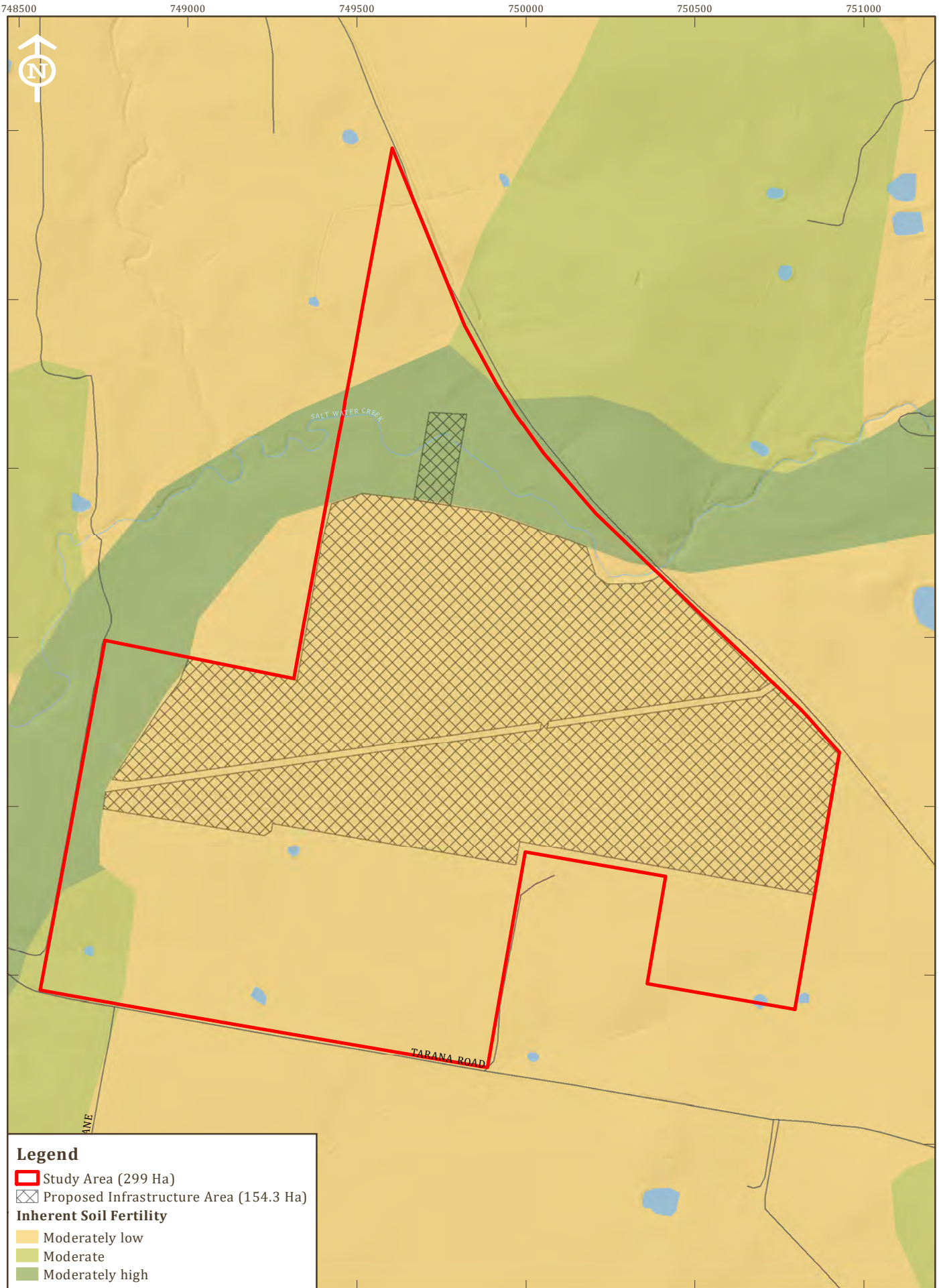

GDA2020 MGA Zone 55

MINESOILS
LAND & REHABILITATION SPECIALISTS

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Regionally Mapped Inherent Soil Fertility

FIGURE 9

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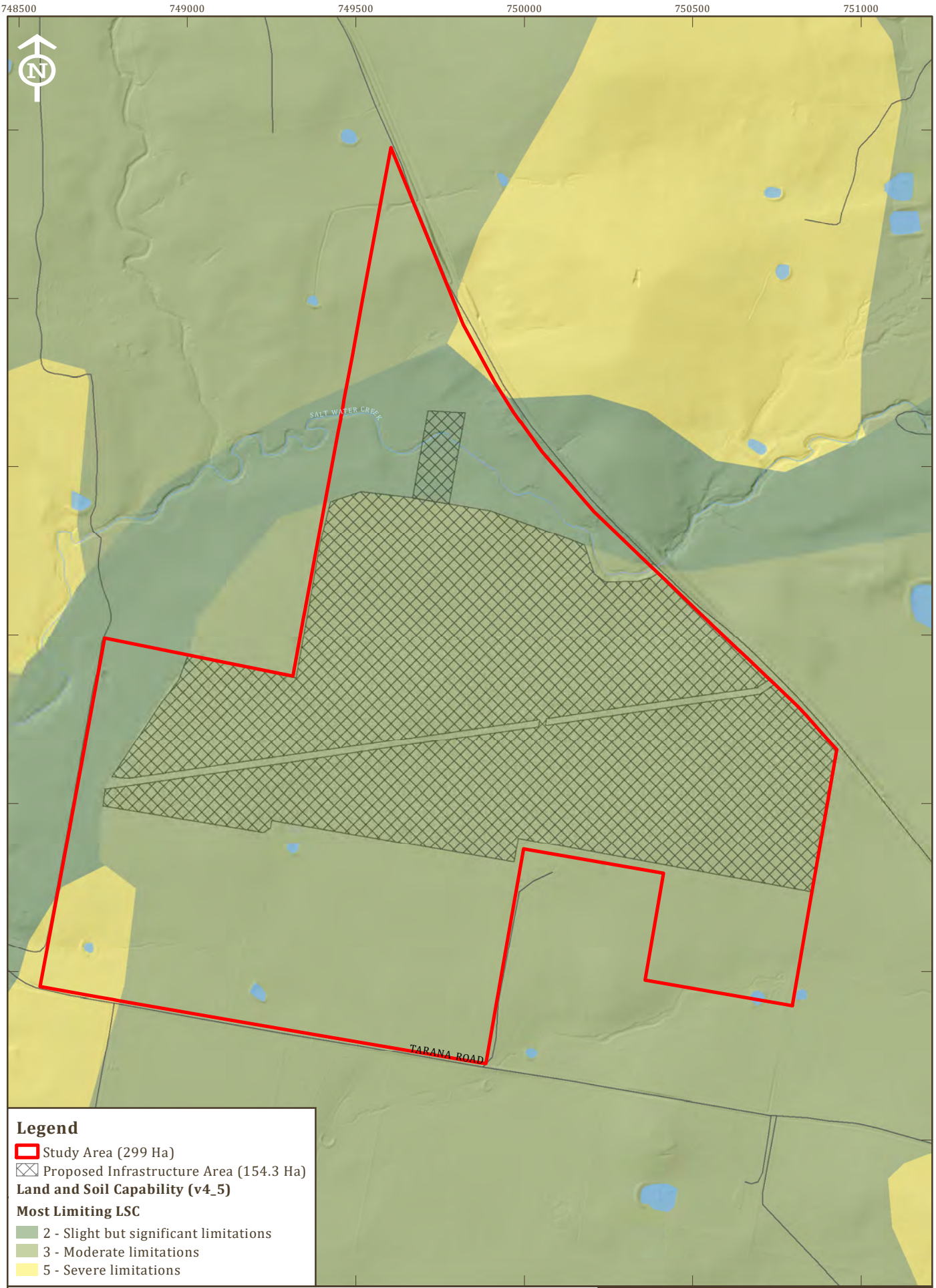

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MINESOILS
LAND & REHABILITATION SPECIALISTS

0 125 250 500 Meters

Scale 1:15000 at A4

Regionally Mapped Land and Soil Capability

FIGURE 10

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3.2.2 SOIL SURVEY METHODOLOGY

Minesoils undertook a soil and land resource survey to inform the following tasks to be undertaken throughout the Scoping Report process:

- Soil assessment, identifying soil units, soil qualities and risks including erosion, acid sulfate soils risk and salinity.
- Land and soil capability (LSC) verification.
- Management and mitigation measures for mitigating soil erosion during construction, operations and decommissioning.

The objective of the Minesoils fieldwork program was to satisfy the field assessment, sampling and testing requirements related to soil and land resources of the LSSE Guideline. The fieldwork plan outlined below was designed to satisfy the following requirements:

- Soil survey and mapping: This was undertaken at a 1:25,000 survey intensity (1 site every 25 ha), and requires collection of landform pattern and element information, soil profile data, and taxonomic parameters to distinguish soil units according to the Australian Soil Classification criteria, within the Study Area.
- LSC verification: The information required for the LSC assessment was collected during both the desktop assessment and verified on the ground during the field program. The LSC system requires data on biophysical features from in situ measurements regional mapping.
- Soil qualities and risks: Additional information was recorded in the field on erosion and evidence of potentially erosive soils including tunnelling, rill, gully and sheet erosion, which may require specific handling and management techniques during construction or operational activities, and the consequences of this on stripping and rehabilitation. Observations were made on risks of ASS and salinity.

The field program was designed as an integrated free survey. An integrated survey assumes that many land characteristics are interdependent and tend to occur in correlated sets (NSCT, 2008). Survey points are irregularly located according to the survey teams' judgement to enable the delineation of soil boundaries. Soil boundaries can be abrupt or gradual, and catena and toposequences are used to aid the description of gradual variation. Soil pits were excavated by a soil corer to a depth of 0.7 – 1.0m. Site clearances and dial before you dig (DBYD) plans were undertaken as part of the safety planning requirements and found underground service running through the centre of the Study Area which were avoided during excavation activities.

The survey area was the full 299 ha of the Study Area. A total of 13 sites were assessed, resulting in a survey intensity of 1 site per <25 ha. Soil profiles within the Study Area (refer to **Figure 11**) were assessed in accordance with the 'Australian Soil and Land Survey Field Handbook soil classification procedures' (NCST, 2009). Detailed soil profile descriptions were recorded covering the major parameters specified in **Table 9**. Soil profile logging was undertaken in the field using Minesoils' soil data sheets, including GPS recordings and photographs of the landforms and soil profiles. Soils were keyed out in accordance with the Australian Soil Classification (ASC) Third Edition (2008) (Isbell, R. F.,2021).

Soil samples were collected at each of the assessment site's soil horizons to a depth of 0.8m, with a total of 40 samples collected. Minesoils chose 22 of these samples that were considered representative in terms of soil type and spatial distribution onsite, to be subject to laboratory testing. The laboratory testing suite for these sites is detailed in the **Table 10**.

Duplicate samples at every site were collected during the fieldwork and stored until the EIS is finalised.

Table 9: Detailed soil profile description parameters

Detailed Field Assessment Parameters	
Horizon depth including distinctiveness and shape	Pan presence and form
Field texture grade	Permeability and drainage
Field colour (Munsell colour chart)	Field pH
Pedality structure, grade and consistence	Field moisture
Soil fabric and stickiness	Surface condition
Stones (abundance and size)	Landform pattern / element
Mottles (amount, size and distinctiveness)	Current land use and previous disturbance
Segregations (abundance, nature, form and size)	Vegetation

Table 10: Soil Sample Laboratory Analysis

Lab Analysis	
Analyte	**Methodology**
pH (1:5 water & CaCl)	Rayment & Lyons 2011-4A1
Electrical Conductivity (EC) and Chloride	Rayment & Lyons 2011-3A1
Cation Exchange Capacity (CEC) & ESP and Ca:Mg Ratio	Rayment & Lyons 2011-15J1
Particle Size Analysis (PSA)	ISSS Hydrometer plus 0.2 and 2.0 mm Sieving (CSIRO 'Yellow Book')
Emerson Aggregate Test (EAT)	AS1289.3.8.1-2017

3.2.3 SOIL SURVEY FINDINGS

Soil Mapping Units

The soil survey undertaken by Minesoils found the Study Area to contain three dominant soil mapping units, as shown on **Figure 11**, and presented in **Table 11**:

- Soil Unit 1: Chromosols – covering 210 ha.
- Soil Unit 2: Sodosols – covering 69 ha.

- Soil Unit 3: Dermosols – 20 ha.

Soil Unit 1 is characterised by Chromosols, which are defined as soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) is not sodic and not strongly acid. Soils with strongly subplastic upper B2 horizons are also included even if they are sodic.

This unit is characterised by sandy loams and loams with moderate structure overlying medium to heavy clay mottled subsoils with moderate to strong structure. pH is slightly to moderately acidic in the topsoil and trends from neutral to mildly alkaline at depth. These soils are consistently non-saline and generally non-sodic. Soil profile drainage ranges from moderate to imperfect, and profiles are consistently deep. This soil unit is found on the undulating slopes that dominate the Study Area.

Representative sites for this unit, which include detailed laboratory data, consist of sites 1 and 5.

Soil Unit 2 is characterised by Sodosols, which are defined as soils with a clear or abrupt textural B horizon and in which the major part of the upper 0.2 m of the B2 horizon (or the major part of the entire B2 horizon if it is less than 0.2 m thick) is sodic and not strongly acid. Soils with strongly subplastic upper B2 horizons are excluded.

This unit is characterised by sandy loams and loams with moderate structure overlying light-medium to heavy clay mottled subsoils with moderate to strong structure. A bleached A2 horizon is consistently present. pH is slightly acidic in the topsoil and trends from neutral to moderately alkaline at depth. These soils are generally non-saline and sodic in the subsoil. Soil profile drainage is imperfect, and profiles are consistently deep. This soil unit is found on a broad, very gently undulating upper slope and crest area in the south east of the Study Area.

Representative sites for this unit, which include detailed laboratory data, consist of sites 11 and 12.

Soil Unit 3 is characterised by Dermosols, which are defined as soils other than Vertosols, Hydrosols, Calcarosols and Ferrosols which:

1. Have B2 horizons that have grade of pedality greater than weak throughout the major part of the horizon, and
2. Do not have clear or abrupt textural B horizon.

This unit is characterised by dark friable loam topsoils overlying light medium clay subsoils with moderate structure. pH is slightly to moderately acidic in the topsoil and trends to neutral at depth. These soils are consistently non-saline and non-sodic. Soil profile drainage is moderately well drained, and profiles are consistently deep. This soil unit is found on drainage flats associated with waterways.

The representative site for this unit, which includes detailed laboratory data, is site 7.

Full soil profile descriptions are included as **Appendix 2**. Laboratory certificates of analysis are included as **Appendix 3**.

Table 11: Soil Mapping Units and Soil Units Summary

Site #	Soil Mapping Units		Soil Profile - ASC	ASC Family Criteria
	#	Name		
1	1	Chromosols	Mottled Eutrophic Red Chromosol	BELOWNR
2	1	Chromosols	Brown Chromosol	-
3	1	Chromosols	Red Chromosol	-
4	1	Chromosols	Red Chromosol	-
5	1	Chromosols	Mottled-Sodic Eutrophic Red Chromosol	BFLOWNR
6	1	Chromosols	Brown Chromosol	-
7	3	Dermosols	Haplic Mesotrophic Black Dermosol	BELOW
8	3	Dermosols	Black Dermosol	-
9	1	Chromosols	Red Chromosol	-
10	3	Dermosols	Black Dermosol	-
11	2	Sodosols	Eutrophic Mottled-Subnatric Black Sodosol	BELOWNR
12	2	Sodosols	Bleached Mottled-Subnatric Grey Sodosol	CELOWNR
13	2	Sodosols	Brown Sodosol	-

Soil Erodibility

Soil aggregate stability refers to the stability of soil structural units (aggregates) when immersed in water. Instability may be indicated by slaking or clay dispersion. A soil with low aggregate stability is likely to be less resilient to mechanical impacts, more likely to be compacted and poorly structured, or be susceptible to tunnelling if used for earthworks.

The Emerson Aggregate Test (EAT) classifies the behaviour of soil aggregates, when immersed, on their coherence in water. **Table 12** shows the EAT class and the dispersion degree during testing and resulting risk of dispersion for that soil.

Table 12: Dispersion Degree and Risk Correlation to EAT Class

EAT Class	Dispersion	
	Degree	Risk
1	Complete dispersion	Very High
2	Partial dispersion	High
3	Complete or partial dispersion after remoulding	Moderate
4 - 8	Well aggregated with no dispersion after remoulding	Negligible

Source: Adapted from Hazelton and Murphy (2011)

Emerson Class Numbers of 1 and 2 indicates a high to very high potential for the soil to disperse when inundated with water. These classes represent the greatest erosion and sediment control hazard to surface disturbance works.

Emerson Class Numbers of 3 indicate that while the soil is only slightly dispersive, the remoulding and breaking down of soil bonds can result in increased dispersive behaviour. Remoulding of the soil at a moisture content near the optimum for compaction (simulating the use of these soils in a filling and compaction operation) does not increase the potential for dispersive behaviour, however further breakdown of the soil may occur, by water turbulence or concentrated rapid water flow. Under these circumstances this class of soil may disperse.

Emerson Class Numbers greater than 4 have a low potential for dispersive behaviour. Some swelling or slaking may occur but generally such soils are not readily dispersive.

Table 13 highlights the lowest Emerson Class Number recorded for select laboratory data representative sites of the Study Area, as an indicator of highest potential risk during disturbance activities.

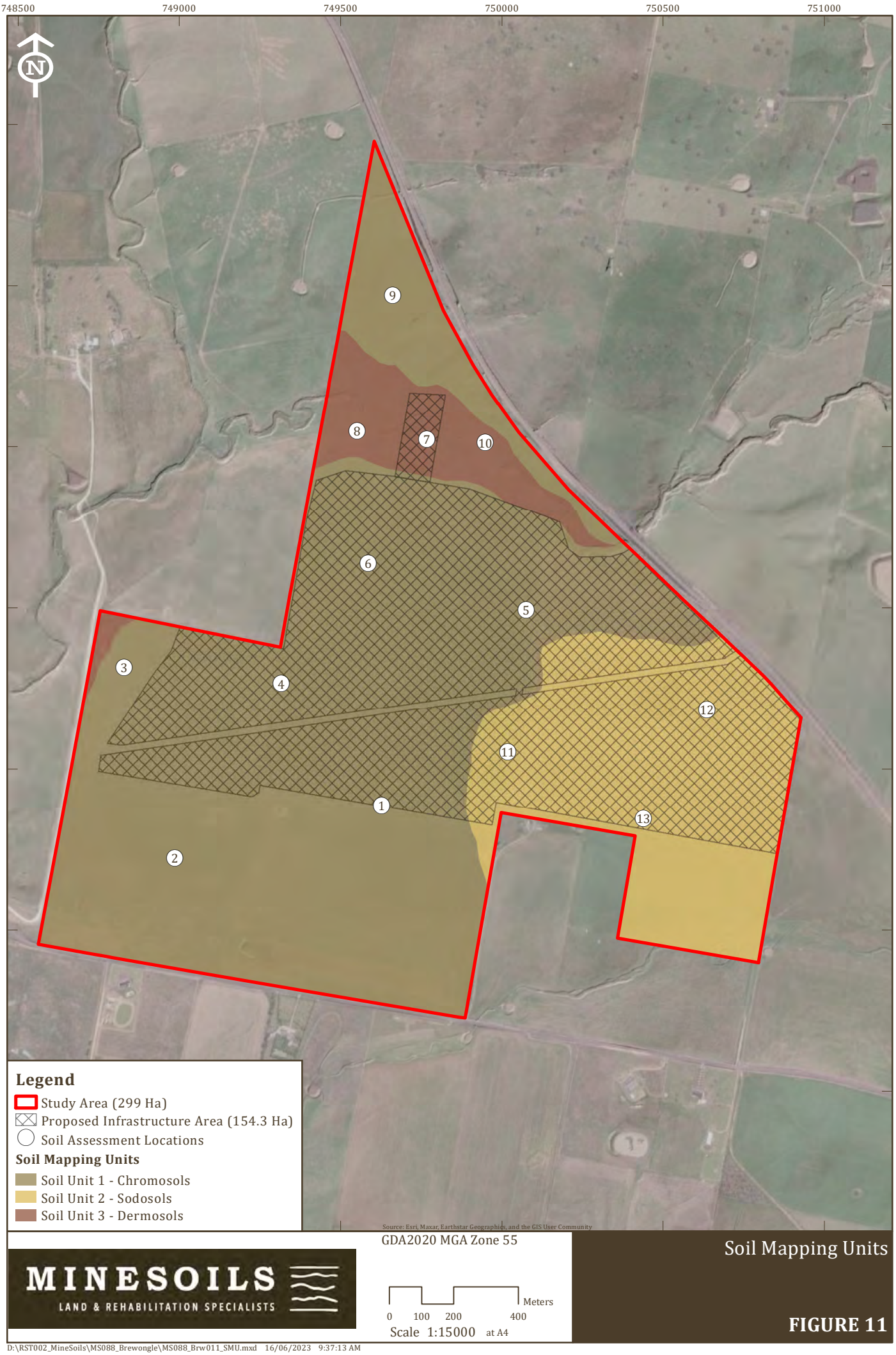
Table 13: Potential Dispersion Risk

Site No.	ASC	Soil Depth (m)	EAT	Potential Risk
1	Mottled Eutrophic Red Chromosol	0.30 – 0.40	3	Moderate
		0.60 – 0.70	4	Negligible
5	Mottled-Sodic Eutrophic Red Chromosol	0.30 – 0.40	3	Moderate
		0.60 – 0.70	3	Moderate
7	Haplic Mesotrophic Black Dermosol	0.20 – 0.30	3	Moderate
		0.50 – 0.60	3	Moderate
11	Eutrophic Mottled-Subnatric Black Sodosol	0.20 – 0.30	2	High
		0.50 – 0.60	3	Moderate
12	Bleached Mottled-Subnatric Grey Sodosol	0.25 – 0.35	2	High
		0.65 – 0.75	2	High

Based on site observation, which included assessment for indicators of erodibility, such as sheet or gully erosion, it can be concluded that there is a minimal erosion and sedimentation risk associated with the topsoils currently present in the Study Area with evidence of minor sheet erosion. However, the dispersion risk status of the tested soils indicate there is high potential risk for dispersion of the A2 horizon and subsoils of Soil Unit 2: Sodosols. The representative laboratory tested soils also indicate high levels of sodicity primarily in the clay subsoils associated with this unit. While sodic soils are generally dispersive, it is important to acknowledge that not all sodic soils disperse, and that not all dispersive soils are sodic. However, given the low levels of salinity of the soils tested, all sodic soils should be considered dispersive.

Based on these results, there is a high potential risk for dispersion where the subsoils of Soil Unit 2 are disturbed within the Study Area. Higher impact activities such as where earthworks are necessary for construction of sub-station pads or site facilities are highly likely to result in increased dispersive behaviour when soil is remoulded, compacted or pulverised. Targeted controls should be applied to this soil unit.

In addition, caution must be taken over the entire Study Area including Soil Units 1 and 3 despite the most stabilise chemical and physical properties and landscape location of specific soil test sites, as these units displays a moderate dispersion risk in subsurface soil horizons. General controls should therefore be applied across the entire Study Area where any disturbance occurs (including changes to vegetation cover). Recommended control measures are presented in Section 6.2.1.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11
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13
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Legend
Study Area (299 Ha)
Proposed Infrastructure Area (154.3 Ha)
Soil Assessment Locations
Soil Mapping Units
Soil Unit 1 - Chromosols
Soil Unit 2 - Sodosols
Soil Unit 3 - Dermosols
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
GDA2020 MGA Zone 55
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MINESOILS
LAND & REHABILITATION SPECIALISTS
Soil Mapping Units
FIGURE 11
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Acid Sulphate Soils

Acid sulfate soils (ASS) have been classified into 5 different classes based on the likelihood of the acid sulfate soils being present in particular areas and at certain depths (NSW Department of Planning and Environment, 2018):

- Class 1: ASS in a class 1 area are likely to be found on and below the natural ground surface.
- Class 2: ASS in a class 2 area are likely to be found below the natural ground surface.
- Class 3: ASS in a class 3 area are likely to be found beyond 1 metre below the natural ground surface.
- Class 4: ASS in a class 4 area are likely to be found beyond 2 metres below the natural ground surface.
- Class 5: ASS are not typically found in Class 5 areas. Areas classified as Class 5 are located within 500 metres on adjacent class 1,2,3 or 4 land.

The Study Area does not contain any of the above classes on the NSW Acid Sulfate Soil Planning Map.

Assessing land elevation and distance from the coast, in conjunction with existing ASS mapping for NSW, the potential for ASS is considered a very low risk.

Further, there was no evidence of ASS indicators such as soil gleying, odour, marine sediments and organic materials recorded as part of the soils survey.

3.2.4 SITE VERIFICATION OF LSC

The 13 soil test sites within the Study Area have been subject to the site verification assessment of LSC, in accordance with the LSC Guideline and outlined in Section 3.2.1.

The Study Area contains four LSC classes:

- LSC class 2: very high capability land – covering 20 ha.
- LSC class 3: high capability – covering 130 ha.
- LSC class 4: moderate capability land – covering 58 ha.
- LSC class 5: moderately low capability land – covering 91 ha.

The spatial extent of each LSC class is shown in **Figure 12**. The LSC verification assessment outcomes for the eight hazards group for the soil profiles assessed is presented in **Table 14**. Full LSC working tables are included as **Appendix 4**.

Class 2 land is directly associated with drainage flats associated with Salt Water Creek and has slight limitations that can be managed by readily available, easily implemented management practices. Land is capable of most land uses and land management practices, including intensive cropping with cultivation. The minor limitations of this class within the Study Area include wind erosion, waterlogging and soil acidity.

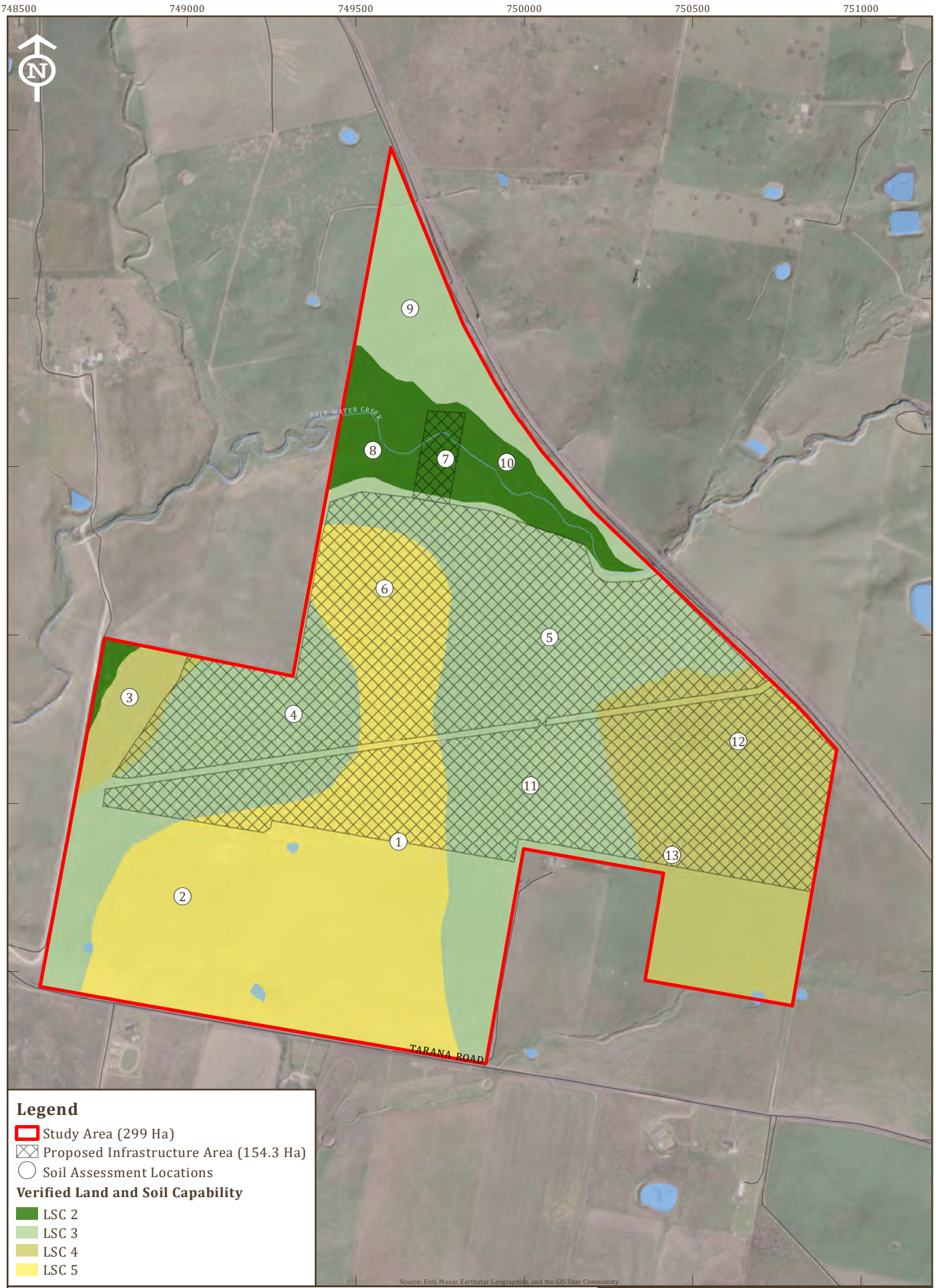
Class 3 land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation. The key limitations of this class within the Study Area include water erosion, wind erosion, soil acidity and soil structure decline.

Class 4 land has moderate to high limitations for high-impact land uses that will restrict land management options for regular high-impact land uses such as cropping, high-intensity grazing and horticulture. These limitations can only be managed by specialised management practices with a high level of knowledge, expertise, inputs, investment and technology. The key limitations of this class within the Study Area include wind erosion, soil acidity and waterlogging.

Class 5 land is associated with Soil Unit 1 and has high limitations for high-impact land uses that will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation. The key limitation of this class within the Study Area is soil acidity.

Table 14: LSC Parameters and Overall Class

		Hazard Criteria								
		1	2	3	4	5	6	7	8	Overall
		Water erosion	Wind erosion	Structure	Acidity	Salinity	Water-logging	Soil depth	Movement	Class
1	Mottled Eutrophic Red Chromosol	3	4	3	5	1	2	1	1	5
2	Brown Chromosol	3	4	3	5	1	2	1	1	5
3	Red Chromosol	3	4	3	4	1	2	1	1	4
4	Red Chromosol	3	3	3	3	1	2	1	1	3
5	Mottled-Sodic Eutrophic Red Chromosol	3	4	3	4	1	2	1	1	4
6	Brown Chromosol	3	4	3	5	1	3	1	1	5
7	Haplic Mesotrophic Black Dermosol	1	2	1	2	2	2	1	1	2
8	Black Dermosol	3	2	1	2	2	2	1	1	2
9	Red Chromosol	3	3	3	3	1	2	1	1	3
10	Black Dermosol	1	2	1	2	2	2	1	1	2
11	Eutrophic Mottled-Subnatric Black Sodosol	3	3	3	3	1	3	1	1	3
12	Bleached Mottled-Subnatric Grey Sodosol	2	4	3	4	1	4	1	1	4
13	Brown Sodosol	3	4	3	4	1	4	1	1	4



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Verified Land and Soil Capability

FIGURE 12

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4 LAND USE CONFLICT RISK ASSESSMENT

4.1 OVERVIEW

The Land Use Conflict Risk Assessment (LUCRA) (NSW Department of Primary Industries, 2011) is required as part of an Agricultural Impact Assessment as per the LSSE Guideline. The LUCRA is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities assess the possibility for and potential level of future land use conflict. LUCRA aims to:

- Accurately identify and address potential land use conflict issues and risk of occurrence before a new land use proceeds or a dispute arises.
- Objectively assess the effect of a proposed land use on neighbouring land uses.
- Increase the understanding of potential land use conflict to inform and complement development control and buffer requirements.
- Highlight or recommend strategies to help minimise the potential for land use conflicts to occur and contribute to the negotiation, proposal, implementation and evaluation of separation strategies.

Land use conflicts occur when one land user is perceived to infringe upon the rights or impact the values or amenity of another. In rural areas land use conflicts commonly occur between agricultural and residential uses. However, land use conflicts can also occur between different agricultural enterprises and other primary industries.

Rural amenity issues are the most common land use conflict issues, followed by environmental protection issues. Rural amenity issues include impacts to air quality due to agricultural and rural industry (odour, pesticides, dust, smoke and particulates); use and enjoyment of neighbouring land (e.g., noise from machinery); and visual amenity associated with rural industry (e.g., the use of netting, planting of monocultures and impacts on views).

Environmental protection issues include soil erosion leading to land and water pollution, clearing of native vegetation, and stock access to waterways.

Direct impacts from neighbouring land uses on farming operations can also cause conflict, such as: harassment of livestock from straying domestic animals; trespass; changes to storm water flows or water availability; and poor management of pest animals and weeds.

4.2 APPROACH

The LUCRA as presented in **Appendix 1** compares and contrasts the Project against adjoining/surrounding land uses and activities for incompatibility and conflict issues based on the risks and impacts identified in Section 5, and the mitigation measures and controls presented in Section 6. Each potential conflict between the operation of the solar farm and adjacent land has been assessed and given a risk ranking based on probability and consequence as outlined in **Appendix 1**. Performance targets will be determined via management plans specified by the EIS (and specialist impact assessments) and development consent conditions (if approved). Monitoring will be undertaken in accordance with those management plans. Indicative performance targets are presents in **Appendix 1**.

Given the significant overlap between the agricultural impact assessment and land use conflict considerations, many agriculture-related risk items listed in the LUCRA are detailed in Section 5.

4.3 FINDINGS

There are 39 risk items that were considered as part of the LUCRA. The mitigation measures and controls outlined in this assessment reduce the level of risk for the majority of considered potential risks with complaints or conflict being managed within normal operations. There are no high risk potential conflicts, however a number of items of potential conflict remain a moderate risk and may require further consultation and management in addition to standard operations. These are summarised in **Table 15**. The LUCRA methodology including risk ranking matrix and full LUCRA assessment are included as **Appendix 1**.

Table 15: LUCRA Moderate Risk Items and Risk Controls Summary

Risk Item	Risk Reduction Controls
Land users in the locality may be concerned about the possibility of increased vehicles during construction on the Tarana Road may result in an incident involving other vehicles, farm machinery or wildlife on roads.	The assessment of potential traffic impacts will be undertaken via a Traffic Impact Assessment (TIA). Appropriate mitigation measures will be specified within the TIA to minimise impacts to the traffic environment. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to traffic for local road users. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).
Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the solar farm.	The assessment of visual impacts to surrounding amenity will be undertaken via a LVIA. Appropriate mitigation measures will be specified within the LVIA to minimise the risk of altered amenity for surrounding residents and public within the locality. Compliance with mitigation measures specified within the LVIA is anticipated to reduce the risk of conflict related to visual amenity. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).
Land users in the locality may be concerned about weed, plant pest, plant disease or pest animal introduction and/or spread.	The assessment of impacts to biodiversity will be undertaken via a BDAR. Consideration of the potential for pest species to impact agriculture has been included in this assessment. Appropriate mitigation measures will be specified within the BDAR and this assessment to minimise the risk for weeds and pests to spread throughout the site and onto neighbouring land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).
Land users in the locality may be concerned about the risk of fires occurring at the site and their potential to spread to surrounding land, infrastructure or livestock.	Consideration of potential bushfire impacts will be undertaken as part of a Preliminary Hazard Analysis (PHA) informing the EIS. Appropriate mitigation measures will be specified within the bushfire assessment within the EIS to minimise the risk of bushfire incidents including their risk to people and potential to damage surrounding land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).
Landowners in the locality may be concerned about potential devaluation of properties due to proximity to solar farm infrastructure.	After delivering eight projects throughout Australia, including the largest solar and battery project in New South Wales, Edify is not aware of, and has not been presented with, any reliable, impartial research or evidence which establishes a correlation between declining real estate values and proximity to renewable infrastructure. Given the size of the landholdings, it is likely that their agricultural production attributes provide a strong foundation for overall property value. The project will not impact the agricultural resources or production value of properties proximate to the Study Area. Further, the change in visual amenity is not anticipated to have any noticeable effect on property values. Ongoing consultation with stakeholders will identify and address concerns if they arise.

Risk Item	Risk Reduction Controls
Stakeholders may be concern about potential impacts to biodiversity within the site and locality	The assessment of impacts to biodiversity will be undertaken via a BDAR. Appropriate mitigation measures will be specified within the BDAR and this assessment to minimise the risk for impacts on biodiversity within the site and locality. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved). Ongoing consultation with stakeholders will identify and address concerns if they arise.
Public Authorities may have concerns regarding the potential for cumulative impacts arising from the proximity of state significant developments.	An assessment of potential cumulative impacts will be undertaken as part of the EIS. Appropriate mitigation measures (where required) will be specified in the EIS to minimise the potential for cumulative impacts to occur at or near the site.
Stakeholders may be concerned about the potential for poor rehabilitation outcomes and the resulting long term environmental and agricultural consequence.	A Rehabilitation and Decommissioning Management Plan will ensure the land can be successfully returned to pre-disturbance land and soil capability and final land use commitments following decommissioning.

5 IMPACTS ON AGRICULTURAL LAND

The impacts solar farming activities can have on land resources and agricultural productivity range from short term temporary impacts to long term and permanent impacts. Temporary impacts can include the removal of agricultural land from service over the life of the Project. Permanent impacts may include changes to land and soil capability and agricultural resources of the Study Area. Permanent impacts are irreversible and compromise the reinstatement of agricultural lands and land productivity. Evidence from Australian solar farming practices generally suggests permanent and irreversible impacts to agricultural land has a low degree of risk.

This section identifies and describes the nature, duration and consequence of the potential impacts on agricultural land as a result of the Project, for the Study Area and in the wider region, across five risk areas:

- Changes in the amount of land used for agriculture.
- Changes to agricultural productivity and agricultural enterprises.
- Changes to agricultural resources.
- Other potential impacts to agriculture considered for the Project.
- Cumulative impacts of the potential for multiple solar farms within the region.

5.1 LAND USED FOR AGRICULTURE

The Project will be undertaken on an area of approximately 170 ha of land that is currently subject to agriculture land use. The Applicant intends to use as much of the Study Area as possible for agricultural purposes during the operational phase of the Project. Land being used simultaneously for agriculture and the solar farm is known as agrisolar and is further described in Section 6.4. However, for the purpose of this assessment, it is assumed that the agriculture will cease within the development footprint for the duration of the Project

Therefore, there will be a temporary decrease of approximately 170 ha of land used for agriculture for the duration of the Project. It is anticipated that agricultural land use will be re-established over the entire 170 ha Study Area at the time of decommissioning (unless otherwise agreed with the landowner and/or regulatory authorities). There will be no permanent decrease in land available for agriculture use.

Current agricultural land use in the remainder of the Study Area, immediate to the Study Area, and in the broader Project locality will not change as a result of the Project, and there will be no fragmentation or displacement of existing agricultural industries.

5.2 PRODUCTIVITY AND ENTERPRISES

5.2.1 PRIMARY PRODUCTIVITY

The productivity of the Study Area is described in Section 3.1.3. For the purpose of this assessment, the impact of the Project on productivity of agricultural land based on the change in land use within the development footprint is up to $70,047 per year.

This is considered negligible impact in the context of the agricultural industry gross value of the Bathurst Regional Council LGA as outlined in Section 2.4.2.

Due to the minimal disturbance to the landform, following the life of the Project, all land removed from agriculture will be returned to agricultural use, with no reductions in land and soil capability. Agricultural enterprises can then re-commence at an equivalent agricultural productivity.

5.2.2 SECONDARY PRODUCTIVITY

The secondary productivity of the Study Area is outlined in Section 3.1.3. For the purpose of this assessment the impact of the Project on secondary agricultural productivity is estimated to be up to $152,618. This is considered

negligible impact in the context of the agricultural industry gross value of the Bathurst Regional Council LGA as outlined in Section 2.4.2.

5.2.3 PRODUCTIVITY OF LAND WITHIN LOCALITY

Agricultural productivity of land outside of the development footprint will not be affected by the Project as the associated agricultural resources will not be affected. Therefore, the Project will not negatively impact any existing agricultural enterprise outside of the Study Area.

5.2.4 AGRICULTURE SUPPORT SERVICES

The Project will have a negligible impact on local and regional agricultural services. Changes to the supply and viability of agricultural support services in the main service centres are the towns of Bathurst and Lithgow are driven by social and market trends far exceeding the scale of the minor reduction in agricultural land use and productivity as a result of the Project.

The reduction in livestock being sold will be a negligible impact at the scale of the Central Tablelands Livestock Exchange, as this reduction is estimated to represents <0.001% of all livestock sold.

5.2.5 CRITICAL MASS THRESHOLDS

Due to the limited reduction in agricultural activity as a result of the Project, there will be no impact to critical mass thresholds of agricultural enterprises needed to attract and maintain investment in agricultural service industries and infrastructure.

5.3 AGRICULTURAL RESOURCES

5.3.1 SOILS

Over the majority of the Study Area, soils will be subject to minor disturbance as part of the construction or maintenance of solar arrays and electrical cabling trenches. In areas where earthworks are necessary for construction of the BESS, substation and switching station, site facilities or access tracks, soils will be subject to higher impact disturbance.

All soil that is proposed to be disturbed during the Project will be stripped and re-used during construction and/or rehabilitation in order to mitigate long term effects on soil resources during operation. Given the limited surface disturbance anticipated, any soil stripping and re-use will be localised; that is, soil may be stripped and stored adjacent to disturbance and respread from where it was stripped. This localised approach will promote reinstatement of the soil profile to its original condition.

Additionally, soils may be stripped only in areas where soil disturbance occurs. The depth of soil salvaged will be as deep as excavations or surface disturbance is required, or to a depth where parent material is encountered.

Impacts on soil biological balance and nutrient availability are linked to the status of vegetation beneath the panels. If grass cover is maintained across the site both between and under the panel rows to provide groundcover, there will be negligible soil composition and productivity impacts as a result of the panels.

However, if vegetation beneath the panels is significantly reduced or eliminated over long periods during operations, the soil may be temporarily sterilised and will require additional efforts and costs at the time of site decommissioning to restore the soil to a level of productivity equivalent to pre-disturbance conditions.

Overall, the impacts to the soils of the Study Area are expected to be minimal and temporary. There will be no direct or indirect impacts to the soil resources of the Project locality outside the Study Area.

Soil impact mitigation measures are outlined in Section 6.2.

5.3.2 LAND AND SOIL CAPABILITY

Due to the nature of the Project which will require only localised and sporadic landform modification including minor soil stripping (for excavation works and leveling), impacts on LSC are expected to be minor. The preliminary surface disturbance footprint for large site infrastructure is shown on **Figure 2**. The proposed infrastructure disturbance footprint has been designed to avoid, as much as practicable, LSC class 2 lands.

Following the end of life for the Project, disturbance footprints will be re-graded (where required) and any minor stockpiles of topsoil and subsoil be respread over disturbed areas and rehabilitated with either native vegetation or improved pastures depending on the intended final land use. This strategy, along with good soil management practices as outlined in Section 6.2 will facilitate the rehabilitation in returning the land to an equivalent LSC class.

Therefore, it is anticipated there will be no permanent impacts on LSC classes within the Study Area as a result of the Project.

5.3.3 WATER

The risk of groundwater impacts during solar farm construction activities is generally low as potential limited site levelling for the solar farm and substation foundations is expected to require excavation of no more than 0.40 – 0.60 m, and trenches for underground cables are expected to be no greater than 1.0 to 1.2 m deep. There are no impacts on groundwater anticipated and risks to water quality are expected to be readily manageable.

Water use during project construction and operation will be minimal and water will be brought to site by tanker as required. No impacts are anticipated on the availability of current surface or groundwater resources used by local landholders.

5.3.4 EROSION AND SEDIMENTATION

Erosion risks are primarily associated with Soil Unit 2: Sodosols in the south west upper slopes and broad crested portion of the Study Area. In addition, EAT classes throughout the entire Study Area indicate the widespread presence of potentially dispersive soils with a moderate potential for increased dispersion upon disturbance. Suitable erosion and sedimentation controls, as outlined in Section 6.2, can be implemented to target these specific erosion hazards to reduce impacts to surface soils and waterways.

5.3.5 AGRICULTURAL INFRASTRUCTURE

The Project will have a negligible impact on local and regional agricultural infrastructure. There will be negligible impacts on the road and rail network that connects the agricultural industry to markets, services and suppliers (refer Section 5.4.4).

Stock fences, dams and access tracks will be retained to accommodate potential agrisolar. Upgrades to access tracks throughout the Project will benefit post-Project agricultural land uses and is considered a positive impact. Dams within the Study Area will not be disturbed by the Project.

5.4 OTHER POTENTIAL IMPACTS ON AGRICULTURE

5.4.1 PEST SPECIES

Pest species could be inadvertently brought into the Study Area with imported materials, machinery, or allowed to invade naturally through removal or damage of current vegetation. The presence of weed species has the potential to be a major hindrance to rehabilitation, regeneration activities, and agricultural endeavours.

Weeds in general will be managed across the site through a series of control measures, including:

- Prior to re-spreading stockpiled topsoil onto the disturbance area, an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and / or “scalping” of weed species prior to topsoil spreading.

- Rehabilitation monitoring programs and routine inspections will be undertaken to identify potential weed infestations; and
- There will be an ongoing effort to identify and eliminate (spray) existing weed populations on-site over the life of the Project.

The spread of declared noxious weeds will be prevented by using the measures above. The monitoring and control of weed populations using herbicides within the site will significantly reduce weed infestations. Weed control, if required, will be undertaken in a manner that will minimise soil disturbance. Any use of herbicides will be carried out in accordance with the regulatory requirements. Records will be maintained of weed infestations and control programs will be implemented according to best management practice for the weed species concerned.

Feral animal control may potentially be undertaken in consultation with neighbouring landholders, as required. Programs to control feral animals will include the determination of appropriate control practices, consultation with appropriate authorities, obtaining appropriate approvals, implementing control practices, and undertaking follow-up monitoring and control as required. If a substantial increase in the numbers of any known feral fauna species, or the occurrence of a previously unrecorded feral fauna species, is discovered, advice will be sought from a suitably qualified and experienced person on the management and control options for that species and appropriate measures for mitigating any impacts caused by its management on native species.

Feral animals may include goats, foxes, cats, rabbits, pigs, and dogs and will be controlled in accordance with Livestock Health and Pest Authority procedures.

5.4.2 BIOSECURITY

Biosecurity is defined in the 'Draft NSW Biosecurity Strategy' (DPI, 2021) as 'the protection of the economy, environment and community from pests, diseases and weeds'. It includes measures to prevent new pests, diseases and weeds from entering our country and becoming established. At the local level, as per Section 5.4.1 above, appropriate weed management will reduce biosecurity risks. On a regional level, any import of equipment or machinery from overseas will follow the standard procurement safeguards and quarantine procedures as per Australian requirements. Given the processes above, it is considered that the Project will not have any potential impact on the biosecurity of agricultural resources and enterprises within the region.

5.4.3 AIR QUALITY AND DUST

Construction has the potential to increase dust through movement of traffic on unsealed roads on dry days, vegetation removal, and localised dust emissions generated by land disturbance (such as excavation activities required for infrastructure). During operations, ongoing maintenance of infrastructure and land will result in very minor, localised vehicle emissions and generation of dust from vehicles travelling along unsealed internal access tracks.

These impacts are unlikely to affect agriculture and standard dust suppression measures can be readily implemented where required.

5.4.4 TRAFFIC

Agricultural enterprises can be impacted by increased traffic movements through an increase in noise and dust, and also through the cumulative impact of road transport being utilised by solar farm operations, leaving fewer transport options for agricultural enterprises.

Tarana Road in the vicinity of the Study Area is anticipated to experience an increase in traffic volumes during the peak construction period. However, the traffic impacts of the Project are not likely to have material consequences on agricultural enterprises within the Project locality. Further, no increases in levels of noise and dust that could impact agriculture will result from increased traffic.

5.4.5 NOISE AND VIBRATION

Background noise levels are expected to reflect the site's location in a rural setting away from population centres. Background noise sources would include traffic, farm equipment (e.g., harvesters, boom sprayers and tractors), wind through trees, and insects.

Noise levels during construction and operation are predicted to comply with noise criteria. It is expected that noise will be effectively managed and minimised through the adoption of standard management practices. The proponent will implement practicable measures to reduce noise impacts including for example, the careful location of noise generating components within the site to increase the distance to sensitive receivers. Supportive evidence will be provided through a Noise Impact Assessment in the EIS.

Vibration issues are not expected to be significant during either construction or operation due to the distance between the site and the nearest sensitive receivers.

Generally, agriculture is only impacted by noise when constantly high noise levels or sudden loud noise leads to a decrease in animal production through increased livestock stress. The predicted noise levels are anticipated to pose a negligible impact on agricultural activities.

5.5 CUMULATIVE IMPACTS

The Project has the potential to generate cumulative impacts with numerous other existing, approved or proposed developments in the region, which will be further investigated in the EIS for the Project.

In the context of agriculture, the applicability of agrisolar to solar farm projects is especially relevant to the Project locality and wider region given the suitable conditions for sheep grazing and the established sheep and lambing industries and infrastructure (as outlined in Section 2.4.3). The cumulative impact on agriculture for the region is considered to be low given changes to agricultural land use and agricultural productivity are anticipated to be minor for each respective Project.

Increased cumulative impacts including changes to land used for agricultural, localised productivity, secondary productivity and some agricultural support services are likely to be experienced where solar farm Projects in the region do not implement agrisolar. However, given the nature and scale of the established agricultural industries within the region, significant impacts to critical mass thresholds and regional agricultural infrastructure are unlikely to occur in the foreseeable future.

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

6 MITIGATION MEASURES

The Program will include a number of measures to prevent, minimise and manage adverse impacts on agricultural resources. This incorporates procedural mitigation measures along with a land management process that ensures the Project has negligible impact on agricultural resources and enterprise.

In addition to the specific measures described in this assessment, all activities associated with the Project will be conducted in consideration of approval obligations and environmental management measures in development consent stipulated environmental management plans.

6.1 PROJECT ALTERNATIVES AND DESIGN

The Applicant undertakes a constraints and opportunities analysis process to identify potential development sites for its projects. For the Project, this process has included consideration of factors such as:

- Access to existing transmission assets to accept energy from the solar farm.
- Access to, and capacity of, existing energy grids.
- Proximity to coal generators that are planned for closure and need replacement.
- Generation/storage capacity.
- Potential for land acquisition.
- Land suitability (e.g. topography, existing land use, flood risk, zoning).
- Need to minimise environmental and social impacts (e.g. avoiding sensitive environments, areas of cultural heritage value, population centres).

The site selection process undertaken included consideration of factors such as the availability and extent of land for housing solar arrays, the consequent potential capacity for generation, the capacity of the grid to receive the generated electricity, the capital and operational costs of the project, and anticipated market conditions.

The Study Area was chosen because it provides the optimal combination of:

- Access to the 132 kV Transgrid Transmission Line
- High levels of available capacity on the grid transmission system
- High quality solar resource
- Low environmental sensitivity and absence of locational constraints due to:
  - the Study Area comprising predominantly cleared grazing land, with little remaining native vegetation
  - the very gently undulating terrain of the site, for cost effective construction
  - an acceptably low flood risk
  - the low density of the surrounding population and limited number of neighbouring properties
  - the suitable planning context of the site including an absence of zoning issues or restrictive planning overlays
  - the access of the site to a suitable road network.

The Applicant has made key decisions regarding the Project in response to agricultural and land use considerations. Namely, the proposed development has been designed to avoid, as much as practicable, LSC class 2 lands (refer **Figure 12**).

In addition, the Project will consist of a number of solar array areas or blocks comprised of PV modules arranged in a series of long rows. The modules are mounted on frames which are fixed to piles driven into the soil. This method of installation includes an ability to track the sun's path throughout the day, in order to maximise the electricity yield that is generated.

This Project design was chosen for its simplicity, maturity and cost-effectiveness, and because it allows retention of existing grassland vegetation in situ with minimal ground disturbance in order to facilitate agrisolar and minimise soil impacts. This design approach is a critical mitigation measure employed to potentially reduce the impacts to agriculture as a result of the Project, if agrisolar is implemented.

No further design amendments are recommended.

6.2 LAND AND SOIL DISTURBANCE MITIGATION

6.2.1 SOIL EROSION MANAGEMENT

Based on site observations, there are no significant erosion and sedimentation issues present at the Study Area. However, as the chemical analysis and dispersion risk status of the tested soils indicate, there is a potential moderate risk for dispersion for the soils within the Study Area, with one soil unit having a potentially high risk of dispersion, which would result in long term agricultural impacts.

Generally, channelised drainage patterns should be minimised and the Project should limit hard engineering solutions for erosion control and preference soft, vegetated structures.

The Project will prepare an erosion and sediment control plan (ESCP) that addressed specific soil dispersion risks based on disturbance activity and phase of the Project. The ESCP should include the following:

Construction Phase

- The Project should utilise the existing landform and not endeavour to undertake broad-scale re-contouring of the existing ground levels without referring to this soil and land resource assessments and implementing erosion and sediment control accordingly. As a result, the existing vegetative cover and soil structure will be maintained intact across much of the Study Area.
- Solar arrays are typically pole mounted, with the poles being supported on a driven or screw pile, so that there is no excavation required other than for electrical cabling.
- Construction areas should be progressively revegetated with grass and pasture species as installation of solar panels proceeds across the site.
- At locations where earthworks are necessary, such as for cable trenching, localised erosion and sediment controls will be placed in accordance with the Landcom (2004) guidelines.
- Preservation and stabilisation of drainageways and minimisation of the extent and duration of any surface disturbance will be prioritised during construction.
- Where the Soil Unit 2: Sodosols are subject to high impact disturbance activity, it is recommended to apply gypsum as an ameliorant to displace the sodium and provide the soil with a stronger aggregate and hold structure when wet.
- All areas disturbed during construction that are not in active use for over 3 months should be sown with grass and pasture species with starter fertiliser to provide stabilising ground cover and a healthy topsoil to provide long term protection against erosion.

Operation Phase

- Soil disturbance during operation of the Project should be minimal and limited to maintenance activities, involving very small, localised disturbance areas on an infrequent basis.
- Standard erosion and sediment control measures should be implemented to minimise the potential for sediment export within areas to be disturbed during operations. These measures would be developed on a case-by-case basis referring to this soil assessment and are likely to include measures such as sediment fencing, localised sediment traps, and progressive stabilisation with vegetation.

- During operation, mounted solar panels will change orientation during the day, with any rainfall runoff being distributed in the area around each panel, and not drained permanently to a single point on the ground.
- Measures to manage any bare areas and erosion that develop beneath the solar arrays over time should be included in an operational management plan for implementation during ongoing operation of the proposal.

Decommissioning and Rehabilitation Phase

- A detailed Decommissioning and Rehabilitation Plan should be prepared within 18 months of the planned closure of the Project. This plan will detail all aspects of decommissioning and removal of all infrastructure unwanted for post Project land use (some infrastructure may remain for post Project land use purposes i.e., constructed internal roads may be kept as part of the agricultural infrastructure), which may require temporary erosion and sediment control measures.
- During decommissioning, where potential erosive impacts have been identified due to the disturbance of sodic subsoils in locations of significant disturbance, soil amelioration should be undertaken as part of remediation earthworks. Standard temporary erosion and sediment control measures are to be put in place for high disturbance areas.

6.2.2 SOIL STRIPPING FOR REHABILITATION

The very minor amount of soil that is proposed to be disturbed during the Project will be stripped and re-used in construction and/or rehabilitation efforts in order to mitigate long term effects on the land and soil capability of the Study Area.

The entirety of the Study Area has been assessed to determine suitability for stripping and re-use. This will allow site managers to make decisions on soil stripping for re-use when the locations of soil disturbance for surface infrastructure have been finalised. This localised, fluid approach is an integral process for successful rehabilitation of the Project. This section provides information on the following key areas related to the management of the topsoil resources for the area within the Study Area.

Soil Stripping Strategy

Laboratory soil analytical results (refer **Appendix 2**) were used in conjunction with the field assessment to determine the potential risk associated with soil material recovery and re-use. Structural and textural properties of soils, along with stones, dispersion potential, sodicity and high acidity are the most common and significant limiting factors in determining depth of soil suitability for re-use, however, given the limited surface disturbance and lack of a soil bank for the site, it is anticipated that all soil stripping and re-use will be localised; that is, soil will be respread from where it is stripped during construction, reinstating the soil profile to its original condition.

Additionally, soils will be stripped only in areas where soil disturbance occurs. The depth of soil salvaged should be as deep as excavations or surface disturbance is required, or to a depth where parent material is encountered.

Due to the sodic nature and dispersion risk of the soils in the south western portion of the Study Area in association with Soil unit 2: Sodosols, targeted controls must be implemented to manage the risk of surface water erosion with potential to occur once excavated. Upon respreading, clay subsoils that have been excavated for trenching will be used exclusively as a subsoil, and encapsulated by the loamy topsoils with which they are currently capped.

Higher Impact Areas

It is recommended that proposed long term small scale stockpiles in areas associated with the higher impact activities where larger amounts of soil will be displaced should be stripped of topsoil. Then the excavated subsoil (only if requiring disturbance) should be placed on the exposed subsoil of the stockpile area to create a low-profile landform of subsoil. A thin layer of topsoil material from the stripped areas should be placed as a 'cap' over the

subsoil stockpiles to promote vegetation growth. Topsoil materials should otherwise be stockpiled separately to subsoils. Subsoils associated with Soil Unit 2: Sodosol should be treated gypsum prior to stockpiling.

Topsoil and subsoil depths for these areas should be recorded in GIS and rehabilitated with target species to build up the seedbank over the years of stockpiling.

Stripped Soil Management

The following soil handling techniques are recommended to prevent excessive soil deterioration and dispersion. It is not anticipated the Project will involve major amounts of soil excavation requiring long-term stockpile solutions, however small scale potential soil stockpiling from trenched areas and hardstand locations should abide by the following measures where practicable:

- Strip soil material to maximum excavation depths only.
- Soil should ideally be stripped in a slightly moist condition, where practicable. Material should not be stripped in either an excessively dry or wet condition.
- Push soil into windrows or small stockpiles with graders. This technique is an example of preferential less aggressive soil handling. This minimises compression effects of the heavy equipment that is often necessary for economical transport of soil material.
- The surface of soil stockpiles should be left in as coarsely structured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established, and to prevent anaerobic zones forming.
- Where necessary, a flow diversion bank or catch drain should be placed up-slope of a stockpile to direct surface water flows away. All stockpiles shall remain in a free-draining location to avoid long term soil saturation.
- Where necessary, silt fences or cleared vegetation should be installed around topsoil stockpiles or stripped areas as a form of erosion and sediment control. Mulch or wood chip from cleared vegetation can also be applied as a veneer over topsoil stockpiles to slow erosion, weed establishment and to maintain moisture content.
- As a general rule, maintain a maximum stockpile height of 3 m. Clayey soils should be stored in lower stockpiles for shorter periods of time compared to coarser textured sandy soils.
- Seed and fertilise stockpiles as soon as possible. An annual cover crop species that produce sterile florets or seeds may be sown. A rapid growing and healthy annual pasture sward will provide sufficient competition to minimise the emergence of undesirable weed species. The annual pasture species will not persist in the rehabilitation areas but will provide sufficient competition for emerging weed species and enhance the desirable micro-organism activity in the soil. Final rehabilitation target species should be established on stockpiles to build up a desirable species seed bank in the topsoil.
- An inventory of available soil should be maintained to ensure adequate materials are available for planned rehabilitation activities when the time comes.
- Prior to re-spreading stockpiled topsoil onto the disturbance area, an assessment of weed infestation on stockpiles should be undertaken to determine if individual stockpiles require herbicide application and / or “scalping” of weed species prior to topsoil spreading.

Soil Re-spreading and Seedbed Preparation

The Project does not anticipate large volumes of topsoil to require significant stockpile and respreading management measures, however the following re-spreading and seedbank preparation techniques are recommended to prevent excessive soil deterioration and dispersion for any minor areas of topsoil removal.

- Topsoil should be spread to a depth that reflects pre-disturbance soil horizons.

- Topsoil should be spread, treated with fertiliser and seeded in one consecutive operation, to reduce the potential for topsoil loss to wind and water erosion. Thorough seedbed preparation should be undertaken to ensure optimum establishment and growth of vegetation.
- All topsoiled areas should be lightly contour ripped (after topsoil spreading or following removal of hardstand from topsoil areas) to create a "key" between the soil and material below. Ripping should be undertaken on the contour. Best results will be obtained by ripping when soil is moist and when undertaken immediately prior to sowing.
- The respread soil surface should be scarified prior to, or during seeding, to reduce run-off and increase infiltration. This can be undertaken by contour tilling with a fine-tyned plough or disc harrow.

6.2.3 SOIL BIOLOGY MANAGEMENT

During the approximately 30 year life of the Project soil hydrological and ecological processes may be impacted. In addition to reducing the landscape's ability to support ecosystem services during the solar facility's lifespan, these changes may leave legacy effects that persist long after the installation is removed, if effective rehabilitation is not undertaken post decommissioning.

Based on the intensity of the panel array layout and potential for stock to graze under the panels, the soil will be able to retain and store nutrients. Upon decommissioning the areas under the panels may be seen to have a short term decrease in productivity compared to adjacent areas, however commitments to achieve a groundcover level during the post operative period will be sufficient to increase soil productivity to match adjacent analogue areas.

Several mitigation measures are available for the operational phase to mitigate the long term impacts of the Projects on soil biological balance and nutrient availability. These include:

- Routine vegetation monitoring and maintenance.
- Erosion and sediment controls to preserve topsoil material.
- Routine monitoring and management of visible surface erosion, such as rilling caused by concentrated flows from infrastructure.
- Promotion of grass cover in spacing between each of the solar panel array rows.
- Weed management strategies to promote continued presence of pasture species and seedbank within topsoil.

These should be incorporated into the Operational Environmental Management Plan, which will guide operational environmental management following the final design of the Project and would be approved by the relevant statutory authority.

A small soil sampling program is a means to demonstrate the ongoing protection of soil health during operation of the Projects. This may be required where existing grass cover is considered marginal.

Soil sterilisation, localised or widespread, remains a minor risk throughout the Project. However, soil rehabilitation measures at the decommissioning stage can be employed to restore soil biological balance and nutrient availability. Measures include the application of mulch and organic materials, fertilisers, soil ameliorants and regenerative farming practices. Further, the spacing between each of the solar panel rows are anticipated to remain biologically active and act as an established source of bioactivity for spreading into potentially sterilised islands following the removal of panels.

6.3 MONITORING PROGRAMS

Monitoring programs are instituted to assess predicted versus actual impacts as the Project progresses in order to implement controls where required. All operations associated with the Project undertaken in accordance with approved environmental management plans and strategies. The management plans will include environmental monitoring programs, where required. Key management plans, or chapters housed within a larger Operation

Environmental Management Plan, that will assist in managing impacts on agricultural land will be stipulated in conditions of development consent.

These management plans, which will include mitigation measures to control impacts to soils and agriculture, will be reviewed and revised where necessary to incorporate the requirements associated with the Project prior to commencement.

6.4 AGRISOLAR

Agrisolar refers to co-developing the same area of land for both use as a solar farm as well as for agriculture activities (Clean Energy Council, 2021). By implementing complementary solar energy and agricultural production, impacts to existing agricultural land use and enterprises, including primary and secondary productivity, can be reduced.

Solar Farms typically require access to relatively flat or gently sloping land in sunny areas within proximity to electricity transmission networks, where biodiversity impacts can be avoided or minimised. This often means that land which has been previously cleared or zoned for agricultural use is well-situated to host solar farm developments.

Where solar farms are proposed and developed, there is increasing interest in exploring the opportunities for complementary agricultural activities which can benefit from a number of the valuable characteristics of solar arrays, including:

- the provision of partial shading and weather protection (including sun, rain, hail and wind).
- improved soil moisture retention, which can lead to improved vegetation growth beneath the panels.
- protection from predators for sheep.

Sheep grazing delivers benefits for the operation of solar farms, as the vegetation is maintained in a cost-effective and safe manner by reducing the need for mowing or spraying. This maintenance reduces the risk of fire hazard, protecting the solar assets and neighbouring properties. Further, agrisolar can strengthens relationships, communication and interaction with local landholders and farming communities and mitigate land use conflicts.

During the detailed design phase prior to construction commencing, the Project will consider design measures to enable the efficient movement of sheep between the solar farm areas and other paddocks. With the development of solar farms commencing in Australia from around 2015 onwards, the local experience of agrisolar practices is still developing and currently dominated by the practice of sheep grazing on solar farms (Clean Energy Council, 2021). By 2020, there were at least 13 large-scale solar farms grazing sheep in Australia. At the Gannawarra Solar and Battery project in Victoria, now in its operational phase, the Applicant has successfully integrated 500 merino sheep onto project site.

Plate 6: Edify Energy's Gannawarra Solar Farm (2020)

The Applicant is committed to exploring the integration of solar panel installation with the existing agricultural use at the Study Area as a means of mitigating the impacts to agriculture and anticipates that approximately 1,000 merino sheep can be introduced to graze within the Study Area during the operation phase of the Project, subject to necessary approvals and climate conditions permitting.

6.5 MITIGATION SUMMARY

The mitigation measures pertaining to soils and agriculture that have been referenced in this assessment will form part of the Project approval commitments. A summary of these is presented in **Table 16**.

Table 16: Summary of Mitigation Measures

Risk Category	Mitigation Measure
Agricultural Land Use	Consider implementing Agrisolar to reduce area of land removed from agricultural service. Agriculture land use will be re-established over the entire Study Area at the time of decommissioning (unless otherwise agreed with the landowner and/or regulatory authorities).
Agricultural Productivity	Consider implement Agrisolar at a suitable stocking rate. Study Area will be returned to an equivalent agricultural productivity following the Project.
Soils	All soil that is proposed to be disturbed during the Project will be stripped and re-used in construction and/or stockpiled for use in rehabilitation. Channelised drainage patterns should be minimised and the Project should limit hard engineering solutions for erosion control and preference soft, vegetated structures. All soil resources are to be managed throughout construction, operation and decommissioning phases of the Project in accordance with recommendations outlined in Section 6.2
LSC	Return disturbed land to an equivalent LSC class following the end of life for the Project, through site rehabilitation and good soil management practices as outlined in Section 6.2, will facilitate the rehabilitation in.
Erosion and Sedimentation	Suitable erosion and sedimentation controls, as outlined in Section 6.2, will be implemented.
Infrastructure	Stock fences, farm dams, and access tracks to be retained and maintained to accommodate Agrisolar.
Pest Species	Pest species will be managed in accordance with measures outlined in Section 5.4.1
Biosecurity	Biosecurity will be managed in accordance with measures outlined in Section 5.4.2

7 SUMMARY

There is a high level of certainty about the status of agricultural resources and enterprises in the Study Area, locality and broader region, based on the site verification assessment undertaken, consultation and desktop studies carried out. Further, there is a high level of confidence regarding the Project activities, surface disturbance requirements and commitments to returning land to pre-disturbance agricultural status following the life of the Project.

Based on these factors, the impacts on agriculture as a result of the Project are determined to be low, temporary, and limited to the development footprint. These impacts can be summarised as the following:

- Temporary removal of 170 ha from agricultural land use within the Study Area for the duration of the Project.
- Temporary removal of potential agricultural primary productivity to the estimated value of up to $70,047 per year for the duration of the Project.
- Temporary removal of potential agricultural secondary productivity to the estimated value of up to $152,618, per year for the duration of the Project.
- Temporary impacts on soil resources within the Study Area where surface disturbance occurs.

The temporary impacts on agriculture listed above are considered a negligible impact in the context of the gross commodity values and land use coverage of the agricultural industries operating within the Bathurst Regional Council LGA. Further, at the scale of the enterprises operating within the Study Area, impacts are considered offset as the involved landowners would be financially compensated.

Following construction and resting period of approximately one year, subject to the approval of Project stakeholders such as Rural Fire Service, Bathurst Regional Council and the Project's insurance providers, Edify anticipates that merino sheep can be introduced to graze within the Project boundary. This integrated land use of solar panels and livestock grazing offers the potential to enable the continuation of agricultural land usage and mitigate the above listed temporary impacts of the Project.

Further, it is anticipated that by adopting the principles of impact minimisation and targeted soil and erosion management during Project construction and operation, and implementing effective decommissioning and rehabilitation at the end of Project life, the Project will have no permanent negative impacts on agricultural resources or enterprises.

A summary of mitigation measures and management recommendations have been provided at Section 6.5 to eliminate the permanent risks and control the temporary risks of the Project on land and soil resources. The salvage of topsoil material for re-use purposes combined with sound erosion and sedimentation management practices during construction, operational and decommissioning phases of the Project, will ensure rehabilitation requirements are met and land is returned to a pre-disturbance agricultural status.

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Appendix 1

Land Use Conflict Risk Assessment

Overview

LUCRA is a system to identify and assess the potential for land use conflict to occur between neighbouring land uses. It helps land managers and consent authorities assess the possibility for and potential level of future land use conflict.

The LUCRA compares and contrasts the Project against adjoining/surrounding land uses and activities for incompatibility and conflict issues based on the risks and impacts identified in Section 5, and the mitigation measures and controls presented in Section 6. Each potential conflict between the operation of the solar farm and adjacent land has been assessed and given a risk ranking based on probability and consequence as outlined in the following section.

Assumption

The current status of rural land use in the area is not considered likely to change significantly during the life of the Project. For example, due to the location of the Study Area relative to major regional towns, it is considered unlikely that surrounding properties will undergo subdivision to accommodate residential or small-block rural developments. Accordingly, it is not expected that future changes to land use will occur that will generate new land use conflicts in addition to those identified.

Methodology

A risk ranking matrix (**Table A1**) provided by the DPI (2011) is used to rank the identified potential land use conflicts. The risk ranking matrix assesses the economic, social and environmental impacts according to the probability of occurrence and consequence of the impact.

Table A1: Risk Ranking Matrix

	Probability				
Consequence	**A**	**B**	**C**	**D**	**E**
Level 1	25	24	22	19	15
Level 2	23	21	18	14	10
Level 3	20	17	13	9	6
Level 4	16	12	8	5	3
Level 5	11	7	4	2	1

(Source: DPI, 2011)

The risk ranking matrix yields a risk ranking from 25 to 1. It covers each combination of five levels of 'probability' (a letter A to E as defined in **Table A2**) and 5 levels of 'consequence', (a number 1 to 5 as defined in **Table A3**) to identify the risk ranking of each impact. For example, an activity with a 'probability 'of D and a 'consequence' of 3 yields a risk rank of 9. A rank of 25 is the highest magnitude of risk; a highly likely, very serious event. A rank of 1 represents the lowest magnitude of risk; an almost impossible, very low consequence event. Low risk is a ranking score of 10 or below.

Table A2: Probability Definitions

Level	Descriptor	Description
A	Almost Certain	Common or repeating occurrence.
B	Likely	Known to occur or it has happened.
C	Possible	Could occur or 'I've heard of it happening.'
D	Unlikely	Could occur in some circumstances but not likely to occur.
E	Rare	Practically impossible or 'I've never heard of it happening.'

(Source: DPI, 2011)

Table A3: Consequence Definitions

	Description	Example of Implications
Level 1		
Severe	• Severe and/or permanent damage to the environment • Irreversible • Severe impact on the community • Neighbours are in prolonged dispute and legal action involved	• Harm or death to animals, fish, birds or plants • Long term damage to soil or water • Odours so offensive some people are evacuated or leave voluntarily • Many public complaints and serious damage to Council's reputation • Contravenes Protection of the Environment & Operations Act and the conditions of Council's licences and permits. Almost certain prosecution under the POEO Act
Level 2		
Major	• Serious and/or long-term impact to the environment • Long-term management implications • Serious impact on the community • Neighbours are in serious dispute	• Water, soil or air impacted, possibly in the long term • Harm to animals, fish or birds or plants • Public complaints. Neighbour disputes occur. Impacts pass quickly • Contravenes the conditions of Council's licences, permits and the POEO Act • Likely prosecution
Level 3		
Moderate	• Moderate and/or medium-term impact to the environment and community • Some ongoing management implications • Neighbour disputes occur	• Water or soil known to be affected, probably in the short to medium-term (e.g. 1-5 years) • Management could include significant change of management needed for agricultural enterprises to continue
Level 4		
Minor	• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours	• Theoretically could affect the environment or people but no impacts noticed • No complaints to Council • Does not affect the legal compliance status of Council
Level 5		
Negligible	• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely	• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable

(Source: DPI, 2011)

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction	Land users in the locality may be concerned construction activity disturbances may affect livestock behaviour and/or breeding.	D	3	9	The assessment of potential noise and vibration impacts will be undertaken via a Noise and Vibration Impact Assessment (NVIA). Appropriate mitigation measures will be specified within the NVIA to minimise noise and vibration impacts. Based on the preliminary separation distances and the mitigation proposed, adverse impacts from noise and vibration during construction and operation are not predicted. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to noise and vibration impacts on agricultural land users. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Any complaints from neighbours regarding effects to livestock can be managed within normal operations. No exceedances of adopted noise policy.
Construction	Land users in the locality may be concerned that dust generated by construction activities may have adverse health implications for residential land users within the locality.	D	3	9	The assessment of potential dust impacts will be undertaken as part of the EIS. Appropriate mitigation measures will be specified within the EIS to minimise the risk for dust to spread throughout the site and onto neighbouring land. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to air quality impacts. Separation distances for dust originating from the development (if applicable) will be included as a management strategy. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	4	3	Any complaints from neighbours can be managed within normal operations. No exceedances of adopted dust criteria.

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction	Increased noise generated by construction activities and heavy vehicle movements may be perceived as nuisance to surrounding residential properties.	C	4	8	The assessment of potential noise and vibration impacts will be undertaken via a Noise and Vibration Impact Assessment (NVIA). Appropriate mitigation measures will be specified within the NVIA to minimise noise and vibration impacts. Based on the preliminary separation distances and the mitigation proposed, adverse impacts from noise and vibration during construction and operation are not predicted. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to noise and vibration impacts on agricultural land users. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	4	5	Any complaints from neighbours can be managed within normal operations. No exceedances of adopted noise policy.
Construction	Land users in the locality may be concerned about changes to water quality, quantity and surface water flows that may affect the site and locality, including local waterways, resulting from surface disturbances during construction activities	C	3	13	Consideration of impacts to surrounding water courses and water quality will be undertaken within the for the EIS. Appropriate mitigation measures will be specified within the EIS, including soil erosion and sedimentation controls within this report, to minimise impacts to watercourse health and quality. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to watercourse health and quality. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved), such as a soil management plan and an erosion and sediment control plan.	D	4	5	No reportable erosion or sedimentation of waterways.

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction	Use of surrounding roadways during construction of the solar farm may cause conflict by interacting with agricultural and/or local transport activities, and/or resulting in additional travel time for road users	C	4	8	The assessment of potential traffic impacts will be undertaken via a Traffic Impact Assessment (TIA). Appropriate mitigation measures will be specified within the TIA to minimise impacts to the traffic environment. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to traffic for local road users. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved)	D	2	4	No complaints from local agricultural enterprises during the construction phase.
Construction	Land users in the locality may be concerned about the possibility of increased vehicles during construction on the Tarana Road may result in an incident involving other vehicles, farm machinery or wildlife on roads.	D	1	19	The assessment of potential traffic impacts will be undertaken via a Traffic Impact Assessment (TIA). Appropriate mitigation measures will be specified within the TIA to minimise impacts to the traffic environment. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to traffic for local road users. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved)	E	2	10	No traffic incidents during construction that are directly related to the solar farm.
Construction	Public authorities may be concern about the increased demand for services and infrastructure that may result from the development, especially during the construction stage, including increased accommodation for workers, availability of medical facilities and capacity of surrounding waste facilities	C	5	4	The assessment of impacts related to the increased demand for surrounding services and infrastructure will be undertaken as part of the EIS. Levels of anticipated increased demand and appropriate mitigation measures will be specified within the EIS to minimise the risk for logistical issues associated with the increased demand for existing infrastructure and services. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No unreasonable additional pressure on local services and infrastructure during the construction phase.

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Construction	Stakeholders may have concerns that construction activities associated with the solar farm may damage existing public services infrastructure including 132 kV TransGrid Transmission Line.	C	4	8	Consideration of potential impacts to surrounding service provider infrastructure will be undertaken as part of the EIS. Appropriate mitigation measures will be specified within the EIS and will be detailed in a Construction Management Plan to minimise the risk of construction activities damaging existing infrastructure. Compliance with construction management measures anticipated to reduce the risk of conflict related to damaging existing infrastructure. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	4	5	No damage to existing infrastructure including transmission line during the construction phase.
Construction	Stakeholders may have concerns that the construction and operation of the solar farm may alter and disturb existing soil properties, undermining the suitability of the land for future agricultural production.	C	2	18	The assessment of soil characteristics, erodibility and land and soil capability has been undertaken within this agricultural assessment. Anticipated impacts and appropriate mitigation measures are provided within this report. Compliance with mitigation measures is anticipated to reduce the risk of potential conflicts related to future land capability for agriculture. Implement all measures specified in this report and associated management plans identified in the EIS and/or consent conditions (if approved).	E	3	6	Stakeholders are informed of assessment findings and have no concern regarding impacts to soil and LSC. No observed erosion or degradation of soils or sedimentation of waterways

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Agriculture Cessation	Stakeholders in the locality may be concerned about the reduction of land used for agricultural purposes or the reduction of productivity of the land	A	4	16	The assessment of the reduction of land used for agriculture and the productivity of land will be undertaken within this agricultural assessment. Anticipated impacts and appropriate mitigation measures (ie consideration of agrisolar) will be provided within this report for stakeholder consideration. A Rehabilitation and Decommissioning Management Plan will ensure the land can be successfully returned to agricultural production following decommissioning.	D	4	5	Stakeholders are informed of assessment findings and have no concern regarding change in land use
Agriculture Cessation	Land users in the locality may be concerned about impacts to agricultural support infrastructure in the Project locality and wider region	D	4	5	The assessment of the impacts to agricultural support infrastructure in the Project locality and wider region have been undertaken within this agricultural assessment. Anticipated impacts are determined to be negligible and presented in this report for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	Stakeholders are informed of assessment findings and have no concern regarding impacts to agricultural support infrastructure
Operation Traffic	Land users in the locality may be concerned about an increase in traffic volume on Tarana Road throughout the operational phase of the Project, which may cause conflict by interacting with agriculture activities or increasing travel times over the life of the Project.	D	4	5	The assessment of potential traffic impacts during the operational phase of the Project will be undertaken via a Traffic Impact Assessment (TIA). Anticipated impacts are anticipated to be negligible and presented in the EIS for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No complaints from agriculture enterprises regarding increased traffic

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Operation Traffic	Land users in the locality may be concerned that dust generated by increased vehicle movements along access roads during the operational phase of the Project has the potential to impact air quality and may have adverse health implications for residential land users within the locality.	D	3	9	The assessment of potential dust impacts during the operational phase of the Project will be undertaken as part of the EIS. Anticipated impacts are anticipated to be negligible and presented in the EIS for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	3	6	No complaints from neighbours due to the solar farm activities. No exceedances of adopted dust criteria
Operation Noise	Land users in the locality may be concerned about an increase in noise levels generated from power inverters, transformer system, tracker motors and maintenance activities throughout the operational phase of the Project.	C	3	13	The assessment of potential noise and vibration impacts will be undertaken via a Noise and Vibration Impact Assessment (NVIA). Anticipated impacts are determined to be negligible and presented in the EIS for land user consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	5	2	No complaints from neighbours due to the solar farm activities. No exceedances of adopted noise policy.
Operation Visual Amenity	Stakeholders in the locality who wish to maintain views of the existing agricultural landscape may be concerned about the change in visual amenity resulting from the solar farm.	B	3	17	The assessment of visual impacts to surrounding amenity will be undertaken via a LVIA. Appropriate mitigation measures will be specified within the LVIA to minimise the risk of altered amenity for surrounding residents and public within the locality. Compliance with mitigation measures specified within the LVIA is anticipated to reduce the risk of conflict related to visual amenity. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	C	4	8	No complaints from stakeholders regarding visual amenity

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Operation Visual Amenity	The solar farm location and potential for glare and reflectivity has the potential to impact the amenity of surrounding residential properties	C	3	13	The assessment of glare and reflectivity impacts to surrounding residential properties will be undertaken via a LVIA. Anticipated impacts are anticipated to be negligible and presented in the EIS for stakeholder consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	3	6	No complaints from neighbouring properties regarding glare and reflectivity of panels
Operation Visual Amenity	Stakeholders in the locality may be concerned about impacts on agriculture-based tourism	C	3	13	Consideration of potential impacts to agriculture-based tourism will be undertaken as part of the EIS. Anticipated impacts are anticipated to be negligible and presented in the EIS for stakeholder consideration. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No complaints from agriculture-based tourism enterprise operating in the Project locality
Operation Pest Control	Land users in the locality may be concerned about weed, plant pest, plant disease or pest animal introduction and/or spread	B	2	21	The assessment of impacts to biodiversity will be undertaken via a BDAR. Consideration of the potential for pest species to impact agriculture will be included in this assessment. Appropriate mitigation measures will be specified within the BDAR and this assessment to minimise the risk for weeds and pests to spread throughout the site and onto neighbouring land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	3	9	No introduction of weed, plant pest, plant disease or pest animals onto the Study Area as a result of the Project, and no spread to surrounding properties
Operation Pest Control	Neighbouring property owners may be concerned about sprays from weed control adversely affecting adjacent land	D	4	5	Weed mitigation measures will be undertaken as per methodology specified in management plans identified in the EIS and/or consent conditions (if approved), including spraying in a manner to prevent spray drift. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No complaints from neighbouring properties regarding overspray of herbicides

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Operation Pest Control	Land users in the locality may be concerned that waste generated by the development may increase the presence of pest animals and/or vermin which could impact agricultural productivity.	D	4	5	Consideration of waste related impacts will be undertaken as part of the EIS. Appropriate mitigation measures will be specified within the EIS to minimise the risk of attracting pest animals and/or vermin. Compliance with mitigation measures specified in the EIS is anticipated to reduce the risk of conflict related to pest animals and/or vermin. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No introduction of weed, plant pest, plant disease or pest animals onto the Study Area as a result of the Project, and no spread to surrounding properties
General Operation	Land users in the locality may be concerned about changes to site run-off water quality during operational phases of the Project	C	3	13	Consideration of impacts to surrounding water courses and water quality will be undertaken within the water impact assessment of the EIS. Appropriate mitigation measures will be specified within the EIS, including soil erosion and sedimentation controls within this report, to minimise impacts to watercourse health and quality. Compliance with mitigation measures is anticipated to reduce the risk of conflict related to watercourse health and quality. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved), such as an erosion and sediment control plan.	D	4	5	No observed erosion of soils or sedimentation of waterways

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
General Operation	Land users in the locality may be concerned about the risk of fires occurring at the site and their potential to spread to surrounding land, infrastructure or livestock	C	2	18	Consideration of potential bushfire impacts will be undertaken as part of a Preliminary Hazard Analysis (PHA) informing the EIS. Appropriate mitigation measures will be specified within the bushfire assessment within the EIS to minimise the risk of bushfire incidents including their risk to people and potential to damage surrounding land. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	2	10	No occurrence of fires beginning on the Study Area and spreading to surrounding land
General Operation	Stakeholders in the locality may be concerned about the effects on local and regional employment	C	1	4	Consideration of employment impacts will be undertaken as part of the EIS. Anticipated impacts are determined to be negligible and outweighed by the employment opportunities of the Project. This finding is presented in the EIS for stakeholder consideration.	E	1	1	No unreasonable additional pressure to local employment
General Operation	Neighbouring landowners may be concerned about livestock used for vegetation control on Study Area entering adjacent properties	D	4	5	Operational management plans will include a provision to ensure boundary fence is maintained to a suitable standard. Regular inspection of fences should be conducted to assess the condition of the fence, and any issues rectified as soon as practical. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No breach of boundary fence.

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
General Operation	Neighbouring landowners may be concerned about their livestock entering the Study Area and becoming injured or causing damage	D	4	5	Operational management plans will include a provision to ensure boundary fence is maintained to a suitable standard. Regular inspection of fences should be conducted to assess the condition of the fence, and any issues rectified as soon as practical. If livestock enter the site, the surrounding landowners should be contacted. Efforts will be made to ensure the animal is not distressed and kept away from public roads. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	4	3	No breach of boundary fence.
General Operation	Land users in the locality may be concerned about electro-magnetic fields (EMF) resulting from electrical infrastructure associated with the Project.	D	2	14	Consideration of EMF impacts resulting from the development will be undertaken as part of the PHA and summarised in the EIS. The report is expected to concludes that EMF exposure levels will not exceed the International Commission on Non-Ionizing Radiation Protection reference level for the general public. No adverse impacts to human health at the site or in the locality are therefore anticipated. This finding is presented in the EIS for stakeholder consideration.	E	5	1	Stakeholders are informed of assessment findings and have no concern regarding EMF
General Operation	The placement of the solar farm on agriculturally viable land may cause conflict with surrounding agricultural operators interested in expanding their operations onto the Study Area.	C	3	13	Existing consultation and engagement for the project has not identified any intent for surrounding agricultural industries to expand operations onto the site in the short term. The reversibility of the Project would allow the site to be returned to its existing agricultural land use, therefore minimising potential for long term conflict.	E	3	6	Successful consultation addresses stakeholder concerns
General Operation	The placement of the solar farm on land that may be viable for sub-division may cause conflict with surrounding business operators interested in expanding production onto the site.	D	3	9	Existing consultation and engagement for the project has not identified any intent for nearby enterprises to expand operations onto the site in the short term. The reversibility of the project would allow the site to be returned to its existing land use, therefore minimising potential for long term conflict.	E	3	6	Successful consultation addresses stakeholder concerns

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
General Operation	The placement of the solar farm in proximity to agricultural business operators may affect insurance premiums for surrounding private property owners, especially in the context of potential fire damage.	C	3	13	Edify has its own insurance and would seek to make claim on that first in the event of fire damage to the solar power station. Notwithstanding, Edify recommends that farmers on nearby properties take all necessary precautions to prevent the ignition and spreading of fires, and seek advice from their insurance providers on individual insurance policy matters. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	3	6	Successful consultation addresses stakeholder concerns
General Operation	Landowners in the locality may be concerned about potential devaluation of properties due to proximity to solar farm infrastructure.	B	3	17	After delivering eight projects throughout Australia, including the largest solar and battery project in New South Wales, Edify is not aware of, and has not been presented with, any reliable, impartial research or evidence which establishes a correlation between declining real estate values and proximity to renewable infrastructure. Given the size of the landholdings, it is likely that their agricultural production attributes provide a strong foundation for overall property value. The project will not impact the agricultural resources or production value of properties proximate to the Study Area. Further, the change in visual amenity is not anticipated to have any noticeable effect on property values. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	2	10	Successful consultation addresses stakeholder concerns
General Operation	Landowners in the locality may be concerned about potential increase in council rates as a result of the change in land use of the Study Area.	C	3	13	The applicant has determined that council rates will not be expected to change in the locality as a result of the Project. Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	3	6	Successful consultation addresses stakeholder concerns

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
General Operation	Land users in the locality may be concerned that waste generated by the development has the potential to enter surrounding residential land.	D	4	5	Consideration of waste related impacts will be undertaken as part of the EIS. Risk will be mitigated by implementing standard operation measures specified in management plans identified in the EIS and/or consent conditions (if approved). Ongoing consultation with stakeholders will identify and address concerns if they arise.	E	5	1	No complaints from land users in the locality regarding waste.
General Operation	Land users in the locality may be concerned that the change in land use may attract people to the area who may not otherwise visit the area, including workers. This may be perceived to adversely affect a resident's security.	D	3	9	Consideration of potential crime related impacts will be undertaken as part of the EIS. Appropriate mitigation measures will be specified in the EIS to minimise the potential for crime to occur at or near the site. Compliance with crime management measures specified within the EIS is anticipated to reduce the risk of conflict related to the increased risk of vandalism and theft for surrounding residents. Ongoing consultation with stakeholders will identify and address concerns if they arise. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	E	3	6	Successful consultation assures residents of security mitigation measures alleviating concerns of perceived additional security risks.
General Operation	Stakeholders may have concerns regarding the ownership of the site i.e., whether it is a foreign-owned company	D	4	5	Engagement for the project has introduced the Project and the applicant (Edify) to surrounding stakeholders. Notification to stakeholders outlined the applicant's ownership and consultation has provided an opportunity for stakeholders to provide feedback. No feedback will be provided regarding the ownership of the site.	E	4	3	Successful consultation addresses stakeholder concerns

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
General Operation	Stakeholders may be concerned about impacts to heritage items or values at the site and locality.	B	4	12	An assessment of impacts to heritage will be undertaken with the preparation of an Aboriginal Cultural Heritage Assessment Report (ACHAR) and Statement of Heritage Impact (SOHI). Appropriate mitigation measures will be specified within the ACHAR and SOHI to minimise impacts to heritage. Compliance with mitigation measures specified within the ACHAR and SOHI is anticipated to reduce the risk of conflict related to environmental features, culturally sensitive land, and heritage. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved).	D	4	5	No complaints from stakeholders regarding impacts to heritage items or values at the Study Area.
General Operation	Stakeholders may be concern about potential impacts to biodiversity within the site and locality	B	3	17	The assessment of impacts to biodiversity will be undertaken via a BDAR. Appropriate mitigation measures will be specified within the BDAR and this assessment to minimise the risk for impacts on biodiversity within the site and locality. Implement all measures specified in management plans identified in the EIS and/or consent conditions (if approved). Ongoing consultation with stakeholders will identify and address concerns if they arise.	D	3	9	No complaints from stakeholders regarding impacts to biodiversity at the Study Area.
General Operation	Public Authorities may have concerns regarding the potential for cumulative impacts arising from the proximity of state significant developments.	B	3	17	An assessment of potential cumulative impacts will be undertaken as part of the EIS. Appropriate mitigation measures (where required) will be specified in the EIS to minimise the potential for cumulative impacts to occur at or near the site. Anticipated impacts are determined to be minor and presented in the EIS for Public Authority consideration.	D	3	9	Successful consultation addresses stakeholder concerns
General Operation	Dispersion of dust and/or agricultural/ rural products from surrounding land uses, including adjacent Monaro Highway may impact the productivity of the solar farm panels, potentially causing conflict between agricultural land users and the solar farmland use.	C	4	8	Compliance with mitigation measures specified within the EIS together within the routine and event triggered cleaning of solar panels and site infrastructure, is anticipated to reduce the risk of conflict related to the functioning of the solar farm panels.	D	5	2	No impact to solar farm operations or infrastructure.

Activity	Potential Conflict	Initial Risk Rating			Risk Reduction Control	Final Risk Rating			Performance Target
		Probability	Consequence	Rating		Probability	Consequence	Rating	
Decommissioning	Stakeholders may be concerned about the potential for poor rehabilitation outcomes and the resulting long term environmental and agricultural consequence.	C	1	22	A Rehabilitation and Decommissioning Management Plan will ensure the land can be successfully returned to pre-disturbance land and soil capability and final land use commitments following decommissioning.	E	2	10	Fulfilment of rehabilitation objectives

Appendix 2

Soil Profile Descriptions

Site Description – Site 1				
Site Reference	1	**ASC Name**	Mottled Eutrophic Red Chromosol (BELOWNR)	
Average Slope	3%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Midslope	**Drainage**	Moderate	X: 749627
Surface Condition	Soft	**Permeability**	High	Y: 6293384

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Very dark greyish brown (Munsell 10YR 3/2) Sandy Loam with weak pedality. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
A2	**0.20 – 0.60**	Dark greyish brown (Munsell 10YR 4/2) Loamy Sand with weak pedality. Neutral pH, non-saline and non-sodic. No coarse fragments. Few roots and well drained. Clear boundary.
B2	**0.60 +**	Light red (Munsell 2.5YR 6/6) Medium Clay with moderate pedality. Neutral pH, non-saline and non-sodic. No coarse fragments. Very few fine roots and moderately drained. 30% distinct grey mottling. 30% distinct red mottling.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.8	Non-saline	6.2	Slightly Acidic	0.8	Non sodic
0.30 – 0.40	0.5	Non-saline	6.7	Neutral	1.9	Non sodic
0.60 – 0.70	0.3	Non-saline	7.0	Neutral	4.5	Non sodic

Site Description – Site 2				
Site Reference	2	**ASC Name**	Brown Chromosol	
Average Slope	6%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Midslope	**Drainage**	Moderate	X: 748985
Surface Condition	Soft	**Permeability**	Moderate	Y: 6293223

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Dark grey (Munsell 7.5YR 4/1) Sandy Loam field texture with moderate pedality. Moderately acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Clear boundary.
A2	**0.20 – 0.45**	Very dark grey (Munsell 7.5YR 3/1) Loam field texture with moderate pedality. No coarse fragments. Few roots and moderately drained. Clear boundary.
B21	**0.45 – 0.65**	Reddish brown (Munsell 7.5YR 4/4) Light Medium Clay field texture with moderate pedality. No coarse fragments. Very few fine roots and moderately drained. 30% distinct grey mottling. Clear boundary.
B22	**0.65+**	Dark greyish brown (Munsell 10YR 4/2) Medium Clay field texture with moderate pedality. No coarse fragments. Very few fine roots and moderately drained. 20% distinct orange mottling.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	5.8	Moderately Acidic	2.4	Non sodic

Site Description – Site 3				
Site Reference	3	**ASC Name**	Red Chromosol	
Average Slope	4%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Mid/lower slope	**Drainage**	Moderate	X: 748828
Surface Condition	Soft	**Permeability**	Moderate	Y: 6293814

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Dark brown (Munsell 7.5YR 3/2) Sandy Loam field texture with moderate pedality. Moderately acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
A2	**0.20 – 0.50**	Dark grey (Munsell 7.5YR 4/1) Sandy Loam field texture with moderate pedality. No coarse fragments. Few roots and moderately drained. Clear boundary.
B21	**0.50 – 0.65**	Light red (Munsell 2.5YR 6/6) Medium Clay field texture with moderate pedality. No coarse fragments. Very few fine roots and moderately drained. 10% faint grey mottling. Clear boundary.
B22	**0.65+**	Light Grey (Munsell 5YR 7/1) Medium Clay field texture with strong pedality. 20% coarse fragments 2 – 10mm. Very few fine roots and moderately drained. 40% orange mottling.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.6	Non-saline	5.7	Moderately Acidic	1.3	Non-sodic

Site Description – Site 4				
Site Reference	4	**ASC Name**	Red Chromosol	
Average Slope	3%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Midslope	**Drainage**	Moderate	X: 749316
Surface Condition	Firm	**Permeability**	Moderate	Y: 6293763

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A11	**0.00 – 0.30**	Dark brown (Munsell 7.5YR 3/3) Loam field texture with moderate pedality. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
A12	**0.30 – 0.55**	Very dark grey (Munsell 7.5YR3/1) Loam field texture with moderate pedality. No coarse fragments. Few roots and moderately drained. Clear boundary.
A22	**0.55 – 0.70**	Bleached Light Brown (Munsell 7.5YR 6/3) Loam field texture with weak pedality. 30% coarse fragments 10mm. No roots and moderately drained.
B2	**0.70+**	Yellowish red (Munsell 5YR 4/6) Medium Clay field texture with strong pedality. No coarse fragments. No roots and moderately drained. 30% distinct grey mottling.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.8	Non-saline	6.2	Slightly Acidic	1.0	Non sodic

Site Description – Site 5				
Site Reference	5	**ASC Name**	Mottled-Sodic Eutrophic Red Chromosol (BFLOWNR)	
Average Slope	5%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Upper slope	**Drainage**	Moderate	X: 750075
Surface Condition	Soft	**Permeability**	High	Y: 6293992

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.30**	Dark reddish-brown (Munsell 5YR 3/3) Sandy Loam with moderate pedality. Slightly acidic pH, non-saline and non-sodic. 5% coarse fragments 5mm. Many roots and well drained. Clear boundary.
B21	**0.30 – 0.55**	Yellowish-red (Munsell 5YR 4/6) Heavy Clay with strong pedality. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Few roots and moderately drained. Gradual boundary.
B22	**0.55 +**	Reddish-brown (Munsell 2.5YR 4/3) Heavy Clay with strong pedality. Mildly alkaline pH, non-saline and sodic. No coarse fragments. Very few fine roots and moderately drained. 10% distinct orange mottling, 10% distinct grey mottling.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	1.1	Non-saline	6.1	Slightly Acidic	1.1	Non sodic
0.30 – 0.40	0.3	Non-saline	6.4	Slightly Acidic	5.4	Non sodic
0.60 – 0.70	0.5	Non-saline	7.7	Mildly Alkaline	12.1	Sodic

Site Description – Site 6				
Site Reference	6	**ASC Name**	Brown Chromosol	
Average Slope	5%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Midslope	**Drainage**	Imperfect	X: 749585
Surface Condition	Soft	**Permeability**	Moderate	Y: 6294138

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.35**	Brown (Munsell 7.5YR 4/4) Sandy Loam field texture with moderate pedality. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
A2	**0.35 – 0.70**	Bleached light brownish grey (Munsell 10YR 6/2) Sandy Loam field texture with weak pedality. No coarse fragments. Few roots and moderately drained. Clear boundary.
B	**0.70 +**	Yellowish brown (Munsell 10YR 5/6) Heavy Clay field texture with moderate pedality. No coarse fragments. No roots and moderately drained. 40% distinct grey mottling.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.7	Non-saline	6.0	Slightly Acidic	3.2	Non sodic

Site Description – Site 7				
Site Reference	7	**ASC Name**	Haplic Mesotrophic Black Dermosol (BELOW)	
Average Slope	0%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Drainage Flat	**Soil Fertility**	High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 749766
Surface Condition	Soft	**Permeability**	High	Y: 6294523

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Black (Munsell 5YR 2.5/1) Loam with friable pedality. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.15 – 0.40**	Black (Munsell 7.5YR 2.5/1) Sandy Clay Loam with moderate pedality. Moderately acidic pH, non-saline and non-sodic. No coarse fragments. Common roots and moderately well drained. Gradual boundary.
B22	**0.40 +**	Brown (Munsell 7.5YR 4/2) Light Medium Clay with moderate pedality. Neutral pH, non-saline and non-sodic. 30% coarse fragments 2mm. Few fine roots and moderately well drained.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	6.1	Slightly Acidic	0.7	Non sodic
0.20 – 0.30	0.2	Non-saline	6.0	Moderately Acidic	0.9	Non sodic
0.50 – 0.60	0.2	Non-saline	6.9	Neutral	0.8	Non sodic

Site Description – Site 8				
Site Reference	8	**ASC Name**	Black Dermosol	
Average Slope	5%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Drainage Flat	**Soil Fertility**	High	MGA 55
Landform Element	Bench	**Drainage**	Moderate	X: 749551
Surface Condition	Soft	**Permeability**	Moderate	Y: 6294548

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.25**	Dark reddish brown (Munsell 5YR 3/4) Loam field texture with friable pedality. Moderately acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.25 – 0.60**	Dark reddish brown (Munsell 5YR 3/2) Sandy Clay Loam field texture with moderate pedality. No coarse fragments. Few roots and moderately well drained. Gradual boundary.
B22	**0.60 +**	Reddish brown (Munsell 5YR 4/4) Light Medium Clay field texture with moderate pedality. No coarse fragments. Very few fine roots and moderately drained. 20% calcium carbonate nodules.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	5.9	Moderately Acidic	0.7	Non sodic

Site Description – Site 9				
Site Reference	9	**ASC Name**	Red Chromosol	
Average Slope	9%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Midslope	**Drainage**	Moderate	X: 749661
Surface Condition	Soft	**Permeability**	Moderate	Y: 6294968

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A	0.00 – 0.30	Brown (Munsell 7.5YR 4/2) Loam field texture with weak pedality. Moderately acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Clear boundary.
B2	0.30 +	Reddish brown (Munsell 5YR 4/4) Medium Clay field texture with moderate pedality. No coarse fragments. Common fine roots and moderately drained. 5% calcium carbonate nodules.

Sample Depth	ECe		$pH_{(1\text{-}5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.4	Non-saline	5.6	Moderately Acidic	1.8	Non sodic

Site Description – Site 10				
Site Reference	10	**ASC Name**	Black Dermosol	
Average Slope	0%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Drainage Flat	**Soil Fertility**	Moderately High	MGA 55
Landform Element	Flat	**Drainage**	Moderately Well	X: 749948
Surface Condition	Soft	**Permeability**	High	Y: 6294511

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.15**	Dark brown (Munsell 7.5YR 3/2) Loam field texture with friable pedality. Moderately acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Gradual boundary.
B21	**0.15 – 0.40**	Very dark grey (Munsell 7.5YR 3/1) Sandy Clay Loam field texture with moderate pedality. No coarse fragments. Common roots and moderately well drained. Gradual boundary.
B22	**0.40 +**	Dark yellowish brown (Munsell 10YR 3/4) Light Medium Clay field texture with moderate pedality. No coarse fragments. Few fine roots and moderately well drained. 30% calcium carbonate nodules.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.4	Non-saline	5.9	Moderately Acidic	0.6	Non sodic

Site Description – Site 11				
Site Reference	11	**ASC Name**	Eutrophic Mottled-Subnatric Black Sodosol (BELOWNR)	
Average Slope	4%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderate	MGA 55
Landform Element	Upper slope	**Drainage**	Imperfect	X: 750018
Surface Condition	Soft	**Permeability**	High	Y: 6293553

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A1	**0.00 – 0.20**	Dark brown (Munsell 7.5YR 3/2) Loam with strong pedality. Slightly acidic pH, non-saline and non-sodic. 10% coarse fragments 10mm. Many roots and well drained. Clear boundary.
B22	**0.20 – 0.35**	Dark brown (Munsell 7.5YR 3/2) Heavy Clay with strong pedality. Neutral pH, non-saline and sodic. No coarse fragments. Few roots and moderately drained. 30% distinct red mottling. Clear boundary.
B23	**0.35 +**	Brown (Munsell 10YR 4/3) Heavy Clay with moderate pedality. Moderately alkaline pH, slightly saline and sodic. No coarse fragments. No roots and moderately drained. 40% distinct yellow mottling.

Sample Depth	ECe		pH(1-5water)		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	1.1	Non-saline	6.1	Slightly Acidic	3.0	Non sodic
0.20 – 0.30	1.1	Non-saline	7.1	Neutral	14.3	Sodic
0.50 – 0.60	2.8	Slightly saline	8.4	Moderately Alkaline	21.8	Sodic

Site Description – Site 12				
Site Reference	12	**ASC Name**	Bleached Mottled-Subnatric Grey Sodosol (CELOWNR)	
Average Slope	2%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderate	MGA 55
Landform Element	Crest	**Drainage**	Imperfect	X: 750636
Surface Condition	Firm	**Permeability**	Moderate	Y: 6293682

Plate 1 – Soil Profile

Plate 2– Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A11	**0.00 – 0.25**	Brown (Munsell 7.5YR 4/2) Sandy Loam with moderate pedality. Slightly acidic pH, non-saline and sodic. No coarse fragments. Many roots and well drained. Clear boundary.
A12	**0.25 – 0.45**	Brown (Munsell 7.5YR 4/3) Sandy Clay Loam with weak pedality. Neutral pH, non-saline and non-sodic. No coarse fragments. Few roots and moderately drained. 40% distinct red mottling. Abrupt boundary.
A2	**0.45 – 0.55**	Bleached Pale Brown (Munsell 10YR6/3) apedal Loamy Sand field texture. Neutral pH, non-saline and sodic. 10% coarse fragments 10mm. No roots and imperfectly drained. Abrupt boundary.
B2	**0.55+**	Greyish brown (Munsell 10YR 5/2) Light Medium Clay with strong pedality. Neutral pH, non-saline and sodic. No coarse fragments. No roots and poorly drained. 10% distinct yellow mottling. 10% distinct red mottling.

Sample Depth	ECe		pH(1-5water)		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.6	Non-saline	6.1	Slightly Acidic	7.2	Sodic
0.25 – 0.35	0.3	Non-saline	6.5	Neutral	3.1	Non sodic
0.45 – 0.55	-	-	7.0	Neutral	8.4	Sodic
0.65 – 0.75	0.5	Non-saline	7.3	Neutral	11.9	Sodic

Site Description – Site 13				
Site Reference	13	**ASC Name**	Brown Sodosol	
Average Slope	3%	**Land Use**	Grazing	**Coordinates**
Landform Pattern	Hillslope	**Soil Fertility**	Moderate	MGA 55
Landform Element	Upper Slope	**Drainage**	Imperfect	X: 750438
Surface Condition	Firm	**Permeability**	Moderate	Y: 6293346

Plate 1 – Soil Profile

Plate 2 – Landscape

Plate 3 – Surface

Horizon	Depth (m)	Description
A11	**0.00 – 0.20**	Dark grey (Munsell 7.5YR 4/1) Sandy Loam field texture with moderate pedality. Slightly acidic pH, non-saline and non-sodic. No coarse fragments. Many roots and well drained. Clear boundary.
A12	**0.20 – 0.55**	Yellowish brown (Munsell 10YR 5/4) Sandy Clay Loam field texture with weak pedality. No coarse fragments. Few roots and moderately drained. Abrupt boundary.
A2	**0.55 – 0.65**	Bleached pale brown (Munsell 10YR 6/3) apedal Loamy Sand field texture. 20% coarse fragments 2 - 5mm. No roots and imperfectly drained. Abrupt boundary.
B2	**0.65+**	Strong brown (Munsell 7.5YR 4/6) Light Medium Clay field texture with strong pedality. No coarse fragments. No roots and poorly drained. 30% distinct red mottling. 10% distinct orange mottling.

Sample Depth	ECe		$pH_{(1-5water)}$		ESP	
	dS/m	Rating	Value	Rating	Value	Rating
0.00 – 0.10	0.5	Non-saline	6.1	Slightly Acidic	5.7	Non sodic

Appendix 3

Laboratory Certificates of Analysis

GRAIN SIZE ANALYSIS (hydrometer and sieving techniques)

16 of 24 soil samples supplied by Minesoils Pty Ltd on 22nd May, 2023 - Lab Job No. P0986
Analysis requested by Matt Hemingway. Job Ref: MS-088 Brewongle
Address Not Given

SAMPLE ID	Lab Code	MOISTURE CONTENT (% of water in sample)	TOTAL GRAVEL > 2 mm (% of total oven-dry equivalent)	GRAVEL > 4.75 mm (% of total oven-dry equivalent)	GRAVEL 2.00-4.75 mm (% of total oven-dry equivalent)	COARSE SAND 200-2000 µm (0.2-2.0 mm) (% of total oven-dry equivalent)	FINE SAND 20-200 µm (0.02-0.2 mm) (% of total oven-dry equivalent)	SILT 2-20 µm (% of total oven-dry equivalent)	CLAY < 2 µm (% of total oven-dry equivalent)
1 0 - 10	P0986/1	13.0%	1.3%	0.0%	1.3%	42.5%	36.7%	8.1%	11.4%
1 30 - 40	P0986/2	8.9%	1.8%	0.0%	1.8%	41.0%	37.8%	12.1%	7.3%
1 60 - 70	P0986/3	13.5%	1.3%	0.0%	1.3%	21.0%	28.3%	4.2%	45.3%
5 0 - 10	P0986/7	12.4%	6.6%	1.0%	5.6%	30.0%	36.8%	8.8%	17.7%
5 30 - 40	P0986/8	23.3%	3.1%	0.9%	2.1%	8.4%	10.9%	2.0%	75.6%
5 60 - 70	P0986/9	23.7%	4.0%	0.7%	3.3%	6.4%	6.1%	4.1%	79.4%
7 0 - 10	P0986/11	18.3%	4.2%	0.0%	4.2%	38.1%	31.6%	10.2%	16.0%
7 20 - 30	P0986/12	11.9%	2.9%	0.0%	2.9%	39.4%	32.5%	5.4%	19.9%
7 50 - 60	P0986/13	15.9%	5.6%	1.7%	3.9%	36.2%	16.9%	2.8%	38.6%
11 0 - 10	P0986/17	15.0%	11.2%	0.0%	11.2%	22.1%	36.3%	12.3%	18.1%
11 20 - 30	P0986/18	24.3%	5.5%	0.0%	5.5%	4.9%	11.6%	4.2%	73.8%
11 50 - 60	P0986/19	27.0%	4.1%	0.0%	4.1%	8.2%	10.6%	4.3%	72.7%
12 0 - 10	P0986/20	13.4%	1.3%	0.0%	1.3%	39.9%	40.4%	7.8%	10.6%
12 25 - 35	P0986/21	10.0%	0.9%	0.0%	0.9%	36.9%	35.1%	7.2%	19.9%
12 45 - 55	P0986/22	5.0%	Insufficient sample						
12 65 - 75	P0986/23	12.9%	1.4%	0.0%	1.4%	16.4%	28.8%	9.8%	43.7%

Note:

1: The Hydrometer Analysis method was used to determine the percentage sand, silt and clay,
modified from SOP meth004 (California Dept of Pesticide Regulation), using method of Gee & Bauder (1986),
in *Methods of Soil Analysis. Part 1* Agron. Monogr. 9 (2nd Ed). Klute, A., American Soc. of Agronomy Inc., Soil Sci. Soc. America Inc., Madison WI: 383-411.

2: Australian Standard 1289.3.8.1-1997 (see attached)

3. Analysis conducted between sample arrival date and reporting date.

4. This report is not to be reproduced except in full. Results only relate to the item tested.

5. All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer scu.edu.au/eal).

6. This report was issued on 06/06/2023.

checked: .....
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AGRICULTURAL SOIL ANALYSIS REPORT

24 samples supplied by Minesoils Pty. Ltd. on 22/05/2023. Lab Job No.P0986

Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

			Sample 1	Sample 2	Sample 3	Sample 4
		Sample ID:	1 0 - 10	1 30 - 40	1 60 - 70	2 0 - 10
		Crop:	Soil	Soil	Soil	Soil
		Client:	EDIFY	EDIFY	EDIFY	EDIFY
	Parameter	Method reference	P0986/1	P0986/2	P0986/3	P0986/4
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.17	6.68	6.98	5.75
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.056	0.021	0.039	0.039
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	4.2	2.6	4.4	3.1
	Exchangeable Calcium (kg/ha)		1,880	1,164	1,984	1,393
	Exchangeable Calcium (mg/kg)		839	519	886	622
	Exchangeable Magnesium (cmol+/kg)		0.85	0.73	4.3	0.98
	Exchangeable Magnesium (kg/ha)		230	197	1,158	266
	Exchangeable Magnesium (mg/kg)		103	88	517	119
	Exchangeable Potassium (cmol+/kg)		0.33	0.15	0.30	0.38
	Exchangeable Potassium (kg/ha)		290	128	261	333
	Exchangeable Potassium (mg/kg)		129	57	117	149
	Exchangeable Sodium (cmol+/kg)		<0.065	0.07	0.42	0.12
	Exchangeable Sodium (kg/ha)		<33	34	216	60
	Exchangeable Sodium (mg/kg)		<15	15	96	27
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	<0.01	<0.01	<0.01	0.17
	Exchangeable Aluminium (kg/ha)		1.6	<1	1.2	35
	Exchangeable Aluminium (mg/kg)		<1	<1	<1	16
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.10	<0.01	<0.01	0.11
	Exchangeable Hydrogen (kg/ha)		2.2	<1	<1	2.4
	Exchangeable Hydrogen (mg/kg)		<1	<1	<1	1.1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	5.5	3.5	9.4	4.9
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	76	73	47	64
	Magnesium (%)		15	21	45	20
	Potassium (%)		6.0	4.1	3.2	7.8
	Sodium - ESP (%)		0.82	1.9	4.5	2.4
	Aluminium (%)		0.14	0.11	0.06	3.6
	Hydrogen (%)		1.8	0.00	0.00	2.2
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	4.9	3.6	1.0	3.2
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	3	4	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10YR 3/2 Very Dark Grayish Brown	10YR 4/2 Dark Grayish Brown	2.5YR 6/6 Olive Yellow	..
	Mottles Munsell Colour		..	..	2.5YR 4/8, 2.5YR 3/1	..
			..	..	..	..
	Degree of Mottling (%)		..	..	50	..

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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

		Sample 1	Sample 2	Sample 3	Sample 4
	Sample ID:	1 0 - 10	1 30 - 40	1 60 - 70	2 0 - 10
	Crop:	Soil	Soil	Soil	Soil
	Client:	EDIFY	EDIFY	EDIFY	EDIFY
Parameter	Method reference	P0986/1	P0986/2	P0986/3	P0986/4

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
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17. This report was issued on 6/06/2023.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

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Not Given

			Sample 5	Sample 6	Sample 7	Sample 8	Sample 9
		Sample ID:	3 0 - 10	4 0 - 10	5 0 - 10	5 30 - 40	5 60 - 70
		Crop:	Soil	Soil	Soil	Soil	Soil
		Client:	EDIFY	EDIFY	EDIFY	EDIFY	EDIFY
	Parameter	Method reference	P0986/5	P0986/6	P0986/7	P0986/8	P0986/9
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	5.71	6.15	6.13	6.41	7.66
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.040	0.054	0.075	0.047	0.085
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	2.9	4.8	5.2	9.8	9.0
	Exchangeable Calcium (kg/ha)		1,302	2,139	2,341	4,383	4,033
	Exchangeable Calcium (mg/kg)		581	955	1,045	1,957	1,800
	Exchangeable Magnesium (cmol+/kg)		0.84	0.90	1.1	7.3	11
	Exchangeable Magnesium (kg/ha)		230	244	302	1,985	2,865
	Exchangeable Magnesium (mg/kg)		103	109	135	886	1,279
	Exchangeable Potassium (cmol+/kg)		0.33	0.58	1.2	0.79	0.48
	Exchangeable Potassium (kg/ha)		285	507	1,052	692	424
	Exchangeable Potassium (mg/kg)		127	226	470	309	189
	Exchangeable Sodium (cmol+/kg)		<0.065	<0.065	0.08	1.0	2.7
	Exchangeable Sodium (kg/ha)		<33	<33	42	533	1,415
	Exchangeable Sodium (mg/kg)		<15	<15	19	238	632
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.14	0.01	0.02	0.18	<0.01
	Exchangeable Aluminium (kg/ha)		29	2.6	4.9	36	1.8
	Exchangeable Aluminium (mg/kg)		13	1.2	2.2	16	<1
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.15	0.08	0.12	0.16	<0.01
	Exchangeable Hydrogen (kg/ha)		3.4	1.7	2.7	3.6	<1
	Exchangeable Hydrogen (mg/kg)		1.5	<1	1.2	1.6	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	4.4	6.4	7.8	19	23
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	66	75	67	51	39
	Magnesium (%)		19	14	14	38	46
	Potassium (%)		7.4	9.1	15	4.1	2.1
	Sodium - ESP (%)		1.3	0.97	1.1	5.4	12
	Aluminium (%)		3.2	0.20	0.31	0.92	0.04
	Hydrogen (%)		3.4	1.2	1.6	0.83	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	3.4	5.3	4.7	1.3	0.85
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..	3	3
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	..	..	5YR 3/3 Dark Reddish Brown	5YR 4/6 Yellowish Brown	2.5YR 4/3 Olive Brown
	Mottles Munsell Colour		..	..	..	5YR 3/2	2.5 4/6, 2.5YR 3/2
	Degree of Mottling (%)		..	..	..	30	50

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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

		Sample 5	Sample 6	Sample 7	Sample 8	Sample 9
	Sample ID:	3 0 - 10	4 0 - 10	5 0 - 10	5 30 - 40	5 60 - 70
	Crop:	Soil	Soil	Soil	Soil	Soil
	Client:	EDIFY	EDIFY	EDIFY	EDIFY	EDIFY
Parameter	Method reference	P0986/5	P0986/6	P0986/7	P0986/8	P0986/9

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013,
   Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 cmol$_+$/kg = 230 mg/kg Sodium, 390 mg/kg Potassium,
    122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
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Quality Checked: Kris Saville
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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle
Not Given

			Sample 10	Sample 11	Sample 12	Sample 13	Sample 14
		Sample ID:	6 0 - 10	7 0 - 10	7 20 - 30	7 50 - 60	8 0 - 10
		Crop:	Soil	Soil	Soil	Soil	Soil
		Client:	EDIFY	EDIFY	EDIFY	EDIFY	EDIFY
	Parameter	Method reference	P0986/10	P0986/11	P0986/12	P0986/13	P0986/14
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.01	6.07	6.00	6.90	5.92
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.049	0.050	0.025	0.023	0.048
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	3.0	5.7	6.7	11	3.0
	Exchangeable Calcium (kg/ha)		1,336	2,570	3,029	4,847	1,363
	Exchangeable Calcium (mg/kg)		597	1,147	1,352	2,164	608
	Exchangeable Magnesium (cmol+/kg)		1.1	1.2	1.3	4.4	0.86
	Exchangeable Magnesium (kg/ha)		286	340	358	1,200	235
	Exchangeable Magnesium (mg/kg)		128	152	160	536	105
	Exchangeable Potassium (cmol+/kg)		0.32	0.69	0.47	0.44	0.53
	Exchangeable Potassium (kg/ha)		277	604	408	382	463
	Exchangeable Potassium (mg/kg)		124	269	182	171	207
	Exchangeable Sodium (cmol+/kg)		0.15	<0.065	0.08	0.12	<0.065
	Exchangeable Sodium (kg/ha)		78	<33	40	64	<33
	Exchangeable Sodium (mg/kg)		35	<15	18	29	<15
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.01	0.02	0.01	0.07
	Exchangeable Aluminium (kg/ha)		4.7	2.0	3.3	2.4	14
	Exchangeable Aluminium (mg/kg)		2.1	<1	1.5	1.1	6.2
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.19	0.07	0.05	<0.01	0.08
	Exchangeable Hydrogen (kg/ha)		4.2	1.5	1.2	<1	1.7
	Exchangeable Hydrogen (mg/kg)		1.9	<1	<1	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	4.7	7.8	8.7	16	4.6
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	63	73	78	68	66
	Magnesium (%)		22	16	15	28	19
	Potassium (%)		6.7	8.8	5.4	2.8	11
	Sodium - ESP (%)		3.2	0.74	0.90	0.79	0.66
	Aluminium (%)		0.50	0.13	0.19	0.08	1.5
	Hydrogen (%)		4.0	0.85	0.60	0.00	1.7
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	2.8	4.6	5.1	2.4	3.5
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	3	3	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	..	5YR 2.5/1	7.5YR 2.5/1	7.5YR 4/2	..
			..	Black	Black	Brown	..
	Mottles Munsell Colour		..	..	..	..	..
			..	..	..	..	..
	Degree of Mottling (%)		..	..	..	..	..

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Not Given

	Sample 10	Sample 11	Sample 12	Sample 13	Sample 14
Sample ID:	6 0 - 10	7 0 - 10	7 20 - 30	7 50 - 60	8 0 - 10
Crop:	Soil	Soil	Soil	Soil	Soil
Client:	EDIFY	EDIFY	EDIFY	EDIFY	EDIFY
Parameter / Method reference	P0986/10	P0986/11	P0986/12	P0986/13	P0986/14

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 cmol$_+$/kg = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
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			Sample 15	Sample 16	Sample 17	Sample 18
		Sample ID:	9 0 - 10	10 0 - 10	11 0 - 10	11 20 - 30
		Crop:	Soil	Soil	Soil	Soil
		Client:	EDIFY	EDIFY	EDIFY	EDIFY
	Parameter	Method reference	P0986/15	P0986/16	P0986/17	P0986/18
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	5.63	5.85	6.13	7.09
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.034	0.040	0.112	0.186
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	2.9	4.6	6.7	12
	Exchangeable Calcium (kg/ha)		1,317	2,053	3,013	5,313
	Exchangeable Calcium (mg/kg)		588	917	1,345	2,372
	Exchangeable Magnesium (cmol+/kg)		0.93	1.1	1.6	6.9
	Exchangeable Magnesium (kg/ha)		252	309	442	1,882
	Exchangeable Magnesium (mg/kg)		113	138	197	840
	Exchangeable Potassium (cmol+/kg)		0.27	0.59	1.1	0.87
	Exchangeable Potassium (kg/ha)		236	517	959	763
	Exchangeable Potassium (mg/kg)		105	231	428	340
	Exchangeable Sodium (cmol+/kg)		0.08	<0.065	0.29	3.3
	Exchangeable Sodium (kg/ha)		41	<33	151	1,682
	Exchangeable Sodium (mg/kg)		18	<15	67	751
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.19	0.05	0.02	0.02
	Exchangeable Aluminium (kg/ha)		39	9.3	3.7	3.2
	Exchangeable Aluminium (mg/kg)		17	4.2	1.7	1.4
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.14	0.16	0.06	<0.01
	Exchangeable Hydrogen (kg/ha)		3.2	3.6	1.4	<1
	Exchangeable Hydrogen (mg/kg)		1.4	1.6	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	4.5	6.5	9.8	23
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	65	70	68	52
	Magnesium (%)		20	17	17	30
	Potassium (%)		5.9	9.0	11	3.8
	Sodium - ESP (%)		1.8	0.59	3.0	14
	Aluminium (%)		4.3	0.70	0.19	0.07
	Hydrogen (%)		3.1	2.5	0.63	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	3.2	4.0	4.1	1.7
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	..	..	..	2
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	..	..	7.5YR 3/2	7.5YR 3/2
			..	..	Dark Brown	Dark Brown
	Mottles Munsell Colour		..	..	..	5YR 2.5/1, 2.5YR 3/4
			..	..	..	..
	Degree of Mottling (%)		..	..	..	50, 20

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Not Given

		Sample 15	Sample 16	Sample 17	Sample 18
	Sample ID:	9 0 - 10	10 0 - 10	11 0 - 10	11 20 - 30
	Crop:	Soil	Soil	Soil	Soil
	Client:	EDIFY	EDIFY	EDIFY	EDIFY
Parameter	Method reference	P0986/15	P0986/16	P0986/17	P0986/18

Notes:

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Not Given

			Sample 19	Sample 20	Sample 21	Sample 22
		Sample ID:	11 50 - 60	12 0 - 10	12 25 - 35	12 45 - 55
		Crop:	Soil	Soil	Soil	Soil
		Client:	EDIFY	EDIFY	EDIFY	EDIFY
	Parameter	Method reference	P0986/19	P0986/20	P0986/21	P0986/22
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	8.37	6.14	6.52	7.04
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.482	0.040	0.029	0.028
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	14	3.7	4.6	2.3
	Exchangeable Calcium (kg/ha)		6,068	1,678	2,056	1,034
	Exchangeable Calcium (mg/kg)		2,709	749	918	462
	Exchangeable Magnesium (cmol+/kg)		11	1.0	1.5	1.4
	Exchangeable Magnesium (kg/ha)		2,934	282	415	387
	Exchangeable Magnesium (mg/kg)		1,310	126	185	173
	Exchangeable Potassium (cmol+/kg)		0.55	0.21	0.17	0.15
	Exchangeable Potassium (kg/ha)		480	184	146	129
	Exchangeable Potassium (mg/kg)		214	82	65	58
	Exchangeable Sodium (cmol+/kg)		6.9	0.40	0.20	0.36
	Exchangeable Sodium (kg/ha)		3,579	204	103	184
	Exchangeable Sodium (mg/kg)		1,598	91	46	82
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.01	0.03	0.02	<0.01
	Exchangeable Aluminium (kg/ha)		2.6	5.2	4.8	2.0
	Exchangeable Aluminium (mg/kg)		1.2	2.3	2.1	<1
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	0.12	<0.01	<0.01
	Exchangeable Hydrogen (kg/ha)		<1	2.7	<1	<1
	Exchangeable Hydrogen (mg/kg)		<1	1.2	<1	<1
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	32	5.5	6.5	4.2
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	42	68	71	54
	Magnesium (%)		34	19	23	34
	Potassium (%)		1.7	3.8	2.6	3.5
	Sodium - ESP (%)		22	7.2	3.1	8.4
	Aluminium (%)		0.04	0.47	0.36	0.23
	Hydrogen (%)		0.00	2.1	0.00	0.00
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.3	3.6	3.0	1.6
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	3	..	2	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10YR 4/3 Brown	7.5YR 4/2 Brown	7.5YR 4/3 Brown	10YR6/3 Pale Brown
	Mottles Munsell Colour		10YR 3/2	..	2.5YR 4/6	..
			..	..	..	..
	Degree of Mottling (%)		50	..	2	..

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AGRICULTURAL SOIL ANALYSIS REPORT

24 samples supplied by Minesoils Pty. Ltd. on 22/05/2023. Lab Job No.P0986

Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

		Sample 19	Sample 20	Sample 21	Sample 22
	Sample ID:	11 50 - 60	12 0 - 10	12 25 - 35	12 45 - 55
	Crop:	Soil	Soil	Soil	Soil
	Client:	EDIFY	EDIFY	EDIFY	EDIFY
Parameter	Method reference	P0986/19	P0986/20	P0986/21	P0986/22

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 cmol$_+$/kg = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
13. ** NATA accreditation does not cover the performance of this service.
14. Analysis conducted between sample arrival date and reporting date.
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17. This report was issued on 6/06/2023.

Quality Checked: Kris Saville
Agricultural Co-Ordinator

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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

			Sample 23	Sample 24
		Sample ID:	**12 65 - 75**	**13 0 - 10**
		Crop:	**Soil**	**Soil**
		Client:	**EDIFY**	**EDIFY**
	Parameter	**Method reference**	**P0986/23**	**P0986/24**
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	7.30	6.11
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.058	0.047
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	6.2	2.7
	Exchangeable Calcium (kg/ha)		2,805	1,221
	Exchangeable Calcium (mg/kg)		1,252	545
	Exchangeable Magnesium (cmol+/kg)		5.5	0.52
	Exchangeable Magnesium (kg/ha)		1,493	143
	Exchangeable Magnesium (mg/kg)		667	64
	Exchangeable Potassium (cmol+/kg)		0.31	0.24
	Exchangeable Potassium (kg/ha)		271	213
	Exchangeable Potassium (mg/kg)		121	95
	Exchangeable Sodium (cmol+/kg)		1.6	0.22
	Exchangeable Sodium (kg/ha)		840	112
	Exchangeable Sodium (mg/kg)		375	50
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.02	0.05
	Exchangeable Aluminium (kg/ha)		3.3	10
	Exchangeable Aluminium (mg/kg)		1.5	4.5
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	<0.01	0.10
	Exchangeable Hydrogen (kg/ha)		<1	2.3
	Exchangeable Hydrogen (mg/kg)		<1	1.0
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	14	3.9
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	46	70
	Magnesium (%)		40	14
	Potassium (%)		2.3	6.3
	Sodium - ESP (%)		12	5.7
	Aluminium (%)		0.12	1.3
	Hydrogen (%)		0.00	2.7
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	1.1	5.2
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	2	..
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	10YR 5/2	..
			Grayish Brown	..
	Mottles Munsell Colour		5YR 2.5/1, 2.5YR 4/4	..
			..	..
	Degree of Mottling (%)		30, 15	..

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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

		Sample 23	Sample 24
	Sample ID:	12 65 - 75	13 0 - 10
	Crop:	Soil	Soil
	Client:	EDIFY	EDIFY
Parameter	Method reference	P0986/23	P0986/24

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia.* CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

			Heavy Soil	Medium Soil	Light Soil	Sandy Soil
		Sample ID:				
		Crop:				
		Client:	Clay	Clay Loam	Loam	Loamy Sand
	Parameter	**Method reference**	**Indicative guidelines - refer to Notes 6 and 8**			
	pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.5	6.5	6.3	6.3
	Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.200	0.150	0.120	0.100
	Exchangeable Calcium (cmol+/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	15.6	10.8	5.0	1.9
	Exchangeable Calcium (kg/ha)		7000	4816	2240	840
	Exchangeable Calcium (mg/kg)		3125	2150	1000	375
	Exchangeable Magnesium (cmol+/kg)		2.4	1.7	1.2	0.60
	Exchangeable Magnesium (kg/ha)		650	448	325	168
	Exchangeable Magnesium (mg/kg)		290	200	145	75
	Exchangeable Potassium (cmol+/kg)		0.60	0.50	0.40	0.30
	Exchangeable Potassium (kg/ha)		526	426	336	224
	Exchangeable Potassium (mg/kg)		235	190	150	100
	Exchangeable Sodium (cmol+/kg)		0.3	0.26	0.22	0.11
	Exchangeable Sodium (kg/ha)		155	134	113	57
	Exchangeable Sodium (mg/kg)		69	60	51	25
	Exchangeable Aluminium (cmol+/kg)	**Inhouse S37 (KCl)	0.6	0.5	0.4	0.2
	Exchangeable Aluminium (kg/ha)		121	101	73	30
	Exchangeable Aluminium (mg/kg)		54	45	32	14
	Exchangeable Hydrogen (cmol+/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.6	0.5	0.4	0.2
	Exchangeable Hydrogen (kg/ha)		13	11	8	3
	Exchangeable Hydrogen (mg/kg)		6	5	4	2
	Effective Cation Exchange Capacity (ECEC) (cmol+/kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol+/kg)	20.1	14.3	7.8	3.3
	Calcium (%)	**Base Saturation Calculations - Cation cmol+/kg / ECEC x 100	77.6	75.7	65.6	57.4
	Magnesium (%)		11.9	11.9	15.7	18.1
	Potassium (%)		3.0	3.5	5.2	9.1
	Sodium - ESP (%)		1.5	1.8	2.9	3.3
	Aluminium (%)		6.0	7.1	10.5	12.1
	Hydrogen (%)					
	Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol+/kg)	6.5	6.4	4.2	3.2
	Emerson Aggregate Test (EAT)	**AS1289.3.8.1-2017	Class 3–8			
	Moist Munsell Colour	**Inhouse Munsell Soil Colour Classification	..			
			..			
	Mottles Munsell Colour		..			
			..			
	Degree of Mottling (%)		..			

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Analysis requested by Matt Hemingway. Your Job: MS-088 Brewongle

Not Given

			Heavy Soil	Medium Soil	Light Soil	Sandy Soil
		Sample ID:				
		Crop:				
		Client:	Clay	Clay Loam	Loam	Loamy Sand
	Parameter	Method reference	Indicative guidelines - refer to Notes 6 and 8			

Notes:

1. All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
2. Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
3. Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
4. 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
5. Guidelines for phosphorus have been reduced for Australian soils.
6. Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
7. Total Acid Extractable Nutrients indicate a store of nutrients.
8. National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
9. Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
10. Conversions for 1 $cmol_+/kg$ = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
11. Conversions to kg/ha = mg/kg x 2.24
12. The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
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Agricultural Co-Ordinator

Appendix 4

Land and Soil Capability Working Tables

Table A4.1: Water Erosion Limitation

Site	Slope (%)	Slope Class (%)	Sodicity (for 10 to <20ha slope class)	LSC Class
1	3	3 to <10	N/A	3
2	6	3 to <10	N/A	3
3	4	3 to <10	N/A	3
4	3	3 to <10	N/A	3
5	5	3 to <10	N/A	3
6	5	3 to <10	N/A	3
7	0	<1	N/A	1
8	5	3 to <10	N/A	3
9	9	3 to <10	N/A	3
10	0	<1	N/A	1
11	4	3 to <10	N/A	3
12	2	1 to <3	N/A	2
13	3	3 to <10	N/A	3

Table A4.2: Wind Erosion Limitation

Site	Surface Soil Texture	Wind Erodibility Class of Soil Texture	Wind Erosive Power	Exposure to Wind	Average Annual Rainfall	LSC Class
1	Sandy Loam	Moderate	High	Moderate	>500mm	4
2	Sandy Loam	Moderate	High	Moderate	>500mm	4
3	Sandy Loam	Moderate	High	Moderate	>500mm	4
4	Loam	Low	High	Moderate	>500mm	3
5	Sandy Loam	Moderate	High	Moderate	>500mm	4
6	Sandy Loam	Moderate	High	Moderate	>500mm	4
7	Loam	Low	High	Low	>500mm	2
8	Loam	Low	High	Low	>500mm	2
9	Loam	Low	High	High	>500mm	3
10	Loam	Low	High	Low	>500mm	2
11	Loam	Low	High	Moderate	>500mm	3
12	Sandy Loam	Moderate	High	Moderate	>500mm	4
13	Sandy Loam	Moderate	High	Moderate	>500mm	4

Table A4.3: Soil Structure Limitation

Site	Surface Soil Texture	Modifier	LSC Class
1	Sandy Loam	Nil	3
2	Sandy Loam	Nil	3
3	Sandy Loam	Nil	3
4	Loam	Normal	3
5	Sandy Loam	Nil	3
6	Sandy Loam	Nil	3
7	Loam	Friable	1
8	Loam	Friable	1
9	Loam	Normal	3
10	Loam	Friable	1
11	Loam	Normal	3
12	Sandy Loam	Nil	3
13	Sandy Loam	Nil	3

Table A4.4: Soil Acidification Limitation

Site	Surface Soil Texture	Buffering Capacity	Mean Annual Rainfall (MM)	Surface Soil pH	LSC Class
1	Sandy Loam	Very Low	550 - 700	6.2	5
2	Sandy Loam	Very Low	550 - 700	5.8	5
3	Sandy Loam	Very Low	550 - 700	5.7	4
4	Loam	Moderate	550 - 700	6.2	3
5	Sandy Loam	Very Low	550 - 700	6.1	4
6	Sandy Loam	Very Low	550 - 700	6.0	5
7	Loam	Moderate	550 - 700	6.1	2
8	Loam	Moderate	550 - 700	5.9	2
9	Loam	Moderate	550 - 700	5.6	3
10	Loam	Moderate	550 - 700	5.9	2
11	Loam	Moderate	550 - 700	6.1	3
12	Sandy Loam	Very Low	550 - 700	6.1	4
13	Sandy Loam	Very Low	550 - 700	6.1	4

Table A4.5: Soil Salinity Limitation

Site	Recharge Potential	Discharge Potential	Salt Store	LSC Class
1	Moderate	Low	Low	1
2	Moderate	Low	Low	1
3	Moderate	Low	Low	1
4	Moderate	Low	Low	1
5	Moderate	Low	Low	1
6	Moderate	Low	Low	1
7	Moderate	Moderate	Low	2
8	Moderate	Moderate	Low	2
9	Moderate	Low	Low	1
10	Moderate	Moderate	Low	2
11	Moderate	Low	Low	1
12	Moderate	Low	Low	1
13	Moderate	Low	Low	1

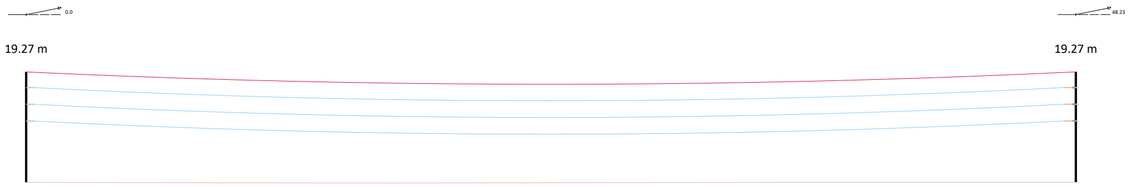
Table A4.6: Waterlogging Limitation

Site	Typical Waterlogging Duration (Months)	Return Period	Soil Drainage	LSC Class
1	0 to 0.25	Every year	Moderately Well	2
2	0 to 0.25	Every year	Moderately Well	2
3	0 to 0.25	Every year	Moderately Well	2
4	0 to 0.25	Every year	Moderately Well	2
5	0 to 0.25	Every year	Moderately Well	2
6	0 to 0.25	Every year	Imperfect	3
7	0 to 0.25	Every year	Moderately Well	2
8	0 to 0.25	Every year	Moderately Well	2
9	0 to 0.25	Every year	Moderately Well	2
10	0 to 0.25	Every year	Moderately Well	2
11	0.25 to 2	Every year	Imperfect	3
12	2 to 3	Every 2 to 3 years	Imperfect	4
13	2 to 3	Every 2 to 3 years	Imperfect	4

Appendix M Concept Overhead Connection Line

BLOCK 1

Warning: tower inside restricted area



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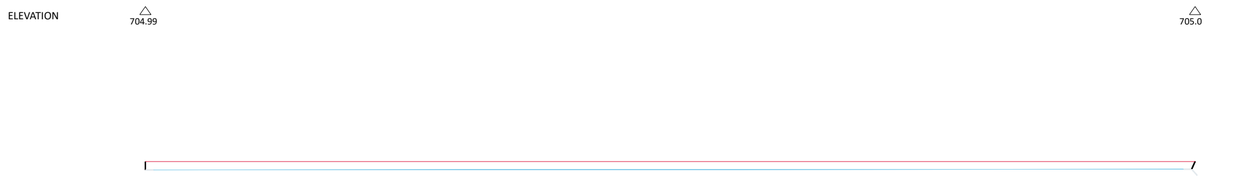

Notes

The overhead line is a transmission line of 145.0 kV transporting a capacity of 82.8 MVA from the step-up substation to the POI.

GENERAL CHARACTERISTICS OF THE LINE:

Nominal voltage: 132.0 kV
Maximum voltage: 145.0 kV
Capacity: 82.8 MVA
Length of the line: 0.3 km
Number of blocks: 2

CHARACTERISTICS OF THE LINE COMPONENTS:

Type of tower: MV_SINGLE_FORK
Number of towers: 3
Conductor's type: 250-A1/S1A
Number of circuits: 1
Number of bundles: 1
Earth wire's type: OPGW-2S 1/48B1 (0/165-213.7)
Number of earth wire(s): 1
Suspension Insulator's type: U160BS
Tension Insulator's type: U160BS

Legend

- Sign of the deflection angle
- Sign of the tower elevation
- Terrain
- Earth wire catenaries
- Phase catenaries
- Suspension and tension insulators

REV	DESCRIPTION	BY	DATE
00	FIRST VERSION	RP	2023-07-31

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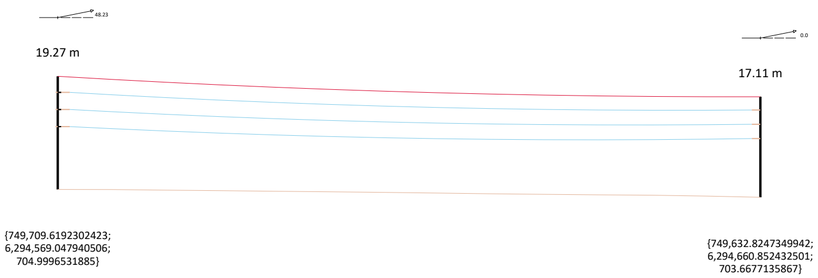
PROJECT: XX

DRAWING: Overhead line drawing

SCALE:	SHEET:
1 : 757	1 / 3
REVISION:	DATE:
00	2023-07-31

DIN A2

BLOCK 2



Notes

The overhead line is a transmission line of 145.0 kV transporting a capacity of 82.8 MVA from the step-up substation to the POI.

GENERAL CHARACTERISTICS OF THE LINE:

Nominal voltage: 132.0 kV
Maximum voltage: 145.0 kV
Capacity: 82.8 MVA
Length of the line: 0.3 km
Number of blocks: 2

CHARACTERISTICS OF THE LINE COMPONENTS:

Type of tower: MV_SINGLE_FORK
Number of towers: 3
Conductor's type: 250-A1/S1A
Number of circuits: 1
Number of bundles: 1
Earth wire's type: OPGW-2S 1/48B1 (0/165-213.7)
Number of earth wire(s): 1
Suspension Insulator's type: U160BS
Tension Insulator's type: U160BS

Legend

- Sign of the deflection angle
- Sign of the tower elevation
- Terrain
- Earth wire catenaries
- Phase catenaries
- Suspension and tension insulators

REV	DESCRIPTION	BY	DATE
00	FIRST VERSION	RP	2023-07-31

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PROJECT: XX

DRAWING: Overhead line drawing

SCALE:	SHEET:
1 : 739	2 / 3
REVISION:	DATE:
00	2023-07-31

DIN A2

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