

AM/1052095/DA134-26

22 July 2026

Habitat Planning Pty Ltd
409 Kiewa Street
Albury NSW 2640



LEETON
SHIRE COUNCIL

**Notice of Determination of a
Development Application**

Environmental Planning and Assessment Act 1979, Section 4.18(1)(a)

Development: **5 MW electricity generating works facility (solar farm) and 10 MWh Battery Energy Storage System (BESS)**

Property Description: **Lot 109 DP 751703
125 Briggs Road, STANBRIDGE NSW 2705**

The consent will operate from: **03 July 2026**

The consent will lapse on: **03 July 2031**

Subject to the following **deferred commencement condition and conditions of consent** by the granting of consent to the following:

Pursuant to section 4.16(3) of the EP&A Act 1979 the granting of consent to the proposed development is not to operate until the applicant satisfies the consent authority, in accordance with section 76 of the EP&A Regulation 2021, regarding the requirements of the following condition:

Deferred Commencement Condition

1. A detailed Landscape Management Plan prepared by a suitably qualified landscape architect is to be submitted to and approved by Council. The Plan is to address the following to the Council's satisfaction:

a. Landscaping Buffer:

- i. A landscaped screening buffer is to be established along the perimeter of the site, particularly adjoining sensitive receivers and public road frontages (including Briggs Road and Murrami Road).

- ii. The buffer is to be a minimum width of 5 metres and is to consist of dense planting at a suitable density to visually screen the proposed development. The width of the buffer is to be increased within the array setback area adjacent to the dwelling house at 149 Murrumbidgee Road in order to protect the visual amenity of the dwelling house.
- iii. Plant species selection is to be appropriate to the local environment, with all selected trees and shrubs being semi-mature (i.e. at least 1m tall above root ball at planting) and capable of achieving an effective visual screen within a reasonable timeframe.
- iv. Screening vegetation must be established outside the perimeter fencing to maximise its effectiveness in mitigating visual impacts.

b. Landscape Management Plan to include:

- i. Details of planting species, spacing, densities and staging of works.
- ii. Details of proposed landscaping irrigation or watering systems.
- iii. Details of ongoing maintenance measures, including replacement of dead or diseased plants during the life of the proposed electricity generating development.
- iv. Details of measures for the ongoing control of noxious weeds within the site.

{Reason: To ensure appropriate visual screening of the development, minimise impacts on the surrounding rural environment, and ensure ongoing establishment and maintenance of landscaping in accordance with Council's planning objectives.}

(B) OPERATIONAL CONDITIONS

General Conditions

1. Approval is granted for **Installation of battery energy storage system (BESS) works in conjunction with solar farm** at Lot 109 DP 751703, located at Briggs Road, Leeton NSW 2705.

The development at the property is to be undertaken in accordance with the stamped approved plans, Statement of Environmental Effects and other approved documentation detailed as follows except where

modified in red on the stamped documents or by any of the conditions of this consent.

Document	Title	Sheet no:	Prepared by:	Dated:
Statement of Environmental Effects.	Lot 109 DP 751703	1-44	Habitat Planning	Nov. 2025
Site Plan, Layout & Elevations	Lot 109 DP 751703	1-6	Bison Energy	26-08-25
Stormwater Management Plan	Lot 109 DP 751703	1-1	JCA Land Consultants	04-07-2025
Traffic Impact Assessment	Lot 109 DP 751703	1-52	Traverse Transport Pty Ltd	10/11/2025
Noise and Vibration Impact Assessment	Lot 109 DP 751703	1-55	BE PRO STB PTY LTD	8 Oct 2025
Landscape Plan & Visual Assessment	Lot 109 DP 751703	1-22	YONDER LANDSCAPE ARCHITECTURE	8 July 2025
Glint and Glare Assessment	Lot 109 DP 751703	1-15	Bison Energy Company	May 2025
FORGESOLAR GLARE ANALYSIS	Lot 109 DP 751703	1-9	Applicant	May 08 2025
EPBC Act Protected Matters Report	Lot 109 DP 751703	1-12	Applicant	01-Oct-2025
Biodiversity development assessment report	Lot 109 DP 751703	1-49	Biodiversity Australia Pty Ltd	Sept 2025

Aboriginal Due Diligence Assessment	Lot 109 DP 751703	1-63	Biosis APEM Group	11 Sep 2025
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Appendix I-LUCRA	Lot 109 DP 751703	1-15	Habitat Planning	April 2026
Appendix J-Agricultural Impact Assessment	Lot 109 DP 751703	1-11	MERIDIAN AGRICULTURE	6 April 2026
Appendix K - Farm Biosecurity Action Planner	Lot 109 DP 751703	1-22	Applicant	-
Appendix L- Site Plan	Lot 109 DP 751703	1-1	BISON ENERGY	04/03/26

{Reason: To ensure that the development is undertaken in accordance with that assessed}

Minimisation of harm to the environment

2. In meeting the specific environmental performance criteria established under this consent, the Applicant must implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, upgrading or decommissioning of the development.

{Reason: To ensure the protection of the environment.}

Structural adequacy

3. The Applicant must ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the National Construction Code - Building Code of Australia (current edition).

Advisory Notes:

Under Part 6 of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the development. Part 8 of the EP&A Regulation sets out the requirements for the certification of the development.

{Reason: Compliance with prescribed conditions made under Environmental Planning & Assessment Regulation 2021.}

Operation Of Plant And Equipment

4. The Applicant must ensure that all plant and equipment used on site, or in connection with the development, is:
 - a. maintained in a proper and efficient condition; and
 - b. operated in a proper and efficient manner.

{Reason: To ensure plant and equipment operates efficiently and does not cause environmental harm.}

Agricultural Land Management

5. The development must be carried out in a manner that minimises impacts on agricultural land and enables the continued productive use of the land for agricultural purposes.
 - a. Groundcover management practices including slashing and/or controlled livestock grazing must be implemented;
 - b. Soil health must be maintained and land must not be degraded through erosion, compaction or contamination;
 - c. Agricultural productivity of the land must be maintained for the life of the development.

All management practices are to be consistent with the Agricultural Impact Assessment and LUCRA submitted with the application.

{Reason: To ensure appropriate management of agricultural land (LSC Class 3) and minimise land use conflict.}

Agricultural Biosecurity

6. Biosecurity measures must be implemented and maintained for the duration of the development in accordance with the Farm Biosecurity Action Plan.

This shall include:

- a. Control and monitoring of weeds, pests and diseases;
- b. Management of vehicle and personnel access to prevent contamination;
- c. Ongoing monitoring and response to biosecurity risks.

{Reason: To minimise potential biosecurity impacts on surrounding agricultural land uses.}

Essential Services

7. The development is to be provided with a water supply appropriate to the operation of the development and use of the site.
The development is to be provided with electricity supply appropriate to the operation of the development and use of the site.

Provision of these services is the applicants' responsibility.

{Reason: To ensure that the development has appropriate essential services for operation.}

Fire Safety – BESS and Associated Infrastructure

8. The development is to be designed, constructed and maintained to ensure appropriate fire safety measures are implemented for all battery energy storage and associated infrastructure, including:
- i. Compliance with the relevant fire safety performance requirements of Volume One of the NCC 2022 for special hazard facilities;
 - ii. Compliance with applicable Fire and Rescue NSW guidance for large-scale external lithium-ion Battery Energy Storage Systems (BESS);
 - iii. Provision of appropriate fire prevention, detection and suppression measures in accordance with industry best practice;
 - iv. All fire safety systems and measures are to be maintained for the life of the development in accordance with their design and certification.

{Reason: To ensure appropriate fire safety measures are implemented and maintained for the development.}

Temporary Structures

9. Temporary use structures shall be placed on-site in accordance with the requirements of State Environmental Planning Policy (Exempt and Complying Development Codes) 2008, Division 3, Subdivision 3.

{Reason: To ensure compliance with Clause 2.112 Development Standards under State Environmental Planning Policy (Exempt and Complying Development Codes) 2008}

PRIOR TO THE ISSUE OF A CONSTRUCTION CERTIFICATE**Contributions and Fees**

10. In accordance with the Leeton Shire Council Developer Contribution Plan (Fixed Levy- Section 7.12), the applicant shall pay the following Section 7.12 monetary contribution:

a. Amount of Contribution;

i. Cost of works including GST = \$12,430,000/-

ii. Calculation: $\$12,430,000 \times 1\% (0.01)$

iii. Amount owing:) \$124,300/-

b. Timing and Method of Payment

The contribution shall be paid in the form of cash, credit or bank cheque made out to Leeton Shire Council. Evidence of payment to Leeton Shire Council shall be submitted to the Principal Certifying Authority prior to the issue of the Construction Certificate.

c. Indexing

The contributions will be adjusted in accordance with the requirements of the Leeton Shire Council Developer Contribution Plan (Fixed Levy- Section 7.12)

{Reason: To meet the demands for public services and facilities as a result of the development within the Leeton Shire}

11. Murrumbidgee Irrigation (MI) approval is required for the following:

- a. Any alterations to the supply and/or drainage of irrigation water for the development.
- b. Construction or alteration of an access or road over their supply or drainage structures.
- c. Discharge of stormwater either by gravity or by pumps into their drainage system.

- d. Disposal of groundwater and seepage resulting from the development into their drainage system.

Written confirmation of approval and any scheduled works are required prior to the issue of any Construction Certificate.

{Reason: So that any changes or infrastructure works relating to the relevant authority is approved. Section 4.15(1)(e) of the Environmental Planning and Assessment Act 1979, as amended.}

12. A separate Council approval under Section 138 of the Roads Act 1993 is required prior to any works commencing within the road reserve, including the construction of access driveway for this development. An application must be submitted to Council and approved prior to issue of Construction Certificate.

The Section 138 application is to include:

- i. Detailed construction plans, including a long section, where appropriate.
- ii. Details of the contractors engaged to undertake works within the road reserve. The contractor must maintain public liability insurance cover to the minimum value of \$20 million. The policy shall specifically indemnify Council of all claims arising from the execution of the works. Documentary evidence of the currency of the policy shall be provided to Council prior to the commencement of work and upon request, during the progress of the work.
- iii. A Traffic Control Plan (TCP) that has been prepared by a person with the applicable certification from Transport for NSW (TfNSW) in accordance with AS1742.3-2009 and the RMS current version of the "Traffic Control at Worksites " manual.

{Reason: Compliance with Roads Act 1993 Section 138 for undertaking work on a public road reserve}

Construction Environmental Management Plan

13. A Construction Environmental Management Plan (CEMP) is to be submitted to and approved by Council prior to the issue of a Construction Certificate. The CEMP is to address environmental impacts during construction and decommissioning and is to include the following:
 - a. Traffic Management Plan;
 - b. Soil and Water Management Plan;

- c. Erosion and Sediment Control Plan;
- d. Waste Management Plan.

The CEMP is also to include:

- i. Measures to manage construction noise in accordance with the Interim Construction Noise Guideline (DECC, 2009);
- ii. Measures to minimise impacts on surrounding land uses and sensitive receivers, including noise, vibration and lighting;
- iii. Measures to control dust and maintain air quality during construction and decommissioning.

{Reason: To ensure construction activities are undertaken in a safe and environmentally responsible manner and to minimise impacts on the surrounding environment and locality.}

Construction Amenity

14. The Applicant must minimise impacts on neighbouring properties during construction by:
- a. Providing advance notification of high-impact works such as piling;
 - b. Restricting high-noise activities to approved construction hours;
 - c. Implementing reasonable respite periods where prolonged works occur.

{Reason: To protect the amenity of surrounding landowners.}

Fire Hazard and On-site Water Storage

Fire Safety and Water Supply for Emergency Response

15. Prior to the issue of a Construction Certificate, the Applicant must submit detailed documentation to the satisfaction of the consent authority demonstrating that adequate fire safety measures and water supply are provided for the development, including:
- a) Provision of a dedicated on-site water storage supply for firefighting purposes, of sufficient capacity to service the solar farm and Battery Energy Storage System (BESS), in consultation with Fire and Rescue NSW and/or the NSW Rural Fire Service;
 - b) Details of access arrangements to all parts of the site for emergency vehicles, including perimeter and internal access tracks suitable for firefighting operations;
 - c) Location and specification of hydrants, fittings, hose connections and fire-fighting infrastructure;

- d) A Fire Safety Strategy addressing the specific risks associated with lithium-ion battery storage systems (BESS), including fire detection, suppression, containment and emergency response procedures;
- e) Demonstration that all fire safety infrastructure can be adequately maintained for the life of the development.

All measures must be consistent with relevant Fire and Rescue NSW guidance and applicable Australian Standards.

{Reason: To ensure adequate fire protection measures are provided having regard to the risks associated with large-scale solar and battery storage infrastructure, and to ensure the safety of the site, surrounding land uses and emergency responders.}

Traffic Management Plan – Construction Phase

16. A Traffic Management Plan is to be included in the Construction Environmental Management Plan and submitted to Council prior to the issue of a Construction Certificate. The Plan is to address traffic and access impacts during construction and decommissioning, and include:
- a. Suitable site access designed in accordance with Austroads requirements, including safe intersection sight distance;
 - b. Provision and maintenance of a rural-type access in accordance with Council standards;
 - c. On-site parking, loading/unloading and turning areas to ensure vehicles enter and exit the site in a forward direction, with no queuing on public roads;
 - d. Preparation and implementation of Traffic Control Plans (TCPs) in accordance with AS1742.3 by a suitably qualified person;
 - e. Measures to ensure no mud or debris is tracked onto public roads, including immediate clean-up if required;
 - f. Rectification of any damage to Council infrastructure caused by the development.

{Reason: To ensure safe and efficient traffic management and to protect the integrity of the public road network.}

Soil and Water Management Plan

17. A Soil and Water Management Plan is to be submitted to and approved by Council prior to the issue of a Construction Certificate, detailing the management of soil and water impacts during construction, operation and decommissioning, including:

- a. Measures to ensure post-development drainage does not exceed pre-development flow rates;
- b. Management of surface water to prevent adverse impacts on adjoining properties and drainage infrastructure, including discharge to existing Murrumbidgee Irrigation Ltd assets where applicable;
- c. Measures to minimise soil disturbance, maintain groundcover, and control erosion and sediment movement.

{Reason: To protect the natural environment and adjoining land from soil, drainage and stormwater impacts.}

Erosion Control Plan

- 18.** An Erosion and Sediment Control Plan is to be submitted to and approved by Council prior to the issue of a Construction Certificate, detailing the management of erosion and sediment impacts during construction, operation and decommissioning, including:
- a. Implementation of erosion and sediment controls in accordance with *Landcom – Managing Urban Stormwater: Soils and Construction (Blue Book)*;
 - b. Stabilisation of disturbed areas and maintenance of groundcover to minimise erosion and weed spread;
 - c. Use of clean fill material (VENM) where required;
 - d. Measures to prevent tracking of soil or mud onto public roads, including immediate clean-up if this occurs;
 - e. Progressive rehabilitation of disturbed areas, including revegetation.

{Reason: To protect the natural environment and adjoining land from erosion and sediment impacts.}

Waste Management Plan

- 19.** A Waste Management Plan is to be submitted to and approved by Council prior to the issue of a Construction Certificate, detailing the management of all waste generated during construction, operation and decommissioning, including:
- a. Waste minimisation, reuse and recycling measures;
 - b. Classification, storage and disposal in accordance with NSW EPA requirements;
 - c. Management of construction, operational and decommissioning waste, including solar panels and infrastructure;

- d. Use of licensed waste transport and disposal facilities;
- e. Measures to prevent pollution and off-site impacts

{Reason: to minimise impacts of waste and to comply NSW Environment Protection Authority (EPA) regulations, to ensure safe handling of complex and hazardous materials, and to comply with Protection of the Environment Operations Act 1997.}

Landscape Management Plan

20. A Landscape Management Plan is to be submitted to, and approved by, Council prior to the issue of a Construction Certificate. The Plan is to address the following:

a. Vegetation Screening Buffer

- i. A vegetation screening buffer is to be established along the perimeter of the site, particularly adjoining sensitive receivers and public road frontages (including Briggs Road and Murrumbidgee Road), generally in accordance with the approved Landscape Plan.
- ii. The vegetation buffer is to be a minimum width of 5 metres and is to consist of dense planting at a suitable density to effectively screen the development.
- iii. Plant species selection is to be appropriate to the local environment and trees are to be semi-mature trees (at least 1m tall above root ball) capable of achieving an effective visual screen within a reasonable timeframe.
- i. Screening vegetation must be established outside the perimeter fencing to maximise its effectiveness in mitigating visual impacts.

b. Plan Details

- i. Details of planting species, spacing, densities and staging of works.
- ii. Details of any proposed irrigation or watering systems.
- iii. Ongoing maintenance measures, including replacement of dead or diseased plants.

c. Implementation and Verification

- i. All vegetation screening is to be installed prior to the issue of an Occupation Certificate, or as otherwise agreed by Council.
- ii. The establishment of landscaping is to be verified by Council or a suitably qualified person prior to the issue of an Occupation Certificate.

d. Ongoing Management

- i. All landscaping and screening vegetation is to be maintained for the life of the development.
- ii. Where grazing (e.g. sheep for vegetation management) is undertaken on site, the screening vegetation is to be protected from grazing to prevent degradation.

e. Weed Management

- i. The Plan is to include measures for the ongoing control of noxious weeds within the site.

{Reason: To ensure appropriate visual screening of the development, minimise impacts on the surrounding rural environment, and ensure ongoing establishment and maintenance of landscaping in accordance with Council's planning objectives.}

CONSTRUCTION CERTIFICATE

- 21.** No activity is to be carried out on site until the Construction Certificate has been issued, other than:

- a) Site investigation for the preparation of the construction, and/or
- b) Implementation of environmental protection measures, such as erosion control etc that are required by this consent.

{Reason: To ensure the construction certificate is issued prior to the commencement of works.}

- 22.** Should Council be appointed as the Principal Certifying Authority, an application for Construction Certificate shall be submitted through the NSW Planning Portal and approved prior to the commencement of any building work, with appropriate fees being paid.

{Reason: To ensure the applicant has submitted the appropriate documentation prior to the commencement of works.}

- 23.** Prior to the issue of any Construction Certificate a practicing structural engineers design and certification of concrete pads and footings shall be submitted to the Certifying Authority.

{Reason: To ensure the structure is certified by an appropriately qualified structural engineer and the footings are adequate for the site's soil conditions and imposed loadings.}

PRIOR TO THE COMMENCEMENT OF WORKS

- 24.** Prior to the commencement of any works within the road reserve, approved Traffic Control Plans are to be implemented. Approved TCPs are to be maintained for the full duration of works.

{Reason: to protect the public where interruptions to normal traffic flow for vehicles and pedestrians are expected.}

- 25.** Prior to the commencement of works erosion and sediment control measures are to be established and maintained for the duration of construction works and the life of the development.

This work is to be in accordance with Landform's Soils and Construction Volume 1, Managing Urban Stormwater ("Blue Book")

NOTE: All erosion and sediment control measures shall be in place prior to earthworks commencing.

{Reason: To ensure the impact of the work on the environment in terms of soil erosion and sedimentation is minimised.}

- 26.** Prior to issue of a construction certificate developer should submit a heavy vehicle movement plan along the road network designating the which path is to be used. Pework work Dilapidation Report with recommendations on planned path must be submitted to council.

{Reason: To ensure that any damage to Council's property is at the full cost to the developer. Environmental Planning & Assessment Act 1979 Section 4.15 (6) (a)}

- 27.** A sign is required to be erected in a prominent position on the work site on which building work is being carried out. The sign shall indicate:

- a) The name, address and telephone number of the Principal Certifying Authority for the work;
- b) The name of the Principal Contractor and a telephone number at which that person may be contacted outside of working hours; and
- c) That unauthorised entry to the work site is prohibited.

Any such sign is to be maintained while the building work is being carried out, but shall be removed when the work has been completed.

{Reason: To ensure compliance with prescribed conditions made under Environmental Planning & Assessment Regulation 2000.}

DURING WORKS**Construction Noise Management**

28. The Applicant must ensure that noise generated by the development, including during construction, does not result in unacceptable impacts at nearby residential receivers.

a) A Construction Noise and Vibration Management Plan (CNVMP) must be prepared and implemented for the duration of construction. The CNVMP must include procedures for monitoring, complaint management and community notification.

b) Construction activities must be managed to achieve compliance with applicable Noise Management Levels at nearby residential receivers.

c) Where construction activities occur in proximity to site boundaries or nearby dwellings (including areas in regular or constant use), **temporary and/or movable acoustic barriers** (such as mobile noise screens, hoarding or equivalent structures) must be installed and maintained to provide effective noise shielding between works and receivers.

d) All feasible and reasonable mitigation measures identified in the approved Noise and Vibration Impact Assessment must be implemented.

{Reason: To minimise noise impacts during construction and ensure compliance with the NSW Noise Policy for Industry (2017), and provide for the use of movable acoustic barriers where required to achieve acceptable noise outcomes at nearby residential receivers.}

29. A copy of the stamped approved plans shall be kept on site for the duration of site works and be made available upon request to either the Principal Certifying Authority or an officer of the Council.

{Reason: To ensure the Principal Contractor has access to the approved plans.}

30. Clearing of land, excavation, and/or earthworks, building works, and the delivery of building materials shall be carried out between the following hours:

Mondays to Fridays - 7:00am to 6:00pm

Saturdays – 8:00am to 1:00pm except as noted in Clause 'b'

a) No work is permitted on Sundays and Public Holidays

b) No work is permitted on Saturdays when a public holiday is adjacent to that weekend, construction industry awarded rostered days off or on Construction industry shutdown long weekends.

{Reason: To protect the amenity of the surrounding environment and to meet compliance with the Protection of the Environment Operations Act 1997.}

31. Temporary closet accommodation are to be provided throughout the course of building operations by means of a chemical closet complying with the requirements of the Department of Environment and Climate Change or a temporary connection, by a licensed plumber and drainer, to Council's sewer where available.

{Reason: To ensure all workers on site have access to toilet facilities.}

32. Any damage to Council infrastructure in, on or under the road reserve as a result of works undertaken for the development site shall be rectified by the Developer to the satisfaction of the Council so as to ensure the integrity of public infrastructure. Any damage to Council's infrastructure which is obvious before construction is to be immediately notified to Council to avoid later conflict.

{Reason: To ensure that any damage to Council's property is at the full cost to the developer. Environmental Planning & Assessment Act 1979 Section 4.15 (6) (a)}

33. Vehicles used in the construction of the development are to be managed such that they do not inhibit traffic flow within the road reserve. At no time are construction or delivery vehicles to block the road or private accesses without prior approval of Council through a Section 138 Application under the Roads Act.

{Reason: to ensure traffic effects are minimised.}

34. All vehicular movement when entering and leaving the site shall be in a forward direction to ensure that the development does not give rise to vehicle reversing movements on or off the Public Road with consequent traffic accident potential and reduction in road efficiency.

{Reason: to provide a level of safety in relation to vehicle movements onto and off the site.}

35. Development likely to affect an Electricity Transmission or Distribution Network

- I. A minimum separation distance of 8 metres must be maintained from Essential Energy infrastructure.
- II. Any encroachment requires prior approval from Essential Energy.
- III. It is also essential that all works comply with SafeWork clearance requirements. In this regard it is the responsibility of the person/s

completing any works to understand their safety responsibilities. The applicant will need to submit a Request for Safety Advice if works cannot maintain the safe working clearances set out in the Working Near Overhead Powerlines Code of Practice, or CEOP8041 - Work Near Essential Energy's Underground Assets.

- IV. If the proposed development changes, there may be potential safety risks and it is recommended that Essential Energy is consulted for further comment;
- V. Any existing encumbrances in favour of Essential Energy (or its predecessors) noted on the title of the above property should be complied with;
- VI. Any activities in proximity to electrical infrastructure must be undertaken in accordance with the latest industry guideline currently known as ISSC 20 Guideline for the Management of Activities within Electricity Easements and Close to Infrastructure;
- VII. Prior to carrying out any works, a "Dial Before You Dig" enquiry should be undertaken in accordance with the requirements of *Part 5E (Protection of Underground Electricity Power Lines)* of the *Electricity Supply Act 1995* (NSW); the location of overhead and underground powerlines are also shown in the Look Up and Live app essentialenergy.com.au/lookupandlive.
- VIII. *Note: If your site's energy demand exceeds Essential Energy's standard limits, electricity supply upgrades may be required, including the possible installation of a padmount substation within your development. It is advised to use Essential Energy's Connection portal early to identify network needs and plan accordingly. Should network augmentation be necessary, consult the current list of Accredited Service Providers (ASPs) at <https://www.energy.nsw.gov.au/households/guides-and-helpful-advice/being-more-energy-efficient/understand-your-energy-bill/altering-supply> to arrange the necessary works.*
{Reason: To ensure safety of electrical infrastructure and compliance with Essential Energy requirements.}

PRIOR TO THE ISSUE OF AN OCCUPATION CERTIFICATE

- 36. Any access Driveway construction and surrounding works shall be completed prior to the issue of an Occupation Certificate.

{Reason: to ensure suitable vehicular access to the development is available to the new development.}

- 37.** Post work Dilapidation Report with recommendations on planned heavy vehicle movement path must be submitted to council.

{Reason: To ensure that any damage to Council's property is at the full cost to the developer. Environmental Planning & Assessment Act 1979 Section 4.15 (6) (a)}

Operation Environmental Management Plan

- 38.** An Operation Environmental Management Plan (OEMP) is to be submitted to the Certifying Authority prior to the issue of any Occupation Certificate and is to include the following sub-plans;

1. Traffic Management Plan (TMP).
2. Soil and Water Management Plan
3. Erosion and Sediment Control Plan
4. Waste Management Plan
5. Landscape Management Plan
6. Emergency Management Plan

The OEMP is also to include the following matters;

- i. The Applicant must minimise the noise generated by any operational activities on site in accordance with the mitigation measures contained in the Statement of Environmental Effects (Habitat Planning, November 2025).
- ii. Agricultural land management measures;
- iii. Biosecurity implementation;
- iv. Monitoring of cumulative impacts;
- v. Complaints handling procedure

{Reason: To ensure the appropriate operation and management of the approved use.}

Traffic Management Plan – Operational Phase

- 39.** A Traffic Management Plan is to be included in the Operation Environmental Management Plan (OEMP) and is to include mitigation measures and is to detail the following matters:

- I. Council verge parking is prohibited. Adequate parking should be provided onsite.

- II. All loading and unloading of goods related to the development proposal shall be carried out within the confines of the allotment's boundary. Under no circumstances will the loading or unloading of goods on the public roadway system be permitted.
- III. No materials, goods, plant or vehicles associated with the proposed development shall be stored, displayed or placed for advertising purposes outside the allotment's boundary without first obtaining separate approval from Council.
- IV. All vehicular movement when entering and leaving the site shall be in a forward direction to ensure that the development does not give rise to vehicle reversing movements on or off the Public Road with consequent traffic accident potential and reduction in road efficiency.

{Reason: Implementation of Council's policy codes for the protection of the public Requirement of Council so as not to create adverse traffic conditions}

Emergency Management Plan -Bushfire protection

40. An Emergency Management Plan is to be submitted prior to the issue of an Occupation Certificate and is to and include the following matters;
- I. establish protocols for the protection of the site and development from bush fire events
 - II. include measures for local rural bush fire brigades to access the site
 - III. the provision of suitable bush fire retarding materials.
 - IV. Management of the site to comply with any requirements of NSW Planning for Bush Fire Guidelines (NSW Rural Fire Service 2019)

{Reason: To ensure that the development is provided with adequate bush fire protection}

ONGOING USE

Operational Noise Compliance Report

41. Within 90 days of commencement of operation, an operational noise compliance report must be prepared by a suitably qualified acoustic consultant and submitted to Council. The report must:
- I. identify the adopted pre-development Rating Background Level (RBL) noise levels as measured at the site boundaries during day, evening, and night times. The applicant must undertake background noise monitoring

prior to commencement of operation for a minimum period sufficient to establish a representative RBL for each relevant time period.

- II. include attended noise monitoring at residential receivers located at the site boundaries at day, evening, and night times; and
- III. confirm compliance with the intrusiveness criterion for each relevant time period in accordance with the NSW Noise Policy for Industry (2017).

The applicant is required to provide noise attenuation measures, including movable acoustic barriers (such as mobile acoustic screens), or other measures approved by Council;

- IV. any complaint regarding noise generated by the development is received by Council, at any time during operation, and
- V. the noise generated by the development exceeds +5 dB(A) above the applicable Rating Background Level (RBL) at any residential receiver, when measured and assessed in accordance with the NSW Noise Policy for Industry (2017), or;
- VI. The noise generated by the development exceeds 40 dB(A) LAeq,15min at any residential receiver between 10pm and 7am, when measured and assessed in accordance with the NSW Noise Policy for Industry (2017)
- VII. Noise assessment must consider cumulative noise environment where relevant.
- VIII. All works to comply with the submitted Noise and Vibration Impact Assessment, including feasible and reasonable mitigation measures. Maintain a complaints register and provide a community contact number during construction.

{Reason: To ensure compliance with NSW Noise Policy for Industry and protect residential amenity.}

42. Ongoing Management

- a) All noise mitigation measures, including any installed acoustic barriers, must be maintained for the life of the development.
- b) A complaints register must be maintained and made available to Council upon request.

{Reason: To ensure compliance with NSW Noise Policy for Industry and protect residential amenity.}

Stormwater and Flooding

- 43.** Stormwater to be managed generally in accordance with the submitted Stormwater Management Plan.

Where the site is within the Flood Planning Area, demonstrate compliance with Part K of the Leeton DCP, including provision of required survey levels and flood planning information.

Infrastructure (including inverter/BESS components) to be set above the Flood Planning Level to Council's satisfaction.

{Reason: To manage stormwater and flood risks, ensure development does not adversely impact adjoining land or drainage infrastructure, and to maintain the safety and resilience of the development within the flood planning area.}

Glint and Glare

- 44.** The development must not result in nuisance glare impacts on surrounding properties.

- a) In the event glare is identified:
 - a. The source is to be investigated;
 - b. Appropriate mitigation measures are to be implemented.
- c. Operate the solar tracking system in a manner consistent with the operating parameters relied upon in the Glint and Glare assessment to achieve nil glare outcomes. Any material change requires reassessment and Council approval.

{Reason: To protect surrounding land uses from visual amenity impacts.}

DECOMMISSIONING

- 45.** A Decommissioning Environmental Management Plan (DEMP) is to be submitted to the Approval Authority not less than 18 months prior to project decommissioning.
- a) The DEMP is to include mitigation measures as detailed in the Statement of Environmental Effects (Habitat Planning, November 2025).
 - b) All equipment and infrastructure is to be removed from site.
 - c) Decommissioning is to include rehabilitation of all disturbed areas on the site.
 - d) The DEMP is to detail safe and environmentally sustainable disposal of all waste materials. Recycling is to be prioritised wherever feasible.

- e) Site and traffic management measures are to be implemented in accordance with the Traffic Management Plan.
- f) The site must be restored to a condition suitable for agricultural use;
- g) All infrastructure must be removed unless otherwise approved;
- h) Soil condition must be remediated to restore productivity.

{Reason: To ensure appropriate rehabilitation of the site following decommissioning.}

Engineering Conditions

General Conditions

- 46.** All new access driveways need to be constructed from the road carriageway to the property boundary for the proposed development site in accordance with the recommendations of the Traffic Impact Assessment (TIA) for Proposed Solar PV Facility & Battery Energy Storage System 125 Briggs Road, Stanbridge by Traverse Transport Pty Ltd and to meet the requirements of LSC engineering guidelines and Standard Drawings.
- I. Have a minimum culvert width of 7.2 meters nominal and be constructed in accordance with Council's Engineering Guidelines, Construction of Rural Type Access Specification and Standard Drawing number RS-056 with Council's Notes and Austroads Guide to Road Design Part 4 .
 - II. The alignment of the access driveway across the verge shall be at right angles to the road.
 - III. The access driveway shall have satisfactory clearance to any power pole or telecommunications pole, manhole cover or marker, or street tree. Any relocation, alteration or replacement required shall be in accordance with the requirements of the relevant Authority and shall be at the Developer's expense.
 - IV. The access driveway shall meet Australian Standard 2890.1 for vertical clearance.
 - V. The access driveway shall be of adequate thickness to accommodate design vehicle loading.
 - VI. The verge adjacent to either side of the access driveway shall be reinstated to surrounding conditions and finished flush with the new vehicle access driveways.

Advisory Note:

The installation of the vehicle access driveway is an approved structure in accordance with Section 138 of the Roads Act 1993. The ongoing maintenance and/or repair of the vehicle access driveway is the responsibility of the adjoining owner in accordance with Section 142 of the Roads Act 1993.

{Reason: to provide for a suitable vehicular access to the development in accordance with Council's minimum standards and minimize impact on pedestrian access facilities.}

47. Stormwater is to be adequately managed as per the Stormwater Management Plan for Proposed Solar Farm Development - 125 Briggs Road, Stanbridge. (DRWNO 34004)

{Reason: to ensure storm water adequately managed and to meet Council's requirements for the development.}

48. It is required to set critical infrastructure to be a minimum of 500mm above the 1% AEP flood event.

ADVISORY NOTES

Developer is to check with Essential Energy for required freeboard before the commencement of any site work.

{Reason: To ensure that the floor level is above the required floor level for the 1% AEP flood event}

49. The developer is to provide sufficient area on site for loading and unloading of vehicles which will allow for turning paths of servicing vehicles.

{Reason: to provide a level of safety to operators by having these practices undertaken on site and not from the public road.}

Other Local Government Act Approvals

In seeking development consent, the following other *Local Government Act, 1993* approvals have been granted under Section 68 with the attached conditions:

Nil other approvals sought.

Right of Appeal

If you are dissatisfied with this decision, section 8.7 of the Environmental Planning and Assessment Act 1979 gives you the right to appeal to the Land and Environment Court within 6 months after the date on which you receive this notice.

Review of Determination

The applicant may request a review of this determination in accordance with Division 8.2 of the Environmental Planning and Assessment Act 1979. A request for review must be made before the expiry of the period within which an appeal may be commenced.

Should further explanation of the terms or conditions of approval be required, please contact Council's Planning Building & Health.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'F. Van Der Berg'.

Francois Van Der Berg
Manager Planning, Building & Health



5MW Solar Energy Facility and Associated Infrastructure

125 Briggs Road, Stanbridge

NOVEMBER 2025

Submitted to Leeton Shire Council
On behalf of Bison Energy

Contact

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PROJECT NUMBER
25002

REVISION NO	ISSUE DATE	VERSION STATUS	AUTHOR	APPROVED
2.0	10/11/2025	Final	PM	DH

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Introduction

This Statement of Environmental Effects (SEE) has been prepared by Habitat Planning on behalf of Bison Energy Australia Pty Ltd and is submitted to Leeton Shire Council in support of a Development Application (DA) for a 5 MW electricity generating works facility with associated infrastructure, including single-axis tracker solar arrays and a 10 MWh battery energy storage system at Lot 109 DP751703, addressed as 125 Briggs Road, Stanbridge NSW 2705.

The DA and this report have been prepared in accordance with the Environmental Planning and Assessment Act 1979 (“EP&A Act”) and the Environmental Planning and Assessment Regulation 2021 (“EP&A Regs”).

This report addresses the relevant heads of consideration listed under Section 4.15(1) of the EP&A Act and provides an assessment of the proposed development against the relevant Environmental Planning Instruments (EPIs) and other planning controls applicable to the site and to the proposal. It also describes the site, its environs, the proposed development, and provides an assessment of the environmental impacts and identifies the steps to be taken to protect or lessen the potential impacts on the environment.

1.1. The Proponent

Bison Energy Australia Pty Ltd is a leading international company specialising in renewable energy. They currently develop, construct and provide asset operation management of energy transition solutions. Starting in Japan, they have expanded to Australia, New Zealand, the United States of America, Italy and Romania. The proponent has established solar farms across NSW and Victoria since its initiation in Australia in 2017.

1.2. Project Justification

The development of a renewable solar energy project is continuing to grow in Australia, particularly regional NSW and Victoria. This growth provides a significant boost for economic development opportunities, leading to additional investment and employment. The development ensures that impacts will be reduced through the following:

- Preservation of biodiversity features through the use of heavily cleared and modified rural land, retaining vegetation on the property.
- Minimise impacts to soil and water with no extensive soil disturbance and excavation.
- Minimise visual impacts to neighbours by locating the facility within a smaller footprint, including landscaping and with large setbacks to surrounding roads and residences.

1.3. Pre-lodgement Meeting

A pre-lodgement meeting was held with Leeton Shire Council on 28th of May 2025. At the pre-lodgement meeting the following matters were raised and discussed:

- Proposal overview
- Objectives of the RU1 zone
- Supporting reports
- Strategic merit of the development

These matters have been addressed accordingly where appropriate in this report.

1.4. Supporting Plans and Documentation

This application is accompanied by the following plans and documentation as listed in Table 1:

Table 1 | Accompanying Documents

Appendix	Description	Prepared by
A	Proposed Development Plans	Bison Energy
B	Landscaping Plan and Visual Assessment	Yonder Studio
C	Stormwater Plan Set	JCA Land Consultants
D	Noise Impact Assessment	Pulse White Noise Acoustics
E	Biodiversity Report Protected Matters MNES Search – Self Assessment	Biodiversity Australia Habitat Planning
F	Aboriginal Heritage Due Diligence	Biosis
G	Traffic Impact Assessment	Traverse Transport
H	Glint and Glare Assessment Foresolar Glare Analysis	Habitat Planning

2. Site Analysis

2.1. Site Location and Context

The subject land to which this application relates is described as Lot 109 in DP751703 and addressed as 125 Briggs Road, Stanbridge NSW 2705. It is located approximately 15km west of Leeton and 11.5km east of Whitton.

The location of the site is shown below.

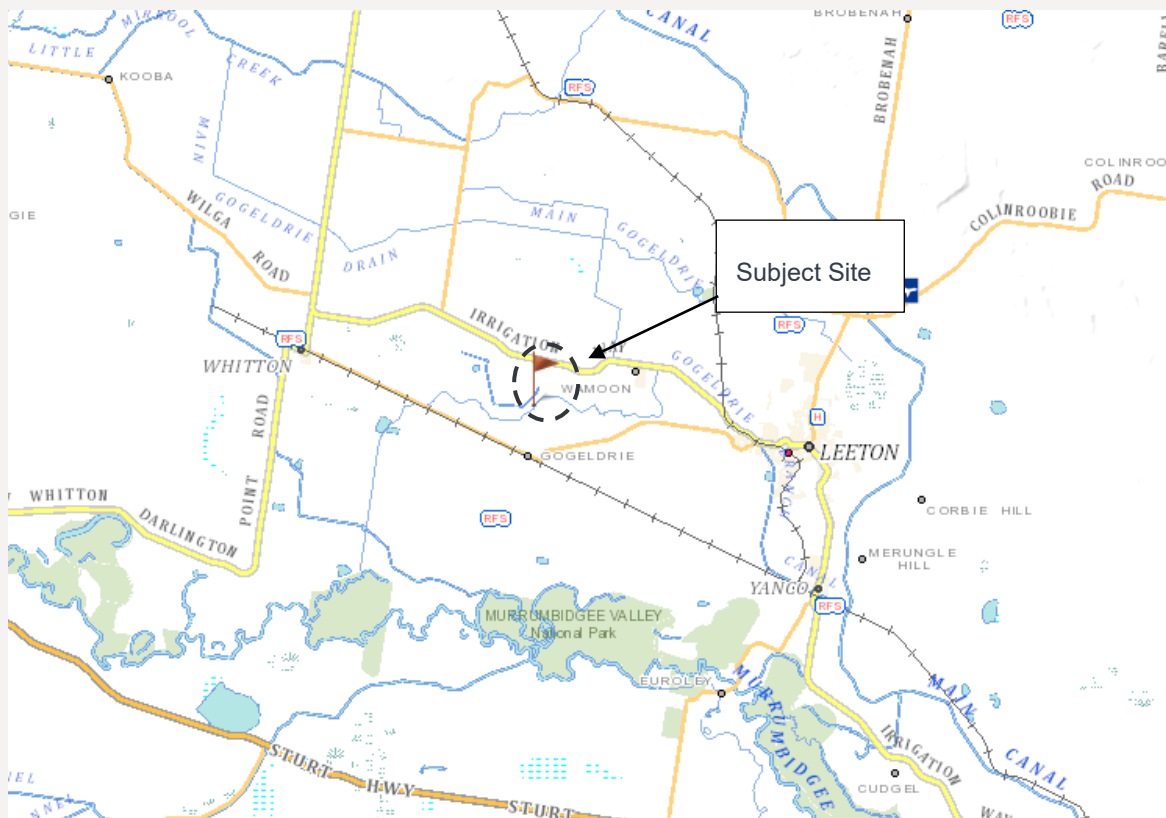


Figure 1 | Context Map

2.2. Site Description

The lot forms an irregular shape with a depth of approximately 890 metres and a width ranging from approximately 205 metres to 290 metres. It has a total area of 21.7 hectares. The land does not contain any existing structures and is used for primary production. It is largely cleared and bordered by standard rural fencing.

The site benefits from dual road frontage and access to both Murrumbidgee Road and Briggs Road. There is no formal kerb crossovers present due to the rural setting, and no significant street trees or power poles directly affecting the frontage along Briggs Road. Power lines are present along Murrumbidgee Road.

The site is generally flat with irrigation banks installed and minor undulations typical of the surrounding agricultural landscape. The existing conditions of the property are illustrated by the images below, showing the lot boundaries, surrounding road network and existing land use.



Figure 2 | Looking southeast at the corner of Murrami Road and Briggs Road



Figure 3 | Looking northeast along Murrami Road

2.3. Surrounding Development

The subject site is located in a rural agricultural setting within the locality of Stanbridge. The surrounding area is dominated by primary production, with large, irregularly shaped lots used for irrigation cropping and grazing. The landscape is flat and largely cleared with minimal vegetation or built form.

To the north, across Briggs Road, land is similarly used for agriculture and contains large, cleared paddocks with irrigation infrastructure. There are no significant buildings directly north of the site except some scattered rural dwellings further along Briggs Road.

To the east, the land is agricultural in nature and features an irrigation storage dam and extensive cleared paddocks with small areas of vegetation along channels.

South of the site, across Murrami Road, land is also used for cropping and grazing which maintains the same rural character. A rural residential property with outbuildings is located further to the southwest.

To the west, the site adjoins the intersection of Briggs Road and Murrami Road, where a solar-powered water pump is in use at the northern end of the adjoining property. Beyond this, land continues to be used for primary production with large, cultivated paddocks and no prominent natural features or built form nearby.



Figure 4 | Aerial of Site and Closest Receivers (PWNA 2025)

3. Description of Proposal

3.1. Overview

The proposal seeks to develop the subject land for a solar renewable energy development with capacity of up to 5 Megawatts ("MW") to generate renewable electricity. The purpose of the development is to support the local electricity network by generating renewable energy to supply nearby farms, including their ongoing operations such as irrigation pumps and packing sheds while also contributing to the stability and resilience of the local energy system. The proposed facility is to be established within a generally rectangular portion of the subject site of approximately 21.7 hectares, with access through double access gates along Briggs Road as shown on the accompanying plans. Both gates are to be lock fitted which will allow for heavy plant entry, including semi-trucks, for possible fault and maintenance purposes.

The facility will comprise of the installation of 13,272 solar photovoltaic panels to be mounted in arrays on single axis trackers, cabling from the solar arrays to panel inverters and substation and connection into the local electricity network from the centre of the development area. This will include a 33kV UG cable connected underground between the inverter and Battery Energy Storage System (BESS) station to the main switch and metering point, totalling 365m, which then extends above ground to the local network along Murrumbidgee Road which is to be 98m long.

The facility will also include construction of unsealed internal access tracks, a new additional main access gate, parking and laydown area, substation and perimeter fencing.

Construction of the facility is expected to take approximately three (3) months to complete. It will operate for a period of up to 30 years, after which it will be subject to further operation or decommissioning and removal of all components. If it is decided that the proposal is to be decommissioned, rehabilitation of the land will be completed.

Figure 5 | Proposed Site Layout

LEGEND

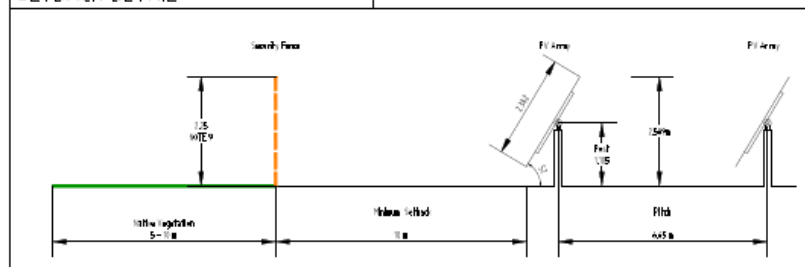
PERCE	
UNDERGROUND ELECTRICAL	
ELEMENT	
ROAD	
PERCEIVED ZONE 0 SETBACK	
PERCEIVED ZONE 1 SETBACK	
VEGETATION SCREEN	
LAYDOWN AREA	
OVERHEAD ELECTRICAL	
DESIGNATED CROSSING PATH	

NOTE:

1. MODULES ARE TO BE 10 METRE MINIMUM FROM SECURITY FENCE
2. INTERNAL ACCESS ROAD: FOR DETAILS, REFER TO CIVIL DESIGN
3. TR-001 CONFIGURATION: 1 PANEL PER TR-001 AND 100 OF 6x6m
4. ACCESS TR-001 ARE TO BE 10 METRE MINIMUM FROM TR-001
5. PERCEIVED ACCESS TR-001 TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH FIRE AUTHORITY SOLAR FACILITY GUIDELINES
6. SITE ENTRANCE GATE: DETAILS: REFER TO FENCING DESIGN
7. LAYDOWN AREA: TO BE DESIGNED FOR STORAGE OF HEAVY EQUIPMENT SUCH AS THE INVERTER STATION TRANSFORMER
8. POINT OF CONNECTION: REFER TO LEVEL 3 DESIGN
9. FENCE HEIGHT: REFER TO FENCING DESIGN
10. ELECTRICAL ENERGY ACCESS: TO BE INSTALLED ON NEW POLE ELEMENTS ARE TO BE COMPLETED BY THE PROJECT
11. NEW OVERHEAD CABLE TO BE INSTALLED BY ELECTRICAL ENERGY INSIDE 10 METRE ELEMENT LOCATED INSIDE BOUNDARY OF PROPERTY OWNER
12. PERCEIVED ACCESS TO BE THROUGH AVAILABLE DRIVE ACCESS
13. AS PER ELECTRICAL ENERGY DIRECTIONS, DC-ARRAY CABLES ARE TO CROSS THE OVERHEAD ELEMENT AT A 90 DEGREE ANGLE
14. ACCESS TO LOT 100 OF 15 IS TO BE THROUGH AVAILABLE DRIVE ACCESS
15. GATE AT ANY ENTRANCE TO THE SOLAR FACILITY SITE WITH ELECTRICAL ENERGY EQUIPMENT THAT ALLOWS HEAVY PLANT ENTRY FOR POSSIBLE FAULT AND MAINTENANCE PURPOSES

SYSTEM CONFIGURATION	
MODULE DETAILS	1x SOLAR JAWA (10x5) MODULE / 3.172
STRIP CONFIGURATION	1x PANEL PER STRIP
TR-001 CONFIGURATION	1x PANEL PER TR-001, 3 STRIPS PER TR-001
PERCEIVED ZONE 0	6x6m
INVERTER	2x 500kW INVERTER
MAXIMUM CAPACITY	4,000kW
POWER FACTOR	0.95
TOTAL DC CAPACITY	4,000kW
BESS SIZE	10MWh

SETBACK DETAIL



REVISION	DATE	BY	CHKD	APP'D
1	10-05-2023	BY	CHKD	APP'D
2	10-05-2023	BY	CHKD	APP'D
3	10-05-2023	BY	CHKD	APP'D

PROJECT: 25002 5MW Solar Energy Facility and Associated Infrastructure
 DRAWING: SITE LAYOUT
 SCALE: 1:2000
 SHEET: 1 OF 1

3.2. Construction Summary

The following table provides an understanding of the estimated construction schedule.

Table 2 | Construction Summary

Stage	Description	Time Period
Site establishment	Site preparation and civil works such as driveway installation as per Council's requirements. Perimeter fencing installation.	4 weeks
Construction	Materials will be scheduled for different times to ensure construction can be conducted in stages without overlapping of materials sitting on the hard stand area. This will include the majority of supplies including piles, trackers and modules. Construction to include part of the above 2-4 weeks for material delivery as stated above.	3 months
Demobilise construction equipment	Construction related equipment to be demobilised.	1 week
Commissioning	No construction activity. Timing is dependent on Essential Energy's booking availability and weather.	1-2 weeks

It is estimated that 50 workers will be employed for construction however, the employees will be spread out over different times dependant on the stage. Local contractors are to be utilised for construction and ongoing maintenance. If required, local accommodation will be utilised in Leeton and surrounding townships.

The works are to be carried out between the hours of 7am to 6pm, Monday to Friday, and 8am to 1pm on Saturdays. No works will be undertaken on a Sunday or public holidays.

The proposed solar panels are to be mounted on a steel structure with mounting posts to be driven into the ground using a vibrating pile driver. The piles will be driven approximately 1 to 2.5 metres into the ground, as to be confirmed by a geotechnical and structural engineer.

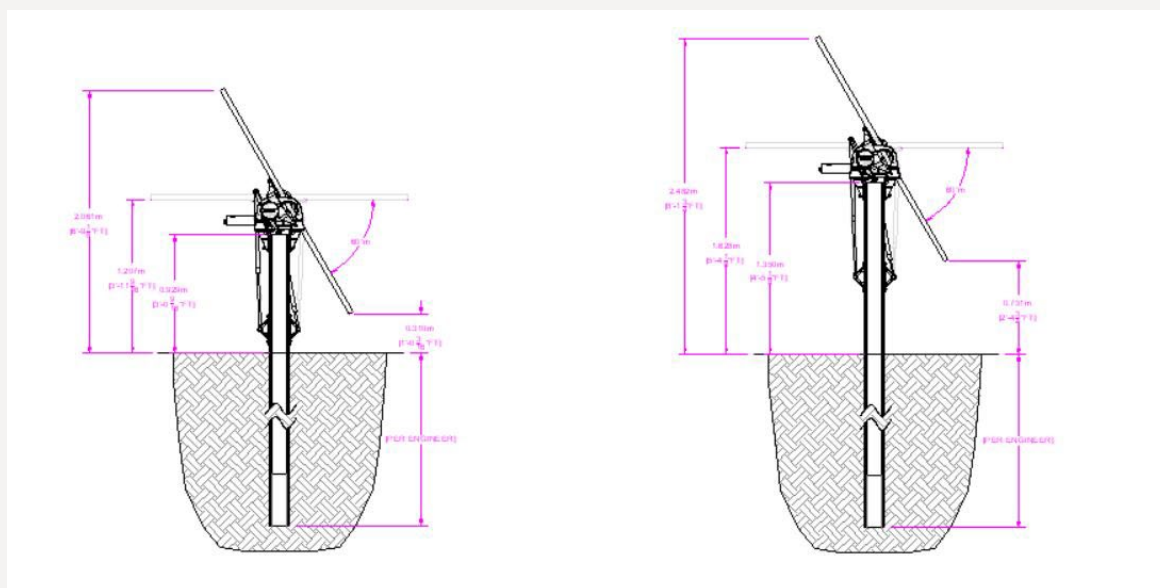


Figure 6 | Extract showing Solar Panels at 60 Degrees

The internal site cabling will be installed by trenching up to 1 metre in depth, laying of electrical wiring and conduits and backfilling and compacted to natural ground level.

Combiner boxes and the proposed central power station are to be installed above ground. The inverters and combiner boxes are to be established at the end of panel arrays, with the larger inverters installed on pre-built skids that enable easy placement on the site. The BESS station will also be installed in the centre of the development, above ground level. They resemble a storage shed, as shown in the below extract.

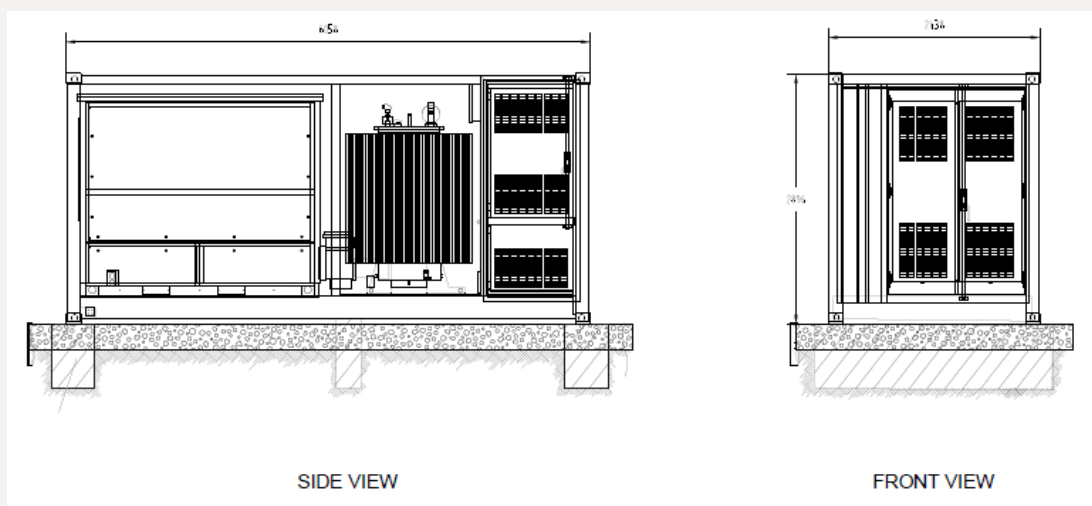


Figure 7 | Typical Elevations of Inverter

3.3. Operational Summary

The following summarises the operational matters of the proposed solar facility once constructed and energised. The facility is expected to be in operation for 30 years.

Table 3 | Operational Requirements

Operational Item	Response
Hours of operation	The facility will generate power during daylight hours, with all infrastructure being operational at all times. Staff will only generally access the site during daytime periods. In emergency events, staff may be required to access the property.
Operations & Management	Daily inspection and monitoring of the facility by full-time employed staff can occur remotely. Maintenance and operational checks as per site operational guidelines. Off-site maintenance crews and contractors to be employed as required to undertake repairs. The facility will generate power during daylight hours, with all infrastructure being operational at all times. The solar generated power will be transformed to the BESS Station until practical to transfer to the Essential Energy network. Staff will only generally access the site during daytime periods. In emergency events, staff may be required to access the property outside this period.
Workforce	During operation, the workforce will shrink to 4 employees. These employees will be split into general maintenance crew and electricals which will be locally appointed. Otherwise, the development will be managed remotely. Not all personnel will be on-site at any one time.
Traffic	On average, the operation of the facility will generate 1 vehicle every 3-5 days a maximum of seven days per week, resulting in 2- 4 vehicles per week. The rate of traffic expected from the site will be one vehicle per hour in the morning peak period, travelling inbound to the site; and one vehicle per hour in the afternoon peak period, travelling outbound from the site. Very infrequent deliveries may be necessary to the site by large vehicles delivering parts, plant or equipment. Access will be required intermittently by the electrical service provider to the substation on site. Internal access will be enabled by the internal access track.
Car parking	A parking area is to be established adjacent to the proposed inverter and BESS Station and will be accessible from the internal access track.

Operational Item	Response
Maintenance	Solar panels may require cleaning up to two times per year. Cleaning will be undertaken with water, to be sourced from water trucks brought to site. Any repairs to panels, other equipment or infrastructure will be undertaken on an as needs basis either by employed staff or contractors.
Lighting	Directional flood lighting to be provided to the inverter and BESS Station and surrounding parking area.
Noise sources	Approximately 40db at 10 metres from solar inverters and BESS Station. Intermittent traffic and machinery noise as a result of movements to and from the property, as well as during maintenance works.
Storage	There will be no storage of hazardous or dangerous goods or materials on site during the operation of the development.
Waste	Minimal waste is to be generated during operation and will be limited to general waste from staff, including paper, plastic and glass as well as putrescible waste including food waste, bottles, cans and paper. Waste will also result from maintenance work, including packaging, and decommissioned/removed equipment. All waste will be stored in prescribed bins or otherwise stockpile areas near the site office, which will divide waste into landfill and recycling streams. These waste materials will then be taken to off-site to the local waste management facilities.

Table 4 | Preliminary Waste Management Strategy

Stage	Anticipated Waste Material	Proposed Management
Construction	- Excess concrete from the setting of mounts and footings - Off cuts and excess construction material - Packaging materials including plastic wrapping, cardboard and wooden pallets - Cable reels and other electrical waste - Domestic and putrescible waste (including food waste, bottles, cans and paper) - Unused or spent chemicals.	Construction waste will be sorted and stored in stockpiles and skip bins as required, located within a defined laydown area in accordance with the NSW EPA <i>Waste Classification Guidelines</i> for recycling and landfill, as follows: Recycling: - Steel & scrap metal - Recyclable plastics - Cardboard packaging - Timber product (incl. cable reels & pallets) Landfill: - General Waste - Domestic & putrescible waste - Non-recyclable plastics Recycling and landfill waste will be collected and taken to off-site waste management facilities which can lawfully accept the waste, as required.
Operation	- General waste from site office, including paper, plastic and glass. - Waste resulting from maintenance work, including packaging, and broken equipment. - Minor degree of domestic and putrescible waste (including food waste, bottles, cans and paper)	All waste will be stored in bin or otherwise stockpile areas near the site office, which will divide waste into landfill and recycling streams. These waste materials will then be taken to off-site waste management facilities.

Stage	Anticipated Waste Material	Proposed Management
Decommissioning	- Photovoltaic modules and supporting poles and mounts, PV boxes, skids, scrap metal. - Glass for panels - Silicon for wafers - Inverters, batteries, transformers and electrical cables - Fencing - Storage containers	As with construction, waste generated from the dismantling of the solar facility infrastructure will be distributed to separate streams for recycling or general waste. Recycling and landfill waste will be collected and taken to off-site waste management facilities which can lawfully accept the waste, as required. The amount of material types that will be recyclable will be determined by the development of the waste recycling industry and their future capacity to process specific materials. Given the anticipated number of operational years, it is expected that the recycling industry will develop new technologies and uses, as required.

3.4. Solar Infrastructure

The following extract is provided from the accompanying plan set which sets out the proposed system configuration.

SYSTEM CONFIGURATION	
MODULE DETAILS	JA SOLAR JAM66D45-620/LB (13,272)
STRING CONFIGURATION	28 PANELS PER STRING
TRACKER CONFIGURATION	1 PANEL IN PORTRAIT, 3 STRINGS PER TRACKER
ROW SPACING (PITCH)	6.65m
INVERTER	2 x SMA SC 2660 UP
MAXIMUM AC CAPACITY	4.998MW
POWER FACTOR	TBC
TOTAL DC CAPACITY	8.2MWp
BESS SIZE	10MWh

Figure 8 | System Configuration Extract

3.4.1. Photovoltaic Panel Arrays

The proposal includes the installation of approximately 13,272 photovoltaic modules (solar panels) (JA Solar JAM66D45-620/LB) which will have a multicrystalline, monocrystalline, or thin film technology. The panels are to be arranged in groups which are known as arrays. The proposal will have 28 modules per string and a total of 474 strings across the development area. Proposed plans attached indicates the alignment of the proposed arrays on the property.

The solar panels primary function is to absorb the sunlight received and convert this into electricity so the panels are designed to reflect as little light as possible. The panels also absorb the majority of sunlight received (approximately 80-90%) and only reflect a small amount, resulting in a rate of reflection that is less than other common rural surfaces.

The proposed PV panels are to be installed on a single axis ground mounted tracker system to follow the sun from east to west and obtain the maximum solar exposure. The panels are proposed to tilt in a single axis for 60 degrees beyond horizontal in either direction. The structure will be fixed in place by pile driven posts at the end of each 'string' being approximately 70 metres.

Proposed PV Panels will be arranged in 'single portrait' orientation (i.e. end to end). Each proposed PV panel type used in the facility be approximately 2.38 metres x 1.13 metre and will be mounted onto the steel tracking structure.

The final height of the structure, including panels (when at full 60 degree tilt) and allowing for a ground clearance of at least 0.52 metres, will be approximately 2.6 metres from natural ground level. This final height is dependent on the final clearance needed beneath the panels



Figure 9 | Example of a Typical Single Axis Tracker System with PV Modules Mounted in Single Panel Portrait Orientation (1P Configuration)

3.4.2. Power Station

The proposed development will provide 1 x Power Station Unit (SMA SC 2660 UP or similar) at the centre of the PV Panel array area. This will contain two (2) inverter units and a LV/MV transformer within a single 'container format' for placement on the site.

The power station will measure approximately 12.2m x 2.5m x 2.9m and is proposed to comprise a muted natural colour to blend into the surrounding landscape.

The electricity generated by the proposed panel arrays are directed to inverters via cabling to be constructed throughout the site. The inverters are used to convert the low voltage DC power into low voltage AC power which can then be transformed to higher voltages. This allows for a step up of the voltage from the solar panels and conversion so that it can be connected to the grid.

3.4.3. Battery Energy Storage System

The proposal will include a Battery Energy Storage System (BESS) which will consist of four (4) units placed adjacent to one another and the power station. During operation, electricity flows from the solar farm power conversion unit via underground electrical cabling to each battery container. The power flow is controlled and directed through the individual battery terminals, charging the internal battery storage cells. During discharge from the battery, the process is reversed with power flows from the battery cells back through an electrical cable connection to the power conversion unit.

The BESS units will take the form of a prefabricated container unit delivered and placed on site. Each unit will have dimensions of 12.2 metres x 2.5 metres (width) x 2.9 metres (height). Each unit will also include heating, ventilation and air conditioning, and will be fitted with a Novec 1230 fire suppression system.

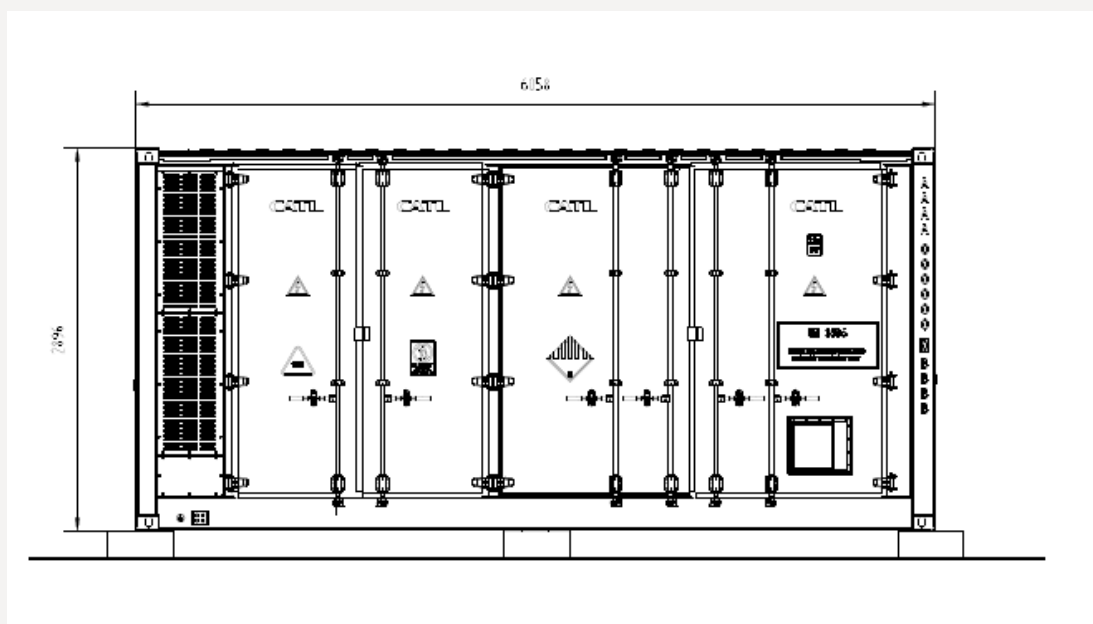


Figure 10 | Typical BESS Station

The proposal will comprise of a network of aboveground and underground cabling throughout the development. This will consist of DC cabling extending from the solar arrays to the inverters and AC cabling from the inverters to the substation.

Underground cabling will be installed between 0.5-1.0 metre below the surface and will be provided by trenching, installing cabling and conduit and backfilling. The disturbed area will be compacted to match the adjacent ground level.

Areas of aboveground cabling will be required at the solar panel arrays, with DC cabling being fed along the mounting structures to aboveground combiner boxes, before being fed to underground conduits.

3.5. Property Access and Internal Movements

Two access gates are proposed, utilising one of the existing access points along Briggs Road, with the secondary access to be located further east along Briggs Road. The new access point (further to the south) is to be constructed to an all-weather access rural standard crossover, capable of accommodating construction and operational vehicles to the site.

An internal all-weather access road is proposed to be constructed of a gravel standard and capable of accommodating heavy vehicles, ensuring all vehicles to enter and exit the site in a forward direction, as per Council's standards. This access road will continue into the centre of the development area where the inverter and BESS station is located, to allow access for maintenance and repair works.

Access tracks will allow for two-way movements and will be unsealed and formed to allow all-weather access by site operation and maintenance crews.

3.6. Stormwater and Drainage

To adequately collect, convey and discharge any runoff from the site, the development will include swale drainage along select internal access roads, with a discharge point at the southwestern corner of the property under Murrarni Road.

Stormwater generation across the site is considered to not result in any significant additional impact above and beyond the existing run-off that would have been expected across the site under its current use. The proposed development is not expected to exacerbate any substantial increase to any current flows and can be managed on site. Detailed design of the relevant stormwater infrastructure required will be undertaken prior to the issue of a construction certificate and is expected to be conditioned on any future development consent.

Any runoff from the gravel access road will be collected and conveyed via the new swale drains. This swale drain network will be designed to collect and discharge runoff from the property at pre-developed levels.

3.7. Maintenance

Once operational, the facility will involve daily monitoring of the plant and all associated infrastructure, which will be carried out by staff. The operation of the development can be accessed remotely, as well as being accessed in person.

Where required, minor repairs and maintenance of components of the facility will be undertaken by either staff or contractors. Other occasional maintenance tasks will include washing panels, controlling grass and weeds on site, maintaining internal access tracks, and general waste collection and disposal. Regular inspections of the site will be carried out to ensure that grassland is managed to reduce the risk of bushfire to surrounding land and to control weeds.

Vegetation management will include mowing between rows of PV panels and in the area immediately surrounding the arrays, as well as the seasonal use of sheep grazing to assist in maintaining grass at sustainable levels, supporting regrowth.

3.8. Landscaping

The proposal includes nominated landscape buffers consisting of shrubbery 3m from the site to Briggs Road and 5m from the site to Murrarni Road. The landscaping areas are intended to reduce visual impacts from potential sensitive receivers and the adjacent Murrarni Road and Briggs Road.

The proposed landscape outcome is intended to enable a long-term landscaping solution whereby it will suitably accommodate the development in the short term and also enable the site to be sustainably returned to rural activities in the event that the solar facility is decommissioned in the future.

3.9. Glint and Glare

Glint refers to the momentary flash of bright light that can be caused by the reflectivity of solar panels and glare refers to the continuous source of light and is generally associated with stationary objects. Glint and glare from PV panels can have potential safety or amenity impacts to surrounding sensitive receivers, including potential to impair observers through inducing an after image.

A Glint and Glare Assessment was carried out using the Glare Gauge modelling tool by Forge Solar (attached). This is an industry standard technical modelling tool, which utilises the Solar Glare Hazard

Analysis Tool (SGHAT) developed by Sandia National Laboratories, to assess the potential glare to receptors around solar arrays.

The tool enables the proposed solar facility to be mapped along with relevant data inputs and then uses the data to consider the potential for temporary after-image or more significant retinal burn. In summary, red glare refers to potential for permanent eye damage from the observation location, yellow glare indicates the potential for after image effects and green glare refers to low potential for after image impacts.

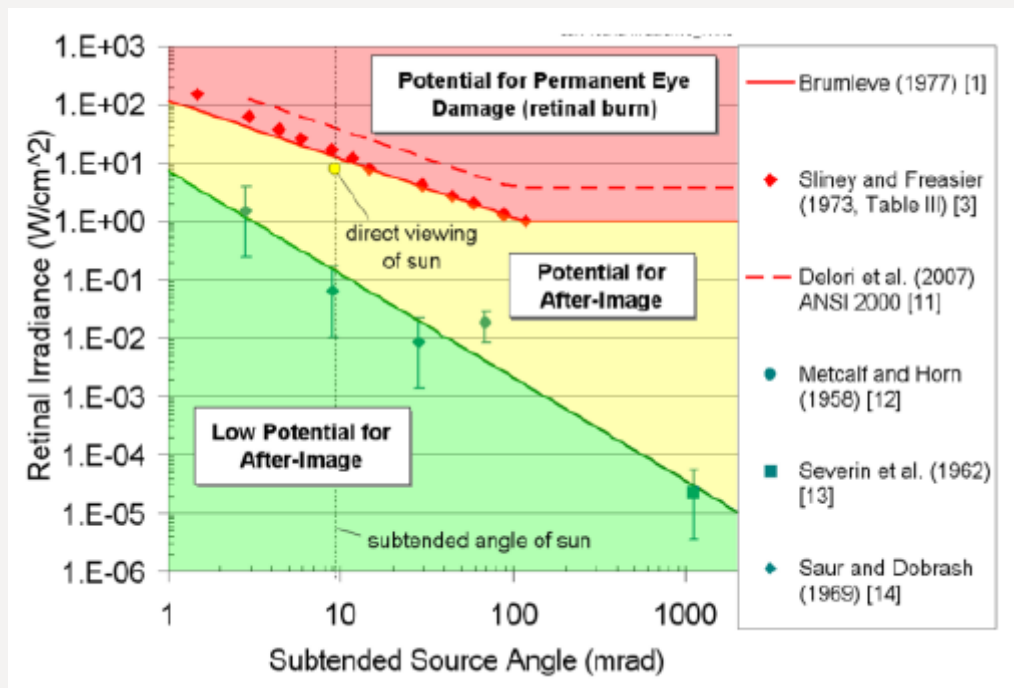


Figure 11 | Chart Used to Plot the Total Minutes of Glare for Each Receptor

As construction of PV panels primarily utilises glass and steel there is a perception of glint and glare from the reflectivity of solar panels. This leads to potential issues of distractions to motorists, aircraft and eye damage.

Generally, solar panels will not create significant glint or glare compared with other surfaces. PV panels are designed to collect sunlight to convert to energy and therefore absorb the majority of light received. The panels are designed using anti-reflective coatings during manufacture to reduce reflection and will typically absorb 80-90% of the light received.

PV panels are also generally less reflective than other naturally occurring elements such as soils and crops and have been found to be generally less reflective than general rural environments and far less reflective than open water.

The angle of incidence of the sunlight is also relevant in considering the reflection of solar development. A fixed axis solar facility will have panels that do not move throughout the day and therefore the angle of incidence varies with the time of day. A tracking system, such as that proposed for this development, will follow the sun through the day and can have the angle of incidence reduced.

The results of the modelling for this development indicates that there will be no glare on the surrounding sensitivity receivers of paths. This is achieved because the panels will be single axis trackers and will follow the sun through the day and the proposed tracking system will be configured not to 'back-track'.

'Backtracking' refers to the process where the panels revert to a flat resting position after sunset (when the sun left the angle of rotation of the panel) until sunrise (when the panel was in the angle of rotation of the panels). This outcome generally results in glare to surrounding properties as the panels would 'reset' to flat in the late evening and early morning. The configuration of this facility will be that at the

If necessary, a condition of consent may be imposed that requires a decommissioning plan to be prepared and approved prior to decommissioning.

4. Planning Assessment

Under Section 4.15(1) of the EP&A Act when considering an application for development, the consent authority must take into consideration the relevant environmental planning instruments. This section details and responds to the relevant planning framework applicable to the proposal.

4.1. Applicable Environmental Planning Policies, Instruments and Controls

- Environmental Protection and Biodiversity Conservation Act 1999
- Environmental Planning and Assessment Act 1979
- State Environmental Planning Policy (Planning Systems) 2021
- State Environmental Planning Policy (Resilience & Hazards) 2021
- State Environmental Planning Policy (Transport and Infrastructure) 2021
- Leeton Local Environmental Plan 2014
- Leeton Development Control Plan 2022

Compliance with the applicable legislation and policies is discussed below.

4.2. Environmental Protection and Biodiversity Conservation Act 1999

The *Environmental Protection and Biodiversity Conservation Act 1999* (“the EPBC Act”) is the principal Commonwealth legislation relating to environmental protection. Specifically, it sets out a framework for identification, protection and management of significant flora, fauna, ecological communities and heritage places as specified within the EPBC Act. The EPBC Act stipulates that approval from the Commonwealth Environment Minister is required if a development is likely to have a significant impact on matters considered to be of “national environmental significance” (MNES).

The development is not likely to have a significant impact on any matters considered to be of “natural environmental significance” in accordance with the accompanying EPBC Act Self-Assessment and Biodiversity Assessment Report (BAR). The report prepared an assessment of the Protected Matters Search Tool which concluded that the proposal is unlikely to significantly affect any MNES as none were identified within or close to the subject site.

4.3. Biodiversity Conservation Act 2016

The NSW Biodiversity Conservation Act 2016 (“the BC Act”) is the NSW state legislation that seeks to maintain a healthy, productive, and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. This legislation includes the requirements for considerations regarding biodiversity conservation.

In respect of Part 4 developments, the BC Act establishes a framework to avoid, minimise and offset the impacts of the proposed development and land-use change on biodiversity. It provides a scientific method for assessing the likely impacts of the proposed development on biodiversity values, for calculating measures to offset those impacts and for assessing improvements in biodiversity values.

The Act aims to maintain the diversity and quality of ecosystems and to support conservation and threat abatement action to slow the rate of biodiversity loss and conserve threatened species and ecological communities in nature.

The primary requirement of the BC Act is to determine if a proposed development is considered likely to significantly affect threatened species. According to clause 7.7(2), this is if:

- a) *The development is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3, (5-part Test) or*
- b) *The development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values, or*
- c) *The development is carried out in a declared area of outstanding biodiversity value.*

The accompanying BAR prepared a Test of Significance (ToS) as the proposal intends to clear native vegetation. The ToS concluded that the development is unlikely to result in a significant impact on threatened species or ecological communities due to the intensive historical agricultural usage of the land and absence of native vegetation and habitat features.

A BDAR is not required as the vegetation zones containing native vegetation does not exceed 0.1ha and the ToS assessment confirms that no further assessment is necessary.

4.4. Environmental Planning and Assessment Act 1979

Section 4.15 of the EP&A Act 1979 sets out the statutory matters for consideration against which the proposed development is to be evaluated. The matters for consideration under Section 4.15 are as follows:

(1) *Matters for consideration—general*

In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:

- (a) *the provisions of:*
 - (i) *any environmental planning instrument, and*
 - (ii) *any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and*
 - (iii) *any development control plan, and*
 - (iiia) *any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and*
 - (iv) *the regulations (to the extent that they prescribe matters for the purposes of this paragraph),*
 - (v) *(Repealed)**that apply to the land to which the development application relates,*
- (b) *the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*
- (c) *the suitability of the site for the development,*
- (d) *any submissions made in accordance with this Act or the regulations,*
- (e) *the public interest.*

The matters for consideration identified in Section 4.15(1) of the EP&A Act 1979 are addressed in the following section. Subsections (b) to (e) of Section 4.15(1) of the EP&A Act 1979 are addressed in Section 5 of this Statement of Environmental Effects.

4.4.1. Consent Authority

Section 4.5 of the EP&A Act establishes the applicable consent authority. The proposal meets the thresholds for Regionally Significant Development (refer below). As such the development application is to be determined by the Regional Planning Panel who is the relevant consent authority. Leeton Shire Council will however undertake the relevant assessment and administration functions.

4.4.2. Designated Development

Pursuant to Section 4.10 of the EP&A Act the development is not identified as "designated development" as the proposal does not exceed 30 megawatts of electrical power for the purposes of 'electrical generating works' clause 24(1)(c) of Schedule 3, Part 1 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regs).

4.4.3. Integrated Development

The application is not identified as Integrated Development under Section 4.46 of the Environmental Planning and Assessment Act 1979 and as a result, the subject development does not require concurrence.

4.5. State Environmental Planning Policy (Planning Systems) 2021

Part 2.4 of the policy identifies Regionally Significant Development as that which is specified under Schedule 6. The proposed development qualifies as Regionally Significant Development as it involves electricity generating works with an estimated development cost exceeding \$5 million. The development will therefore be referred to the Western Regional Planning Panel (WRPP).

4.6. State Environmental Planning Policy (Resilience & Hazards) 2021

4.6.1. Chapter 4 – Remediation of Land

Chapter 4 of *State Environmental Planning Policy (Resilience & Hazards) 2021* sets out considerations relating to land contamination across the state. The intention of the SEPP is to establish 'best practice' guidelines for managing land contamination through the planning and development control process.

In the context of this application, clause 4.6 of Chapter 4 generally requires that consideration be given to whether or not land proposed for development is contaminated and fit for use for its intended purpose. The SEPP requires the consent authority to consider whether the subject land is contaminated when determining a development application. If the land is contaminated, the consent authority must be satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out.

The subject land has been previously cultivated for primary production with no contaminating practices evident, nor is it expected to be at risk of contamination given its historical use and surrounding context. The land use is not changing to a more sensitive development from the current use.

4.7. State Environmental Planning Policy (Transport & Infrastructure) 2021

4.7.1. Chapter 2 – Infrastructure

Chapter 2 of *State Environmental Planning Policy (Transport & Infrastructure) 2021* provides a consistent and flexible planning system to facilitate the delivery of infrastructure and services. The policy identifies environmental assessment categories for types of infrastructure, matters to consider when assessing development adjacent to infrastructure and provides for consultation with relevant public authorities.

The Chapter 2 contains provisions relating to approval processes and assessment requirements for infrastructure proposals according to the type or sector of infrastructure. It outlines land-use zones where types of infrastructure are permissible with or without consent and identifies certain works as exempt and complying development.

Division 4 governs the planning and development of electricity generating works and solar energy systems, aiming to streamline the approval process for small-scale renewable energy installations,

promoting sustainable energy solutions while maintaining appropriate environmental and safety standards.

There are several Clauses under the SEPP that trigger referral and concurrence matters. These are addressed in the table below for consideration.

Table 5 | Matters for Consideration

Matter for consideration	Response
Division 4 – Electricity generating works or solar energy systems	<i>In this Division—</i> <i>electricity generating works means a building or place used for the following purposes, but does not include a solar energy system—</i> (a) <i>making or generating electricity,</i> (b) <i>electricity storage.</i> <i>prescribed non-residential zone means any of the following land use zones or a land use zone that is equivalent to any of those zones—</i> (a) <i>RU1 Primary Production,</i> (b) <i>RU2 Rural Landscape,</i> (c) <i>RU3 Forestry,</i> (d) <i>RU4 Primary Production Small Lots,</i> (e) <i>E4 General Industrial,</i> (f) <i>E5 Heavy Industrial,</i> (g) <i>IN1 General Industrial,</i> (h) <i>IN2 Light Industrial,</i> (i) <i>IN3 Heavy Industrial,</i> (j) <i>IN4 Working Waterfront,</i> (k) <i>SP1 Special Activities,</i> (l) <i>SP2 Infrastructure,</i> (m) <i>W4 Working Waterfront.</i> Comment: The proposal falls under the definition of an electricity generating works and will be located on land that is zoned RU1 which is land in a prescribed non-residential zone. The development may be carried out on land with consent. The development is not considered complying development under clause 2.39 as the system will occupy more than 500m2.

Matter for consideration	Response
Clause 2.48 – Determination of development applications – other development	This clause applies to a development application (or an application for modification of a consent) for development comprising or involving any of the following— (a) <i>the penetration of ground within 2m of an underground electricity power line or an electricity distribution pole or within 10m of any part of an electricity tower,</i> (b) <i>development carried out—</i> (i) <i>within or immediately adjacent to an easement for electricity purposes (whether or not the electricity infrastructure exists), or</i> (ii) <i>immediately adjacent to an electricity substation, or</i> (iii) <i>within 5m of an exposed overhead electricity power line,</i> (c) <i>installation of a swimming pool any part of which is—</i> (i) <i>within 30m of a structure supporting an overhead electricity transmission line, measured horizontally from the top of the pool to the bottom of the structure at ground level, or</i> (ii) <i>within 5m of an overhead electricity power line, measured vertically upwards from the top of the pool,</i> (d) <i>development involving or requiring the placement of power lines underground, unless an agreement with respect to the placement underground of power lines is in force between the electricity supply authority and the council for the land concerned.</i> Comment: Referral under Clause 2.48 will be required to the relevant electricity supply authority as the development proposes to connect to the existing line which runs along the western boundary of the site. Before determining a development application, the consent authority must notify the relevant electricity supply authority and take consideration of any comments made by this authority.

Matter for consideration	Response
Clause 2.122 – Traffic generating development	This clause applies to development specified in Column 1 of the Table to Schedule 3 that involves— (a) <i>new premises of the relevant size or capacity, or</i> (b) <i>an enlargement or extension of existing premises, being an alteration or addition of the relevant size or capacity.</i> Comment: The following threshold applies to the proposed development: • <i>'any other development' with access to a road (generally) specifies 200 or more motor vehicles an hour.</i> As the proposed solar facility does not meet these thresholds, the development is not classified as 'traffic-generating development'.

4.8. Leeton Local Environmental Plan 2014

Leeton Local Environmental Plan 2014 ("the LEP") is the principal planning instrument that guides development within the LGA. The below provides an overview of consistency and compliance of the proposal against the relevant provisions.

4.8.1. Land Use and Permissibility

The subject land is within the RU1 - Primary Production Zone ("RU1 zone") for which the objectives are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To provide opportunities for intensive and extensive agriculture in appropriate locations consistent with the environmental capability of the land and access to irrigation water.*
- *To allow the development of processing, service and value-adding industries related to agriculture and primary industry production.*
- *To protect and enhance the water quality of receiving watercourses and groundwater systems so as to reduce land degradation.*

The proposal is consistent with the objectives of the RU1 zone by providing a sustainable, low-impact land use that can coexist with surrounding rural activities. The proposal will enhance land productivity in an alternative, sustainable form without degrading soil or water quality. The proposal will allow for potential future agricultural use once the infrastructure is removed, as the soil integrity will be preserved and will contribute to the diversity of primary industry enterprises in the area, aligning with the zone's encouragement of alternative, sustainable land uses. It also contributes to the diversity of primary industries in the area and has been designed and sited to minimise land use conflicts and remain compatible with the environmental capacity of the land.

The development is defined under the LEP as:

electricity generating works means a building or place used for the purpose of—

- (a) making or generating electricity, or
- (b) electricity storage.

Under the RU1 Primary Production land use table of the LEP, the proposal is permitted with consent in this zone.

4.9. Leeton Development Control Plan 2022

The Leeton Development Control Plan 2022 (“the DCP”) provides specific requirements for development within the LGA, including the subject site.

The following chapters of the DCP are applicable to the proposed works:

- Part A – Introduction
- Part B – Design Guidelines
- Part J – Car parking and access

These matters are addressed in the following sections below.

4.9.1. Part A – Introduction

The broad aims of the plan are:

- a. *To provide guidance at the Development Application (DA) stage of new development.*
- b. *To promote growth and development in the Leeton Local Government Area.*
- c. *To ensure growth and development occurs in a consistent, orderly and environmentally sustainable manner.*
- d. *To ensure positive planning outcomes at individual sites are maximised for the benefit of the broader community.*

The proposal is applicable as the subject land is within the Leeton Shire Local Government Area (LGA) and aligns with the aims of the plan by supporting informed decision-making through detailed documentation and specialist assessments. The development promotes economic growth and diversification by delivering a renewable energy project that attracts investment, creates local employment, and supports the region’s long-term sustainability.

The proposal is located on low-productivity irrigation land, ensuring development occurs in an environmentally sustainable and orderly manner without displacing viable agriculture. The land will be preserved for future use once the infrastructure is removed. The project will contribute to clean energy generation and support the shift to a low-carbon economy, while also creating opportunities for local engagement and community benefit. Its low-impact and reversible design mean the development will deliver lasting value to both the local area and the wider region.

4.9.2. Part B – Design Guidelines

The following factors should be considered when determining whether a site is suitable for development:

- i. *Physical constraints (e.g. flooding, bushfire, landslip, heritage, environmentally sensitive land).*

ii. Topography and drainage.

iii. Adjoining land-uses, particularly important for intensive agriculture and industrial type uses which require separation from sensitive land-uses such as dwellings and schools.

iv. The standard of access available for the intended development and its estimated traffic generation.

v. The availability of electricity supply and the capacity of the electricity grid (single or 3 phase, transformer size and capacity) to meet the intended development / use.

vi. The availability of reticulated water supply and the capacity of water supply (size of mains, location of hydrants, pressure and flow) to meet the requirements of any development for potable water supply and firefighting purposes.

vii. The availability of reticulated sewerage and the capacity of the system to meet the requirements of any development, including sewer main size, depth and location of manholes.

viii. Restrictions on use of land (e.g. zoning, easements and other restrictions on the Land Title).

ix. Lot configuration to accommodate the intended development in compliance with building setback rules and the like.

x. Solar efficiency, particularly for land-uses requiring submission of a BASIX Certificate.

Part B1 applies to all land within the Leeton LGA, including the subject site. The land was chosen for its suitability, being flat, generally cleared, and free from major constraints such as flooding, bushfire risk, or heritage overlays. These qualities make it appropriate for a low-impact solar development that avoids unnecessary earthworks and minimises runoff and drainage issues.

The proposal is compatible with its rural surroundings and avoids conflict with nearby sensitive uses. Dwellings within 1 km have been considered, with buffers and landscaping included to reduce potential impacts. As the land is of low agricultural productivity, the project will not displace valuable farming operations but instead put underutilised land to productive use.

The site has direct access to rural roads suitable for construction and operational traffic, with assessments confirming that temporary increases can be managed safely. Its location close to existing transmission infrastructure with available grid capacity further supports its suitability. While water and sewerage are not required, temporary construction needs will be provided for without placing pressure on local utilities.

The RU1 Primary Production zone allows for compatible rural land uses, and solar farms are increasingly recognised as appropriate, particularly on marginal farmland. The lot comfortably accommodates the layout, which has been designed to optimise solar efficiency while meeting setback and access requirements. Although BASIX is not triggered, the project aligns with its objectives by contributing to renewable energy and sustainability outcomes.

In summary, the proposal responds directly to the provisions of Part B1 and represents a well-planned development. It delivers renewable energy, supports investment and employment in the Shire, and offers community benefit through engagement initiatives. With its low-impact and reversible design, the solar farm is a responsible and strategic use of rural land in the Leeton LGA.

4.9.3. Part J – Car parking and access

Part J of the DCP provides details relating to parking and access throughout the Leeton LGA.

The objectives for parking are as follows:

a. Ensure that adequate provision is made for off-street parking consistent with the parking demand generated by the development.

- b. Provide convenient and adequate parking for staff, clients, visitors and servicing groups.*
- c. To provide parking areas which promote ease of access as well as suitable internal circulation patterns.*
- d. Ensure quality of parking areas in terms of safety, amenity and integration with surrounding areas.*
- e. Ensure the adequate provision of suitably located parking for disabled persons.*
- f. Provide landscaping and quality materials in the construction of parking areas to improve the amenity of those parking areas.*
- g. Provide parking areas which promote ease of access as well as suitable internal circulation patterns.*
- h. Ensure that all traffic generating developments are in accordance with the Roads and Traffic Authority's "Guide to Traffic Generating Developments" and relevant Australian Standards.*
- i. Ensure that each development proposal is assessed consistently and equitably with respect to parking*

The proposal does not fall under any of the specific land use categories listed in Tables 1–7 of the DCP. However, applying best practice, the development is most appropriately considered under Table 7 – Miscellaneous Land-use Types, which requires a traffic and parking study prepared by a suitably qualified professional to justify the proposed parking arrangements. A Traffic Impact Assessment (TIA) has been prepared and accompanies this report.

The Leeton Shire Council DCP and the RTA Guide to Traffic Generating Developments (2002) does not provide any specific guidance on the required car parking provision for solar farm developments. As such, the TIA has outlined that car parking requirements should be determined based on the number of personnel needed for both construction activities and ongoing operational and maintenance tasks.

- Operational staff are typically limited to a maximum of two (2) staff on any given day therefore, the two (2) vehicle spaces in accordance with AS2890.1:2004 can be sufficiently accommodated by the proposal.
- Construction phase parking will be located on site and be able to accommodate 20-30 light vehicles. This is deemed sufficient to meet peak demand and can be accommodated appropriately within the site.

Overall, the TIA determines that there will be no significant impact on roads in the vicinity of the site or further afield during the operation of the proposed development, and that impacts from construction can be appropriately managed through the development and implementation of an appropriate CTMP.

4.9.4. Variations to Development Controls

No variations to the DCP are requested.

5. Assessment of Environmental Impacts

This section of the SEE identifies potential impacts which may occur as a result of the proposed development and are relevant matters for the consideration of the DA under Section 4.15(1)(b) to (e) of the EP&A Act 1979.

These impacts and mitigating measures have been identified following comprehensive analysis of the site and the proposed plans.

The analysis and impact identification under this section is informed by:

- Site analysis and visual inspection of the subject land and surrounding properties.
- Analysis of the proposed plans for development (provided attached for reference)
- Desktop review of applicable Environmental Planning Instruments
- Consideration of the Councils Development Plans and Policies including the DCP
- Assessment of relevant strategic planning documents.
- Consultation with Council and other authorities

5.1. Context and Setting

The subject land is located 15km west of Leeton with dual road frontage to Murrumbidgee Road to the south-west and Briggs Road to the north and northwest. The lot features an extended frontage along Briggs Road which is unsealed. The site is suitably located in relation to the character of the area which is defined by a variety of rural properties and large areas with agricultural uses.

As the site is situated within a rural area, there are low visual sensitivities and minimal surrounding development, making it well-suited for renewable energy infrastructure. The development is proposed to be set back from Murrumbidgee Road with partial screening of scattered vegetation, reducing visual exposure from public viewpoints and helping maintain the rural character of the area. A buffer area is also proposed between the residential dwelling and the development to further mitigate potential impacts and preserve amenity. The development is consistent with the surrounding landscape and land use patterns, ensuring it integrates appropriately with the local environment and contributes to broader sustainability objectives.

5.2. Traffic, Access and Parking

Impacts regarding traffic have been considered through inspection of the existing road network and the present condition of the land. A Traffic Impact Assessment (TIA) has also been prepared by Traverse to review the existing conditions in the vicinity of the site, including traffic, parking and servicing, as well as the performance of the surrounding network. The TIA evaluates the required traffic and parking requirements for the proposed development, and the impacts on the surrounding road network.

The subject land is presently utilised for primary production and has been improved with the installation of irrigation banks. Legal access is from Briggs Road which is a local maintained dirt road, accessed via Murrumbidgee Road. No access is existing or proposed off Murrumbidgee Road, access and egress to the property via Briggs Road will vary throughout the day, however the majority of movements will occur during the construction phase. Traffic will increase during the construction as delivery trucks, construction personnel and associated vehicles and contractors' vehicles are expected throughout the process.

Once operational, the facility will have a very low rate of traffic generation. Primarily, traffic generated during operation of the site would be movement of staff in light vehicles to and from the site. This rate of traffic can be managed by the existing road network and will have no impacts on the existing network.

The site has sufficient land to accommodate the parking of two (2) light vehicles associated with operational staff and 20-30 spaces during the construction stage.

Overall, the TIA determines that there will be no significant impact on roads in the vicinity of the site or further afield during the operation of the proposed development, and that impacts from construction can be appropriately managed through the development and implementation of an appropriate CTMP.

5.3. Infrastructure

The proposal will require supporting infrastructure including site access, internal access tracks, underground cabling, inverter and transformer stations, and a connection point to the existing electricity transmission network. Construction activities will temporarily increase heavy vehicle movements and may require minor upgrades to existing rural roadways to accommodate delivery vehicles.

The proposed infrastructure requirements can be accommodated without significant impacts on existing services or the surrounding community. The development will not increase demand on reticulated water or sewerage systems and will connect efficiently into the existing electricity network. Overall, the proposal is considered low impact from an infrastructure perspective and consistent with the provisions of the DCP.

5.4. Heritage & Cultural Heritage

The proposal will require earthworks required for cabling of each photovoltaic array to inverters and the substation, for piledriving of the supportive frames, and for the proposed perimeter road. As such, heritage and cultural heritage were considered as part of the proposal to ensure that no harm would come from these works or the ongoing operation of the facility.

The subject land is not identified as a heritage item nor is it located within a heritage conservation area following a review of Schedule 5 and the Heritage Map of the LEP.

An Aboriginal Due Diligence Assessment has been carried out for the property by Biosis which determined that due to the historical disturbance of the site within the study area, this has resulted in there being low potential for archaeological artefacts in the area. The report was prepared in accordance with the sequence of steps identified in the NSW Office of Environment and Heritage's Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW.

Notwithstanding, if any archaeological items are identified during works, the items will be left in place and appropriate protocols for dealing with such instances will be observed ('unexpected finds protocol').

5.5. Noise

A Noise Impact Assessment (NIA) was undertaken for the proposal which included background noise logging between the 3rd August to 12th August. One noise logger was positioned along the southwestern boundary of the site and five noise sensitivity receivers are presented within the report and summarised below. The results were then modelled using SoundPLAN v9.1 for operational and construction activities associated with the proposal.

Operational Noise

The primary operational noise sources associated with the proposal are the inverters, BESS unit, medium voltage transformer, and Power Conversion System (PCS). Site operational noise emissions were calculated using the CONCAWE algorithm to ensure that noise enhancing weather conditions including temperature inversions and downwind conditions have been appropriately considered at worst-case situation. The predicted site operational noise impacts have been represented below and indicate that compliance is achieved at all receptors.

Table 6 | Predicted operational noise impacts LAeq,15min dB(A).

Receiver	PSNTL	Standard meteorology (exceedance)	Noise enhancing meteorology (exceedance)
Peak daytime (7:00am – 6:00pm)			
R01	40	34	-
R02	40	33	-
R03	40	31	-
R04	40	32	-
R05	40	28	-
Peak evening (6:00pm – 10:00pm)			
R01	35	34	35
R02	35	33	33
R03	35	31	31
R04	35	32	32
R05	35	28	29
Peak nighttime (10:00pm – 7:00am)			
R01	35	34	35
R02	35	33	33
R03	35	31	31
R04	35	32	32
R05	35	28	29

Construction Noise and Vibration

Calculations of the noise impacts have been undertaken in accordance with the ISO9613 noise propagation algorithm at the most affected sensitive receiver locations. This is considered temporary noise from machinery and vehicle movements, including:

- Grader
- Wheel loader
- Trencher

- Vibratory post driver
- Mobile crane
- Hand power tools

The predicted construction noise impacts provided below identify that an exceedance of the noise management levels is likely to occur for receivers R01 and R02, with smaller exceedances predicted for receivers R04 and R05 during the preparation of solar farm site. No noise sensitive receivers have been identified to be highly noise affected by the proposed works.

Table 7 | Predicted standard hours work construction noise impacts LAeq,15min dB(A)

Receiver	Noise management level	Predicted level	Exceedance	Highly noise affected (exceedance)
Stage 1 – Preparation of solar farm site				
R01	45	72	27	75 (-)
R02	45	55	10	75 (-)
R03	45	42	-	75 (-)
R04	45	43	-	75 (-)
R05	45	46	1	75 (-)
Stage 2 – Solar panel post installation				
R01	45	57	12	75 (-)
R02	45	53	8	75 (-)
R03	45	45	0	75 (-)
R04	45	46	1	75 (-)
R05	45	47	2	75 (-)
Stage 3 – Installation of solar plant / BESS and associated electrical equipment				
R01	45	50	5	75 (-)
R02	45	46	1	75 (-)
R03	45	38	-	75 (-)
R04	45	39	-	75 (-)
R05	45	40	-	75 (-)

An assessment of the potential for vibration generation was also considered and it was concluded that surrounding sensitive receivers are very unlikely to exceed the vibration criteria or safe working distances.

Table 8 | Recommended indicative safe working distances for vibration intensive plant

Plant	Rating	Safe Working distances (m)	
		Cosmetic Damage	Human Comfort (AVTG)
Vibratory roller	<50 kN (Typically 1 – 2 tonnes)	5	15 – 20
	< 100 kN (Typically 2 – 4 tonnes)	6	20
Small hydraulic hammer	300 kg, typically 5-12 tonne excavator	2	7
Medium hydraulic hammer	900 kg, typically 12-18 tonne excavator	7	23
Large hydraulic hammer	1600 kg, typically 18-34 tonne excavator	22	73
Vibratory pile driver	Sheet piles	2 – 20	20
Jackhammer	Hand held	1	Avoid contact with structure and steel reinforcements

Any impact associated with construction activities are short term and limited to standard construction hours in accordance with Council and EPA requirements. The contractor, where reasonable, will implement and apply best practice noise practices including:

- Maximising the offset distances between plant items and nearby noise receivers
- Preventing noisy plant working simultaneously and adjacent to sensitive receivers
- Minimising consecutive works in the same site area
- Orienting equipment away from sensitive noise sensitive areas
- Carrying out loading and unloading away from noise sensitive areas
- Undertaking works in accordance with standard hours of operation

Noise and vibration impacts have been considered during construction and operation of the proposal. Construction activities are expected to create some minor noise disturbance however, these are temporary in nature and will be managed by the contractor to mitigate impacts.

Once the works are complete, noise from operation of the proposal has been predicted to be compliant with relevant noise thresholds and no mitigation measures are necessary.

5.6. Soils and Erosion

The capability of the land was assessed utilising the Land and Soil Capability Mapping for NSW. This mapping system grades land in a scale from 1-8 with 1 indicating slight to negligible limitation, and 8 indicating extreme limitations. The entirety of the subject land, including the development area is located with land capability class 3, indicating “moderate limitations.” Given the scale of the facility and the minimal ground disturbance, the loss of agricultural value will be minimal and temporary. The nature of the array will leave the majority of the impact area undisturbed.

5.7. Biodiversity

The site is comprised of exotic grasslands with some small areas of native groundcover along the existing fence lines. Field surveys were conducted by Biodiversity Australia to assess any impact associated with the proposal and a BAR was subsequently prepared.

The ToS concluded that the development is unlikely to result in a significant impact on threatened species or ecological communities due to the intensive historical agricultural usage of the land and absence of native vegetation and habitat features. A BDAR is not required as the vegetation zones containing native vegetation does not exceed 0.1ha and the ToS assessment confirms that no further assessment is necessary.

Accordingly, no mitigation measures have been recommended.

5.8. Stormwater

The proposal is not expected to generate significant stormwater impacts, as noted by JCA Land Consulting for their Stormwater Plan provided with this report, as the majority of the site will remain permeable. With the application of standard erosion and sediment control measures, and careful design of access tracks and infrastructure, stormwater will be managed effectively within the site. The development therefore complies with Council and DCP requirements for water quality and drainage.

A Stormwater Plan has been prepared by JCA Land Consulting which accompanies this report.

5.9. Visual Impact

The visual impact of solar farms depends on the scale and type of infrastructure, the prominence and topography of the site relative to the surrounding environment; vegetation; and any proposed screening measures to reduce visibility of the site. In this instance, the proposal represents a small-scale facility and has been proposed within an area of the site that maintains significant separation distances from the main road frontage and neighbouring dwellings.

Generally, solar panels will not create significant glare compared with other commonly existing surfaces. Likewise, photovoltaic solar panels are generally less reflective than other naturally occurring elements such as soils and crops.

The development will result in the placement of new solar panels and other aboveground infrastructure within a generally open landscape and presents risks to visual amenity.

The character of the landscape is predominantly an open modified agricultural landscape that has been shaped by farming and contains only scattered patches of native vegetation and other planted perimeter fencing. The landscape is very flat, with no areas of elevated viewpoints towards the site.

Further assessment and analysis can be found in the Visual Impact Assessment completed by Yonder Landscape Architecture which is attached.

5.10. Landscaping

Further to the discussion above in relation to visual impacts, the proposal includes landscape buffers to screen and soften the development. 3m wide screening is proposed along Briggs Road and 5m wide screening is proposed along the site's boundary of Murrarn Road and part of the internal access road. The landscaping is proposed to be constructed around the lease area boundaries inside the proposed security fence. The landscaping areas are intended to reduce visual impacts from sensitive receivers and the adjacent Murrarn Road.

The proposed landscape outcome is intended to enable a long-term landscaping solution and is detailed in the accompanying Landscape Plan.

5.11. Glint and glare

Glint refers to the momentary flash of bright light that can be caused by the reflectivity of solar panels and glare refers to the continuous source of light and is generally associated with stationary objects. Glint and glare from PV panels can have potential safety or amenity impacts to surrounding sensitive receivers, including potential to impair observers through inducing an after image.

A Glint and Glare Assessment was carried out using the Glare Gauge modelling tool by Forge Solar (attached). This is an industry standard technical modelling tool, which utilises the Solar Glare Hazard Analysis Tool (SGHAT) developed by Sandia National Laboratories, to assess the potential glare to receptors around solar arrays. The Glint and Glare Assessment is included attached.

The tool enables the proposed solar facility to be mapped along with relevant data inputs and then uses the data to consider the potential for temporary after-image or more significant retinal burn. In summary, red glare refers to potential for permanent eye damage from the observation location, yellow glare indicates the potential for after image effects and green glare refers to low potential for after image impacts.

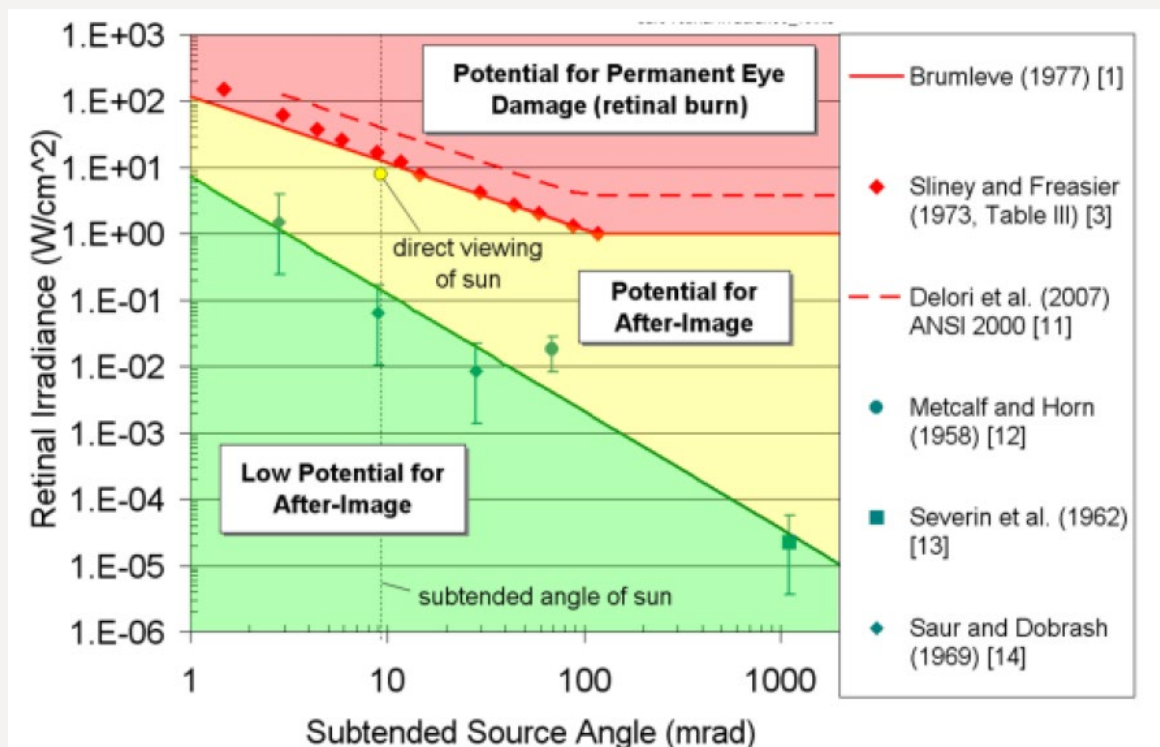


Figure 13 | Summary of Potential Glare Impact

As construction of PV panels primarily utilises glass and steel there is a perception of glint and glare from the reflectivity of solar panels. This leads to potential issues of distractions to motorists, aircraft and eye damage.

Generally, solar panels will not create significant glint or glare compared with other surfaces. PV panels are designed to collect sunlight to convert to energy and therefore absorb the majority of light received. The panels are designed using anti-reflective coatings during manufacture to reduce reflection and will typically absorb 80-90% of the light received.

The angle of incidence of the sunlight is also relevant in considering the reflection of solar development. A fixed axis solar facility will have panels that do not move throughout the day and therefore the angle incidence varies with the time of day. A tracking system, such as that proposed for this development, will follow the sun through the day and can have the angle of incidence reduced.

The results of the modelling for this development indicates that there will be no glare on the surrounding sensitivity receivers of paths. This is achieved because the panels will be single axis trackers and will follow the sun through the day and the proposed tracking system will be configured not to 'back-track'.

'Backtracking' refers to the process where the panels revert a flat resting position after sunset (when the sun left the angle of rotation of the panel) until sunrise (when the panel was in the angle of rotation of the panels). This outcome generally results in glare to surrounding properties as the panels would 'reset' to flat in the late evening and early morning. The configuration of this facility will be that at the end of the day, panels will remain fixed at 60 degree tilt facing west and will rotate back to 60 degrees facing east only when the sun is within the angle of rotation in the morning.

Landscaping is proposed in accordance with the accompanying landscape plan to the perimeter around the PV array around all boundaries. This will contribute to minimising potential for impacts from glare at these modelled locations. The analysis algorithm does not consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc. This means that any vegetation or obstructions (existing or proposed) that may prevent glare are not assessed.

5.12. Natural Hazards

The subject land is not mapped as being in a flood prone area or bushfire prone area. It is considered that no further assessment or mitigation measures are necessary.

5.13. Electro-magnetic radiation

The generation and use of electricity can produce extremely low frequency electro-magnetic fields (EMF). According to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA), which is the department which oversees emerging research into the potential health effects of EMF exposure, there is no established evidence of health effects from exposure to electric and magnetic fields from powerlines, substation, and other electrical sources, regardless of proximity.

The location of the proposed solar facility is considered appropriately separated from the nearby adjacent dwellings. No further mitigation measures are proposed.

5.14. Safety and Security

Safety and security have been considered in the design and management of the site. Public access to the development is not permitted, ensuring controlled and secure use. The site is enclosed with existing rural fencing, which provides a physical barrier to unauthorised entry. In addition, appropriate signage will be installed to reinforce site boundaries, indicate restricted access, and support ongoing safety and security measures.

5.15. Waste

The proposal will generate waste predominantly during the construction phase that would typically include off cuts, excess construction material and domestic and putrescible waste (including food waste, bottles, cans and paper). The primary waste will likely result from the establishment and construction works of the facility and installation of the arrays. It is not anticipated that the works will generate substantial amounts of waste providing that the appropriate management and mitigation measures are implemented. Any waste produced through the construction stage will be collected and appropriately stored on site and disposed at a facility which can lawfully accept the waste material produced.

It is expected that the solar farm will be operational for at least 20 to 25 years. Waste generated during operation of the facility is expected to be relatively low given the minimal occupation of the facility and the nature of the proposed activities. Operational waste is anticipated to include occasional waste generated by staff on the site and any excess materials used during management and maintenance works. On site waste storage bins will be provided and collected as required by waste removal contractors.

Upon decommissioning all infrastructure, including cabling and panels and mounting frames including footings and inverters would be disassembled and removed from the site.

A preliminary Waste Management Strategy is set out in Section 3.3 within this report.

5.16. Air-quality

The construction processes of the proposed solar farm will not involve substantial earthworks and only small-scale excavation for footings, ancillary structure including the substation, and for the establishment of an unsealed perimeter road. Other ground disturbance may result from the passage of large vehicles for the delivery of the panels and driving machinery for the array footings.

Dust emissions may be generated as a result of earthwork activities, particularly during dry and windy conditions. Excessive dust generation may impact the amenity of surrounding properties and be detrimental to human health. Some of the environmental factors that must be considered when evaluating the risk of dust generation are the following:

- Soil type & structure – clay content influences the expected dust generation, with higher percentages correlating to decreased dust generation. Degradation of soil structure increases dust generation.
- Soil moisture – wetter soil decreases dust generation.
- Rainfall – as well as contributing to soil moisture, it also influences the potential suspension and drift of dust particles.
- Wind direction and speed – determines the potential drift and direction of dust particles.

These environmental factors will be monitored for each of the construction and operational stage of the development.

The rate of dust generation from the land once the facility is operational is expected to reduce from the former agricultural use due to there being less ground disturbance required for the operation of the facility.

The following mitigation measures are proposed to minimise dust generation for the construction and operational stages of the development:

During Construction:

- Minimise vehicle movements to defined paths and laydown areas.
- Suppress dust emissions using watering carts, spraying water to suppress dust as required.

- Daily monitoring of weather conditions and pause works during dry and windy weather.
- Construction will cease and be rescheduled if monitoring identifies windy weather in excess of 40-50km/hr
- Minimise the driving of the footings of the arrays through an appropriately designed layout.
- Ensure stockpiles of excavated material is bunded and protected from wind and vehicle movements
- Enforce an on-site speed limit of construction and contractor vehicles to limit vehicle dust generation
- Construction vehicles will be washed down, using on-site facilities, to minimise the transportation of mud and dirt onto roadways
- Any dirt that has tracked onto the adjacent roadway, from construction vehicles, will be cleaned and appropriately disposed of within 24 hours
- Visual inspection of the construction areas will be undertaken by the HSE Coordinator and construction personnel to identify any potential management issues.

During Operation:

- Provide training as a part of site induction process to educate employees and contractors of air quality management.
- Regular monitoring of dust generation rates to ensure that low levels
- Revegetation and regeneration of site with appropriate ground cover species.
- Ensure all plant, storage areas and equipment are contained within a designated graded area.
- Grade and add gravel base to accessways and circulating roads, where appropriate.
- Ensure monitoring and maintenance protocols for the internal road network is followed to reduce dust generation
- Enforce a maximum speed limit on the internal road network to ensure operational traffic generates minimal dust.

The implementation of these mitigation measures will ensure that the impacts on air quality from dust generation is minimised. Throughout the construction and operational stages, the success of these measures will be monitored and reviewed as required.

5.17. Social and Economic Impacts

The social and economic impacts were anticipated based on the existing value of the land, and the anticipated social and economic effects which the facility will have. These impacts may result from the construction, operation and decommissioning of the facility.

The anticipated potential impacts are as follows:

- Alteration of rural landscape character and visual amenity, noise levels and air quality.
- Increase in traffic on roads from construction and delivery vehicles.
- Increased employment opportunities and ongoing benefits to local businesses and suppliers.

The proposed facility will generate employment opportunities and opportunity for business with local suppliers. This will bring economic benefits to the local economy through wages and contracted payments, and other indirect benefits to the Leeton region for accommodation and other businesses.

The decommissioning of the facility will restore the agricultural use of the land. It will be ensured that the arrays, other infrastructure and fencing will be appropriately removed to avoid inhibiting any future farming practices.

Resources and labour will be sourced locally from within the Leeton LGA as much as possible.

Overall, the land will assist towards goals to reduce emissions nationwide relating to climate change. It will also assist towards supplying land within the LGA with electricity, further contributing to its capacity and electrical infrastructure.

5.18. Suitability of the Site

The location of the proposed development has been carefully selected based on its suitability, taking into account key factors such as physical constraints, topography, drainage, surrounding land uses, and site access. As demonstrated in the accompanying plans, the scale, context, and density of the proposal have been considered and informed the final design of the development.

5.19. The Public Interest

The public interest is a broad consideration relating to many issues and is not limited to any one issue. Considering the full range of matters for consideration under Section 4.15C of the Environmental Planning and Assessment 1979 (as discussed within this report), it is considered that approval of the application is consistent with the public interest.

The development of land in an orderly and economic way is in the public interest.

6. Conclusion

This DA seeks approval for a 4.998 MW electricity generating works facility with associated infrastructure, including single-axis tracker solar arrays and a 10 MWh Battery Energy Storage System (BESS) at Lot 109 DP751703, addressed as 125 Briggs Road, Stanbridge NSW 2705.

The application seeks development consent under Part 4 of the EP&A Act and has been assessed against the provisions of Section 4.15(1) of the EP&A Act.

As demonstrated by the detailed assessment above, the proposal satisfies the intent of the provisions of the applicable EPIs and will result in a positive development outcome in terms of social, environmental, and economic impacts.

The site has been selected due to its solar exposure and access to the electrical transmission network, with the proposal being of low-level environmental impact. The likely impacts of the development have been considered in this report and supporting documents and have been found to be acceptable subject to appropriate mitigation measures.

It is considered that the site is suitable given the general rural context and minimal development in the immediate surrounds. The flat profile of the land will enable the facility to have minimal impacts on nearby dwellings and urban development. The site is also flat, free of development constraints and is accessible to large delivery vehicles during the construction phase and convenient for ongoing management and maintenance.

Having regard for the content of this report, the proposal deserves the support of Council because:

- it is consistent with the relevant environmental planning instruments and development control plan;
- it will contribute to reducing greenhouse gas emissions by generating clean, renewable energy;
- the battery storage system will assist in enhancing grid stability by storing excess energy for use during peak demand periods, improving energy reliability and efficiency;
- it will promote regional economic development through job creation during construction and ongoing maintenance; and
- it will demonstrate a commitment to sustainable infrastructure and innovation in energy solutions.

In light of the above considerations, it is our opinion that the proposal is appropriate from a planning point of view and is in the public interest. The proposed development warrants support by Council.

LEGEND

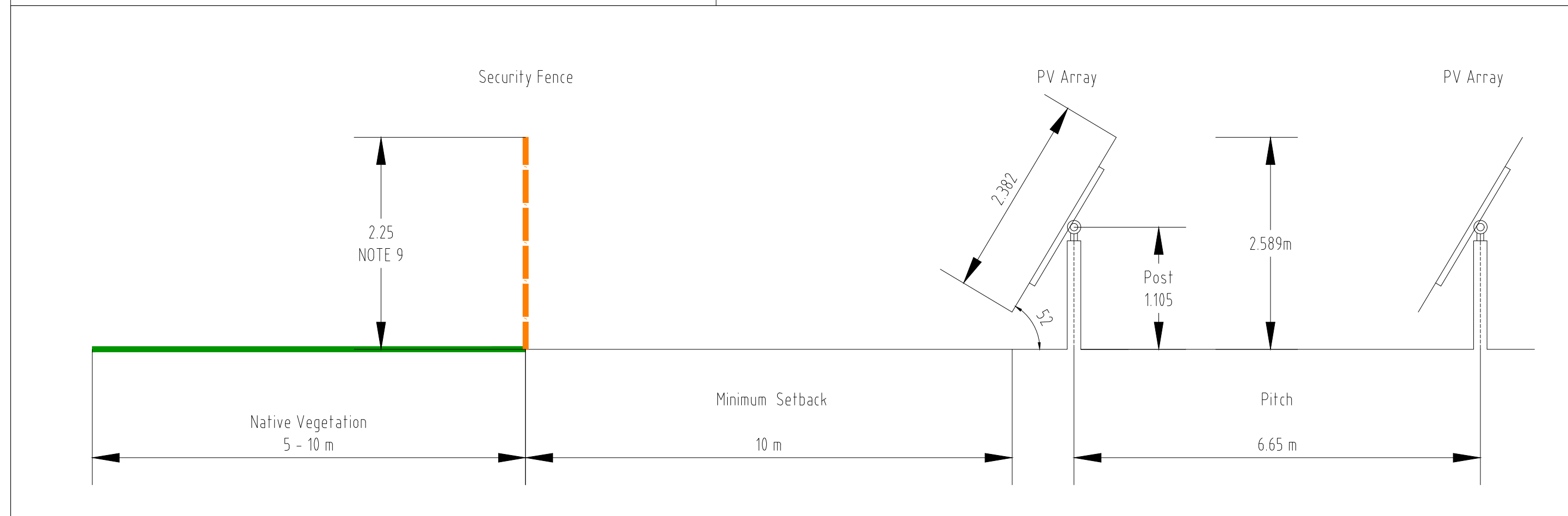
FENCE	
UNDERGROUND ELECTRICAL	
EASEMENT	
ROAD	
FIREBREAK ZONE & SETBACK	
PV TRACKER TABLE	
VEGETATION SCREEN	
LAYDOWN AREA	
OVERHEAD ELECTRICAL	
DESIGNATED DC CROSSING PATH	

NOTES

1. MODULES ARE SETBACK 10 METRE MINIMUM FROM SECURITY FENCE,
2. INTERNAL ACCESS ROADS. FOR DETAILS REFER TO CIVIL DESIGN
3. TRACKER CONFIGURATION (1 PANEL IN PORTRAIT) AND ROW SPACING OF 6.65m
4. ACCESS TRACKS ARE INDICATIVE ONLY. REFER TOP CIVIL DESIGN
5. PROPOSED ACCESS TRACK TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH FIRE AUTHORITY SOLAR FACILITY GUIDELINES
6. SITE ENTRANCE GATES DETAILS REFER TO FENCING DESIGN
7. LAYDOWN AREA TO BE DESIGNED FOR STORAGE OF HEAVY EQUIPMENT SUCH AS THE INVERTER STATION TRANSFORMER.
8. POINT OF CONNECTION, REFER TO LEVEL 3 DESIGN
9. FENCE HEIGHT REFER TO FENCING DESIGN
10. ESSENTIAL ENERGY ACR IS TO BE INSTALLED ON NEW POLE, EASEMENTS ARE TO ACQUIRED BY THE PROPONENT
11. NEW OVERHEAD CABLE TO BE INSTALLED BY ESSENTIAL ENERGY INSIDE 10 METRE EASEMENT LOCATED INSIDE BOUNDARY OF PROPERTY OWNER.
12. PV ARRAY OVERSIZED SO THAT OVERLOAD CLIPPING LOSSES ARE USED TO CHARGE THE DC COUPLED BESS
13. AS PER ESSENTIAL ENERGY DIRECTIONS, DC ARRAY CABLES ARE TO CROSS THE OVERHEAD EASEMENT AT A MAXIMUM OF 2 LOCATIONS
14. ACCESS TO LOT 109 DP 751703 IS TO BE THROUGH SUITABLE DOUBLE ACCESS GATES AT ANY ENTRANCE TO THE SOLAR FARM SITE WITH ESSENTIAL ENERGY LOCK FITTED THAT ALLOWS HEAVY PLANT ENTRY FOR POSSIBLE FAULT AND MAINTENANCE PURPOSES.

SYSTEM CONFIGURATION	
MODULE DETAILS	JA SOLAR JAM66D45-620/LB (13,272)
STRING CONFIGURATION	28 PANELS PER STRING
TRACKER CONFIGURATION	1 PANEL IN PORTRAIT, 3 STRINGS PER TRACKER
ROW SPACING (PITCH)	6.65m
INVERTER	2 x SMA SC 2660 UP
MAXIMUM AC CAPACITY	4.998MW
POWER FACTOR	TBC
TOTAL DC CAPACITY	8.2MWp
BESS SIZE	10MWh

SETBACK DETAIL



APPROVED
Subject to compliance with the accompanying notice of determination conditions of:

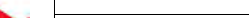
Development Application No: **DA 134-2025** Date: **3 July 2026**

LEETON
SHIRE COUNCIL

SITE LAYOUT

SCALE: 1:2000



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				CHECKED				MURRAMI ROAD, STANBRIDGE NSW 2705				A1
				VERIFIED				TITLE: SITE LAYOUT				
B	PV MODULE QTY ADDED	DA	27-03-25		BY	DATE		SHEET 1				REV
A	PRELIMINARY DESIGN	MAC	06-03-25	PRELIMINARY				SHEET 1		B		
REV	DESCRIPTION	BY	DATE									
								SHEET 1		SCALE		

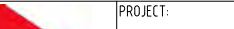
Subject to compliance with the accompanying notice
of determination conditions of:



LEETON
SHIRE COUNCIL



1. THE COLOURS AND FINISHES OF ALL BUILDINGS AND WORKS WILL BE NON-REFLECTIVE AND MATCHED, WHERE POSSIBLE, TO COLOURS PRESENT WITHIN THE SURROUNDING LANDSCAPE TO MINIMISE VISUAL IMPACT
2. FENCE TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH RELEVANT STANDARDS – AS1725

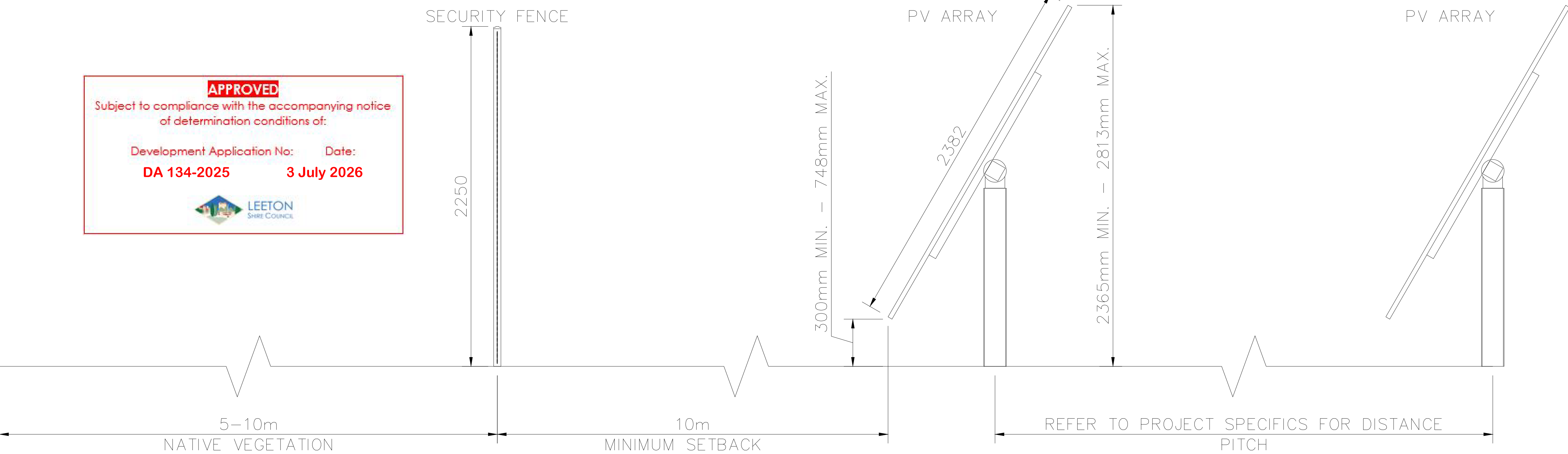
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D	UPDATED INTERMEDIATE POSTS TO DN50		MAC	26-08-25	CHECKED VERIFIED	BY DATE		PRELIMINARY	TITLE: TYPICAL FENCE LAYOUT AND ELEVATIONS	REV: D
C	ADDED NOTE REGARDING FENCE STANDARD		MAC	07-08-25						
B	MESH HEIGHT CHANGED TO 1800mm		MAC	20-05-25						
A	ORIGINAL ISSUE		MAC	24-04-25						
REV	DESCRIPTION	BY	DATE					JOB NO: BEANZ-STD	DWG NO: G21	SCALE: NTS

APPROVED

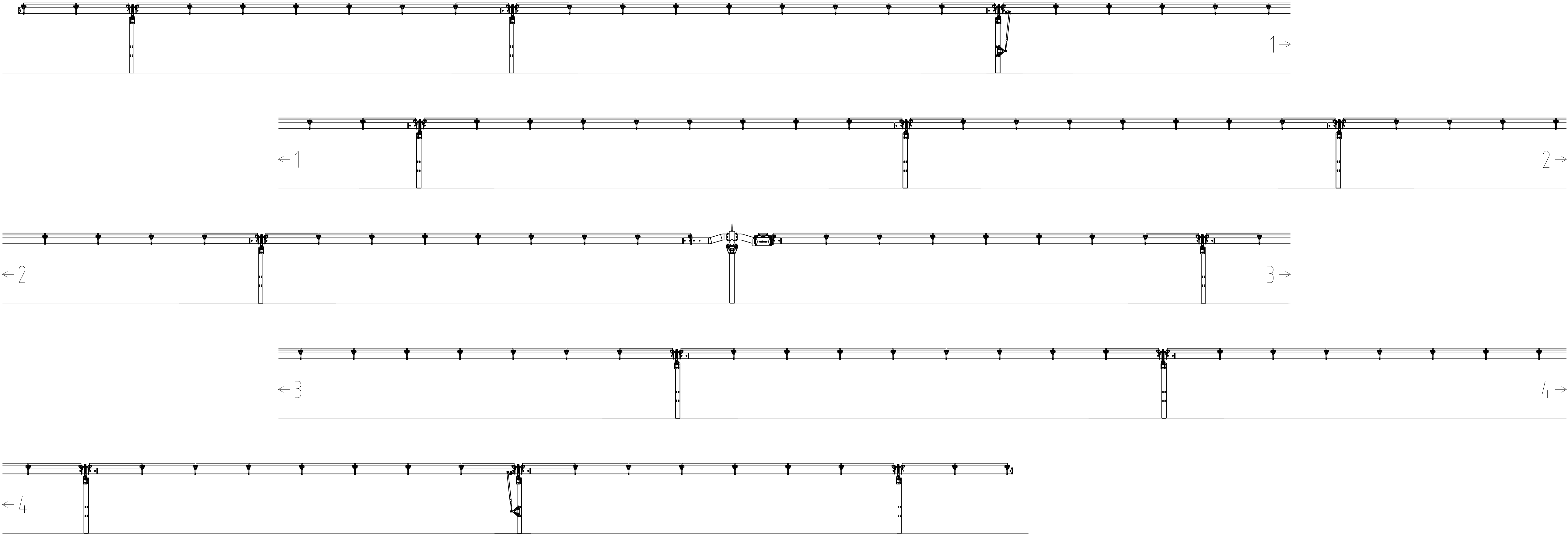
Subject to compliance with the accompanying notice of determination conditions of:

Development Application No: DA 134-2025Date: 3 July 2026

LEETON
SHIRE COUNCIL



PV ARRAY SETBACKS



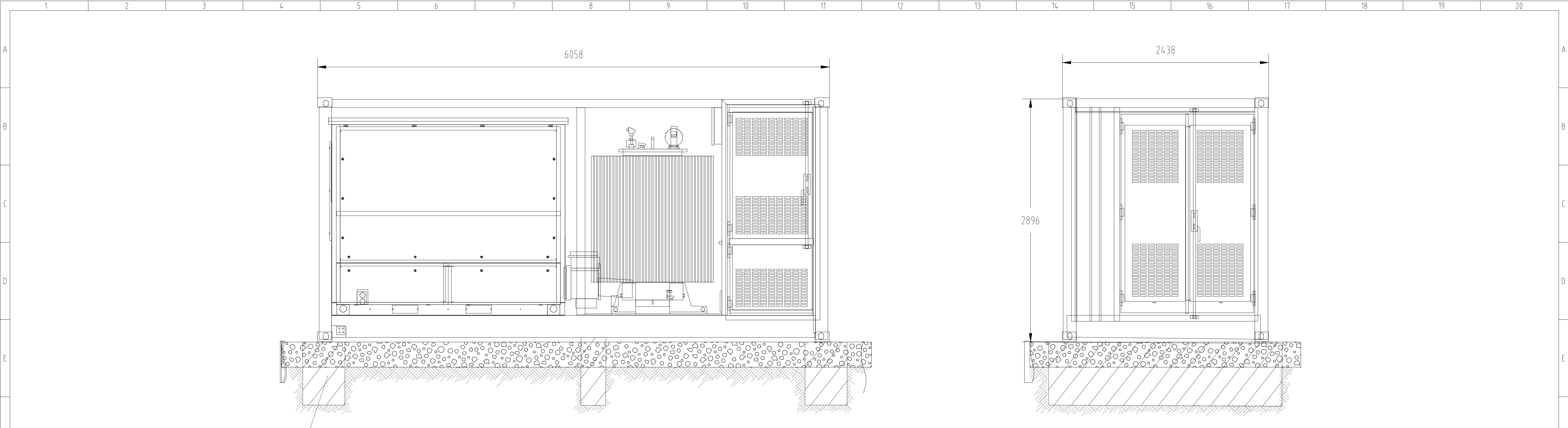
NOTES

1.

THE COLOURS AND FINISHES OF ALL BUILDINGS AND WORKS WILL BE NON-REFLECTIVE AND MATCHED, WHERE POSSIBLE, TO COLOURS PRESENT WITHIN THE SURROUNDING LANDSCAPE TO MINIMISE VISUAL IMPACT
2.

ADDITIONAL MINOR RAISE TO PILE HEIGHTS MAY BE REQUIRED IN SOMETRACKER LOCATIONS WHERE 1.100 AEP FLOOD LEVELS REQUIRE EXTRAHEIGHT CLEARANCES - LOCATIONS OF ADDITIONAL PILE HEIGHT (IF ANY) TOBE DETERMINED IN DETAILED DESIGN

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A	ORIGINAL ISSUE		MAC	24-04-25					LAYOUT AND ELEVATIONS		B
REV	DESCRIPTION		BY	DATE	PRELIMINARY			DWG No	BEANZ-STD	SCALE	NTS
2	13		14	15	16		17	18	19		20



APPROVED

Subject to compliance with the accompanying notice of determination conditions of:

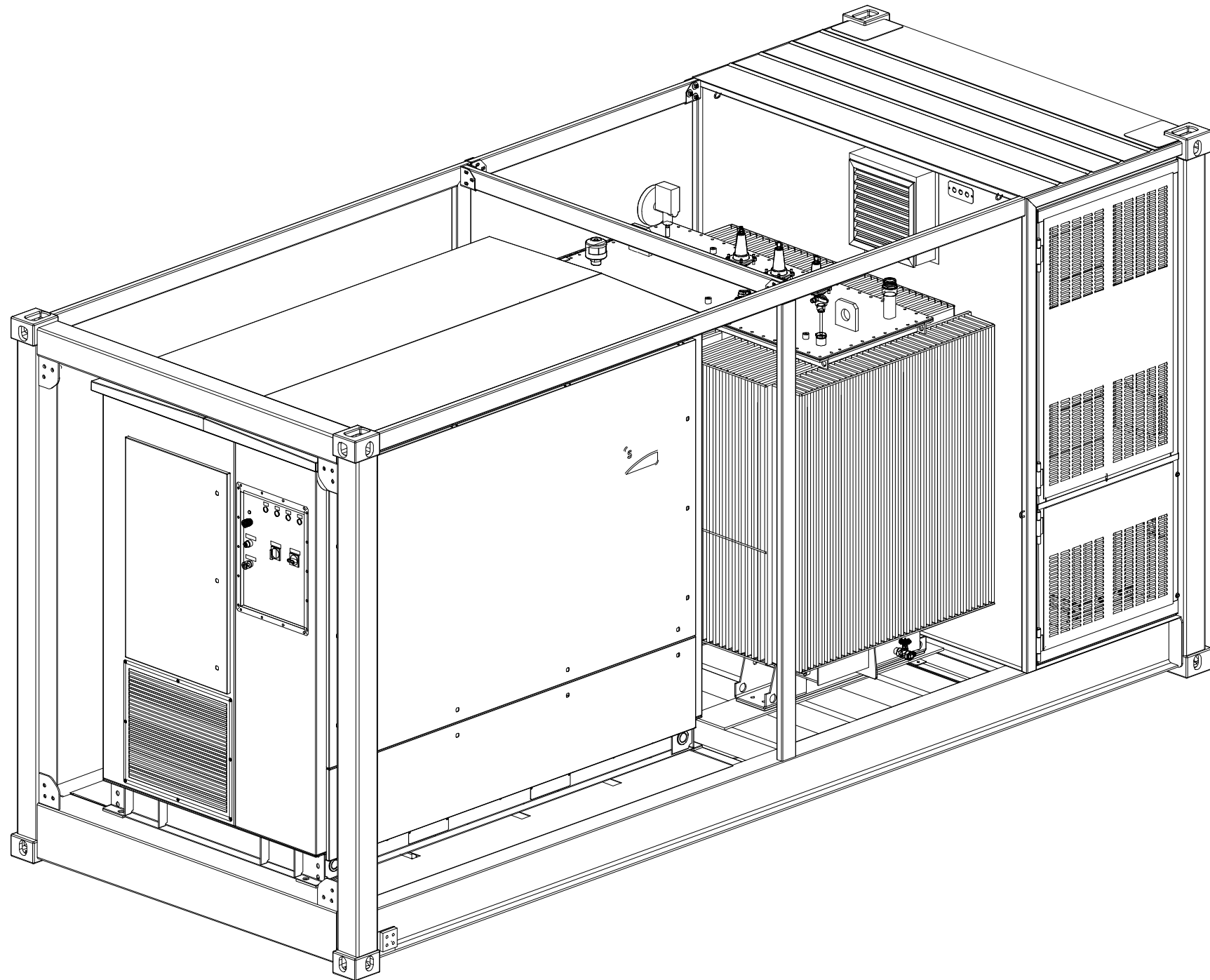
Development Application No: Date:

DA 134-2025 3 July 2026

LEETON
SHIRE COUNCIL

SIDE VIEW

FRONT VIEW



ISOMETRIC VIEW

NOTES

1.

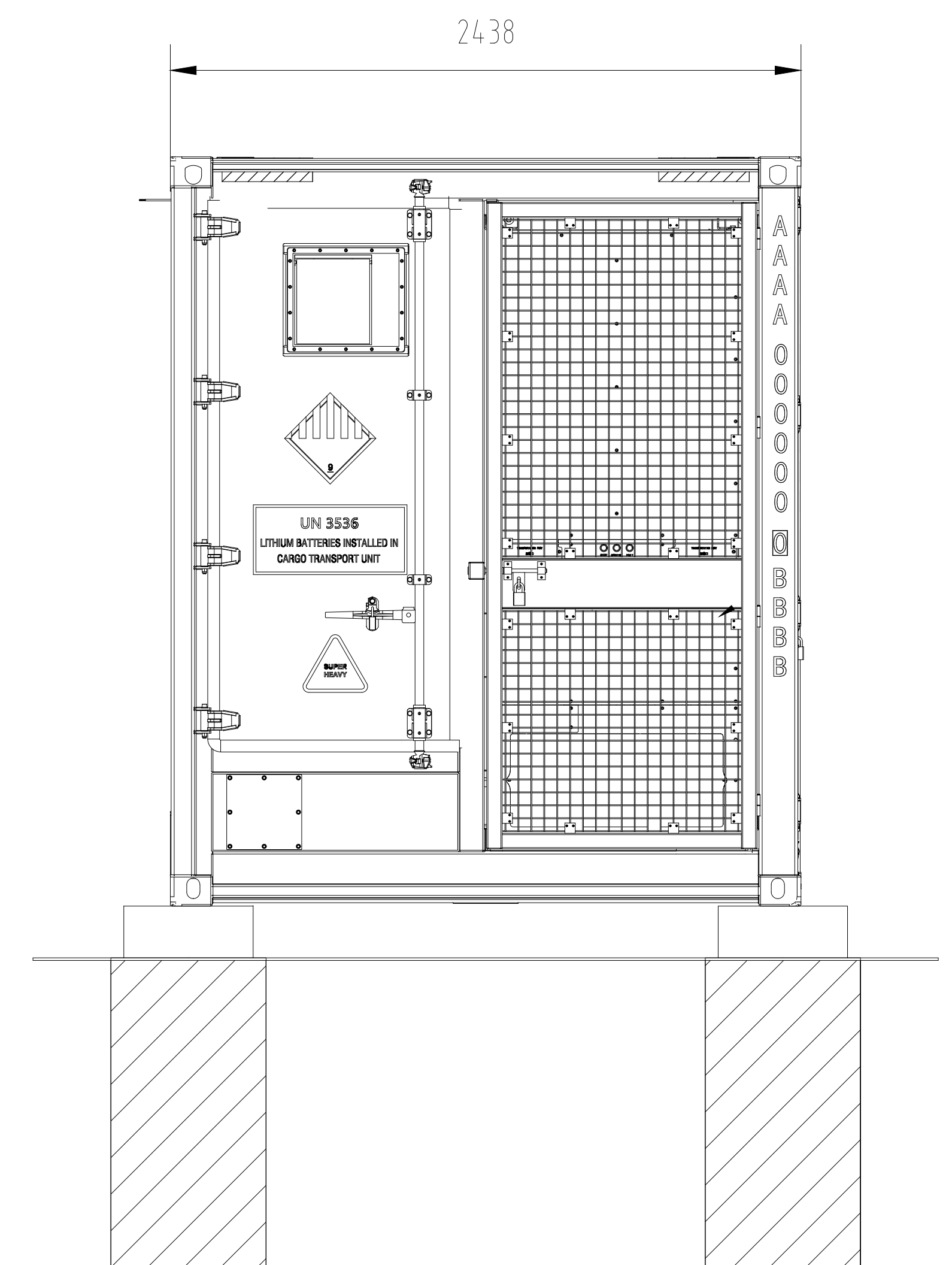
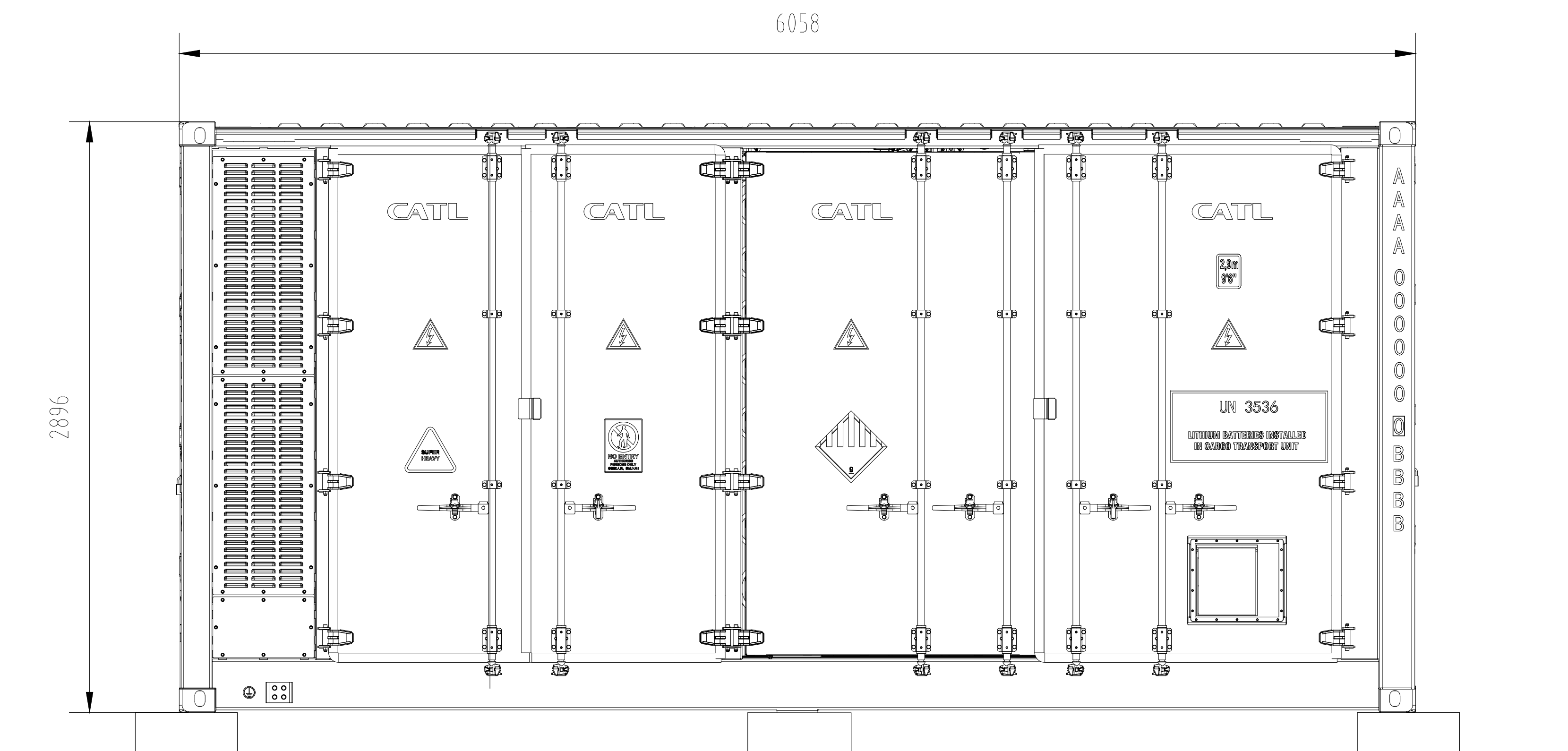
THE COLOURS AND FINISHES OF ALL BUILDINGS AND WORKS WILL BE NON-REFLECTIVE AND MATCHED, WHERE POSSIBLE, TO COLOURS PRESENT WITHIN THE SURROUNDING LANDSCAPE TO MINIMISE VISUAL IMPACT
2.

ADDITIONAL MINOR RAISE TO PILE HEIGHTS MAY BE REQUIRED IN SOMETRACKER LOCATIONS WHERE 1:100 AEP FLOOD LEVELS REQUIRE EXTRAHEIGHT CLEARANCES - LOCATIONS OF ADDITIONAL PILE HEIGHT (IF ANY) TOBE DETERMINED IN DETAILED DESIGN

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					VERIFIED				TITLE:	TYPICAL INVERTER	REV	
						BY	DATE		LAYOUT AND ELEVATIONS		A	
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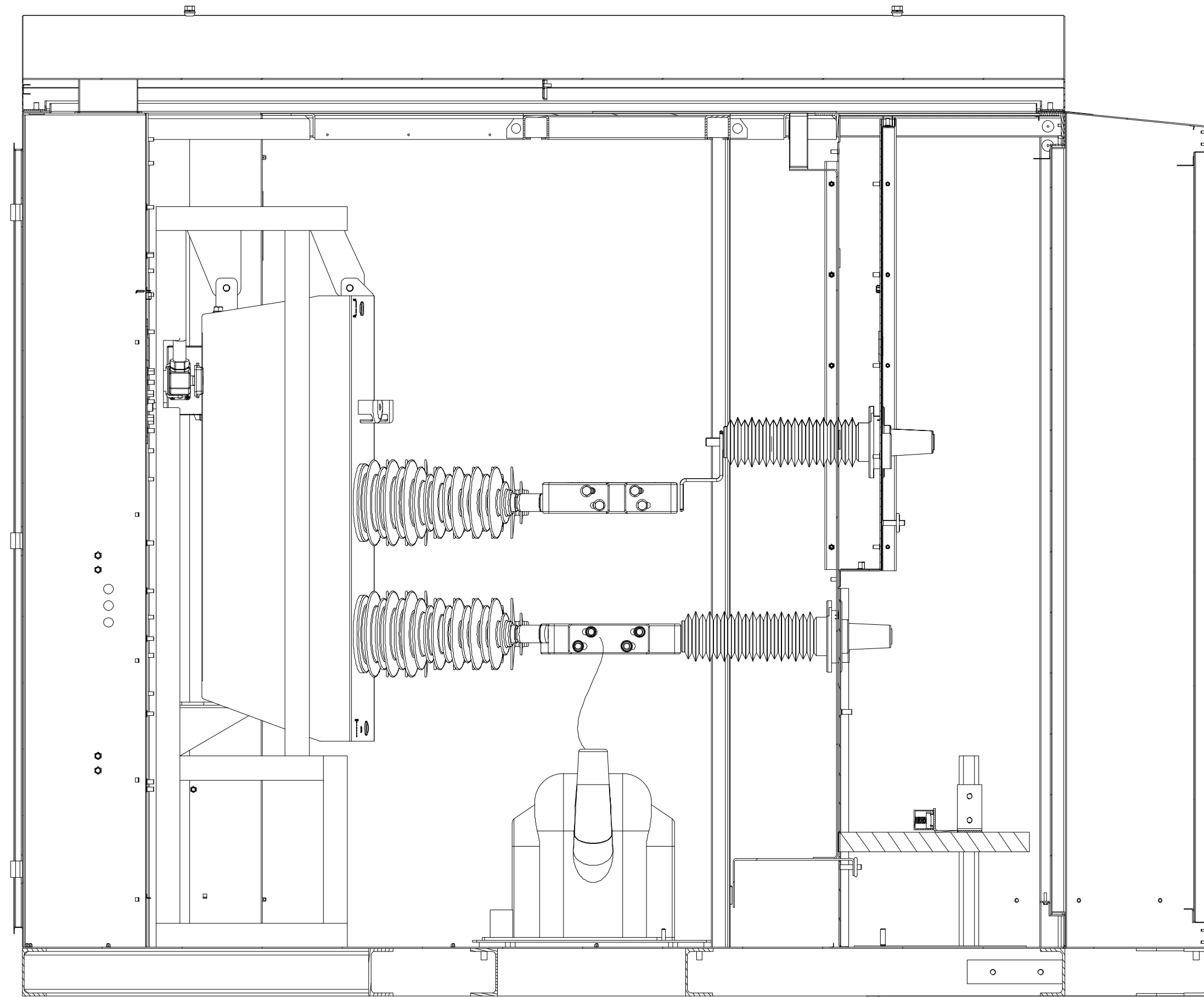
Subject to compliance with the accompanying notice of determination conditions of:

DA 134-2025 3 July 2026



1. THE COLOURS AND FINISHES OF ALL BUILDINGS AND WORKS WILL BE NON-REFLECTIVE AND MATCHED, WHERE POSSIBLE, TO COLOURS PRESENT WITHIN THE SURROUNDING LANDSCAPE TO MINIMISE VISUAL IMPACT
2. ADDITIONAL MINOR RAISE TO PILE HEIGHTS MAY BE REQUIRED IN SOMETRACKER LOCATIONS WHERE 1:100 AEP FLOOD LEVELS REQUIRE EXTRAHEIGHT CLEARANCES - LOCATIONS OF ADDITIONAL PILE HEIGHT (IF ANY) TOBE DETERMINED IN DETAILED DESIGN

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					CHECKED				TITLE	TYPICAL BESS			REV			
A	ORIGINAL ISSUE			MAC	24-04-25	BY	DATE		LAYOUT AND ELEVATIONS				A			
REV	DESCRIPTION			BY	DATE	PRELIMINARY										
12		13		14		15	16	17	18	JOB No.	BEANZ-STD	DWG No.	G27	SCALE	NTS	20



SIDE VIEW

LV CABLE ENTRY

8 - M12
MOUNTING
HOLES

BOTTOM
VIEW

HV Cable Entry

1510.0

990.0

990.0

300.0

1200 x 1200 x 900
CONCRETE PIT

APPROVED

Subject to compliance with the accompanying notice
of determination conditions of:

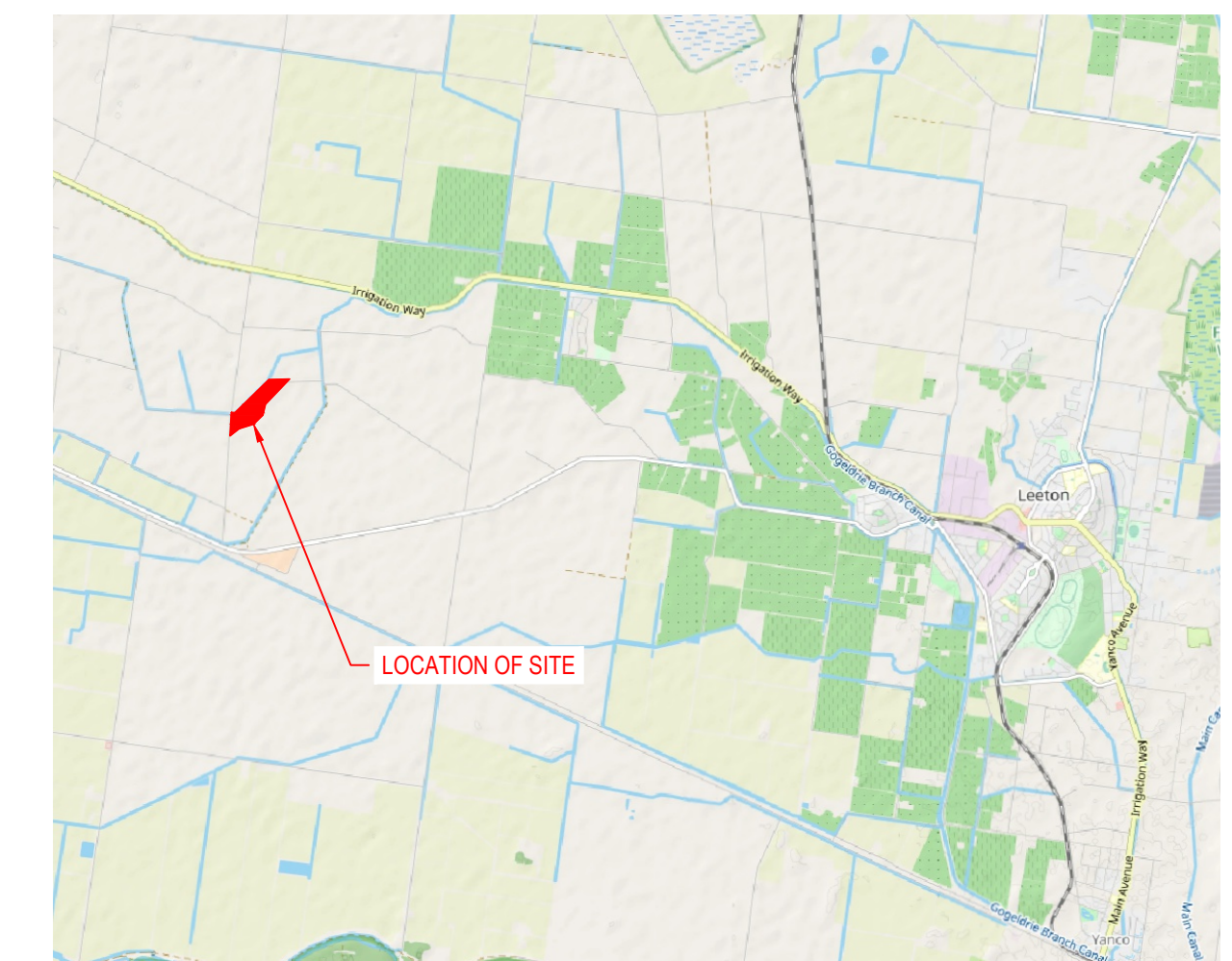
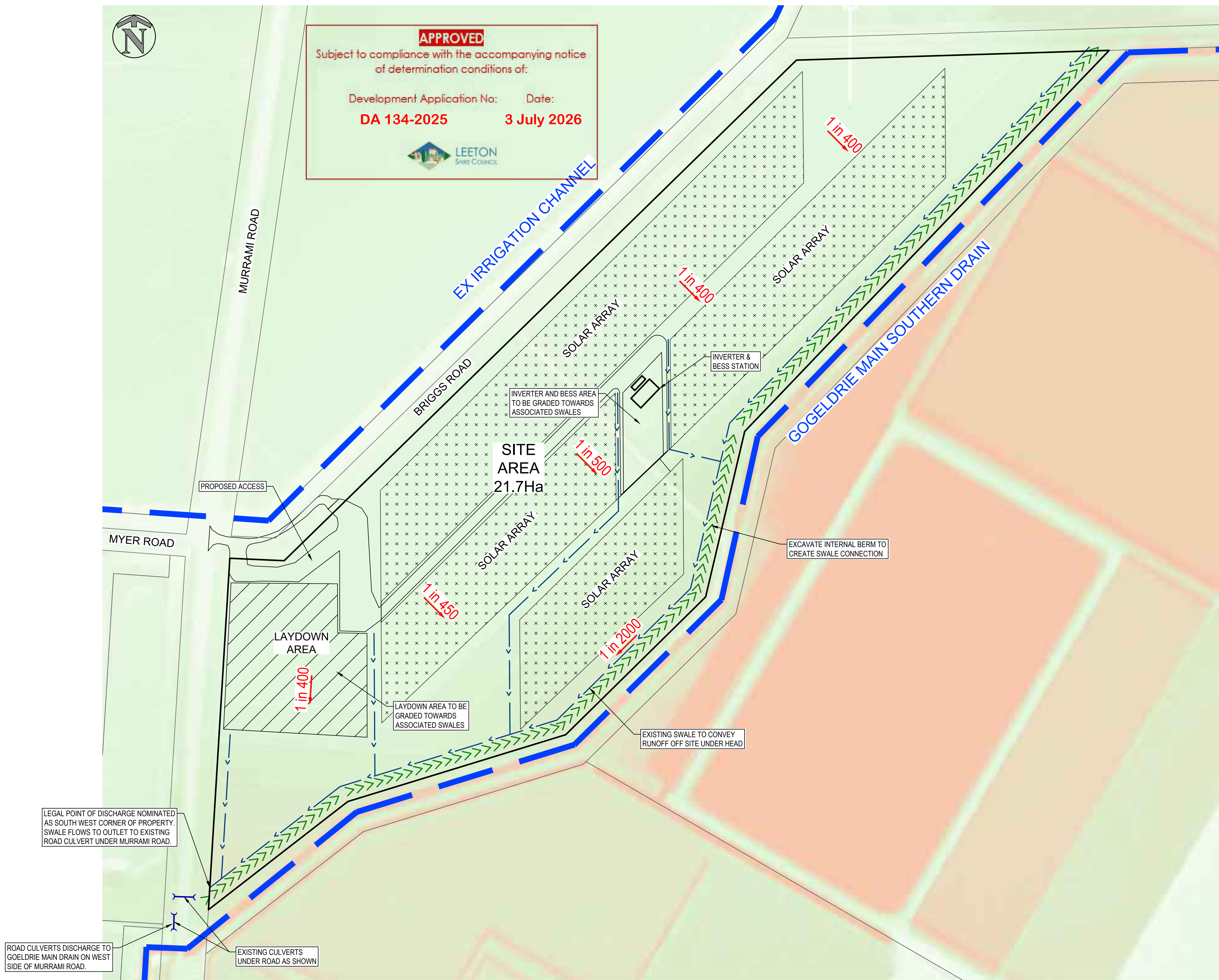
Development Application No: Date:
DA 134-2025 **3 July 2026**



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				VERIFIED				TITLE				REV
A	ORIGINAL ISSUE	MAC	23-06-25	BY		DATE	PRELIMINARY	TYPICAL HV SWITCH AND METERING KIOSK PIT LAYOUT AND ELEVATIONS				A
REV	DESCRIPTION	BY	DATE					DWG No:	BEANZ-STD	G28A	SCALE	NTS

STORMWATER MANAGEMENT PLAN

PROPOSED SOLAR FARM DEVELOPMENT - 125 BRIGGS ROAD, STANBRIDGE



 **LOCALITY PLAN**
SCALE - 1:100,000

STORMWATER MANAGEMENT PLAN

GENERAL

1. THE SITE CURRENTLY FALLS TOWARDS THE SOUTH-EAST INTO AN EXISTING SWALE DRAIN ASSOCIATED WITH THE PROPERTY. STORMWATER FLOWS THROUGH THIS EXISTING SWALE UNDER HEAD TOWARDS THE SOUTH-WEST CORNER OF THE LOT. THE STORMWATER IS THEN CONVEYED UNDER MURRAY ROAD WHERE IT CONTINUES SOUTH UNTIL IT JOINS WITH THE GOELDRIE MAIN SOUTHERN DRAIN.
2. THERE IS NO EXPECTATION IN AN INCREASE IN RUNOFF ASSOCIATED WITH THE INSTALLATION OF SOLAR PANELS ACROSS THE SITE AS THE STORMWATER FALLS ONTO THE EXISTING SURFACE AS IT WOULD HAVE PREVIOUSLY.
3. INVERTER AND BESS (BATTERY ENERGY STORAGE SYSTEM) AREA ASSOCIATED WITH THE PROPOSED ROAD AND LAYDOWN AREA TO GRADE TOWARDS THE PROPOSED SWALES AS SHOWN. IMPACT TO THE OVERALL SITE RUNOFF COEFFICIENT TO BE NEGLIGIBLE DUE TO THE OVERALL CATCHMENT RESPONSE TIME.

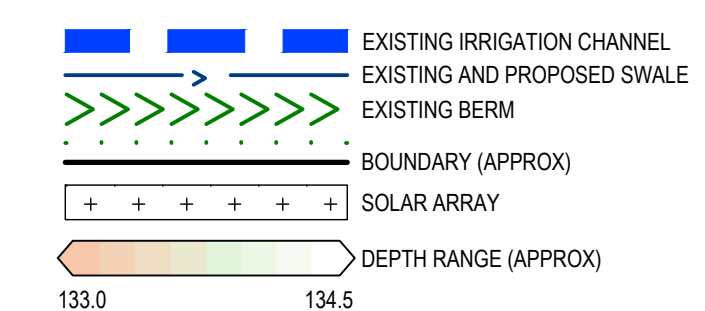
FLOOD STUDY

1. AS REPORTED AND SHOWN IN THE LEETON SHIRE FLOOD STUDY IN SEPTEMBER 2015, A FLOOD IMPACT IN THE 1% AEP STORM EVENT IS ONLY EXPECTED TO HAVE A DEPTH OF FLOODING ON THE SITE OF BETWEEN 0.00m TO 0.25m. AS SUCH IT IS RECOMMENDED THAT INVERTER AND BESS INFRASTRUCTURE ASSOCIATED WITH THE DEVELOPMENT IS SET ABOVE THIS FLOOD LEVEL TO THE SATISFACTION OF COUNCIL.
2. IT CAN BE REASONABLY EXPECTED THAT THE SWALE RUNNING ACROSS THE SOUTH-WESTERN BORDER OF THE SITE IS TO BE INUNDATED MORE FREQUENTLY AND FLOODING ALONG THIS BOUNDARY IS TO BE CONSIDERED REGARDING THE PROPOSED DEVELOPMENT LAYOUT.

REFER TO ELECTRICAL PLAN BY BISON ENERGY DATED 27th MARCH 2025

SHOWN IMAGE IS
FOR ILLUSTRATIVE
PURPOSES ONLY

LEGEND



SITE PLAN

SCALE - 1 :2000

WARNING BEWARE - UNDERGROUND SERVICES THE LOCATIONS OF EXISTING UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT DEPTH AND LOCATION SHOULD BE VERIFIED AND PROVEN ON SITE BY THE APPROPRIATE SERVICE PROVIDERS PRIOR TO ANY SITE EXCAVATION. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN. CONTRACTOR TO TAKE PRECAUTIONS TO AVOID CONFLICTS 		CAD FILE: 34004_SWMP.dwg DESIGNED: C. JONES CHECKED: B. SKIPWORTH DATE: 4th July 2025 DATUM AHD	SCALE:	PLAN STATUS: PRELIMINARY (NOT FOR CONSTRUCTION) PROPOSED SOLAR FARM DEVELOPMENT 125 BRIGGS ROAD STANBRIDGE STORMWATER MANAGEMENT PLAN	SHEET SIZE A1 VERSION 00 DWG No. 34004 SHEET No. 1 of 1			
						00	04-07-2025	ORIGINAL ISSUE
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						THE USE OF THESE DRAWINGS ARE ON THE BASIS OF THE PLAN STATUS ONLY. DRAWINGS SHOULD BE READ IN CONJUNCTION WITH ALL OTHER DOCUMENTATION. DRAWINGS ARE THE INTELLECTUAL PROPERTY OF JCA LAND CONSULTANTS. © - NO PORTION OF THESE DRAWINGS MAY BE REPRODUCED BY ANY PROCESS WITHOUT CONSENT.		

traverse



Traffic Impact Assessment (TIA)

Proposed Solar PV Facility & Battery Energy Storage System
125 Briggs Road, Stanbridge

Prepared for:
Bison Energy

Date:
10 November 2025

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Report Details

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D01	03/10/2025	Draft	J.McKenzie – RPEng (Civil)
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1 Introduction:

1.1 Purpose

Traverse Transport was commissioned by the Applicant, Bison Energy, to undertake a traffic engineering assessment of the proposed 5MW Solar photovoltaic (PV) facility and associated 11MWh Battery Energy Storage System (BESS) on the site at 125 Briggs Road, Stanbridge.

This Traffic Impact Assessment (TIA) has been prepared to accompany the development application to Council and is informed by site observations, traffic survey data, and relevant insights from comparable developments across Australia.

1.2 Reference Material

The following policies, guidelines, and standards have been considered in the preparation of this TIA:

- Austroads Guides (e.g., Traffic Management & Road Design series).
- Transport for NSW's Guide to Transport Impact Assessment (2024).
- RTA Guide to Traffic Generating Developments (2002).
- Local Planning Policies and Engineering Design Guidelines.
- Australian Standards (e.g., AS2890 series).
- Complementary TfNSW Supplement.

2 Existing Conditions:

2.1 Location and environment

The development site is located at 125 Briggs Road, Stanbridge, to the south-east of the Briggs Road and Murrumbidgee Road intersection. The site is positioned within Leeton Shire Council and approximately 15km west of Leeton and 45km south-east of Griffith. The site's location is illustrated in Figure 2.1.

Figure 2.1: Site Locality



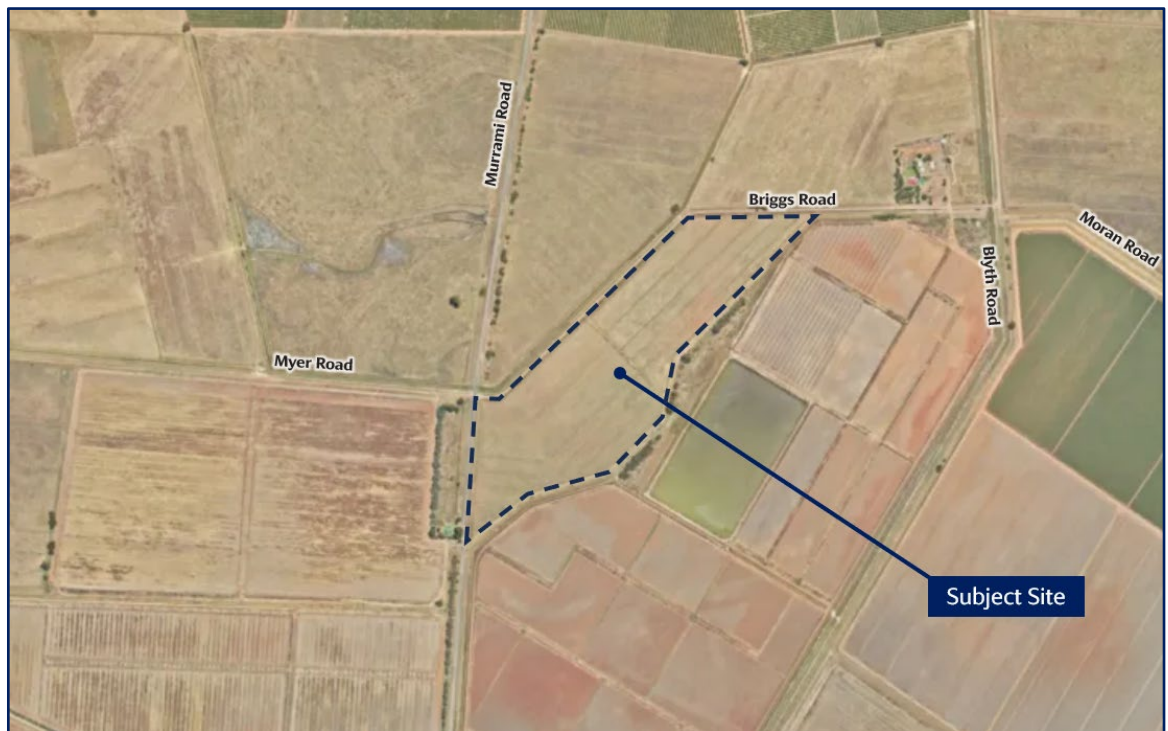
Source: [google.com.au](https://www.google.com.au)

The development site comprises a portion of the property at 125 Briggs Road, Stanbridge, located on the southern side of Briggs Road. The development site is irregular in shape with a frontage to Briggs Road to the north of approximately 980 metres, a frontage to Murrumbidgee Road to the west of approximately 320 metres and an area of approximately 23 hectares.

The site is subject to the Primary Production (RU1) land zoning and is currently used for agricultural purposes. No formal vehicular crossover is currently provided to the development site. Surrounding land use in the vicinity of the site is predominantly rural and agricultural land uses.

Figure 2.2 shows an aerial photograph of the subject site relative to its surroundings.

Figure 2.2: Aerial Photography



Source: <https://landchecker.com.au/>

2.2 Road Network

Briggs Road

Briggs Road is classified as a Local Road under the care and management of Council which essentially runs in an east to west alignment between Blyth Road in the east and Murrambi Road in the west. Briggs Road comprises an unsealed carriageway of approximately 5 metres in width and accommodates two-way vehicular movements. Briggs Road has a default speed limit applicable to a rural area of 100km per hour, and there are no pedestrian or cyclist facilities along Briggs Road.

Site photographs of Briggs Road proximate to the subject site are shown in Figure 2.3 and Figure 2.4.

Figure 2.3: Briggs Road (to the north-east)



Figure 2.4: Briggs Road (to the west)



Murrami Road

Murrami Road is classified as a Local Road under the care and management of Council which essentially runs in a north to south alignment between Malcolm Road in the north and Whitton Road in the south. Murrami Road comprises a sealed carriageway of approximately 8 metres in width and accommodates one lane of traffic in each direction. Murrami Road has a default speed limit applicable to a rural area of 100km per hour, and there are no pedestrian or cyclist facilities along Murrami Road.

Site photographs of Murrami Road proximate to the subject site are shown in Figure 2.5 and Figure 2.6.

Figure 2.5: Murrami Road (to the north)



Figure 2.6: Murrami Road (to the south)



Irrigation Way

Irrigation Way is classified as a State Road under the care and management of Transport for NSW (TfNSW). It essentially runs in an east–west alignment between Wamoon Avenue in the east and MacKay Avenue in the west. In the vicinity of the site, Irrigation Way consists of a sealed carriageway with a typical width of approximately 11 metres, comprising one traffic lane in each direction (each lane approximately 3.5 metres wide) with sealed shoulders on both sides of the road (approximately 2.0 metre wide).

Irrigation Way has a posted speed limit of 100km/hr, and there are no pedestrian or cyclist facilities along Irrigation Way proximate to the site.

Site photographs of Irrigation Way proximate to the subject site are shown in Figure 2.7 and Figure 2.8.

Figure 2.7: Irrigation Way (to the east)



Figure 2.8: Irrigation Way (to the west)



Whitton Road

Whitton Road is classified as a Local Road under the care and management of Council which essentially runs in an east to west alignment between Toorak Road in the east and Binyah Street in the west. Whitton Road comprises a sealed carriageway of approximately 7 metres in width and accommodates one lane of traffic in each direction. Whitton Road has a posted speed limit of 100km per hour, and there are no pedestrian or cyclist facilities along Whitton Road.

Site photographs of Whitton Road proximate to the subject site are shown in Figure 2.9 and Figure 2.10.

Figure 2.9: Whitton Road (to the east)



Figure 2.10: Whitton Road (to the west)



Briggs Road / Murrami Road / Myer Road Intersection

The intersection of Briggs Road / Murrami Road / Myer Road is a priority-controlled four-way intersection with priority given to motorists travelling in a north-south alignment along Murrami Road. No auxiliary turn lanes are provided for the intersection. The existing layout of the intersection of Briggs Road / Murrami Road / Myer Road is illustrated in Figure 2.11.

Figure 2.11: Briggs Road / Murrumbidgee Road / Myer Road Intersection



Irrigation Way / Murrumbidgee Road Intersection

The intersection of Irrigation Way and Murrumbidgee Road is a priority-controlled four-way intersection with priority given to motorists travelling in an east-west direction along Irrigation Way. The eastern and western approaches of the intersection provide auxiliary left-turn lanes for vehicles turning left from Irrigation Way into Murrumbidgee Road. The existing layout of the intersection of Irrigation Way and Murrumbidgee Road is illustrated in Figure 2.12.

Figure 2.12: Irrigation Way and Murrami Road Intersection



Whitton Road / Murrami Road Intersection

The intersection of Whitton Road and Murrami Road is a priority-controlled three-way intersection with priority given to motorists travelling in an east-west direction along Whitton Road. No auxiliary turn lanes are provided for the intersection. The existing layout of the intersection of Whitton Road and Murrami Road is illustrated in Figure 2.13.

Figure 2.13: Murrami Road and Whitton Road Intersection



2.3 Traffic Survey Data

Turning Movement Count Surveys

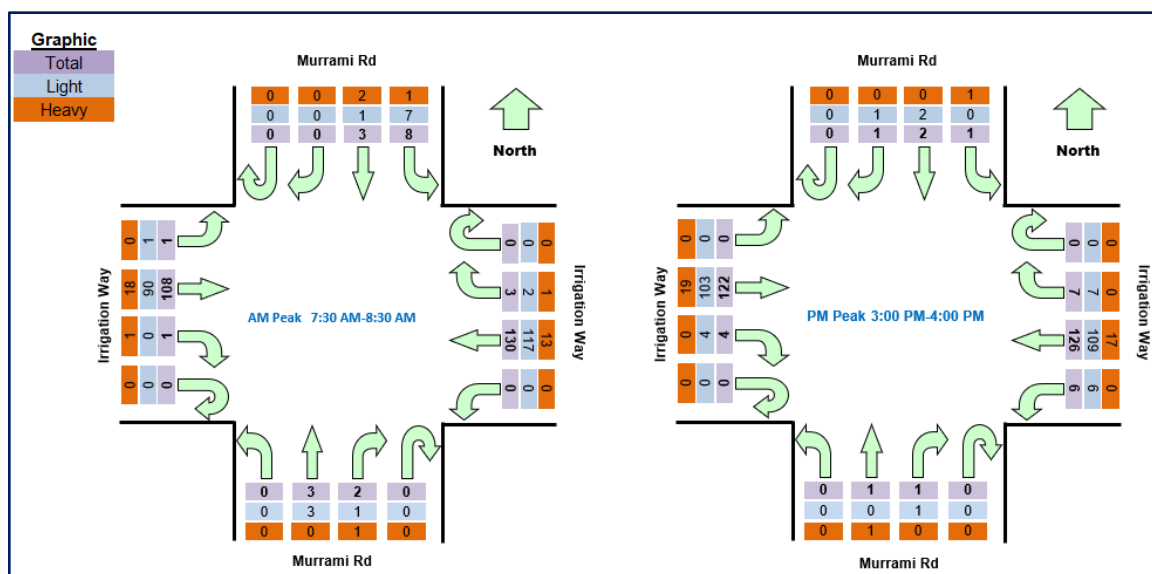
Peak period traffic movement counts were conducted at the key intersection of Irrigation Way and Murrumbidgee Road by Trans Traffic Survey Pty Ltd on Thursday the 11th of September 2025.

The survey periods were strategically selected to align with the network peak periods, as follows:

- **AM Network Peak Period:** 6:00am to 9:00am.
- **PM Network Peak Period:** 3:00pm to 6:00pm.

The peak hour surveyed volumes are shown in Figure 2.14.

Figure 2.14: AM Peak Hour Survey Volumes



In summary, traffic movement count surveys showed the following:

AM Peak Hour

- The AM peak hour occurred between 7:30am and 8:30am.
- There was a total of 259 vehicle movements travelling through the intersection in the AM peak hour.
- The dominant movement was westbound through movements along Irrigation Way with 130 vehicle movements.
- A total of nine vehicle movements were recorded travelling through the southern approach of the intersection (Murrumbidgee Road), comprising five departures and four arrivals.

PM Peak Hour

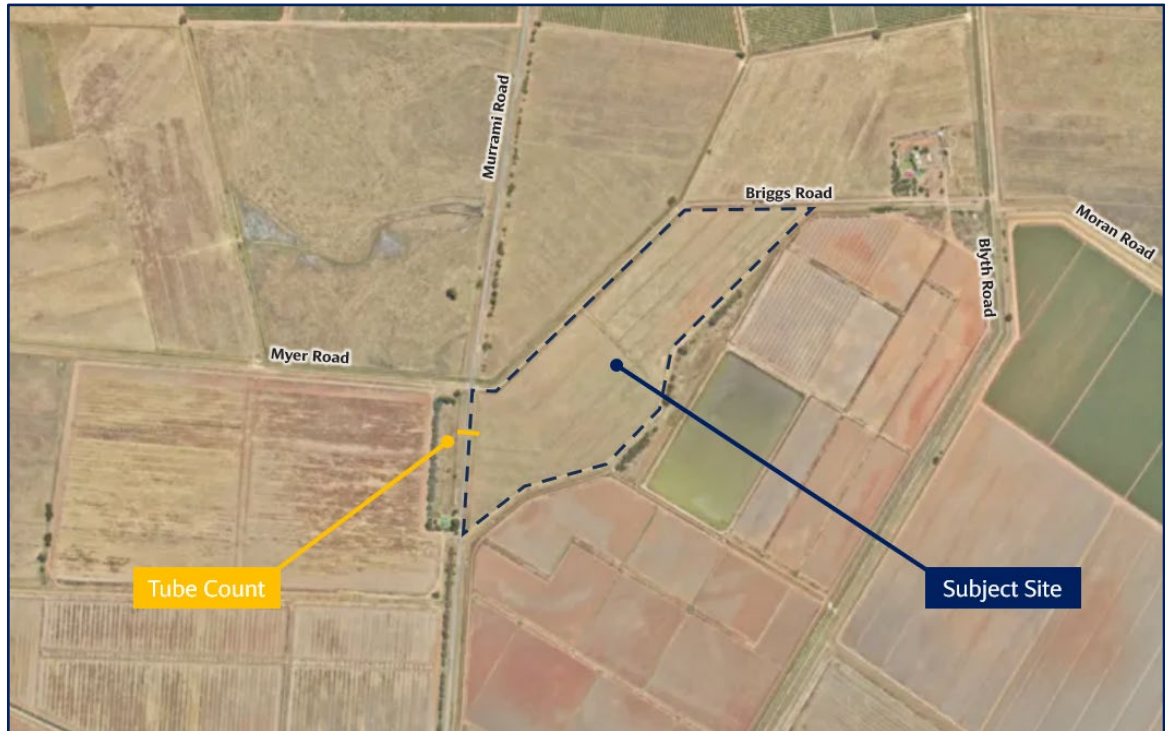
- The PM peak hour occurred between 3:00pm and 4:00pm.
- There was a total of 271 vehicle movements travelling through the intersection in the PM peak hour.
- The dominant movement was westbound through movements along Irrigation Way with 126 vehicle movements, however there was a relatively even distribution of through movements in the PM peak hour with 122 eastbound movements along Irrigation Way.
- A total of 14 vehicle movements were recorded travelling through the southern approach of the intersection (Murrumbidgee Road), comprising two departures and 12 arrivals.

In summary, the survey data collected in September 2025 indicates that the Irrigation Way and Murrumbidgee Road intersection was carrying a relatively modest volume of vehicular traffic, with particularly low traffic volumes accessing Murrumbidgee Road via the southern approach of the intersection.

Tube Count Surveys

To determine the existing traffic volumes along Murrami Road fronting the subject site, a weeklong tube count survey was also conducted by Trans Traffic Survey Pty Ltd from Saturday the 6th of September 2025 until Friday the 12th of September 2025. The tube was positioned across Murrami Road in front of the subject site, as illustrated in Figure 2.15.

Figure 2.15: Tube Count Survey Location



A summary of the data from the weeklong tube count survey is shown in Table 2.1.

Table 2.1: Tube Count Survey Data

Time Period	AM Peak Hour (vehicles per hour)	PM Peak Hour (vehicles per hour)	Daily Volumes (vehicles per day)
Saturday 6 September 2025	7	9	68
Sunday 7 September 2025	6	8	72
Monday 8 September 2025	8	9	78
Tuesday 9 September 2025	9	20	108
Wednesday 10 September 2025	5	11	67
Thursday 11 September 2025	8	11	83
Friday 12 September 2025	14	7	83

**Bold numbers represent the highest traffic volumes in the respective time period*

The following is noted from the tube count surveys:

- The AM peak hour volumes along Murrami Road fronting the subject site were up to 14 vehicles per hour.
- The PM peak hour volumes along Murrami Road fronting the subject site were up to 20 vehicles per hour.
- The daily volumes along Murrami Road fronting the subject site were up to 108 vehicles per day.
- The average vehicular speed recorded along Murrami Road across the entire week was 88km/hr. The 85th percentile speed recorded along Murrami Road across the entire week was 96km/hr.
- Light vehicles accounted for approximately 65% of total traffic on Murrami Road, with heavy vehicles comprising the remaining 35%.

The tube count surveys support the findings of the turning movement count, confirming that Murrami Road abutting the subject site currently carries a low volume of vehicular traffic at present, a result consistent with its road classification and rural setting.

2.4 Existing Intersection Operation

General

An existing conditions peak hour intersection analysis has been undertaken of the key intersection of Irrigation Way and Murrami Road, using the analysis program SIDRA Intersection. The surveyed volumes, shown in Figure 2.14, have been used in the following existing conditions SIDRA assessment.

The intersections of Murrami Road / Briggs Road / Myers Road and Murrami Road / Whitton Road currently experience very low traffic volumes, considerably lower than those at the intersection of Irrigation Way and Murrami Road. Site observations confirm that both intersections operate efficiently, with negligible queuing or delays. On this basis, a SIDRA Intersection analysis has not been undertaken for these intersections.

SIDRA Parameters

The key parameters used to determine the operational capacity of an intersection are queue length, average delay and degree of saturation (or volume to capacity ratio). Degree of Saturation (DOS) is a ratio of arrival (or demand) flow to capacity. DOS above 1.0 represent oversaturated conditions and a DOS below 1.0 represent undersaturated conditions. The operational rating associated with the DOS is summarised in Table 2.2.

Table 2.2: Rating of Degree of Saturation (DoS)

Degree of Saturation (DoS)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very Poor

The 95th percentile queue length is the value below which 95 percent of all observed cycle queue lengths fall, or 5 percent of all observed queue lengths exceed.

Average Delay is the average time, in seconds, that all vehicles making a particular movement can expect to wait at an intersection.

Existing Operation - Irrigation Way and Murrumbidgee Road Intersection

The results of the existing AM and PM peak hour SIDRA analysis are detailed in Appendix A and summarised in Table 2.3 and Table 2.4.

Table 2.3: Existing AM Peak SIDRA - Irrigation Way / Murrumbidgee Road Intersection

Approach	Movement	AM Peak Period		
		DoS	95%ile Queue	Ave. Delay
Murrumbidgee Road (S)	Left	0.009	0.3	5.8
	Through	0.009	0.3	6.5
	Right	0.009	0.3	10.2
Irrigation Way (E)	Left	0.039	0.0	5.5
	Through	0.039	0.2	0.0
	Right	0.039	0.2	6.4
Murrumbidgee Road (N)	Left	0.015	0.5	5.9
	Through	0.015	0.5	9.1
	Right	0.015	0.5	7.8
Irrigation Way (W)	Left	0.033	0.0	5.5
	Through	0.033	0.1	0.0
	Right	0.033	0.1	7.3
Intersection		0.039	0.5	0.7

Table 2.4: Existing PM Peak SIDRA - Irrigation Way / Murrarni Road Intersection

Approach	Movement	PM Peak Period		
		DoS	95%ile Queue	Ave. Delay
Murrarni Road (S)	Left	0.005	0.2	5.8
	Through	0.005	0.2	10.7
	Right	0.005	0.2	7.9
Irrigation Way (E)	Left	0.042	0.0	5.6
	Through	0.042	0.4	0.1
	Right	0.042	0.4	6.0
Murrarni Road (N)	Left	0.006	0.2	7.2
	Through	0.006	0.2	6.7
	Right	0.006	0.2	7.9
Irrigation Way (W)	Left	0.038	0.0	5.5
	Through	0.038	0.2	0.0
	Right	0.038	0.2	6.0
Intersection		0.042	0.4	0.6

The SIDRA analysis demonstrates that the Irrigation Way / Murrarni Road intersection is currently operating under 'Excellent' conditions, with negligible queues and delays observed on all approaches. These findings are expected given the modest level of traffic travelling through the intersection at present and are consistent with site observations, which also confirmed that the intersection is functioning efficiently with minimal queues and delay.

2.5 Sustainable Transport Services

Briggs Road, Murrarni Road, Irrigation Way, and Whitton Road in the vicinity of the site do not currently provide footpaths, dedicated cycle lanes, or nearby public transport stops. As a result, access to the site for pedestrians, cyclists, and public transport users is limited. This limited accessibility is consistent with the site's rural setting and the predominantly agricultural and low-density land uses in the surrounding area.

2.6 Crash Statistics Analysis

A review has been conducted of Transport for NSW 'interactive crash statistics' for the most recent five-year period of available data (2019 to 2023) for any reported crashes within the following search area:

- The full length of Briggs Road.
- Murrami Road between Irrigation Way and Whitton Road.
- The intersection of Briggs Road and Murrami Road.
- The intersection of Murrami Road and Irrigation Way.
- The intersection of Murrami Road and Whitton Road.

A summary of the crashes in the search area for the last five-year period is presented in Table 2.5.

Table 2.5: Summary of Crashes in the Vicinity of the Subject Site (5 Year Period)

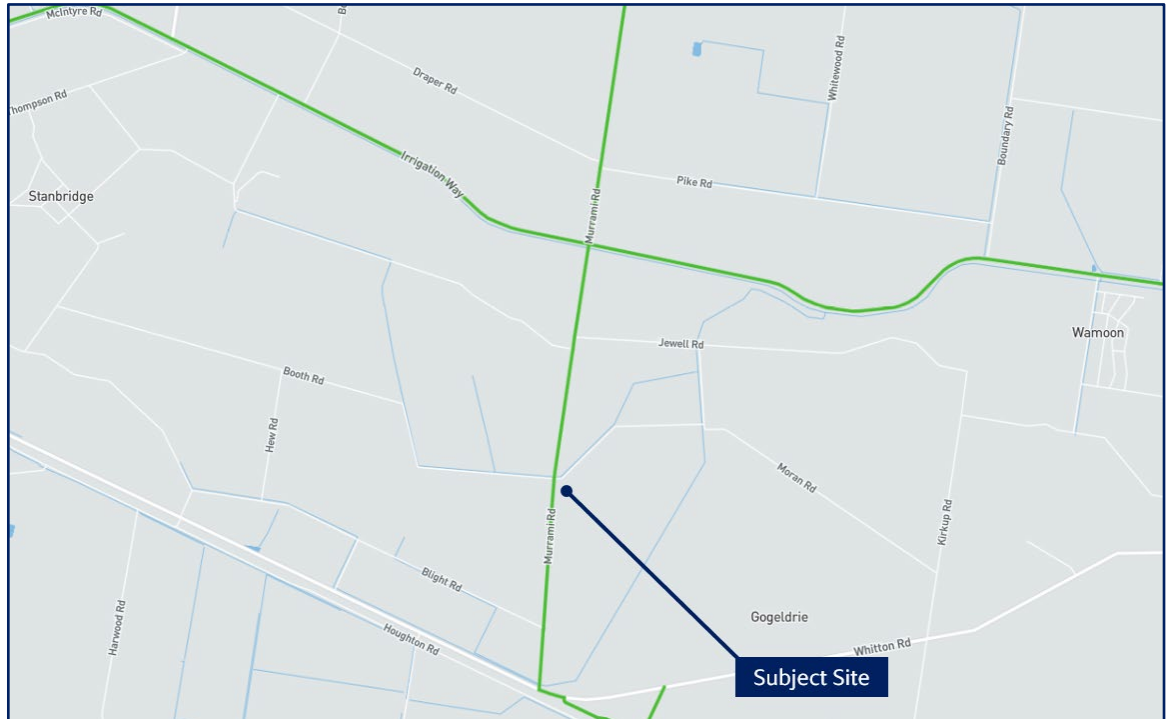
Location	Accident No.	Crash Type
<i>Frontage Roads</i>		
Briggs Road	0	-
Murrami Road	0	-
<i>Nearby Intersections</i>		
Briggs Road / Murrami Road Intersection	0	-
Irrigation Way / Murrami Road Intersection	3	2 x 'Rear End' type crashes resulting in no injury (non-casualty crash) 1 x 'Cross Traffic' type crash resulting in serious injury (serious injury crash)
Murrami Road / Whitton Road Intersection	0	-
Total	3	3 x crashes

The crash statistics analysis reveals three crashes (including two non-casualty type crashes) have occurred within the last five-year period of available data. These crashes occurred at the intersection of Irrigation Way and Murrami Road. Notably, no casualty crashes were recorded along Briggs Road or Murrami Road within the last five-year period of available data. Given the road classifications and associated traffic volumes, it is considered that the surrounding road network is operating in a relatively safe manner under existing conditions.

2.7 Heavy Vehicle Routes

The National Heavy Vehicle Regulator (NHVR) outlines all authorised heavy vehicle routes, through the National Network Map. The NHVR map demonstrates that Irrigation Way and Murrumbidgee Road are authorised to accommodate prime movers and semi-trailers up to 19.0m in length, as illustrated in Figure 2.16.

Figure 2.16: Prime Mover and Semi-Trailer (19m) Authorised Routes



3 Proposal

3.1 Development Specifics

It is proposed to establish a 5MW Solar PV facility and associated 11MWh Battery Energy Storage System (BESS) located on the development site at 125 Briggs Road, Stanbridge. More specifically, the proposal will incorporate the following:

- Installation of solar PV panels and associated mounting structures to generate up to 5MW of renewable energy.
- Provision of an 11MWh Battery Energy Storage System (BESS) to store and release electricity as required.
- Establishment of a secure perimeter fence and controlled access gate to ensure site safety and security.
- Vehicular access to the site will be provided via two access points connecting to Briggs Road at the north-west corner of the development site.
- Establishment of an internal circulation accessway which will facilitate vehicle movements within the site.
- Car parking will be provided on-site to meet the demand of staff and contractors. The parking area will be located adjacent to the proposed inverter and BESS station and accessed via the internal circulation accessway.

3.2 Project Stages

The proposal is expected to progress through the typical stages of a solar PV facility, including site establishment, construction, commissioning, operation, and decommissioning. Information regarding these stages has been provided by the intended operator and is discussed in further detail below.

Site Establishment

This stage involves site preparation and associated civil works, including the installation of driveways, supporting infrastructure, and perimeter security fencing. This work is expected to take approximately four weeks and will establish the necessary access, security, and groundwork for subsequent construction activities.

Construction

The construction of the solar PV facility will involve on-site assembly of piles, trackers, and modules, coordinated with scheduled material deliveries to minimise on-site storage. Works will occur in a single phase over approximately three months, between 7:00 am and 6:00 pm on weekdays and 8:00 am to 1:00 pm on Saturdays, with no work on Sundays or public holidays. Up to 50 workers are expected to be employed for construction, with peak on-site staffing of 20–30 personnel.

Upon completion, all temporary facilities and equipment will be removed within about one week, preparing the site for operation.

Commissioning

The commissioning phase involves testing and activating the solar PV facility and associated battery storage systems to ensure they operate in accordance with design specifications. No construction activities are scheduled during this stage. The timing will depend on the energy provider's booking availability and prevailing weather conditions, however, is expected to take approximately 1-2 weeks in duration.

Operation

The operation phase involves the ongoing generation and export of electricity from the solar PV facility and management of the battery energy storage system. During this phase, the facility operates continuously, with routine maintenance conducted as needed to ensure optimal performance and safety. Operational maintenance is typically undertaken by up to two staff members on-site. Very infrequent deliveries may also be required, involving heavy vehicles bringing parts, plant, or equipment to the site, as needed.

Decommissioning

The decommissioning phase involves the removal and dismantling of the solar PV facility and associated battery energy storage system at the end of its operational life. This includes the removal of panels, inverters, battery units, and supporting infrastructure, with the site restored or repurposed as required.

3.3 Project Schedule

The project schedule for the proposed solar PV facility is summarised in Table 3.1 below.

Table 3.1: Project Schedule

Project Stage	Time Period
Site establishment (including fencing construction)	~ 1 month
Construction (including material delivery)	~ 3 months
Demobilise construction equipment	~ 1 week
Commissioning	~ 1-2 weeks Timing dependent on the energy provider's scheduling and prevailing weather conditions.
Operation	Ongoing electricity generation and facility management.
Decommissioning	Timing to be determined at the conclusion of the facility's operational period.

4 Traffic Assessment – Construction Phase

4.1 Traffic Generation

During the construction phase of the proposed solar PV facility, traffic movements will be generated by staff and contractors, delivery of construction materials, and the transport of equipment and machinery. Construction traffic estimates have been prepared based on operational advice provided by Bison Energy and are categorised into light and heavy vehicle movements, as outlined below.

Light Vehicle Movements

Light vehicles, including passenger vehicles, utility vehicles, and 4WDs, will be used by supervisors, engineers, and general labour for site access and day-to-day construction activities. Based on operational advice, 20–30 light vehicles are expected to access the site per day during peak construction periods. Whilst vehicle movements will be generally dispersed throughout the day, a concentrated portion of traffic is expected to coincide with road network peak hours. For assessment purposes, it is conservatively assumed that up to 50% of daily light vehicle movements could occur during the road network peak hours. During the morning peak hour, a greater portion of these movements are expected to be inbound with fewer outbound trips, whilst during the afternoon peak hour the split is reversed, with a higher proportion of outbound trips and fewer inbound trips.

The estimated traffic generation from light vehicles during peak construction periods is shown in Table 4.1.

Table 4.1: Construction Traffic Generation – Light Vehicles

Trip Direction	Estimated Vehicle Movements		
	AM Peak Hour	PM Peak Hour	Daily Movements
Arriving Trips	10 vph	5 vph	30 vpd
Departing Trips	5 vph	10 vph	30 vpd
Total Movements	15 vph	15 vph	60 vpd

Heavy Vehicle Movements

Heavy vehicles, including articulated trucks, rigid trucks, dump trucks, water trucks, concrete trucks and pumps will be used for deliveries, earthworks, material transport, and on-site construction logistics. The largest vehicle expected to access the site during construction is 19m long articulated vehicles. Based on operational advice, 10–15 heavy vehicles are expected to access the site per day during peak construction periods. These movements will generally be spread throughout the day, with deliveries and equipment movements coordinated to minimise on-site congestion. For assessment purposes, it is conservatively assumed that up to 50% of daily heavy vehicle movements could occur during the road network peak hours. During both the morning and afternoon peak hour periods, heavy vehicle movements are assumed to be relatively evenly split.

The estimated traffic generation from heavy vehicles during peak construction periods is shown in Table 4.2.

Table 4.2: Construction Traffic Generation – Heavy Vehicles

Trip Direction	Estimated Vehicle Movements		
	AM Peak Hour	PM Peak Hour	Daily Movements
Arriving Trips	4 vph	4 vph	15 vpd
Departing Trips	4 vph	4 vph	15 vpd
Total Movements	8 vph	8 vph	30 vpd

Summary

The total traffic generation during peak construction periods, combining both light and heavy vehicle movements, is summarised in Table 4.3.

Table 4.3: Construction Traffic Generation – Total Traffic

Trip Direction	Estimated Vehicle Movements		
	AM Peak Hour	PM Peak Hour	Daily Movements
Arriving Trips	14 vph	9 vph	45 vpd
Departing Trips	9 vph	14 vph	45 vpd
Total Movements	23 vph	23 vph	90 vpd

Based on the above, construction of the proposed solar PV facility is expected to generate relatively modest traffic volumes, with up to 23 vehicle movements during peak hours and a maximum of 90 vehicle movements per day. Vehicle movements are anticipated to be distributed throughout the day, with staff, contractors, deliveries, and equipment transport occurring at different intervals, thereby reducing peak congestion.

The above estimates represent the estimated traffic during peak construction periods with lower traffic volumes expected during off-peak construction periods.

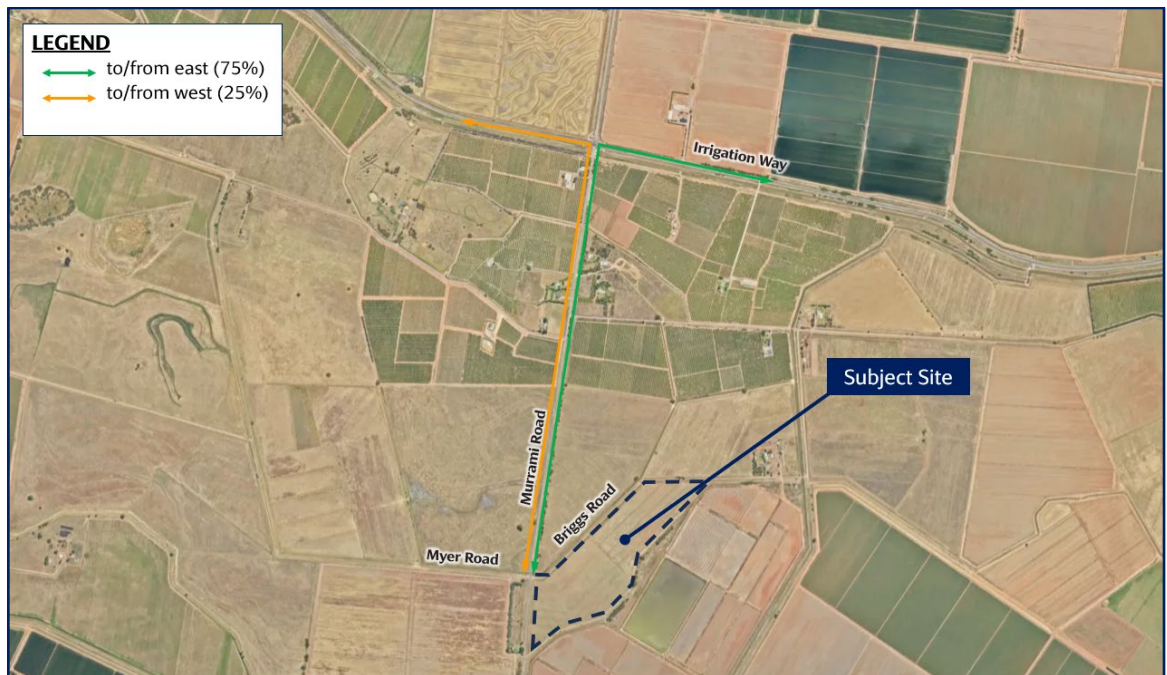
4.2 Traffic Distribution

Based on operational advice and observed traffic patterns, the following assumptions have been made regarding traffic distribution.

The majority of construction-related vehicle movements are expected to access the site via Irrigation Way to the north, given its classification as a State Road and its ability to accommodate higher traffic volumes. A smaller proportion is expected to use Whitton Road to the south. To provide a conservative assessment of the traffic impacts at the key intersection of Irrigation Way and Murrumbidgee Road intersection, it has been assumed that all construction traffic could pass through this intersection. A higher proportion of vehicle movements are anticipated to access the site from the east along Irrigation Way. For assessment purposes, it is assumed that 75% of traffic will access the site via the eastern section of Irrigation Way, with the remaining 25% using the western section.

The adopted traffic distribution is illustrated in Figure 4.1.

Figure 4.1: Traffic Distribution



4.3 Construction Period Traffic Volumes

Based on the information presented in Section 4.1 and Section 4.2, site generated traffic volumes at the intersection of Irrigation Way and Murrumbidgee Road during peak hour periods have been determined and are shown in Figure 4.2 and Figure 4.3.

Figure 4.2: Site Generated Vehicle Movements – AM Peak Hour

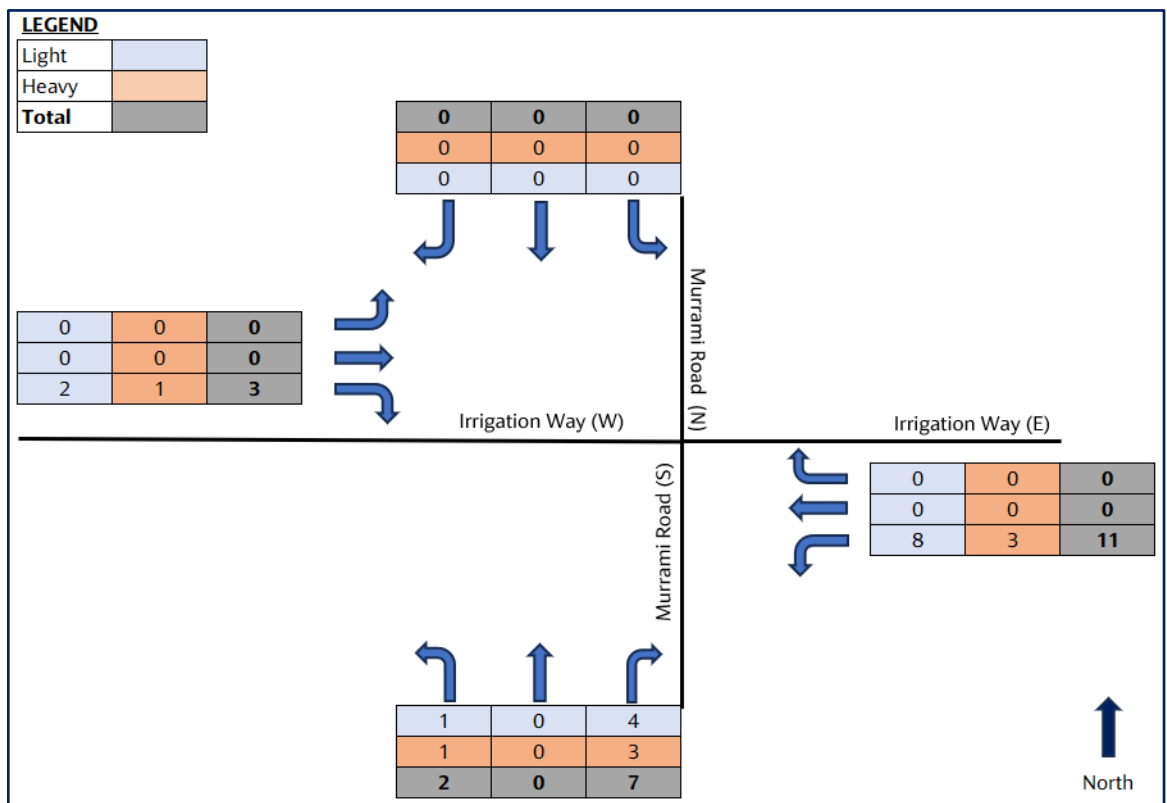
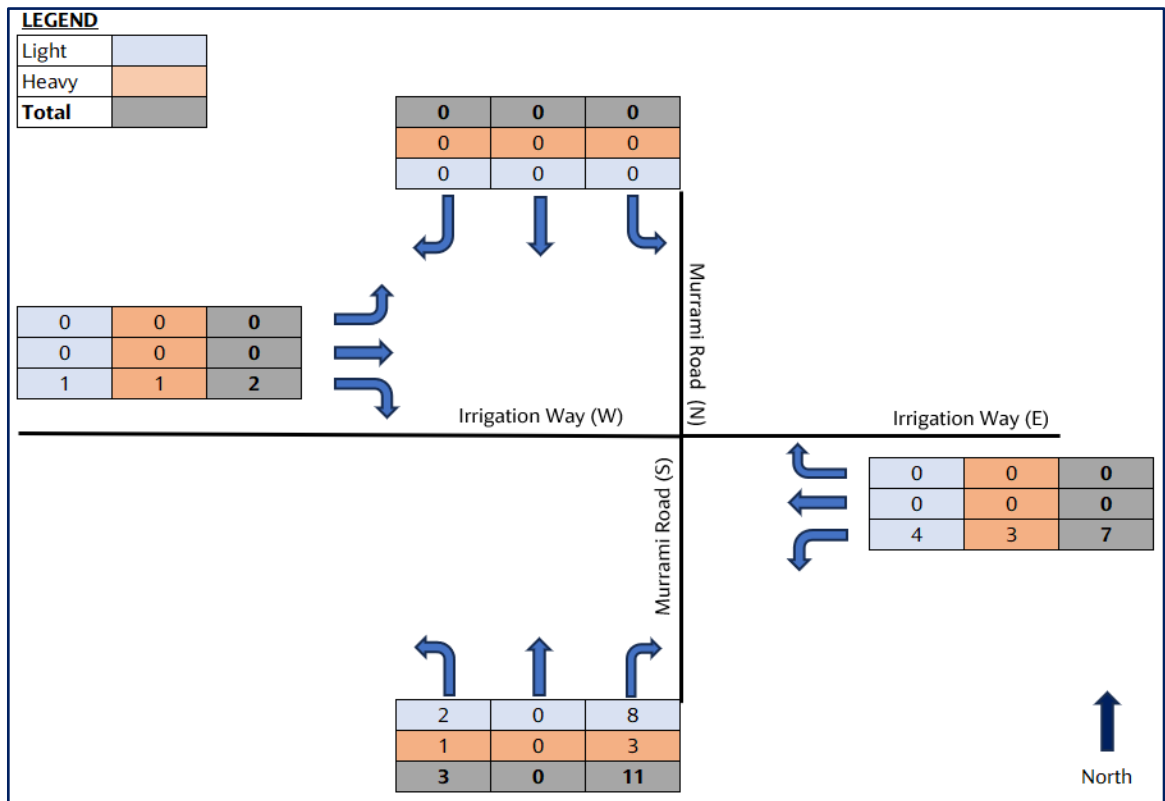


Figure 4.3: Site Generated Vehicle Movements – PM Peak Hour



To determine the total traffic volumes at the intersection of Irrigation Way and Murrumbidgee Road during peak construction periods, the existing survey volumes have been combined with the additional site-generated traffic volumes. The construction period peak hour traffic volumes are shown in Figure 4.4 and Figure 4.5.

Figure 4.4: Construction Period Traffic Volumes – AM Peak Hour

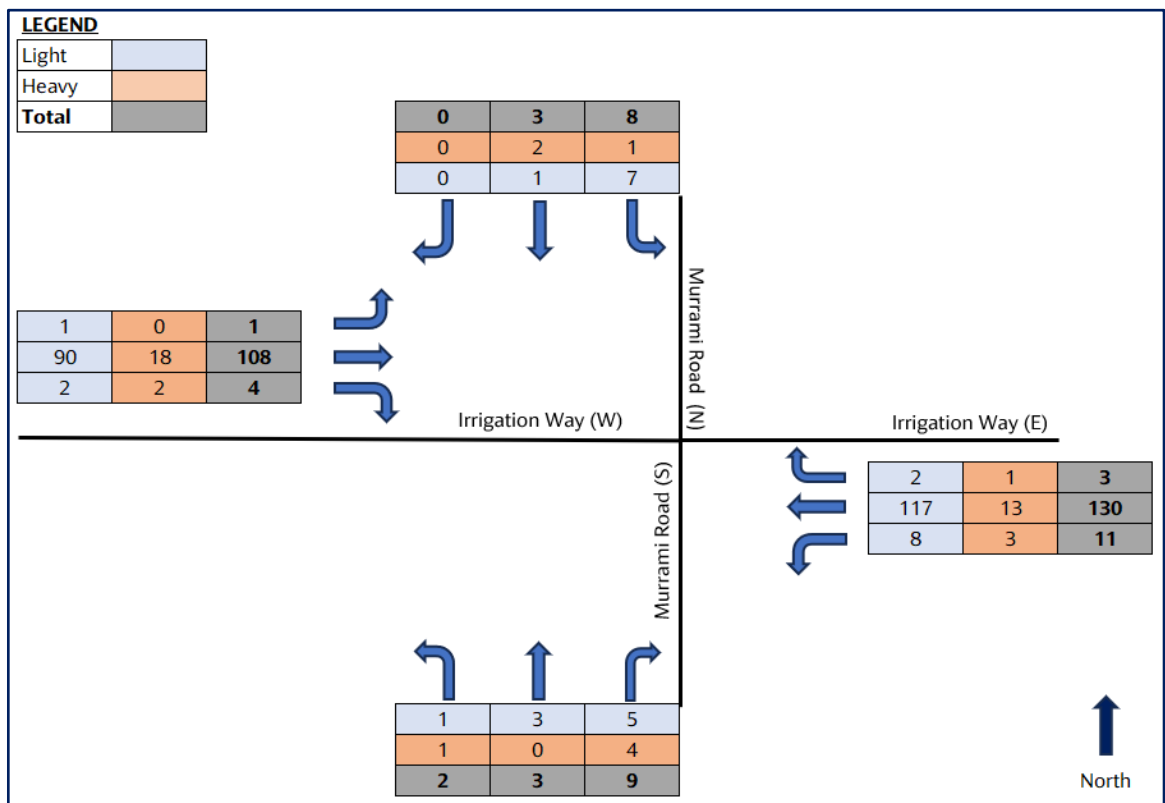
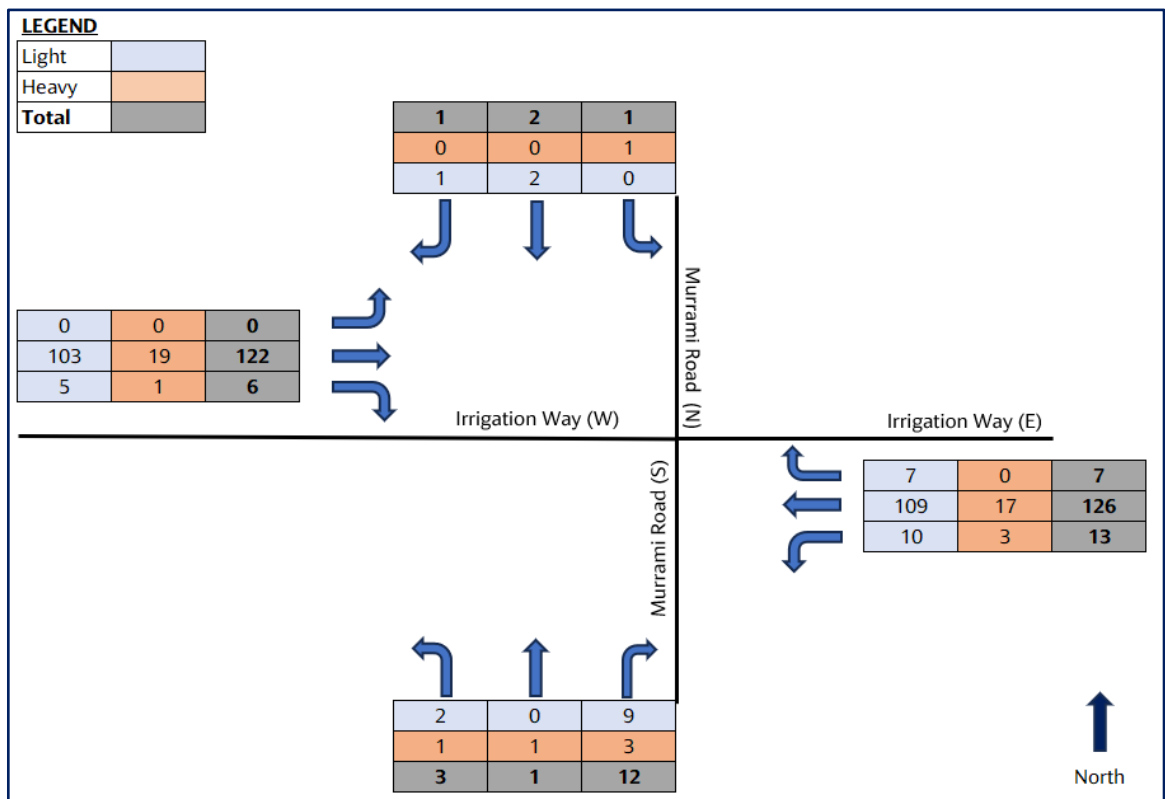


Figure 4.5: Construction Period Traffic Volumes – PM Peak Hour



4.4 Intersection Operation

This section assesses the key intersections in the vicinity of the site to determine their capacity to accommodate additional traffic during the construction period. As Irrigation Way is a State Road and carries the highest traffic volumes of the surrounding network, SIDRA Intersection software has been used to assess the development's impact at the Irrigation Way / Murrami Road intersection. The other intersections in the area comprise local roads with comparatively low traffic volumes, reflecting their rural setting and surrounding land use. These intersections are expected to operate more efficiently than the Irrigation Way / Murrami Road intersection and have been assessed using a combination of traffic counts and site observations.

Irrigation Way and Murrami Road Intersection

A peak hour intersection analysis of the Irrigation Way and Murrami Road intersection has been conducted using the SIDRA Intersection software to assess traffic conditions during the peak construction periods.

SIDRA Parameters

The key parameters used to determine the operational capacity of an intersection are queue length, average delay and degree of saturation (or volume to capacity ratio). Degree of Saturation (DOS) is a ratio of arrival (or demand) flow to capacity. DOS above 1.0 represent oversaturated conditions and a DOS below 1.0 represent undersaturated conditions. The SIDRA operational ratings associated with the DOS is summarised in Table 4.4.

Table 4.4: SIDRA Rating of Degree of Saturation (DoS)

Degree of Saturation (DoS)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very Poor

The 95th percentile queue length is the value below which 95 percent of all observed cycle queue lengths fall, or 5 percent of all observed queue lengths exceed.

Average Delay is the average time, in seconds, that all vehicles making a particular movement can expect to wait at an intersection.

Construction Period Operation - Irrigation Way and Murrumbidgee Road Intersection

The results of the construction period AM and PM peak hour SIDRA analysis are detailed in Appendix B and summarised in Table 4.5 and Table 4.6.

Table 4.5: Construction Period AM Peak SIDRA - Irrigation Way / Murrumbidgee Road Intersection

Approach	Movement	AM Peak Period		
		DoS	95%ile Queue	Ave. Delay
Murrumbidgee Road (S)	Left	0.026	0.9	6.5
	Through	0.026	0.9	6.7
	Right	0.026	0.9	10.2
Irrigation Way (E)	Left	0.043	0.0	5.9
	Through	0.043	0.2	0.0
	Right	0.043	0.2	6.3
Murrumbidgee Road (N)	Left	0.015	0.5	6.0
	Through	0.015	0.5	9.4
	Right	0.015	0.5	7.9
Irrigation Way (W)	Left	0.035	0.0	5.5
	Through	0.035	0.4	0.1
	Right	0.035	0.4	7.1
Intersection		0.043	0.9	1.2

Table 4.6: Construction Period PM Peak SIDRA - Irrigation Way / Murrarni Road Intersection

Approach	Movement	PM Peak Period		
		DoS	95%ile Queue	Ave. Delay
Murrarni Road (S)	Left	0.030	1.0	6.3
	Through	0.030	1.0	11.1
	Right	0.030	1.0	9.4
Irrigation Way (E)	Left	0.044	0.0	5.8
	Through	0.044	0.4	0.1
	Right	0.044	0.4	6.0
Murrarni Road (N)	Left	0.006	0.2	7.3
	Through	0.006	0.2	6.8
	Right	0.006	0.2	8.0
Irrigation Way (W)	Left	0.039	0.0	5.5
	Through	0.039	0.4	0.1
	Right	0.039	0.4	6.4
Intersection		0.044	1.0	1.2

Accordingly, the Irrigation Way and Murrarni Road intersection is expected to continue operating under 'Excellent conditions' in the peak construction periods, consistent with the current performance of the intersection.

The estimated increase in traffic of up to 24 vehicle movements per hour during peak construction periods results in minimal increases to queues and delays projected, which is expected given the relatively modest volume of additional traffic and the low existing traffic levels.

For clarity, a table comparing the highest recorded Degree of Saturation, 95th Percentile Queue and Average Delay at the Irrigation Way and Murrarni Road intersection in existing and peak construction period is shown in Table 4.7.

Table 4.7: Comparison of Existing Conditions vs Construction Period

Measure	AM Peak Hour			PM Peak Hour		
	Existing	Construction	Variation	Existing	Construction	Variation
DoS – All vehicles	0.039	0.043	+0.004	0.042	0.044	+0.002
95%ile Queue – All	0.5	0.9	+0.4	0.4	1.0	+0.6
Average Delay – All Vehicles	0.7	1.2	+0.5	0.6	1.2	+0.6

Construction period conditions are expected to result in no discernible increase in the Degree of Saturation or queue lengths at the intersection, with impacts limited to negligible increases in these values. These small increases in queues and delay will be imperceivable on the operation of the intersection.

Overall, the analysis confirms that the construction of the proposed solar PV facility will have a negligible impact on the operation of the Irrigation Way and Murrumbidgee Road intersection.

RTA Guide Parameters

The RTA Guide to Traffic Generating Development (October 2002) is a key reference document published by Roads and Traffic Authority (RTA). It provides guidelines and methodologies for assessing the traffic and transport impacts of developments. The guide is widely used by traffic engineers, urban planners, and developers in Australia.

The RTA Guide outlines the level of service criteria for intersections and has been reproduced below in Table 4.8.

Table 4.8: Level of Service Criteria for Intersections

Level of Service	Average Delay per Vehicle (secs/vehicle)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15-28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29-42	Satisfactory	Satisfactory, but accident study required
D	43-56	Operating near capacity	Near capacity & accident study required
E	57-70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode.	At capacity, requires other control mode

SIDRA Intersection analysis indicates that the average delay for all approaches at the Irrigation Way / Murrarni Road intersection is comfortably less than 14 seconds during both the AM and PM peak hours, corresponding to a 'Level of Service A'. This confirms that the intersection will continue to operate efficiently during peak construction periods, with negligible impact from the proposed development.

Briggs Road / Murrarni Road / Myer Road Intersection

All construction traffic associated with the proposed solar PV facility is expected to travel through the Briggs Road / Murrarni Road / Myer Road intersection, as the site's two vehicular access points are located along Briggs Road. Traffic surveys and site observations confirm that this intersection currently operates with very low traffic volumes, with only a limited number of movements even during peak periods. On this basis, the intersection is considered capable of accommodating the anticipated construction traffic. A Construction Traffic Management Plan (CTMP) will be implemented to ensure safe and efficient vehicle movements, including the use of traffic controllers or spotters for heavy vehicle operations where required.

Murrarni Road and Whitton Road Intersection

The majority of construction-related traffic is expected to access the site via Irrigation Way to the north, with only a small proportion using Whitton Road to the south. Any construction traffic on Whitton Road is anticipated to be minimal and generally limited to smaller vehicles, as prime movers and semi-trailers are not permitted on this road as illustrated in Figure 2.16. Traffic surveys and site observations confirm that this intersection is capable of accommodating the minor increase in traffic anticipated during the construction period.

4.5 Road Capacity Assessment

Briggs Road

All construction traffic associated with the proposed solar PV facility is expected to utilise the western section of Briggs Road, as the site's two vehicular access points are located along this road. Traffic surveys and site observations indicate that Briggs Road currently experiences very low volumes, with a limited number of vehicular movements even during peak periods. Accordingly, Briggs Road is considered capable of accommodating the anticipated increase of up to 90 additional daily vehicle movements during the construction phase. As previously noted, a Construction Traffic Management Plan (CTMP) will be implemented to ensure the safe and efficient movement of vehicles along Briggs Road during construction, including the use of traffic controllers or spotters for heavy vehicle movements where required.

Murrami Road

Tube count surveys indicate that Murrami Road adjacent to the site currently carries relatively low daily traffic volumes, ranging between 68 and 108 daily vehicle movements. Construction traffic estimates suggest the proposed facility could generate up to 90 additional vehicle movements per day during peak activity, resulting in a maximum of around 200 daily movements for Murrami Road during peak construction periods. These levels remain well within the capacity of the local rural road network.

Whitton Road

The majority of construction-related traffic is expected to access the site via Irrigation Way to the north, with only a small proportion using Whitton Road. Any construction traffic on Whitton Road is anticipated to be minimal and generally limited to smaller vehicles, as prime movers and semi-trailers are not permitted to use this road. Traffic surveys and site observations confirm that Whitton Road currently experiences very low traffic volumes and is capable of accommodating the minor increase in daily traffic expected during the construction period.

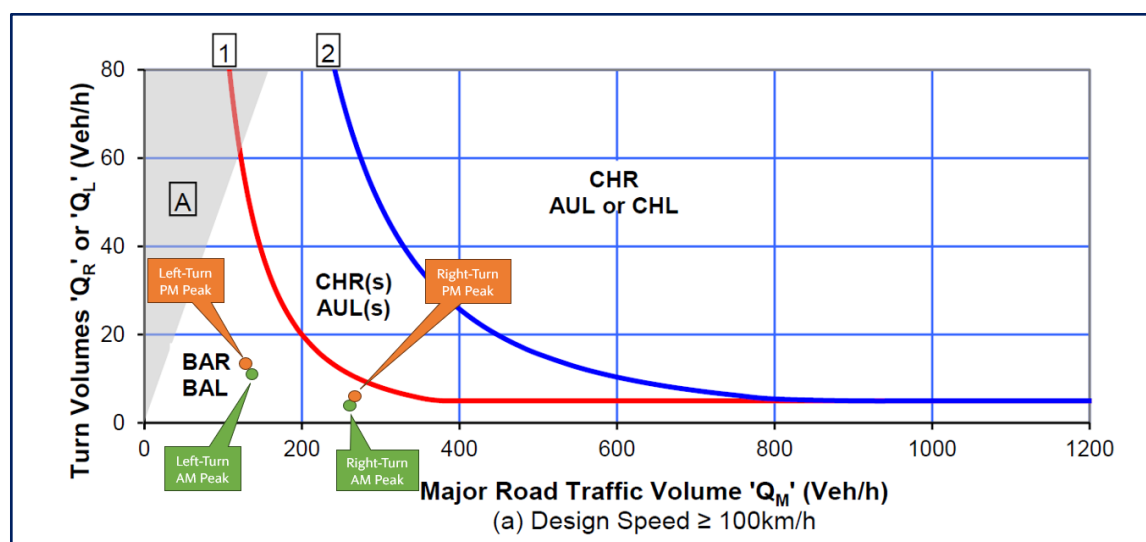
Irrigation Way

The majority of construction-related traffic is expected to access the site via Irrigation Way, with a higher proportion of movements to and from the east and a smaller proportion to and from the west. Irrigation Way currently carries relatively modest traffic volumes for a State Road and is considered capable of comfortably accommodating the anticipated increase of up to 90 additional vehicle movements per day during peak construction periods, given its classification and existing road configuration.

In summary, all roads surrounding the site are considered capable of comfortably accommodating the additional traffic generated during peak construction periods. This is due to the relatively modest traffic increases and the currently low traffic volumes on the surrounding road network, which is consistent with the area's rural setting and surrounding land use characteristics.

To assess the suitability of the existing configuration of the Irrigation Way / Murrumbidgee Road intersection, anticipated peak-hour traffic volumes during the peak construction period were evaluated against the turn lane treatment warrants specified in the *Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings*.

Figure 4.6: Austroads Turn Treatment Warrants



The Irrigation Way and Murrumbidgee Road intersection already includes an auxiliary left-turn lane on the eastern approach, allowing vehicles to safely decelerate and turn left into Murrumbidgee Road. This configuration exceeds the design requirements for a BAL treatment. On the western approach, two eastbound lanes enable through traffic to pass vehicles waiting to turn right from Irrigation Way onto Murrumbidgee Road, satisfying the requirements of a BAR treatment. Accordingly, the existing intersection layout is considered compliant with Austroads Turn Treatment Warrants for the peak construction period.

4.7 Intersection Swept Path Assessment

It is acknowledged that longer heavy vehicles, such as articulated trucks, turning left into Briggs Road from the north would momentarily need to cross the centreline of Briggs Road when entering. However, given the infrequency of these movements, the minimal traffic volumes along Briggs Road and the temporary nature of this arrangement during the construction period, this is considered acceptable and consistent with typical rural practice. A Construction Traffic Management Plan (CTMP) will also be implemented to ensure safe vehicle movements, including traffic controllers or spotters for heavy vehicles as required. The swept path assessment demonstrates that light vehicles can safely and efficiently navigate the intersection. On this basis, it is concluded that the existing Briggs Road / Murrumbidgee Road intersection configuration is suitable to accommodate the anticipated construction traffic, given the site context and associated traffic volumes.

As shown in Figure 2.16, the Irrigation Way / Murrarni Road intersection is designed to accommodate prime movers and semi-trailers up to 19.0 m in length. Accordingly, heavy vehicles of this size are considered able to navigate the intersection safely and efficiently.

4.8 Summary of Construction Traffic Impacts

Based on the traffic analysis presented in this section, the following key conclusions have been made:

- Construction traffic for the proposed solar PV facility is anticipated to generate up to 24 vehicle movements during peak hours and 90 daily vehicle movements, comprising a combination of light and heavy vehicles. The majority of these movements are expected to access the site via Irrigation Way (to the north), then Murrarni Road and Briggs Road.
- The SIDRA analysis confirms that the proposed solar PV facility will have a negligible impact on the critical intersection of Irrigation Way and Murrarni Road in the peak construction period. The Irrigation Way and Murrarni Road intersection will operate at 'Level of Service A' during the peak construction period, with minor queues and delays at all approaches.
- The local road intersections surrounding the site are considered capable of accommodating the additional traffic generated during the construction phase, given the relatively modest increase in vehicle movements and the low existing traffic volumes, which is consistent with the rural setting and surrounding land use characteristics.
- The existing configuration of the Irrigation Way and Murrarni Road intersection complies with the Austroads Turn Treatment Warrants in the peak construction period. Briggs Road, Murrarni Road, and Whitton Road currently carry very low levels of through traffic and therefore the intersections of these local roads do not warrant the provision of turning lanes.
- The swept path assessment undertaken demonstrates that the current configuration of the intersection of Murrarni Road and Briggs Road is suitable to accommodate the expected vehicles during the construction period.
- All roads surrounding the site are considered capable of comfortably accommodating the additional traffic generated during peak construction periods, due to the relatively modest traffic increases and the currently low traffic volumes on the local road network.

In summary, it is considered that the additional traffic generated by the proposed solar facility during peak construction periods can be accommodated by Briggs Road, Murrarni Road, Irrigation Way, Whitton Road and the surrounding road network in a safe and efficient manner.

5 Traffic Assessment - Operational & Decommissioning Phase

5.1 Operational Traffic

During the operational phase, the solar PV facility is expected to generate minimal traffic. Typically, two staff members will attend the site to carry out operational and maintenance activities, resulting in approximately four vehicle movements per day. Up to two of these movements may occur during the network peak periods, associated with staff arrivals in the morning and departures in the evening. In addition, very infrequent heavy vehicle deliveries may occur for the transport of parts.

Overall, operational traffic is therefore significantly lower than construction traffic and based on the detailed analysis undertaken for the construction phase, it is expected that the surrounding road network can readily accommodate operational traffic without adverse impacts.

5.2 Decommissioning Traffic Assessment

Should the solar PV facility be decommissioned in the future, associated vehicle movements are expected to be lower than those experienced during construction. The surrounding road network is therefore likely to accommodate decommissioning traffic without operational issues. A future assessment of traffic impacts and the implementation of an appropriate Construction Traffic Management Plan (CTMP) would need to be undertaken to ensure safe and efficient vehicle movements during the decommissioning phase.

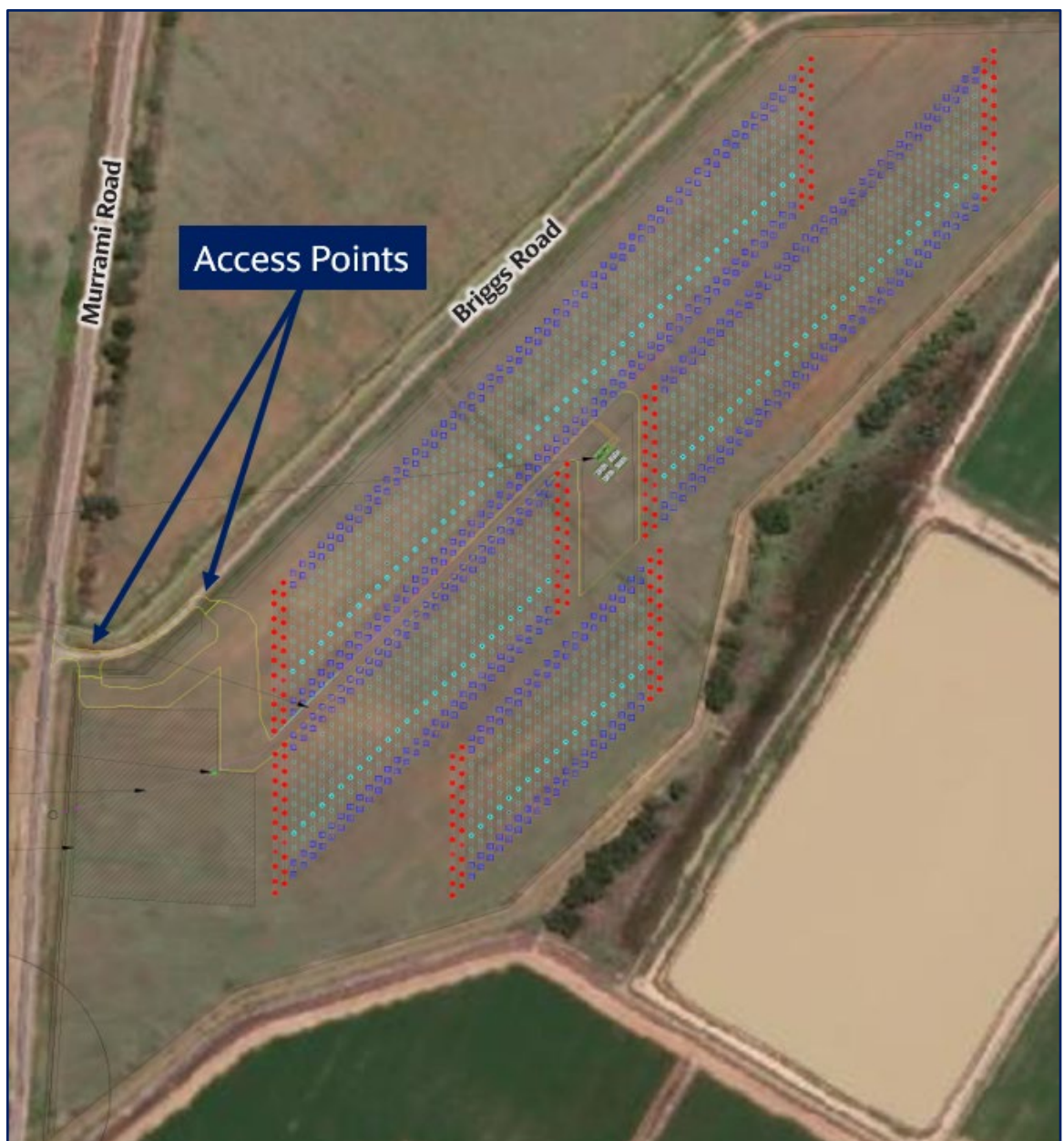
6 Vehicular Access & Car Parking Considerations

An assessment of the vehicle access arrangements and car parking considerations of the proposed solar PV facility is undertaken in this section.

6.1 Site Access

Vehicular access to the site is proposed via two separate vehicular access points connecting to/from Briggs Road in the north-west corner of the site. The vehicle access arrangements are illustrated in Figure 6.1

Figure 6.1: Proposed Access Arrangements



A range of light and heavy vehicles will access the site during construction and ongoing operations, with all movements occurring from the west via the Briggs Road / Murrumbidgee Road intersection. The largest vehicles expected to service the site are articulated vehicles, which can be up to 19 metres in length.

The site's access arrangements are currently shown indicatively on the plans, however, a preliminary swept path assessment (refer to Appendix C) demonstrates that the largest expected vehicle can safely and efficiently access Briggs Road via the proposed access points. It is recommended that a one-way vehicular circulation system be implemented, with vehicles entering the site via the westernmost access point and exiting via the easternmost access point.

6.2 Car Parking Considerations

The development plans do not detail the provision of car parking, however, it is understood that car parking will be provided adjacent to the inverter and BESS station once the solar PV facility becomes operational.

Car Parking Provision

The Leeton Shire Council DCP and the RTA Guide to Traffic Generating Developments (2002) do not provide specific guidance on the required car parking provision for solar farm developments. Consequently, car parking requirements for this facility should be determined based on the number of personnel needed for both construction activities and ongoing operational and maintenance tasks.

Given the rural nature of the site, operational staff are expected to travel to the site by private vehicle and typically limited to a maximum of two staff on any given day. The car parking provision during the operational phase should be sufficient to accommodate the maximum expected staffing levels.

For the construction phase, car parking should ideally be located near the site office and be sufficient to meet peak demand. Based on current estimates, this would require space for approximately 20–30 light vehicles, with additional areas allocated for loading and unloading activities.

Car Parking Layout

Car parking spaces should be designed in accordance with AS2890.1:2004 (Australian Standard for Off-Street Car Parking). Car parking spaces should be designed for User Class 2 (Medium-Term Parking) and comprise dimensions of 2.5m in width by 5.4m in length accessed via a parking aisle of 5.8m.

7 Mitigation Measures

7.1 Construction Activity Traffic Management Considerations

Construction Traffic Management Objective

A Construction Traffic Management Plan (CTMP) will need to be prepared prior to the commencement of construction works, with site induction for construction personnel outlining the requirements of the CTMP. The primary objectives of the CTMP are to:

- Minimise the impact of construction vehicle traffic on the operation of the surrounding road network.
- Ensure continuous, safe, and efficient movement of both the general public and construction personnel.
- Install appropriate advance warning signage to inform road users of changes in traffic conditions.
- Provide details of construction vehicles, including types and volumes accessing the site.
- Outline proposed access arrangements and external vehicle routes, including heavy vehicles.
- Establish a safe pedestrian environment in the vicinity of the site.

Traffic Management

Public access along Briggs Road and Murrami Road is expected to be maintained at all times with the majority of works expected to occur within the boundaries of the site. Vehicles will be permitted to travel past the worksite, with any traffic signage required to be implemented in accordance with a Traffic Control Plan (TCP) prepared in line with RMS *Traffic Control at Works Sites* and AS1742.3 – *Traffic Control for Works on Roads*. The TCP will inform motorists of construction vehicle movements, including “Truck Turning” activity. Road closures on public roads are not anticipated during construction. Traffic Control Plans will be developed as part of the CTMP prior to the commencement of works, where applicable.

Traffic Activity and Parking Provisions

Site personnel are expected to access the site during standard daytime hours from Monday to Saturday. An assessment of the impact of construction traffic has been undertaken in Section 4 of this TIA. Carpooling among workers will be encouraged to reduce traffic activity and parking demand.

Parking for construction personnel will be accommodated within the site, with sufficient space provided for peak site staff numbers. Parking on public roads will not be permitted. Given the large available site area, adequate on-site parking can be provided for construction workers and visitors.

Pedestrian and Cycle Management

Access to the site will be restricted to authorised personnel only. Pedestrian and cyclist activity in the surrounding area is expected to be minimal due to the rural context and absence of formal pedestrian and cyclist facilities. Within the site, pedestrian pathways will be maintained to key areas such as site entrances and work areas, and kept free of trip hazards.

Road Hazards

The CTMP will identify potential road hazards in the surrounding area, including but not limited to:

- Fog, frost, and wet weather conditions.
- Extreme heat.
- Wildlife.
- School buses routes, if applicable.
- Coordination with any other nearby construction activities, if applicable.

8 Conclusions

It is proposed to establish a 5MW Solar PV facility and associated 11MWh Battery Energy Storage System located on the development site at 125 Briggs Road, Stanbridge. Vehicular access to the site will be provided via two access points connecting to Briggs Road at the north-west corner of the development site. Car parking will be provided on-site to meet the demand of staff and contractors.

Based on the preceding traffic impact assessment, the following conclusions are drawn:

Construction Traffic Impacts

- Traffic associated with the proposed solar PV facility is expected to be highest during the construction phase of the project, with up to 24 vehicle movements during peak hours and 90 daily vehicle movements, comprising a combination of light and heavy vehicles. The majority of these movements are expected to access the site via Irrigation Way (to the north), then Murrarni Road and Briggs Road.
- The SIDRA analysis confirms that the proposed solar PV facility will have a negligible impact on the critical intersection of Irrigation Way and Murrarni Road in the peak construction period. The Irrigation Way and Murrarni Road intersection will operate at 'Level of Service A' during the peak construction period, with minor queues and delays at all approaches.
- The local road intersections surrounding the site are considered capable of accommodating the additional traffic generated during the construction phase, given the relatively modest increase in vehicle movements and the low existing traffic volumes, which is consistent with the rural setting and surrounding land use characteristics.
- The existing configuration of the Irrigation Way and Murrarni Road intersection complies with the Austroads Turn Treatment Warrants in the peak construction period. Briggs Road, Murrarni Road, and Whitton Road currently carry very low levels of through traffic and therefore the intersections of these local roads do not warrant the provision of turning lanes.
- The swept path assessment undertaken demonstrates that the current configuration of the intersection of Murrarni Road and Briggs Road is suitable to accommodate the expected vehicles during the construction period.
- All roads surrounding the site are considered capable of comfortably accommodating the additional traffic generated during peak construction periods, due to the relatively modest traffic increases and the currently low traffic volumes on the local road network.

Operational & Decommissioning Traffic Impacts

- During the operational phase, the solar PV facility is expected to generate minimal traffic, with typically two staff on site and occasional deliveries by heavy vehicles. This equates to approximately four vehicle movements per day, including up to two movements during peak hours. Operational traffic is therefore significantly lower than construction traffic and can be readily accommodated by the surrounding road network without causing adverse impacts.
- Future decommissioning of the solar PV facility is expected to generate fewer vehicle movements than construction and can be accommodated by the local road network. A future traffic assessment and implementation of a suitable CTMP would ensure safe and efficient vehicle movements during this phase.

Vehicular Access & Car Parking Considerations

- A preliminary swept path assessment confirms that the largest vehicles can safely access the site via the indicative access points shown on the development plans. A one-way circulation system is recommended for the site, with entry via the westernmost access and exit via the easternmost access.
- Operational car parking will be provided near the inverter and BESS station to accommodate operational staff, typically limited to two vehicles per day.
- Construction car parking should ideally be located near the site office to meet peak demand, accommodating approximately 20–30 light vehicles, and areas for loading/unloading.
- Car parking spaces should comply with AS2890.1:2004 for User Class 2 (Medium-Term Parking), with dimensions of 2.5 m × 5.4 m and a 5.8 m access aisle.

Construction Traffic Management Plan

- A Construction Traffic Management Plan (CTMP) will need to be prepared prior to the commencement of any construction works. This document will outline measures to manage traffic-related issues associated with the development, including vehicle movements, access arrangements, and site safety during the construction phase. The CTMP will ensure that construction traffic operates safely and efficiently, minimising impacts on the surrounding road network.

In summary, it is considered that the traffic engineering considerations of the proposed solar PV facility are acceptable and that the additional traffic generated will not create adverse traffic safety or operational impacts on the surrounding road network.

Appendix A: SIDRA Results – Existing Conditions

MOVEMENT SUMMARY

▼ Site: [1] Irrigation Way / Murrami Road - Existing - AM Peak
(EXISTING)

Output produced by SIDRA INTERSECTION Version: 10.0.4.216

Irrigation Way / Murrami Road - Existing - AM Peak
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh.]	[Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Murrami Road (S)															
1	L2	All MCs	1	0.0	1	0.0	0.009	5.8	LOS A	0.0	0.3	0.37	0.54	0.37	51.6
2	T1	All MCs	3	0.0	3	0.0	0.009	6.5	LOS A	0.0	0.3	0.37	0.54	0.37	52.0
3	R2	All MCs	2	50.0	2	50.0	0.009	10.2	LOS B	0.0	0.3	0.37	0.54	0.37	49.5
Approach			6	16.7	6	16.7	0.009	7.6	LOS A	0.0	0.3	0.37	0.54	0.37	51.0
East: Irrigation Way (E)															
4	L2	All MCs	1	0.0	1	0.0	0.039	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.4
5	T1	All MCs	137	10.0	137	10.0	0.039	0.0	LOS A	0.0	0.2	0.02	0.02	0.02	59.8
6	R2	All MCs	3	33.3	3	33.3	0.039	6.4	LOS A	0.0	0.2	0.03	0.04	0.03	55.4
Approach			141	10.4	141	10.4	0.039	0.2	NA	0.0	0.2	0.02	0.02	0.02	59.7
North: Murrami Road (N)															
7	L2	All MCs	8	12.5	8	12.5	0.015	5.9	LOS A	0.1	0.5	0.23	0.52	0.23	51.5
8	T1	All MCs	3	66.7	3	66.7	0.015	9.1	LOS A	0.1	0.5	0.23	0.52	0.23	50.2
9	R2	All MCs	1	0.0	1	0.0	0.015	7.8	LOS A	0.1	0.5	0.23	0.52	0.23	51.9
Approach			13	25.0	13	25.0	0.015	6.9	LOS A	0.1	0.5	0.23	0.52	0.23	51.2
West: Irrigation Way (W)															
10	L2	All MCs	1	0.0	1	0.0	0.033	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.4
11	T1	All MCs	114	16.7	114	16.7	0.033	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	59.8
12	R2	All MCs	1	100.0	1	100.0	0.033	7.3	LOS A	0.0	0.1	0.02	0.02	0.02	52.5
Approach			116	17.3	116	17.3	0.033	0.1	NA	0.0	0.1	0.01	0.01	0.01	59.7
All Vehicles			276	14.1	276	14.1	0.039	0.7	NA	0.1	0.5	0.03	0.05	0.03	59.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

▼ Site: [1 (2)] Irrigation Way / Murrami Road - Existing - PM Peak (EXISTING)
Output produced by SIDRA INTERSECTION Version: 10.0.4.216

Irrigation Way / Murrami Road - Existing - PM Peak
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh.]	[Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Murrami Road (S)															
1	L2	All MCs	1	0.0	1	0.0	0.005	5.8	LOS A	0.0	0.2	0.35	0.52	0.35	51.0
2	T1	All MCs	1	100.0	1	100.0	0.005	10.7	LOS B	0.0	0.2	0.35	0.52	0.35	48.2
3	R2	All MCs	1	0.0	1	0.0	0.005	7.9	LOS A	0.0	0.2	0.35	0.52	0.35	50.9
Approach			3	33.3	3	33.3	0.005	8.1	LOS A	0.0	0.2	0.35	0.52	0.35	50.0
East: Irrigation Way (E)															
4	L2	All MCs	6	0.0	6	0.0	0.042	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	57.0
5	T1	All MCs	133	13.5	133	13.5	0.042	0.1	LOS A	0.1	0.4	0.03	0.07	0.03	59.3
6	R2	All MCs	7	0.0	7	0.0	0.042	6.0	LOS A	0.1	0.4	0.06	0.09	0.06	56.5
Approach			146	12.2	146	12.2	0.042	0.6	NA	0.1	0.4	0.03	0.07	0.03	59.0
North: Murrami Road (N)															
7	L2	All MCs	1	100.0	1	100.0	0.006	7.2	LOS A	0.0	0.2	0.34	0.52	0.34	48.0
8	T1	All MCs	2	0.0	2	0.0	0.006	6.7	LOS A	0.0	0.2	0.34	0.52	0.34	52.1
9	R2	All MCs	1	0.0	1	0.0	0.006	7.9	LOS A	0.0	0.2	0.34	0.52	0.34	51.6
Approach			4	25.0	4	25.0	0.006	7.2	LOS A	0.0	0.2	0.34	0.52	0.34	50.9
West: Irrigation Way (W)															
10	L2	All MCs	1	0.0	1	0.0	0.038	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.4
11	T1	All MCs	128	15.6	128	15.6	0.038	0.0	LOS A	0.0	0.2	0.02	0.03	0.02	59.7
12	R2	All MCs	4	0.0	4	0.0	0.038	6.0	LOS A	0.0	0.2	0.04	0.05	0.04	56.8
Approach			134	15.0	134	15.0	0.038	0.3	NA	0.0	0.2	0.02	0.03	0.02	59.5
All Vehicles			287	13.9	287	13.9	0.042	0.6	NA	0.1	0.4	0.03	0.06	0.03	59.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Appendix B: SIDRA Results – Construction Period

MOVEMENT SUMMARY

▽ Site: [1 (3)] Irrigation Way / Murrami Road - Construction
Period - AM Peak (CONSTRUCTION PERIOD)
Output produced by SIDRA INTERSECTION Version: 10.0.4.216

Irrigation Way / Murrami Road - Construction Period - AM Peak
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance													
Mov ID	Turn	Mov Class	Demand Flows [Total HV] veh/h %	Arrival Flows [Total HV] veh/h %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Murrami Road (S)													
1	L2	All MCs	2 50.0	2 50.0	0.026	6.5	LOS A	0.1	0.9	0.41	0.58	0.41	48.9
2	T1	All MCs	3 0.0	3 0.0	0.026	6.7	LOS A	0.1	0.9	0.41	0.58	0.41	51.2
3	R2	All MCs	9 44.4	9 44.4	0.026	10.2	LOS B	0.1	0.9	0.41	0.58	0.41	49.0
Approach			15 35.7	15 35.7	0.026	8.9	LOS A	0.1	0.9	0.41	0.58	0.41	49.4
East: Irrigation Way (E)													
4	L2	All MCs	12 27.3	12 27.3	0.043	5.9	LOS A	0.0	0.0	0.00	0.09	0.00	55.6
5	T1	All MCs	137 10.0	137 10.0	0.043	0.0	LOS A	0.0	0.2	0.02	0.06	0.02	59.5
6	R2	All MCs	3 33.3	3 33.3	0.043	6.3	LOS A	0.0	0.2	0.03	0.03	0.03	55.4
Approach			152 11.8	152 11.8	0.043	0.6	NA	0.0	0.2	0.02	0.06	0.02	59.1
North: Murrami Road (N)													
7	L2	All MCs	8 12.5	8 12.5	0.015	6.0	LOS A	0.1	0.5	0.24	0.52	0.24	51.4
8	T1	All MCs	3 66.7	3 66.7	0.015	9.4	LOS A	0.1	0.5	0.24	0.52	0.24	50.1
9	R2	All MCs	1 0.0	1 0.0	0.015	7.9	LOS A	0.1	0.5	0.24	0.52	0.24	51.8
Approach			13 25.0	13 25.0	0.015	7.0	LOS A	0.1	0.5	0.24	0.52	0.24	51.1
West: Irrigation Way (W)													
10	L2	All MCs	1 0.0	1 0.0	0.035	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.4
11	T1	All MCs	114 16.7	114 16.7	0.035	0.1	LOS A	0.0	0.4	0.03	0.04	0.03	59.7
12	R2	All MCs	4 50.0	4 50.0	0.035	7.1	LOS A	0.0	0.4	0.06	0.07	0.06	54.5
Approach			119 17.7	119 17.7	0.035	0.4	NA	0.0	0.4	0.03	0.04	0.03	59.5
All Vehicles			298 15.9	298 15.9	0.043	1.2	NA	0.1	0.9	0.05	0.10	0.05	58.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

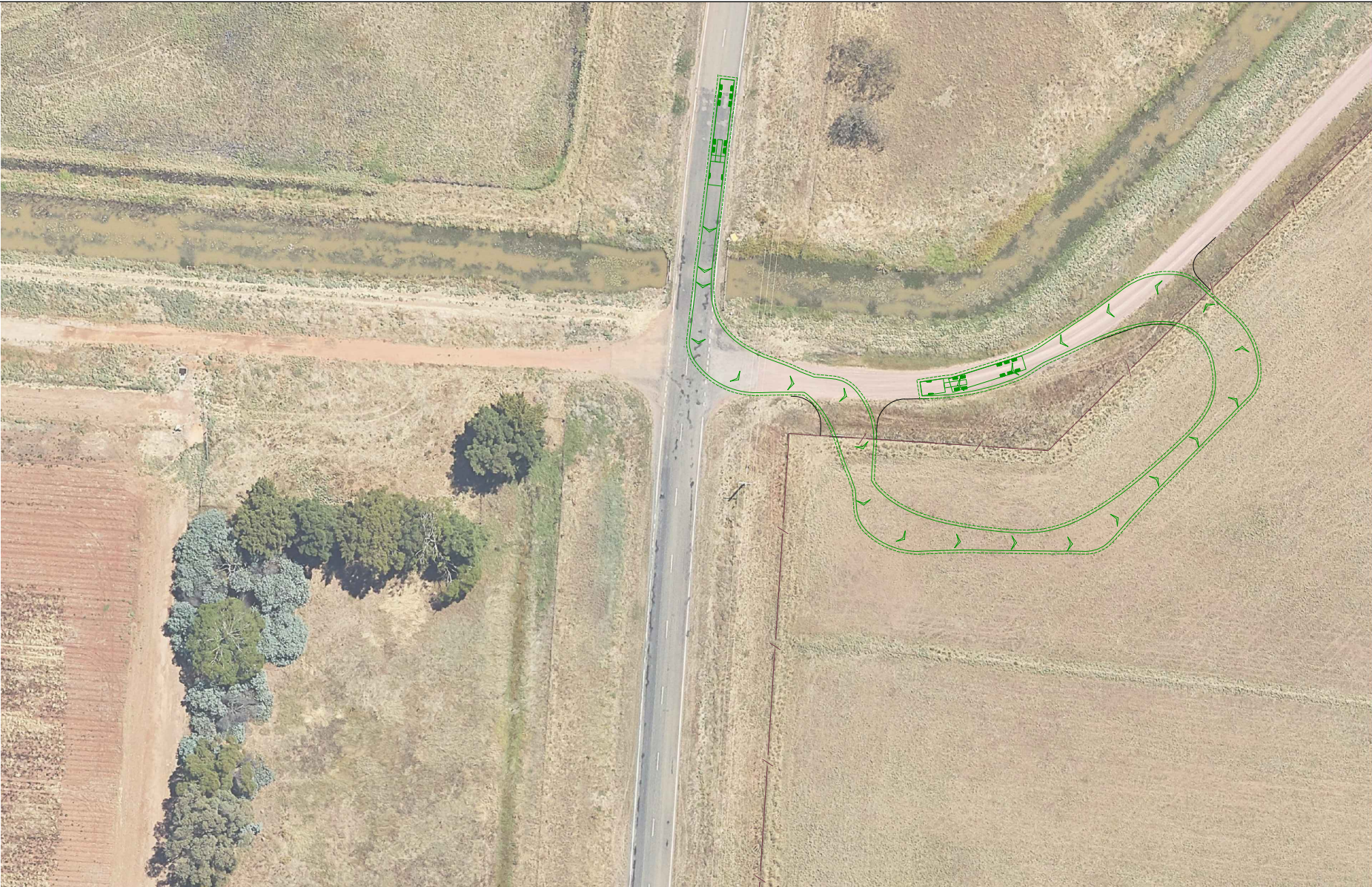
▼ Site: [1 (4)] Irrigation Way / Murrami Road - Construction
Period - PM Peak (CONSTRUCTION PERIOD)
Output produced by SIDRA INTERSECTION Version: 10.0.4.216

Irrigation Way / Murrami Road - Construction Period - PM Peak
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop of Cycles	Number of Cycles	Aver. Speed
			[Total HV]	[Total HV]	[Total HV]	[Total HV]				[Veh.]	[Dist]		Rate to Depart		km/h
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Murrami Road (S)															
1	L2	All MCs	3	33.3	3	33.3	0.030	6.3	LOS A	0.1	1.0	0.39	0.59	0.39	49.4
2	T1	All MCs	1	100.0	1	100.0	0.030	11.1	LOS B	0.1	1.0	0.39	0.59	0.39	47.9
3	R2	All MCs	13	25.0	13	25.0	0.030	9.4	LOS A	0.1	1.0	0.39	0.59	0.39	49.5
Approach			17	31.2	17	31.2	0.030	9.0	LOS A	0.1	1.0	0.39	0.59	0.39	49.4
East: Irrigation Way (E)															
4	L2	All MCs	14	23.1	14	23.1	0.044	5.8	LOS A	0.0	0.0	0.00	0.10	0.00	55.6
5	T1	All MCs	133	13.5	133	13.5	0.044	0.1	LOS A	0.1	0.4	0.03	0.09	0.03	59.1
6	R2	All MCs	7	0.0	7	0.0	0.044	6.0	LOS A	0.1	0.4	0.06	0.08	0.06	56.6
Approach			154	13.7	154	13.7	0.044	0.9	NA	0.1	0.4	0.03	0.09	0.03	58.7
North: Murrami Road (N)															
7	L2	All MCs	1	100.0	1	100.0	0.006	7.3	LOS A	0.0	0.2	0.34	0.52	0.34	47.9
8	T1	All MCs	2	0.0	2	0.0	0.006	6.8	LOS A	0.0	0.2	0.34	0.52	0.34	52.0
9	R2	All MCs	1	0.0	1	0.0	0.006	8.0	LOS A	0.0	0.2	0.34	0.52	0.34	51.5
Approach			4	25.0	4	25.0	0.006	7.2	LOS A	0.0	0.2	0.34	0.52	0.34	50.8
West: Irrigation Way (W)															
10	L2	All MCs	1	0.0	1	0.0	0.039	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	57.4
11	T1	All MCs	128	15.6	128	15.6	0.039	0.1	LOS A	0.1	0.4	0.03	0.04	0.03	59.6
12	R2	All MCs	6	16.7	6	16.7	0.039	6.4	LOS A	0.1	0.4	0.07	0.08	0.07	55.8
Approach			136	15.5	136	15.5	0.039	0.4	NA	0.1	0.4	0.03	0.05	0.03	59.4
All Vehicles			311	15.6	311	15.6	0.044	1.2	NA	0.1	1.0	0.06	0.10	0.06	58.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
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Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

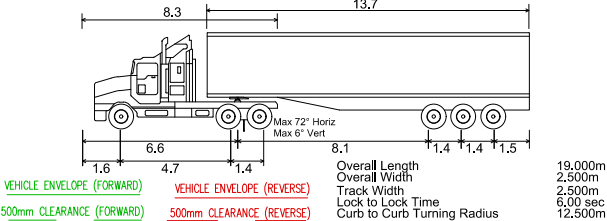
Appendix C: Swept Path Analysis



traverse

TRAVERSE TRANSPORT PTY LTD
ABN 43 671 343 365
425 SMITH STREET
FITZROY, VICTORIA 3065
TELEPHONE +61435 267 778

AV - Articulated Vehicle (AS2890.2:2002)



Proposed Solar PV Facility
125 Briggs Road, Stanbridge
Swept Path Assessment

DRAWING NOTES:
1) Base Plan Prepared by:
Bison Energy Company
2) Maximum Design Speed 10km/h

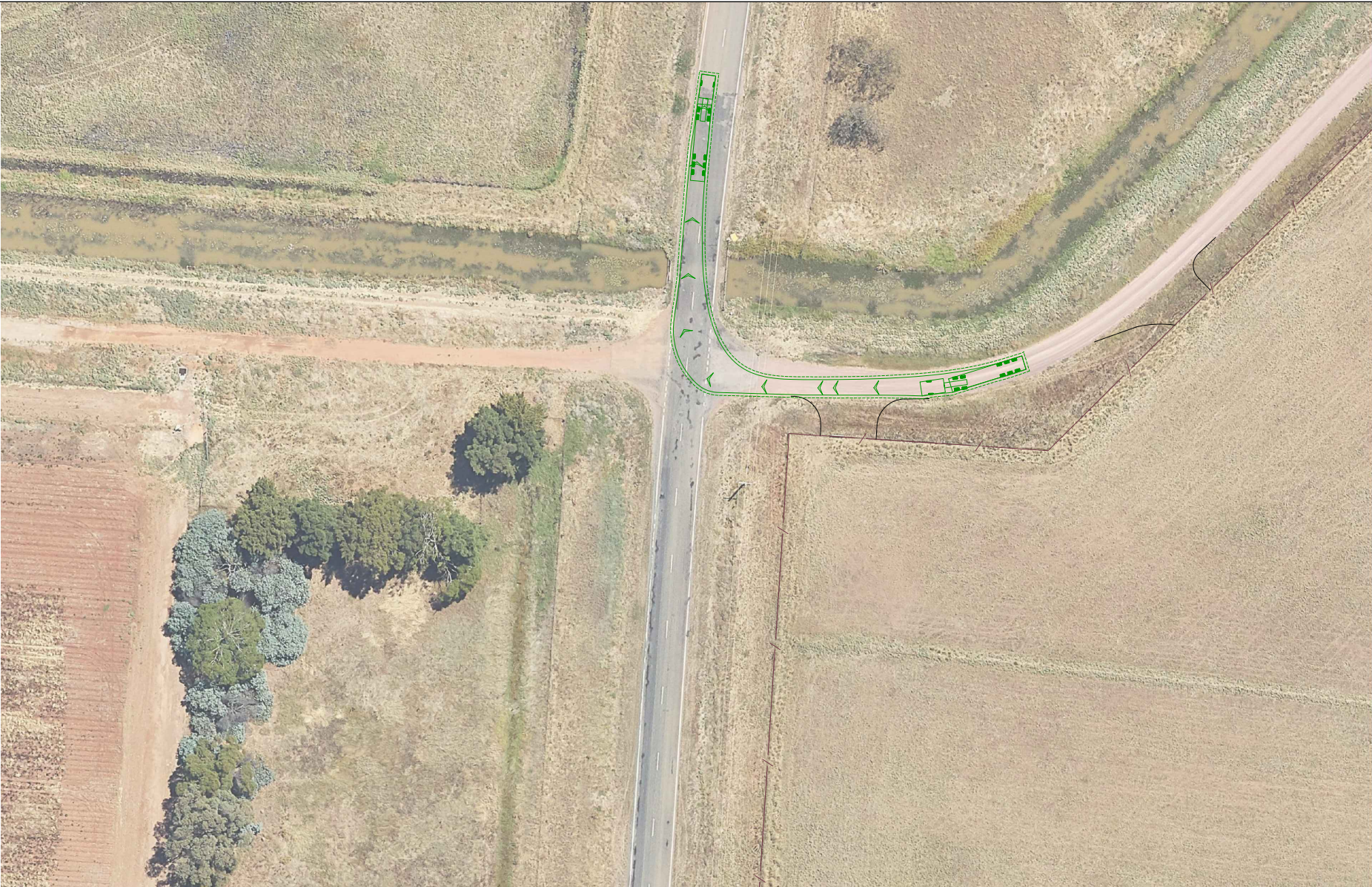


TRAVERSE REFERENCE
206T-SK01/JM

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1 of 5

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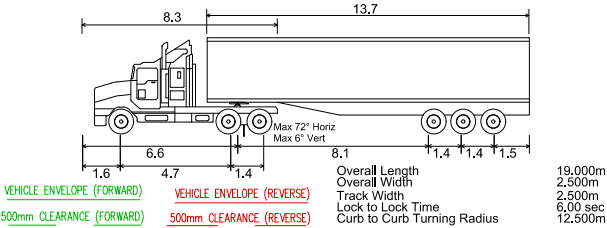
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Proposed Solar PV Facility
125 Briggs Road, Stanbridge
Swept Path Assessment

DRAWING NOTES:
1) Base Plan Prepared by:
Bison Energy Company
2) Maximum Design Speed 10km/h



TRAVERSE REFERENCE
206T-SK01/JM

SHEET NO.
2 of 5

SCALE
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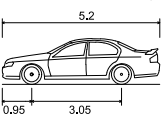
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TELEPHONE +61435 267 778

B99 Vehicle (AS/NZS2890.1:2004)



Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock to Lock Time
Curb to Curb Turning Radius

VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

5.200m
1.940m
2.200m
0.312m
1.840m
4.00 sec
6.30m

Proposed Solar PV Facility
125 Briggs Road, Stanbridge
Swept Path Assessment

TRAVERSE REFERENCE
206T-SK01/JM

SHEET NO.
3 of 5

DRAWING NOTES:
1) Base Plan Prepared by:
Bison Energy Company
2) Maximum Design Speed 10km/h

SCALE
1:500@A4



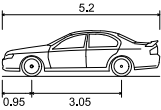
DATE
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TRAVERSE TRANSPORT PTY LTD
ABN 43 671 343 365
425 SMITH STREET
FITZROY, VICTORIA 3065
TELEPHONE +61435 267 778

B99 Vehicle (AS/NZS2890.1:2004)



Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock to Lock Time
Curb to Curb Turning Radius

VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

5.200m
1.940m
2.200m
0.312m
1.840m
4.00 sec
6.30m

Proposed Solar PV Facility
125 Briggs Road, Stanbridge
Swept Path Assessment

TRAVERSE REFERENCE
206T-SK01/JM

SHEET NO.
4 of 5

DRAWING NOTES:
1) Base Plan Prepared by:
Bison Energy Company
2) Maximum Design Speed 10km/h

SCALE
1:500@A4



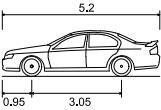
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FITZROY, VICTORIA 3065
TELEPHONE +61435 267 778

B99 Vehicle (AS/NZS2890.1:2004)



Overall Length
Overall Width
Overall Body Height
Min Body Ground Clearance
Track Width
Lock to Lock Time
Curb to Curb Turning Radius

VEHICLE ENVELOPE (FORWARD)
300mm CLEARANCE (FORWARD)
VEHICLE ENVELOPE (REVERSE)
300mm CLEARANCE (REVERSE)

5.200m
1.940m
2.200m
0.312m
1.840m
4.00 sec
6.30m

Proposed Solar PV Facility
125 Briggs Road, Stanbridge
Swept Path Assessment

TRAVERSE REFERENCE
206T-SK01/JM

SHEET NO.
5 of 5

DRAWING NOTES:
1) Base Plan Prepared by:
Bison Energy Company
2) Maximum Design Speed 10km/h

SCALE
1:500@A4



DATE
03/10/2025

APPROVED

Subject to compliance with the accompanying notice
of determination conditions of:

Development Application No:

DA 134-2025

Date:

3 July 2026



LEETON
SHIRE COUNCIL



125 Briggs Road, Stanbridge Solar Facility Noise and Vibration Impact Assessment

BE PRO STB PTY LTD

Report Reference: 250284 – 125 Briggs Road, Stanbridge Solar Facility – Noise and Vibration Impact Assessment – R0

Date: 8 October 2025

Revision: R0

Project Number: 250284

**DOCUMENT CONTROL**

Project Name:	125 Briggs Road, Stanbridge Solar Facility – Noise and Vibration Impact Assessment
Project Number:	250284
Report Reference:	250284 – 125 Briggs Road, Stanbridge Solar Facility – Noise and Vibration Impact Assessment – R0
Client:	BE PRO STB PTY LTD

Revision	Description	Reference	Date	Prepared	Checked	Authorised
0	Revision 0	For information	08/10/25	NDC	MA	MA

PREPARED BY:

Pulse White Noise Acoustics Pty Ltd

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Phone: 1800 4 PULSE

This report has been prepared by Pulse White Noise Acoustics Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with BE PRO STB PTY LTD.

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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1 INTRODUCTION

1.1 Background

BE PRO STB PTY LTD (the Client) is proposing to develop a 5 MW Solar PV Facility and an accompanying 5 MWh battery Energy Storage System (BESS) at 125 Briggs Road, Stanbridge (Lot 109 DP751703).

The proposal includes the construction of a solar farm and accompanying electrical equipment. This assessment considers the noise and vibration impacts of the full operational capacity of the development.

The proposed operational hours if the development are:

- Operate continuously 24 / 7.

1.2 Scope of this report

Pulse White Noise Acoustics (PWNA) has been engaged to undertake a Noise and Vibration Impact Assessment (NVIA) for the proposed development. This NVIA is developed to form part of the designated and integrated development application to address noise and vibration impacts that have the potential to be generated by the proposal.

This report:

- Identifies the existing noise sensitive receivers,
- Presents details about the existing noise environment, including existing noise measurements of the existing operation on site,
- Identifies the applicable NSW noise and vibration policies and applicable construction and operational design criteria,
- Assesses the construction and operational noise and vibration impacts in accordance with the applicable NSW policies; and
- Provides construction and operational noise and vibration mitigation and management measures to comply with the applicable design criteria.



2 EXISTING AMBIENT NOISE ENVIRONMENT

2.1 Land uses

The project site is located within the existing agricultural area approximately 12 km east of Whitton, NSW. The project site is bounded by Murrami Road along the western boundary, Briggs Road along the northwestern and northern boundary, and existing agricultural farming land along the southern boundary.

The nearest existing residential receivers are located approximately 30 m to the west of the project site and 220 m northeast. Additional residential receivers are located further to the north and south of the project site.

The project site is located within an existing agricultural farming area. The noise environment of the nearest receivers of the project site is typical of rural farmland, with background noise levels largely controlled by natural sounds with little / no road traffic noise.

Presented below in Table 1 are the location of the potentially most affected sensitive receivers. These locations are illustrated in Figure 1 below.

Table 1 Noise sensitive receivers.

ID	Address	Use
R01	149 Murrami Road Stanbridge	Residential – RU1
R02	125 Briggs Road Stanbridge	Residential – RU1
R03	10 Carver Road Stanbridge	Residential – RU1
R04	33 Carver Road Stanbridge	Residential – RU1
R05	253 Jewell Road Stanbridge	Residential – RU1

Figure 1 Site map, measurement locations and surrounding receivers – site map sourced from SixMaps.





2.2 Noise survey

Background noise logging was undertaken in one location between the 3rd of August 2025 and the 12th of August 2025. Noise Logger 01 was positioned along the southwestern boundary of the project site. The results from logger 01 have been presented in Appendix B.1, and not been corrected (i.e., raw data is presented).

Instrumentation for the survey comprised one SVANTEK 958 sound level meter (NL01 - Serial number 92397). Calibration of the logger was checked prior to and following the measurements. Drift in calibration did not exceed ± 0.5 dB. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Charts presenting summaries of the measured daily noise data are attached in Appendix B.1. The charts present each 24-hour period and show the L_{A01} , L_{A10} , L_{Aeq} and L_{A90} noise levels for the corresponding 15-minute periods. This data has been filtered to remove periods affected by adverse weather conditions based on weather information.

Data affected by adverse meteorological conditions and by spurious and uncharacteristic events have been excluded from the results and excluded from the data used to determine the noise emission criteria. Meteorological information has been obtained from the Yanco AWS (ID 074037) which is located within 30 km of the project site. Noise levels provided are processed results with extraneous weather events removed.

The noise logger location illustrated Figure 1 above and has been selected to measure the existing noise environment representative of the nearby noise sensitive receivers.

The Rating Background Noise Level (RBL) is the background noise level used for assessment purposes at the nearest potentially affected receiver. It is the 90th percentile of the daily background noise levels during each assessment period, being day, evening and night. The L_{Aeq} is the ambient noise level (logarithmically averaged) over the period.

The standard measurement periods used in NSW for site noise impacts are:

- Daytime – 7:00 am to 6:00 pm
- Evening – 6:00 pm to 10:00 pm
- Night-time – 10:00 pm to 7:00 am

Presented in Table 2 is a summary of the ambient and RBL noise levels measured over the entire measurement period. Noise logging charts are presented in Appendix B.1. These noise levels are used throughout the assessment to determine the existing noise environment and establish appropriate site-specific noise criteria.

Table 2: Measured ambient noise levels, dB(A).

ID	Address	Rating background level			Ambient noise level, $L_{Aeq,period}$		
		Daytime	Evening	Night	Daytime	Evening	Night
Noise Logger 01	Along the southwestern boundary of the project site. (refer to Figure 1)	32	25	19	71	62	56

The dominate noise source for Nosie Logger 01 consists of primarily natural sounds (birds chirping) and distant agricultural noise (tractors / machinery noise). An inspection of the logger location and nearest residential receivers identified that the noise logger location was representative of the noise environment for all nearby sensitive receivers.

3 NOISE AND VIBRATION CRITERIA

3.1 Construction noise

The EPA's Interim Construction Noise Guideline (ICNG) provides guidance on appropriate construction noise management levels that should be adhered to on construction projects throughout NSW. This guideline identifies that potential impacts from construction noise are determined based on time of day of the noise, the increase in site noise above background noise, the duration of the event, and any adverse characteristics of the noise.

The ICNG provides assessment procedures for the assessment of noise impacts, and management and mitigation measures procedures to address potential impacts on sensitive receivers. The main objectives of the ICNG are:

- Promote a clear understanding of ways to identify and minimise noise from construction works,
- Focus on applying all feasible and reasonable work practices to minimise construction noise impacts,
- Encourage construction to be undertaken only during the recommended standard hours unless approval is given for works that cannot be undertaken during these hours,
- Streamline the assessment and approval stages and reduce time spent dealing with complaints at the project implementation stage; and
- Provide flexibility in selecting site-specific feasible and reasonable work practices to minimise noise impacts.

The ICNG identifies a quantitative assessment approach which is applicable to this project. The quantitative assessment method involves predicting noise levels at sensitive receivers and comparing them with site specific Noise Management Levels (NMLs). The NML affectation categories for receivers have been reproduced from the guideline and are listed in Table 3.

Table 3 Construction noise management levels – residential receivers.

Receiver type	Time of day	Noise management level $L_{Aeq(15minute)}^{1,2}$	How to apply
Residential	Approved working hours of the project, including: Monday-Friday 7 am -6 pm and Saturday 8 am - 1 pm	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured $L_{Aeq(15minute)}$ is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.

Receiver type	Time of day	Noise management level $L_{Aeq(15\text{minute})}^{1,2}$	How to apply
		Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. Times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences. 2. If the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
	Outside recommended standard hours	Noise affected RBL + 5 dB	A strong justification would typically be required for works outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5 dB above the noise affected level, the proponent should negotiate with the community.
Note 1 Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m of the residence. Noise levels may be higher at upper floors of the noise affected residence. Note 2 The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours). The term RBL is described in detail in the NSW Industrial Noise Policy (EPA 2000).			

The ICNG also provides NMLs for non-residential land uses. Unlike residential receivers, these criteria are fixed levels, independent of local background noise levels. Presented below in Table 4 are NMLs for non-residential land uses.

**Table 4 Construction noise management levels – other receivers.**

Land use	Location applied	Noise management level, $L_{Aeq,15min}$
Classrooms and other educational institutions	Internal noise level	45 dB(A)
Hospital wards and operating theatres	Internal noise level	45 dB(A)
Places of worship	Internal noise level	45 dB(A)
Active recreation areas (characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion)	External noise level	65 dB(A)
Passive recreation areas (characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, for example, reading, meditation)	External noise level	60 dB(A)
Community centres	Refer to the recommended "maximum" internal levels in AS2107 for specific uses	
Industrial premises	External noise level	75 dB(A)
Offices, retail outlets	External noise level	70 dB(A)

3.1.1 Site specific noise management levels

Presented below in Table 5 is the receiver specific noise criteria. For sensitive receivers such as educational, an external noise criterion is assumed based on a typical indoor to outdoor attenuation from an open window of 10 dB(A).

Table 5 Site specific external construction noise management levels, dB(A).

Area	Type	Daytime 7 am to 6 pm	Evening 6 pm to 10 pm	Night-time 10 pm to 7 am	Highly noise affected
All	Residential	45 ¹	35 ¹	35 ¹	75

Note 1 Measured background noise levels were below the NPfI minimum background noise levels (Table E3.1 – NPfI). Hence, the external criteria has been based on the rated background noise levels + 10 / + 5 for standard and non-standard house respectively. Daytime RBL = 35 dB(A), Evening RBL = 30 dB(A), and nighttime RBL = 30 dB(A).

3.2 Construction vibration criteria

Effects of ground borne vibration on buildings may be segregated into two major categories:

- Human comfort – vibration in which the occupants or users of the building are inconvenienced or possibly disturbed.
- Effects on building structures – where vibration can compromise the integrity of the building or structure itself



Vibration criteria – human comfort

Vibration effects relating specifically to the human comfort aspects of the project are taken from the guideline titled *"Assessing Vibration – A Technical Guideline"* (AVATG). Vibration impacts can be defined based on the nature of the construction works and vibration generated, specifically:

- Continuous vibration – from uninterrupted sources (refer to Table 6).
- Impulsive vibration – up to three instances of sudden impact e.g. dropping heavy items, per monitoring period (refer to Table 7).
- Intermittent vibration – such as from drilling, compacting or activities that would result in continuous vibration if operated continuously (refer to Table 8).

Presented below in Table 6, Table 7, and Table 8 is a summary of the applicable human comfort vibration criteria, for continuous, impulsive, and intermittent vibration respectively.

Table 6 Continuous vibration acceleration criteria (m/s²) 1 Hz-80 Hz.

Location	Assessment period	Preferred Values		Maximum Values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day or night-time	0.020	0.014	0.040	0.028
		0.04	0.029	0.080	0.058
Workshops	Day or night-time	0.04	0.029	0.080	0.058

Table 7 Impulsive vibration acceleration criteria (m/s²) 1 Hz-80 Hz.

Location	Assessment period	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day or night-time	0.64	0.46	1.28	0.92
Workshops	Day or night-time	0.64	0.46	1.28	0.92

**Table 8 Intermittent vibration impacts criteria (m/s^{1.75}) 1 Hz-80 Hz.**

Location	Daytime		Night-time	
	Preferred	Maximum	Preferred	Maximum
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutions and places of worship	0.40	0.80	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

Vibration criteria – building contents and structures

The vibration effects on the building are provided by British Standard BS 7385: Part 2-1993 "Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration" (BSI 1993)

The criteria are based on peak particle velocity (mm/s) which is to be measured at the base of the building. These are summarised in Table 9 and illustrated in Figure 2.

Table 9 Transient vibration criteria as per standard BS 7385 Part 2 – 1993.

Line in standard	Type of Building	Peak component particle velocity in frequency range of predominant pulse	
		4 Hz to 15 Hz	15 Hz and Above
1	Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
2	Unreinforced or light framed structures Residential or light commercial type buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

The vibration standard BS 7385 Part 2 – 1993 states that the values in Table 9 relate to transient vibration which does not cause resonant responses in buildings.

Where the dynamic loading caused by continuous vibration events is such as that results in dynamic magnification due to resonance (especially at the lower frequencies where lower guide values apply), then the values in Table 9 may need to be reduced by up to 50% (refer to Line 3 in Figure 2).

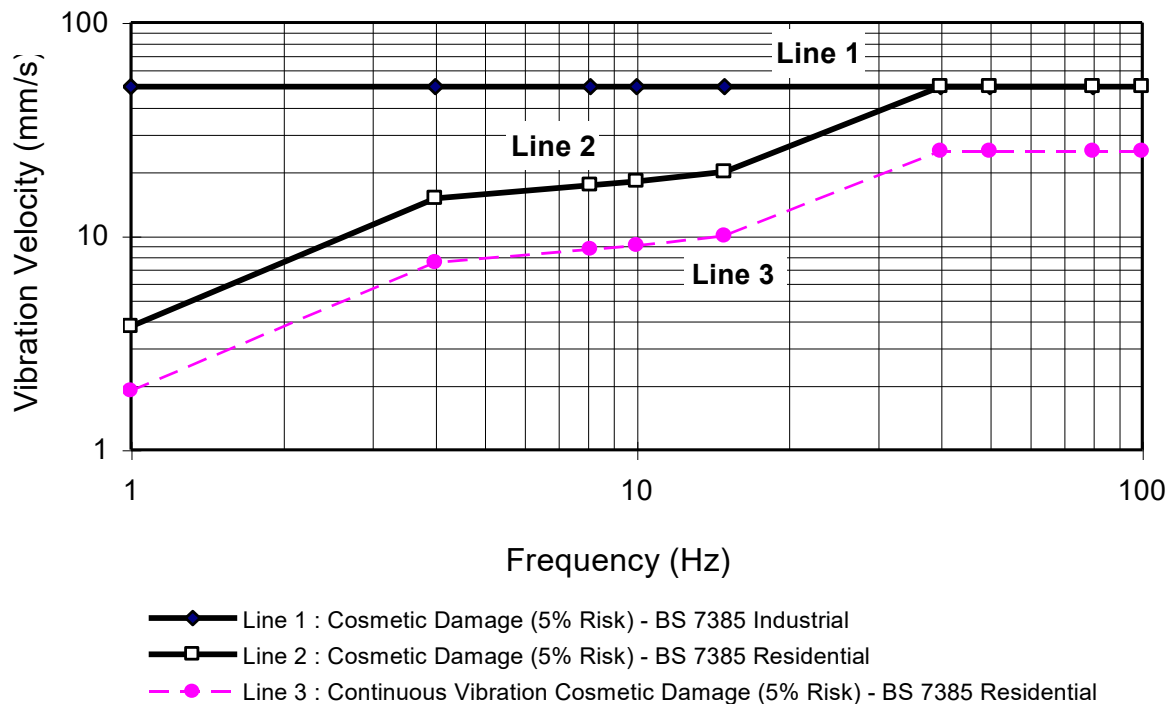


Figure 2 BS 7385 Part 2 – 1993, graph of transient vibration values for cosmetic damage

In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the recommended values corresponding to Line 2 are reduced. Below a frequency of 4 Hz where a high displacement is associated with the relatively low peak component particle velocity value, a maximum displacement of 0.6 mm (zero to peak) is recommended. This displacement is equivalent to a vibration velocity of 3.7 mm/s at 1 Hz.

The standard also states that minor damage is possible at vibration magnitudes which are greater than twice those given in Table 9, and major damage to a building structure may occur at values greater than four times the tabulated values.

Fatigue considerations are also addressed in the standard and it is concluded that unless calculation indicates that the magnitude and number of load reversals is significant (in respect of the fatigue life of building materials) then the values in Table 9 should not be reduced for fatigue considerations.

Project vibration criteria

Based on the details included in the sections above the project specific vibration criteria to protect the surrounding lightweight industrial and heavy industrial receivers from structural or architectural damage includes the following:

- Project construction vibration management level at all surrounding building structures – 7.5 mm/s.

In the event that this vibration criterion is exceeded, further investigation is required, including an assessment of the nature of the vibration and frequency characteristics to determine if the vibration criterion can be relaxed for the specific nature of the works.



3.3 Operational facility noise criteria

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the NSW Environment Protection Authority (EPA).

The EPAs NSW Noise Policy for Industry (NPfI) provides guidance on appropriate noise levels for external noise emissions from fixed facilities on surrounding sensitive receivers. The NPfI criteria for industrial noise sources have two components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity of defined land uses for residents and sensitive receivers in other land uses.

The intrusiveness noise level protects against significant changes in noise, while the amenity noise level seeks to protect against cumulative noise impacts from industry. Together, these levels are used to assess the potential impact of noise and assess reasonable and feasible noise mitigation measures. Project noise trigger levels are developed through this process. They are not used directly as regulatory limits.

The NPfI requires a project to take consideration of other industrial noise sources in setting amenity noise objectives. In cases of a new development where there are no existing industrial sources, the NPfI accepts a default of the amenity noise level minus 5 dB to take account of future industrial sources.

For this project, the default amenity noise level minus 5 dB adjustment will be used to account for cumulative noise sources.

3.3.1 Intrusive noise impacts – residential receivers

The intrusiveness noise level protects against significant changes in noise levels and is applicable to residential receivers only. The criterion is defined by the formula below:

$$L_{Aeq,15min} = \text{rating background noise level} + 5 \text{ dB}$$

The RBL is the average background noise level over a measurement period of at least one week. Using the RBL results in the intrusiveness criterion being met for 90% of the time. Adjustments are to be applied to the level of noise produced by the source that is received at the assessment point where the noise source contains annoying characteristics such as tonality or impulsiveness.

Presented below in Table 10 is a summary of the measured RBL and corresponding intrusiveness level for each time period.

Table 10 Intrusive noise criteria, dB(A).

Location	Rating background level			Intrusive noise level, $L_{Aeq,15min}$		
	Daytime	Evening	Night-time	Daytime	Evening	Night-time
All Areas	32	25	19	37	30	24



3.3.2 Protecting noise amenity

The amenity noise level seeks to protect against cumulative noise impacts from industry.

The NPfI uses project noise trigger levels measured over a 15-minute time period, assessed as an $L_{Aeq,15min}$. To account for converting $L_{Aeq,period}$ to $L_{Aeq,15min}$, the NPfI accepts a default conversion factor of $L_{Aeq,15min} = L_{Aeq,period} + 3$ dB.

To ensure industrial noise levels do not gradually increase with new developments, a minus 5 dB correction is applied to the amenity noise level. The amenity noise levels have been presented in Table 11.

Table 11 Amenity noise levels, dB(A).

Receiver	Noise amenity area	Time of day	Recommended amenity noise level
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks	5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day		
School classroom	All	Noisiest 1-hour period	35 internal
Hospital ward	All	Noisiest 1-hour period	35 internal 50 external
Place of worship	All	When in use	40
Passive recreation	All	When in use	50
Active recreation	All	When in use	55
Commercial	All	When in use	65
Industrial	All	When in use	70
Industrial interface	Add 5 dB(A) to recommended noise amenity area		

3.3.3 Corrections for annoying noise characteristics

Table C1 of the NPfI provides corrections for tonality, intermittency, irregularity or dominant low-frequency content. These corrections are to be added to the measured or predicted noise levels at the receiver before comparison with the project noise trigger levels. NPfI also provides adjustments for duration that can increase the project noise criterion for unusual or one-off high-noise level events.

3.3.4 Low frequency noise correction

A difference of 15 dB or more between the C- and A-weighted noise measurements, identifies the potential for an unbalanced spectrum and an increased likelihood of low frequency noise annoyance.

The difference between C- and A-weighted noise levels is typically used as a screening tool to determine if further investigation is required. Where further investigation confirms significant low frequency content, a low frequency noise correction is applied to the predicted or measured noise levels.

The NPfI identifies that the corrections should 'reflect external assessment locations', or sensitive receiver locations so the existing noise environment should be considered.

3.3.5 Residential receivers – area classification

As shown in Figure 3 below, the development site is located within an area classified as RU1 (Primary Production). All of the nearest residential receivers are also located within the RU1 classified area.

Figure 3 NSW ePlanning Spatial viewer



3.3.6 Project specific noise trigger levels

The NPfI characterises a Rural Residential area noise environment as an area with an acoustical environment that is:

As area with an acoustical environment that is dominated by natural sounds, having little or no road traffic noise and generally characterised by low background noise levels. Settlement patterns would be typically sparse.

Based on the above description, the surrounding residential receivers would be best classed as Rural Residential.

Presented below in Table 12 is a summary of the project specific noise trigger levels.

**Table 12 Project specific noise trigger level, $L_{Aeq,15\text{minute}}$ dB(A).**

Receiver	Time period	RBL	Intrusiveness	Amenity ¹	Overall ²
Residential	Daytime	32	37 40 ³	48	40
	Evening	25	30 35 ³	43	35
	Night-time	19	24 35 ³	38	35

Note 1 As previously discussed, the amenity noise level has been reduced by 5 dB(A) to account for other industrial noise sources and increased by 3 dB(A) to convert from $L_{Aeq,period}$ to $L_{Aeq,15\text{minute}}$

Note 2 The overall PNTL is the more stringent of the intrusiveness and amenity criteria (shown in bold).

Note 3 The NPfI includes an allowance for minimum RBLs and intrusiveness levels. The minimum intrusiveness levels are 40 dB(A) during the daytime and 35 dB(A) during the evening and night-time.

3.4 Operational road traffic noise

Industrial developments have the potential to generate additional road traffic and associated noise impacts from the vehicles accessing the site. The EPAs Road Noise Policy provides guidance on appropriate noise criteria which should be considered.

Presented below are the applicable noise criteria for road traffic on local roads and arterial / sub-arterial roads. Access routes for vehicles accessing the site will utilise the following routes: Murrumbidgee Road (Local Road), Irrigation Way (Arterial Road).

The road noise criteria for local roads and sub-arterial / arterial roads for residential receivers are presented in Table 13 below.

Table 13 Road noise criteria.

Road category	Type of project / land use	Assessment criteria, dB(A)	
		Daytime 7am-10pm	Night-time 10pm-7am
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq,1\text{ hour}}$ 55 (external)	$L_{Aeq,1\text{ hour}}$ 50 (external)
Freeway /arterial / sub-arterial roads	Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,15\text{hour}}$ 60 (external)	$L_{Aeq,9\text{hour}}$ 55 (external)

Where the predicted noise levels with the project indicate likelihood to exceed the noise criteria presented in Table 13, it is considered not reasonable and feasible to provide noise mitigation measures if the project does not increase noise by greater than 2.0 dB. A change of 2 dB to 3 dB in road traffic noise is often considered to be indiscernible.

4 CONSTRUCTION NOISE AND VIBRATION IMPACTS

Noise impacts from construction works associated with the project have been predicted in accordance with the requirements in the EPAs ICNG. A three-dimensional noise model was developed using SoundPLAN v9.1 using the ISO9613 noise propagation algorithm and the noise impacts modelled for each major construction scenario.

Presented below is a summary of the construction activities, equipment and associated sound power levels, and a summary of the predicted noise impacts from the works. An assessment has been completed of the typical worst-case noise impacts. Noise from the project is likely to be lower than the worst-case noise levels presented in this assessment.

4.1 Construction noise scenarios

It is anticipated that the construction methodology of the site will consist of the following stages:

- Stage 1 – Preparation of solar farm site – which includes the use of a grader and trencher machine.
- Stage 2 – Post installation – including the use of a vibratory post driver to instal each post.
- Stage 3 – Installation of solar plant / BESS and associated electrical equipment – including the use of wheel loaders, mobile crane and power hand tools.

The equipment anticipated for use in each task is based on previous project experience. The sound power levels for the equipment likely to be used for each of the listed tasks is provided in Table 14 below.

Table 14 Summary of predicted sound power levels, dB(A).

Tasks	Equipment	Sound power levels (dB(A) re 1pW)	Aggregate per task (dB(A) re 1pW)
Preparation of solar farm site	Grader	113	115
	Wheel loader	112	
	Trencher	105	
Solar panel post installation	Vibratory post driver	119	118
Installation of solar plant / accessories	Mobile crane	97	111
	Wheel loaders	112	
	Power hand tools	97	
Note 1 Aggregate sound power determined by the logarithmic addition of each individual sound power level component.			

Detailed timing is not available at this stage of the project. The specific timing of impacts will be dependent on the contractor's specific equipment selection, staging plan, and ground conditions. All this information will be considered in the Construction Environmental Management Plan, and the Construction Noise and Vibration Management Plan which would be developed by the contractor.

4.2 Assessment methodology

Calculations of the noise impacts have been undertaken in accordance with the ISO9613 noise propagation algorithm at the most affected sensitive receiver locations. ISO9613 includes consideration of downwind noise propagation. Receivers located further from the site would have lower noise levels from the proposed works.

The construction hours are generally restricted to:

- Monday to Friday 7:00 am to 5:00 pm
- Saturday 8:00 am to 5:00 pm
- Sunday/Public Holiday No work or ancillary activity

Night-time construction works are not envisaged to be required for this project.

Presented in Table 15 is a summary of the representative sensitive receivers which have been assessed for this project. The location of the receivers listed below in relation to the site and local area is illustrated in Figure 1. Construction noise contours for all surrounding receivers are also included in this assessment within Appendix C.

Table 15 Sensitive receiver standard hours construction noise management levels, dB(A).

ID	Address	Use	Construction noise management level (standard hours)	Highly noise affected level
R01	149 Murrumbidgee Road Stanbridge	Residential – RU1	45 ¹	75
R02	125 Briggs Road Stanbridge	Residential – RU1	45 ¹	75
R03	10 Carver Road Stanbridge	Residential – RU1	45 ¹	75
R04	33 Carver Road Stanbridge	Residential – RU1	45 ¹	75
R05	253 Jewell Road Stanbridge	Residential – RU1	45 ¹	75

Note 1 Measured background noise levels were below the NPfI minimum background noise levels (Table E3.1 - NPfI). Hence, the external criteria has been based on the rated background noise levels + 10 / 5 for standard and non-standard hours respectively. Daytime RBL = 35 dB(A), Evening RBL = 30 dB(A), and Nighttime RBL = 30 dB(A).

4.3 Predicted construction noise impacts

An assessment of the likely construction noise impacts has been calculated using the ISO9613 noise propagation algorithm. The assessment has been based on the likely equipment which would be used during the proposed works as identified in Section 4.2.

Presented below in Table 16 is a summary of the worst-case predicted noise impacts. Noise contours are also presented in Appendix C.

**Table 16 Predicted standard hours work construction noise impacts, $L_{Aeq,15min}$ dB(A).**

Receiver	Noise management level	Predicted level	Exceedance	Highly noise affected (exceedance)
Stage 1 – Preparation of solar farm site				
R01	45	72	27	75 (-)
R02	45	55	10	75 (-)
R03	45	42	-	75 (-)
R04	45	43	-	75 (-)
R05	45	46	1	75 (-)
Stage 2 – Post installation				
R01	45	57	12	75 (-)
R02	45	53	8	75 (-)
R03	45	45	0	75 (-)
R04	45	46	1	75 (-)
R05	45	47	2	75 (-)
Stage 3 – Installation of solar plant / BESS and associated electrical equipment				
R01	45	50	5	75 (-)
R02	45	46	1	75 (-)
R03	45	38	-	75 (-)
R04	45	39	-	75 (-)
R05	45	40	-	75 (-)

The predicted construction noise impacts provided in Table 16 identify that an exceedance of the noise management levels is likely to occur for receivers R01 and R02, with smaller exceedances predicted for receivers R04 and R05 during periods of extensive works (particularly Stage 1 – Preparation of solar farm site).

No noise sensitive receivers have been identified to be highly noise affected by the proposed works.

Provided in Section 6.1 is a summary of recommended management and mitigation measures which should be followed to reduce the impacts on the local community.

4.4 Out of hours work

Out of hours construction works are currently not proposed as part of this project. However, out of hours works may be required under the following limited circumstances:

- The delivery of materials as required by the Police or other authorities for safety reasons,
- Where it is required to avoid the loss of lives, property and/or to prevent environmental harm in an emergency; or



- Where agreement is reached with affected receivers work may also be undertaken where explicitly approved through an Environment Protection Licence.

4.5 Construction traffic noise assessment

Construction traffic movements will occur on Murrami Road, a local road. There are both residential and industrial receivers that would be affected by both light and heavy vehicles during the construction phase of the project.

Estimated construction volumes are expected to peak at 25 vehicles per hour during peak construction phases.

The noise propagation algorithm Calculation of Road Traffic Noise (CoRTN) has been proven to effectively calculate road traffic noise from free-flowing traffic throughout Australia. Construction noise levels have been predicted for noise sensitive receivers along Murrami Road (nearest local road which contains residential receivers).

In the absence of a detailed traffic study for this development, the existing road traffic volumes along Murrami Road are unknown. Therefore, a detailed assessment of the likely noise increase as a result of the increased road traffic volume is not possible. However, noise impacts to the nearest noise sensitive receivers from the development alone have been predicted for completeness.

Presented in Table 17 below is the predicted construction only noise impacts, assessed against the applicable criteria.

Table 17 Construction traffic noise impacts – standard hours.

Period	Criteria	Existing, dB(A)	Future, dB(A)	Change in noise, dB
Construction Traffic Noise Impacts				
Murrami Road – standard hours	L _{Aeq} (1 hour) External 55 dB(A)	Not available	51	Not available

Table 17 above provides the predicted construction traffic noise resulting from the increased number of vehicles on the nearby roads, however, do not equate the change in noise levels (due to the absence of a detailed traffic study of the area). It is therefore expected that the existing road traffic noise will not be increased by an appreciable amount. It is therefore not considered reasonable, nor feasible to provide noise mitigation to reduce road traffic noise impacts as part of this proposal.

Despite this, construction management of potential impacts is still recommended and are included in Section 6.1.

4.6 Construction vibration assessment

To maintain compliance with the human comfort vibration criteria identified in Section Note 1, it is recommended that the indicative safe distances listed in Table 18 should be maintained. These indicative safe distances should be validated prior to the start of construction works by undertaking operator-attended measurements of vibration levels generated by construction equipment to be used on site.

Recommended safe working distances for various typical items of plant are included in the following table.

Table 18 Recommended indicative safe working distances for vibration intensive plant.

Plant	Rating / Description	Safe Working Distances (m)	
		Cosmetic Damage	Human Comfort (AVTG)
Vibratory roller	< 50 kN (Typically 1 – 2 tonnes)	5	15 – 20
	< 100 kN (Typically 2 – 4 tonnes)	6	20
Small hydraulic hammer	300 kg, typically 5 – 12 tonnes excavator	2	7
Medium hydraulic hammer	900 kg, typically 12 – 18 tonnes excavator	7	23
Large hydraulic hammer	1600 kg, typically 18 – 34 tonnes excavator	22	73
Vibratory pile driver	Sheet piles	2 – 20	20
Jackhammer	Hand held	1	Avoid contact with structure and steel reinforcements

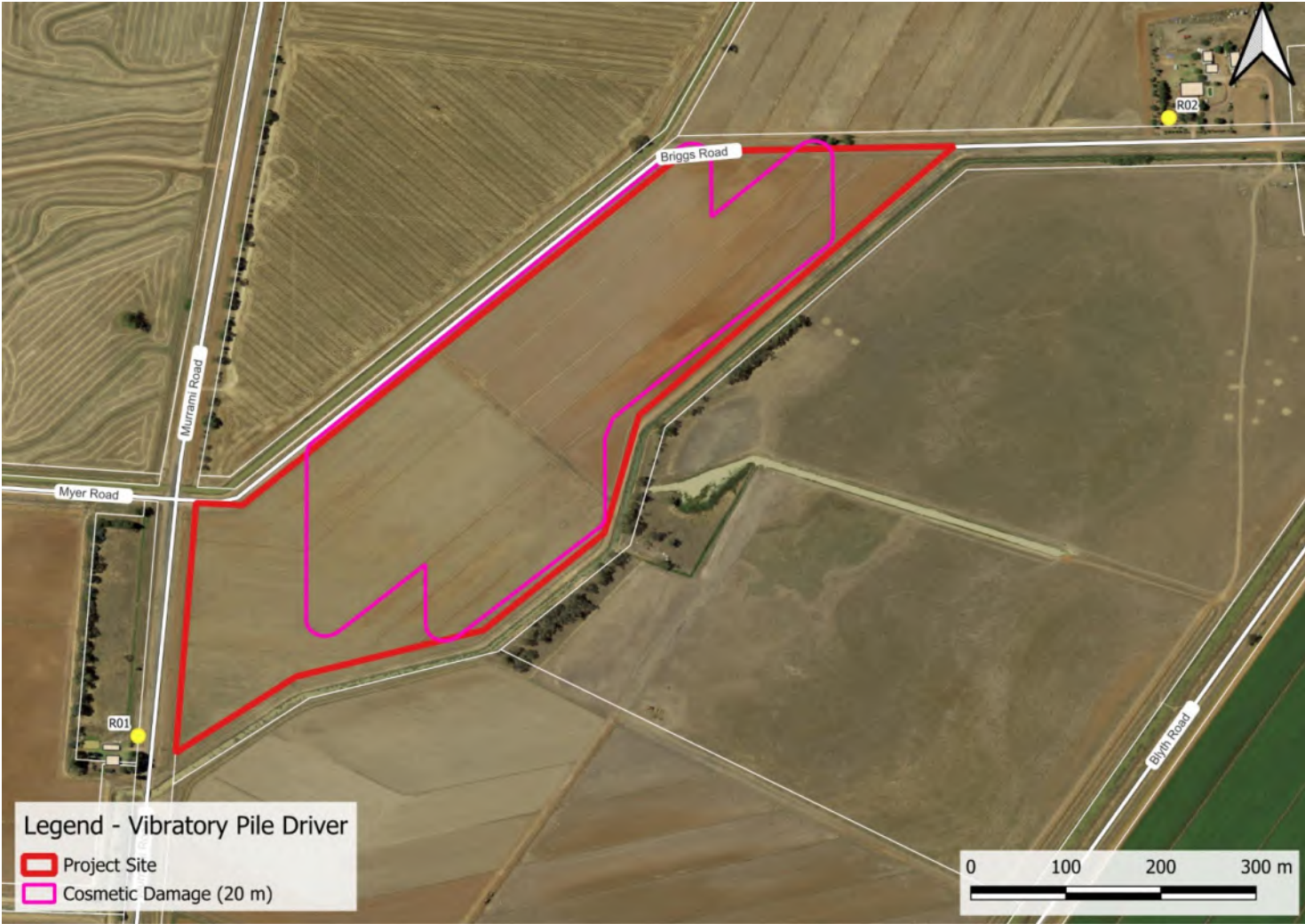
An assessment of the potential for vibration generated as part of the required construction activities on the project has been undertaken based on the expected vibration detailed in the table above. The surrounding residential receivers are very unlikely to exceed the project vibration criteria, or safe working distances.

The safe working distances are illustrated in Figure 4 below. These represent vibration impacts from the project during the post installation phase (using a vibratory post driver) of the proposed works. Each contour indicates a vibration level:

- Residential buildings – 7.5 mm/s

Although the project vibration criteria is not predicted to exceed at any residential receiver, vibration management measures are discussed further in Section 6.1.4 to manage vibration impacts to receivers for completeness.

Figure 4 Safe working distance (vibratory pile driver)





5 OPERATIONAL NOISE IMPACTS

5.1 Modelling methodology

Site operational noise emissions have been calculated using the CONCAWE algorithm. The CONCAWE algorithm has been selected to ensure that noise enhancing weather conditions including temperature inversions and downwind conditions have been appropriately considered in the noise assessment.

CONCAWE provides six meteorological categories, which are different to the Pasquil Stability Category usually referenced. Both adverse wind and temperature inversions fall into CONCAWE Category 6.

The meteorological assessment has assessed a worst-case situation, which entails the calculation of the worst-case weather in all directions for all receivers. The following weather conditions have been included in the assessment, in accordance with the requirements of the NPfI – Fact Sheet D.

Standard meteorological conditions:

- 0.5 m/s wind speeds; and
- Stability category D.

This is equivalent to CONCAWE Meteorological Category 4

Daytime and evening noise enhancing properties:

- 3 m/s wind speeds; and
- Stability category D.

This is equivalent to CONCAWE Meteorological Category 5

Night-time noise enhancing properties:

- 2 m/s wind speeds; and
- Stability category F.

This is equivalent to CONCAWE Meteorological Category 6 (the highest category)

5.2 Operational site noise emissions

Typical operations of the site include the continuous operation of the solar farm and associated electrical equipment, including inverters, battery Energy Storage System (BESS) unit, medium voltage transformer, and Power Conversion System (PCS).

Table 19 below depicts the modelled worst-case noise scenarios for each time of operation. The operational equipment represents a single movement and corrected for the number of operational equipment sources in a 15-minute period.

**Table 19 Predicted worst-case site operations.**

Scenario	Description – Peak 15-minute period
All time periods, continuously operational	2 x Central Inverters – Continuous 24 / 7 operations 1 x 5 MWh BESS – Continuous 24 / 7 operations 1 x PCS – Continuous 24 / 7 operations 1 x MV transformer – Continuous 24 / 7 operations

5.3 Source noise levels

Presented in Table 20 are the sound power levels (SWL) used for this assessment. The SWL represents a single source.

The locations of modelled sources are illustrated in Figure 5 for all time periods.

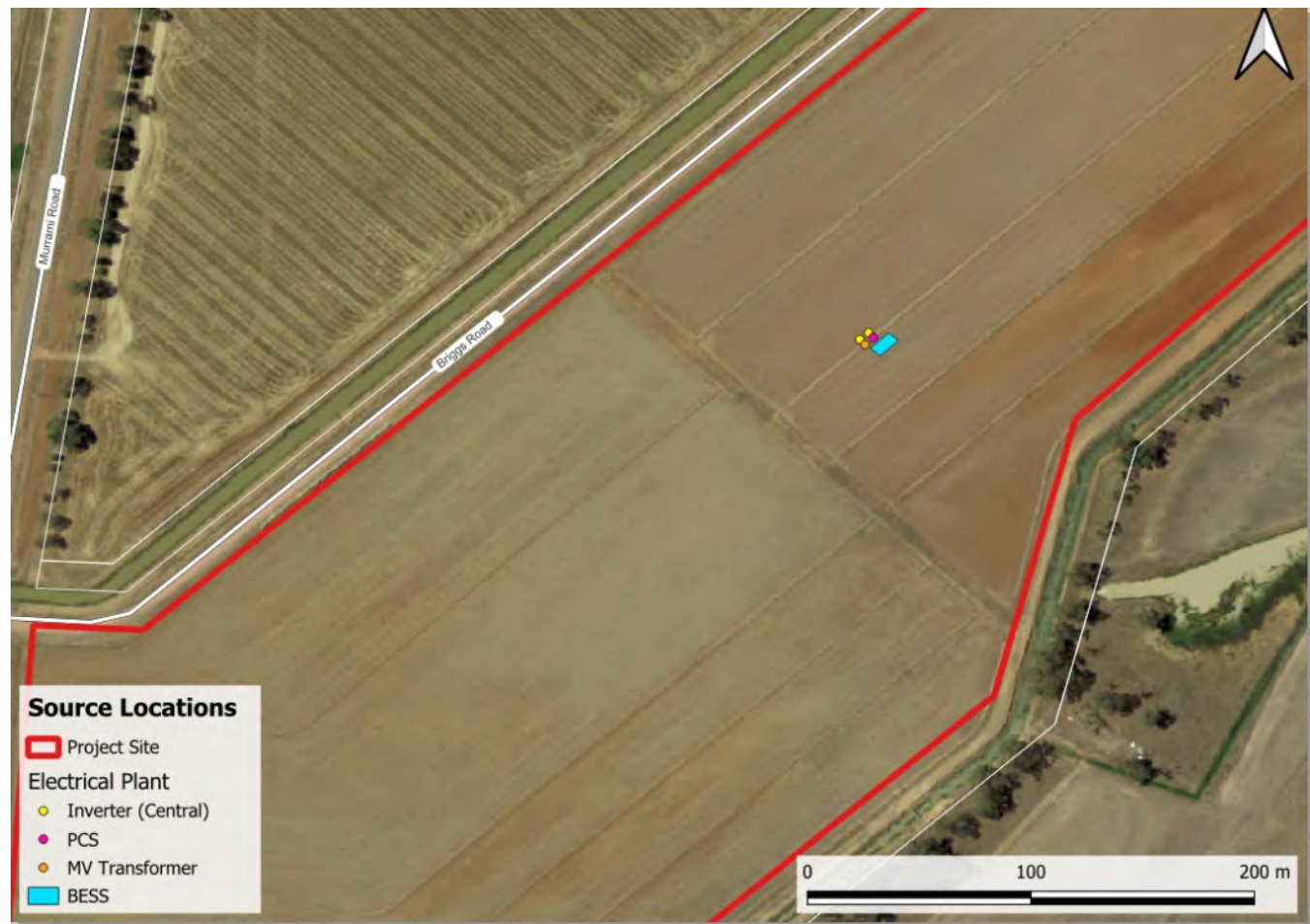
Table 20 Single event source noise levels, L_{Aeq} SWL, dB.

Source	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4 kHz	8 kHz	Overall, dB(A)
Central Inverter	63	73	81	80	81	81	86	78	90
5 MWh BESS	91	95	81	82	81	75	65	63	85
PCS	65	73	86	87	88	89	82	72	93
MV Transformer	87	89	84	83	78	73	68	58	84

Note 1 Octave band data is presented unweighted, overall level is presented A-weighted.

Note 2 Sound power levels for the electrical plant / equipment presented have been obtained from the manufacturer, information from previous projects and / or our database.

Figure 5 Modelled source location layout – all time periods.





5.4 Annoying characteristics of noise

The NPfI requires annoying characteristics of noise to be taken into consideration in the assessment of noise. Annoying characteristics include:

- Tonal noise – noise containing a prominent frequency and characterised by a defined pitch.
- Low frequency noise – where a source has a significant component of noise in the 10 – 160 Hz range
- Intermittent noise – where the noise source at the receiver varies by more than 5 dB(A)

For the characteristics to be relevant, they must be assessed at the receiver location, so the propagation characteristics of noise and existing ambient noise level should be taken into consideration.

Of the noise sources identified in Table 20, both the central inverters and PCS sources are considered to feature annoying characteristics (tonality). Hence, an additional +5 dB correction has been applied to all of the considered noise sensitive receivers (consistent with Table C1 - NPfI).

5.5 Predicted site operational noise impacts

Presented below in Table 21 is a summary of the predicted noise levels for each scenario and the applicable noise criteria. Noise contours of these scenarios are presented in Appendix D. The presented noise levels are inclusive of any penalties added due to annoying characteristics, tonality (+5 dB) for this assessment.

Table 21 Predicted operational noise impacts, $L_{Aeq,15minute}$, dB(A).

Receiver	PSNTL	Standard meteorology (exceedance)	Noise enhancing meteorology (exceedance)
Peak daytime operations (7:00 am – 6:00 pm)			
R01	40	34	-
R02	40	33	-
R03	40	31	-
R04	40	32	-
R05	40	28	-
Peak evening operations (6:00 pm – 10:00 pm)			
R01	35	34	35
R02	35	33	33
R03	35	31	31
R04	35	32	32
R05	35	28	29
Peak nighttime operations (10:00 pm – 7:00 am)			
R01	35	34	35
R02	35	33	33
R03	35	31	31



Receiver	PSNTL	Standard meteorology (exceedance)	Noise enhancing meteorology (exceedance)
R04	35	32	32
R05	35	28	29

Note 1 The predicted noise levels are inclusive of the +5 dB penalty added to both the inverter and PCS for tonality.

The results in Table 21 indicate that compliance with the noise criteria is achieved at all locations under neutral weather conditions. Compliance is also achieved under enhancing meteorological conditions for all receivers.

5.6 Operational road traffic noise

Operational traffic movements will occur on Murrarni Road and Irrigation Way, a local road and Sub-arterial road respectively, with residential and industrial receivers that would be affected by both light and heavy vehicles during the operational phase of the project.

No operational road traffic volumes are available for the proposed development, since the project is not expected to generate any significant or regular volume of road traffic. What road traffic that will be generated, would likely be limited to occasional light vehicles arriving during the daytime period for maintenance / servicing purposes.

In the absence of a detailed traffic study for this development, the existing road traffic volumes along Murrarni Road / Irrigation Way are unknown. Therefore, a detailed assessment of the likely noise increase as a result of the increased road traffic volume is not possible.

It is therefore expected that the existing road traffic noise will not be increased by an appreciable amount. It is therefore not considered reasonable, nor feasible to provide noise mitigation to reduce road traffic noise impacts as part of this proposal.

Despite this, operational management and mitigation of potential impacts is still recommended and are included in Section 6.1.

5.7 Construction cumulative impacts

Construction noise from multiple sites has the potential to increase noise at sensitive receiver locations. Dependent on the nature of the work multiple construction sites have the potential to:

- Increase overall noise levels by as much as 3 dB greater than noise from the loudest site; and/or
- Impact sensitive receivers by generating noise on multiple sides of the property simultaneously.

Both these impacts can increase the annoyance from construction activities. At the planning stage of the project, it is very difficult to determine the likelihood of impacts. Specific timing and noise impacts from this project can be estimated, but cannot be confirmed until a contractor has been appointed and the construction methodology and programme confirmed.

This project is currently unaware of other planned construction works that may occur at the time of this proposal, however this does not rule out the potential for cumulative noise impacts.

The uncertainty highlights the importance of the contractor's Construction Noise and Vibration Management Plan (CNVMP). Construction works from other projects should be identified during the establishment of this plan, and management strategies established to minimise the potential impacts of the surrounding community. The plan will require:

- consultation with other projects to confirm their construction schedules,



- identification of the potential of cumulative noise and vibration impacts,
- a plan to establish how these impacts would be managed on an ongoing basis; and
- a communication strategy to provide notifications to the surrounding community.

5.8 Operational cumulative impacts

In the designation of the operational project noise trigger levels, the NPfI requires the consideration of intrusiveness and amenity levels.

The amenity noise level establishes noise targets for different area and the project specific amenity noise criteria are established 5 dB below the allowable total amenity noise levels. This reduction is the allowable amenity level taking into account for any additional future developments to operate.

In summary, cumulative operational noise levels have been considered throughout the development of the project noise trigger levels by basing the noise trigger levels on:

- The existing noise generated by operational industrial noise (the intrusiveness level); and
- The potential for future developments to generate noise (the amenity noise level)

Further consideration of the potential for cumulative noise impacts is not required.

6 MANAGEMENT AND MITIGATION MEASURES

6.1 Construction management measures

The construction predicted noise levels identified in Section 5 indicate that the noise impacts have the potential occur from the proposed works. These impacts are typical for a construction such as this and highlight the importance for appropriate noise management and mitigation measures.

Presented in Table 22 is a summary of site-specific management procedures recommended to manage the predicted airborne noise and vibration impacts.

Table 22 Summary of mitigation procedures.

Procedure	Abbreviation	Description	Further reference
General Management Measures	GMM	Introduce best-practice general mitigation measures in the workplace which are aimed at reducing the acoustic impact onto the nearest affected receivers.	Refer to Section 6.1.3 For vibration impact, also refer to section 6.1.4
Project Notification	PN	Issue project updates to stakeholders, discussing overviews of current and upcoming works. Advanced warning of potential disruptions can be included. Content and length to be determined on a project-by-project basis.	Refer to Section 6.1.6
Verification Monitoring	V	Monitoring to comprise attended or unattended acoustic surveys. The purpose of the monitoring is to confirm measured levels are consistent with the predictions in the acoustic assessment, and to verify that the mitigation procedures are appropriate for the affected receivers. If the measured levels are higher than those predicted, then the measures will need to be reviewed and the management plan will need to be amended.	For noise impact, refer to Section 6.1.4. For vibration impact, refer to Section 6.1.4
Complaints Management System	CMS	Implement a management system which includes procedures for receiving and addressing complaints from affected stakeholders	Refer to Section 6.1.6
Specific Notification	SN	Individual letters or phone calls to notify stakeholders that noise levels are likely to exceed noise objectives. Alternatively, contractor could visit stakeholders individually in order to brief them on the noise impact and the mitigation measures that will be implemented.	Refer to Section 6.1.6
Respite Offer	RO	Offer provided to stakeholders subjected to an ongoing impact. The offer could include movie tickets, meal vouchers, gift cards or equivalent measures.	-

Procedure	Abbreviation	Description	Further reference
Alternative Construction Methodology	AC	Contractor to consider alternative construction options that achieve compliance with relevant criteria. Alternative option to be determined on a case-by-case basis. It is recommended that the selection of the alternative option should also be determined by considering the assessment of on-site measurements (refer to Verification Monitoring above).	-

The application of these procedures is in relation to the exceedances over the relevant criteria. For airborne noise, the criteria are based on NMLs. The allocation of these procedures is discussed in Section 6.1.1

For vibration, the criteria either correspond to human comfort, building damage or scientific and medical equipment. The application of these procedures is discussed in Section Note 1.

6.1.1 Allocation of noise management procedures

For residences, the management procedures have been allocated based on noise level exceedances at the affected properties, which occur over the designated NMLs (refer to section Note 1). The allocation of these procedures is summarised in Table 23 below.

Table 23 Allocation of noise management procedures.

Construction Hours	Exceedance over NML (dB)	Management procedures (see definition above)
Standard Hours Mon – Fri: 7:00 am to 6:00 pm Sat: 8:00 am – 1:00 pm	0 - 3	GMM
	4 - 10	GMM, PN, V ¹ , CMS, AC
	> 10	GMM, PN, V, CMS, SN, AC
Outside Standard Hours	0 - 10	GMM, AC
	11 - 20	GMM, PN, V ¹ , CMS, AC
	> 20	GMM, PN, V, CMS, SN, RO, AC
1. Verification monitoring to be undertaken upon complaints received from affected receivers		

Please note the following regarding the allocation of these procedures:

- The exceedances have been predicted as part of the acoustic assessment, and these are summarised in Section Note 1.
- The allocation of procedures is based on the assumptions used for noise level predictions (refer to Section Note 1).



6.1.2 Allocation of vibration management procedures

Table 24 summarises the vibration management procedures to be adopted based on exceedance scenarios (i.e., whether the exceedance occurs over human comfort criteria, building damage criteria, or criteria for scientific and medical equipment). Please note these management procedures apply for any type of affected receiver.

Table 24 Allocation of vibration management procedures.

Construction Hours	Exceedance Scenario	Management procedures
Standard Hours Mon – Fri: 8:00 am to 7:00 pm Sat: 8:00 am – 5:00 pm	Over human comfort criteria (refer to Section 4.6)	GMM, PN, V, RO
	Over building damage criteria (refer to Section 4.6)	GMM, V, AC
Outside Standard Hours Mon – Fri: 7:00 am to 8:00 am Sat: 7:00 am to 8:00 am	Over human comfort criteria (refer to Section 4.6)	GMM, SN, V, RO, CMS
	Over building damage criteria (refer to Section 4.6)	GMM, V, AC

6.1.3 General comments

The contractor will, where reasonable and feasible, apply best practice noise mitigation measures. These measures shall include the following:

- Maximising the offset distance between plant items and nearby noise sensitive receivers.
- Preventing noisy plant working simultaneously and adjacent to sensitive receivers.
- Minimising consecutive works in the same site area.
- Orienting equipment away from noise sensitive areas.
- Carrying out loading and unloading away from noise sensitive areas.

To minimise noise impacts during the works, the contractor will take all reasonable and feasible measures to mitigate noise effects.

The contractor will also take reasonable steps to control noise from all plant and equipment. Examples of appropriate noise control include efficient silencers and low noise mufflers.

The contractor should apply all feasible and reasonable work practices to meet the NMLs and inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels, duration of noise generating construction works, and the contact details for the proposal.

Presented below in Table 25 is a summary of the noise management measures and approximate noise reductions. Further information is provided in the proceeding section.

Table 25 Standard noise and vibration mitigation measures.

Item	Description	Noise reduction
Management measures		
Implement community consultation measures	Providing the community ongoing updates about potential noise impacts can reduce the impacts and annoyance from the project	Reduced annoyance
Site inductions	All employees, contractors and subcontractors are to receive an environmental induction which would include consideration of noise and vibration impacts.	
Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.	
Monitoring	See Section 6.1.5.	
Work scheduling	Includes scheduling noise intensive works and respite periods	Annoyance reduction
Source controls		
Alternative equipment or process	Use quieter and less vibration emitting construction methods where feasible and reasonable.	5 to 15 dB
Plan worksites and activities to minimise noise and vibration	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site	1 to 3 dB
Minimise the movement of materials	Reduces noise generated through reduced plant operations	1 dB to 3 dB
Broadband reversing alarm	Site based vehicles should be fitted with broadband reversing alarms to reduce tonal noise impacts.	5 dB
Siting of equipment	Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be avoided. The offset distance between noisy plant and adjacent sensitive receivers is to be maximised. Plant used intermittently to be throttled down or shut down. Noise-emitting plant to be directed away from sensitive receivers	3 to 15 dB
Silencers on mobile plant	Where possible reduce noise from mobile plant through additional fittings	5 dB to 8 dB
Maximise hammer penetration	Reduces the time required and associated noise impacts	Reduced duration
Path controls		
Acoustic enclosure or screening	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained.	5 dB to 10 dB



Alternate equipment or process

Exceedance of the site's NMLs should result in an investigation as to whether alternate equipment could be used, or a difference process could be undertaken.

In some cases, the investigation may conclude that no possible other equipment can be used, however, a different process could be undertaken.

Acoustic enclosures/screening

Typically, on a construction site there are three different types of plant that will be used: mobile plant (i.e., excavators, skid steers, etc.), semi mobile plant (i.e., hand tools generally) or static plant i.e. (diesel generators).

For plant items which are static it is recommended that, in the event exceedances are being measured due to operation of the plant item, an acoustic enclosure/screen is constructed to reduce impacts. These systems can be constructed from Fibre Cement (FC) sheeting or, if airflow is required, acoustic attenuators or louvres.

For semi mobile plant, relocation of plant should be investigated to either be operated in an enclosed space or at locations away from a receiver.

With mobile plant it is generally not possible to treat these sources. However, investigations into the machine itself may result in a reduction of noise (i.e., mufflers/attenuators etc).

General mitigation measures (Australia Standard 2436-2010)

As well as the above project specific noise mitigation controls, AS 2436-2010 "*Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites*" sets out numerous practical recommendations to assist in mitigating construction noise emissions. Examples of strategies that could be implemented on the subject project are listed below, including the typical noise reduction achieved, where applicable.

Adoption of universal work practices

- Regular reinforcement (such as at toolbox talks) of the need to minimise noise and vibration.
- Regular identification of noisy activities and adoption of improvement techniques.
- Avoiding the use of portable radios, public address systems or other methods of site communication that may unnecessarily impact upon nearby sensitive receivers.
- Where possible, avoiding the use of equipment that generates impulsive noise.
- Minimising the need for vehicle reversing for example (particularly at night), by arranging for one-way site traffic routes.
- Use of broadband audible alarms on vehicles and elevating work platforms used on site.
- Minimising the movement of materials and plant and unnecessary metal-on-metal contact.
- Minimising truck movements.

Plant and equipment

The operation of plant and equipment on the site should be undertaken, including the following:

- Choosing quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks.
- Selecting plant and equipment with low vibration generation characteristics.
- Operating plant and equipment in the quietest and most efficient manner.

Work scheduling

- Providing respite periods which could include restricting very noisy activities to time periods that least affect the nearby noise sensitive locations, restricting the number of nights that after-hours work is conducted near residences or by determining any specific requirements.



- Scheduling work to coincide with non-sensitive periods.
- Planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from the sensitive receivers.
- Optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours.

Source noise control strategies

Some ways of controlling noise at the source are:

- Where reasonably practical, noisy plant or processes should be replaced by less noisy alternatives.
- Modify existing equipment: Engines and exhausts are typically the dominant noise sources on mobile plant such as cranes, graders, excavators, trucks, etc. To minimise noise emissions, residential grade mufflers should be fitted on all mobile plant utilised on site.
- Siting of equipment: locating noisy equipment behind structures that act as barriers, or at the greatest distance from the noise-sensitive area; or orienting the equipment so that noise emissions are directed away from any sensitive areas, to achieve the maximum attenuation of noise.
- Regular and effective maintenance.

Miscellaneous comments

Deliveries should be undertaken, where possible, during standard construction hours.

Maximise hammer penetration (and reduce blows) by using sharp hammer tips. Keep stocks of sharp profiles at site and monitor the profiles in use.

It is advised that mobile plant and trucks operating on site for a significant portion of the project are to have reversing alarm noise emissions minimised. This is to be implemented subject to recognising the need to maintain occupational safety standards.

No public address system should be used on site.

6.1.4 Construction vibration mitigation measures

The following vibration mitigation measures should be implemented:

- Any vibration generating plant and equipment is to be in areas within the site to lower the vibration impacts.
- Investigate the feasibility of rescheduling the hours of operation of major vibration generating plant and equipment.
- Use lower vibration generating items of construction plant and equipment; that is, smaller capacity plant.
- Minimise conducting vibration generating works consecutively in the same area (if applicable).
- Undertake the removal of concrete within the building using saw cutting or pulverising where possible.

To ensure the vibration impact criteria detailed in this report are complied with the following safe working mitigations and/or working distances should be implemented as detailed in the table below.

Table 26 Vibration mitigation requirements.

Construction Phase	Activity	Vibration Mitigation
Construction	General Construction activities	General construction activities are not expected to exceed project vibration limits detailed in this report.



6.1.5 Noise and vibration monitoring

Noise monitoring, if required, will be performed by an acoustical consultant directly engaged by the contractor in accordance with the projects Conditions of Consent.

Noise monitoring is recommended to be undertaken by attended noise measurements at the start of any new phase of works (i.e. demolition, ground works or remediation works etc.). The statistical parameters to be measured should include the following noise descriptors: L_{Amin} , L_{A90} , L_{A10} , L_{A1} , L_{Amax} and L_{Aeq} . Unattended noise measurements should be conducted over consecutive 15-minute periods.

The survey methodology and any equipment should comply with the requirements discussed in Standard AS 1055.1-1997.

As part of the management of noise and vibration from the proposed demolition and ground works activities to be undertaken on the site the following noise and vibration measurements are recommended to be undertaken:

1. Noise Monitoring –
 - a. Attended noise level measurements of typical demolition and ground works activities should be undertaken at site. Attended construction noise surveys of the site and surrounding impacts on neighbours should be undertaken during the following as a minimum:
 - i. Commencement of any rock breaking or sawing on the site.
 - ii. In response to any ongoing complaints received from neighbours.
2. Vibration Monitoring– To confirm vibration magnitudes are within the expected levels the following attended vibration measurements are required:
 - a. Short term attended vibration measurements – Attended short term vibration measurement of activities with the potential to generate maximum vibration to be undertaken on commencement at the site, including the following:
 - i. Measurements to be undertaken at a representative location from the activity being conducted with a similar distance to the potentially affected receiver.
 - ii. Activities with the potential to generate the greatest magnitudes of vibration include:
 - Hydraulic hammering during the post installation phase for the solar panel farm.
 - Hydraulic hammering of concrete slabs.
 - Hydraulic hammering during ground works within rock.

6.1.6 Community consultation

Active community consultation and the maintenance of positive relations with nearby court houses, local residents, and businesses would assist in alleviating concerns and thereby minimising complaint.

This form of notification should provide specific notification of the duration and timing of the required ground works activities so that residents are informed about the works ahead of time. The letter should also provide the community with a hotline number for a community liaison officer available to adequately respond to all project related enquiries.

Ideally the hotline number should provide concerned locals an opportunity to raise any concerns with the project proponent and provide an opportunity to determine the best method to satisfy all requirements.

Prior to the works onsite being undertaken, community consultation with the neighbouring affected parties be undertaken. Community engagement and consultation should not be limited to the beginning of the onsite works but throughout, providing the community with constant updates on the progress and upcoming works. In our experience these could include:

- Site noticeboard,
- Email notifications; and
- Letterbox drops.

Complaints management system

Should complaints arise they must be dealt with in a responsible and uniform manner, therefore, a management system to deal with complaints is detailed below:

Local residents and landowners should be informed by direct mail of a direct 24-hour telephone line where any noise complaints related to the required ground works will be recorded. The 24-hour telephone line number will be made available on the construction site signage.

All complaints should be investigated by the Contractor in accordance with the procedures outlined in Australia Standard 2436-2010. Consequently, a complaint response procedure should be implemented. Information to be gathered as part of this process should include:

- location of complainant
- time/s of occurrence of alleged noise or vibration impacts
- nature of impact particularly with respect to vibration
- Perceived source
- Prevailing weather conditions and similar details that could be utilised to assist in the investigation of the complaint.

All resident complaints will be responded to in the required timeframe and action taken recorded.

Post receiving a noise and or vibration complaint, the process outlined in the Contingency Plans below should be undertaken.

Contingency plans

Contingency plans are required to address noise or vibration problems if excessive levels are measured at surrounding sensitive receivers and/or if justified complaints occur. Such plans include:

- Stop the onsite works.
- Identify the source of the main equipment within specific areas of the site which is producing the most required ground works noise and vibration at the sensitive receivers; and
- Review the identified equipment and determine if an alternate piece of equipment can be used or the process can be altered.



- In the event an alternate piece of equipment or process can be used, works can re-commence.
- In the event an alternate piece of equipment or process cannot be determined implement a construction assessment to be performed by a suitably qualified acoustic consultant.
- Respite periods to be scheduled during potentially noise sensitive periods of the surrounding receivers.

The Superintendent shall have access to view the Contractor's noise measurement records on request. The Superintendent may undertake noise monitoring if and when required.

6.2 Operational noise management and mitigation measures

The noise impact assessment has predicted compliance with the operational noise criteria. Additional noise management and mitigation measures are recommended to minimise the potential impact on the surrounding sensitive receivers.

6.2.1 Operational mitigation measures

All of the continuously operating electrical equipment is predicted to comply with the relevant criteria for all noise sensitive receivers surrounding the site. No additional mitigation measures are required for the proposed development.

6.2.2 Operational management measures

Noise management measures can be effective to control noise impacts associated with behaviours. The corner stone to noise management measures is making employees and people accessing the site aware of their site requirements and obligations.

Light and heavy service vehicles that may occasionally access the site, should minimise reversing where possible, removing the potential tonal noise source.

It is anticipated that all service / maintenance operations would occur within the daytime period, removing

6.2.3 Operational compliance verification assessment

A potential operational compliance verification assessment may be completed after a reasonable amount of time (potentially six months) since the commissioning of the project site. This may include one round of noise monitoring are the nearest noise affected residential receivers to determine if the site is operating within compliance.

If deemed necessary, the noise monitoring should include measurements during the daytime period. It is recommended that measurements be conducted for the following durations at a minimum:

- a) 1.5 hours during the daytime period

These post occupancy compliance measurements should be completed over multiple consecutive operating days (i.e. over three consecutive days).

No compliance measurements are recommended to assess the vibration generation of the site. This is due to the minimal vibration intensive equipment / operations that typically take place on the project site.

7 CONCLUSION

BE PRO STB PTY LTD (the Client) is proposing to develop a 5 MW Solar PV Facility and an accompanying 5 MWh battery Energy Storage System (BESS) at 125 Briggs Road, Stanbridge (Lot 109 DP751703).

This report presents a noise and vibration impact assessment to support the development application.

The project site is located within the existing agricultural area approximately 12 km east of Whitton, NSW. The project site is bounded by Murrumbidgee Road along the western boundary, Briggs Road along the northwestern and northern boundary, and existing agricultural farming land along the southern boundary.

The nearest existing residential receivers are located approximately 30 m to the west of the project site and 220 m northeast. Additional residential receivers are located further to the north and south of the project site.

The project site is located within an existing agricultural farming area. The noise environment of the nearest receivers of the project site is typical of rural farmland, with background noise levels largely controlled by natural sounds with little / no road traffic noise.

Background noise logging was undertaken in one location between the 3rd of August 2025 and the 12th of August 2025. Noise Logger 01 was positioned along the southwestern boundary of the project site. The results from logger 01 have been presented in Appendix B.1, and not been corrected (i.e., raw data is presented).

Appropriate construction noise management noise levels have been established in accordance with the EPAs Interim Construction Noise Guideline and the background noise logging. Appropriate vibration criteria were derived from the EPAs Assessing Vibration: a technical guideline. The EPAs Road Noise Policy provided appropriate noise criteria for the assessment of construction traffic noise associated with the site.

Construction noise scenarios were modelled using SoundPLAN v9.1 and assessed against the derived project specific NMLs. The assessment identified that while there were no receivers which would be Highly Noise Affected, some receivers would exceed the project NMLs. Appropriate construction noise management and mitigation measures have been recommended to reduce the potential for impacts on the surrounding community.

Construction vibration has been considered for a range of equipment that could be used on the project. As part of the construction phase of the proposed works, the equipment that would feature the most significant vibration generating equipment that is expected to be used (vibratory post driver). However, the relevant vibration criteria for the nearest surrounding receivers are expected to maintain compliance with both the human comfort criteria and cosmetic damage criteria.

Noise impacts from construction traffic are not predicted to increase road traffic noise levels significantly, however no detailed traffic study is available for the area, so the numerical change in traffic noise is not quantifiable.

Operational noise emission criteria have been derived from the background noise logging in accordance with the EPAs Noise Policy for Industry and background noise logging undertaken for this project.

An operational noise model has been developed using SoundPLAN v9.1. The noise model assessed the dominant noise sources generated from the operation of the site (which was found to include tonal noise sources). The predicted noise levels identified compliance with the applicable noise criteria is achieved with the inclusion of appropriate noise mitigation measures, including the penalty added to account for the tonal nature of the inverters and PCS.

Operational road noise criteria have been derived from the EPAs Road Noise Policy. The predicted noise impacts from the operational traffic are not predicted to increase road traffic noise levels significantly, however no detailed traffic study is available for the area, so the numerical change in traffic noise is not quantifiable.



APPENDIX A. ACOUSTIC TERMINOLOGY

The following is a brief description of the acoustic terminology used in this report:

Ambient Sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.
Audible Range	The limits of frequency which are audible or heard as sound. The normal ear in young adults detects sound having frequencies in the region 20 Hz to 20 kHz, although it is possible for some people to detect frequencies outside these limits.
Character, acoustic	The total of the qualities making up the individuality of the noise. The pitch or shape of a sound's frequency content (spectrum) dictate a sound's character.
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. The following are examples of the decibel readings of every day sounds; 0 dB the faintest sound we can hear 30 dB a quiet library or in a quiet location in the country 45 dB typical office space. Ambience in the city at night 60 dB Martin Place at lunch time 70 dB the sound of a car passing on the street 80 dB loud music played at home 90 dB the sound of a truck passing on the street 100 dB the sound of a rock band 115 dB limit of sound permitted in industry 120 dB deafening
dBA	<i>A-weighted decibels</i> The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dBA. Practically all noise is measured using the A filter. The sound pressure level in dBA gives a close indication of the subjective loudness of the noise.
Frequency	Frequency is synonymous to <i>pitch</i> . Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Loudness	A rise of 10 dB in sound level corresponds approximately to a doubling of subjective loudness. That is, a sound of 85 dB is twice as loud as a sound of 75 dB which is twice as loud as a sound of 65 dB and so on
L_{max}	The maximum sound pressure level measured over a given period.
L_{min}	The minimum sound pressure level measured over a given period.
L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dBA.
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Sound Pressure Level, LP dB	A measurement obtained directly using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the rms sound pressure to the reference sound pressure of 20 micro Pascals.
Sound Power Level, Lw dB	Sound power level is a measure of the sound energy emitted by a source, does not change with distance, and cannot be directly measured. Sound power level of a machine may vary depending on the actual operating load and is calculated from sound pressure level measurements with appropriate corrections for distance and/or environmental conditions. Sound power levels is equal to 10 times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power of 1 picoWatt.

APPENDIX B. NOISE LOGGING DATA

B.1. Noise Logger 01

125 Briggs Road, Stanbridge

Ambient noise monitoring report

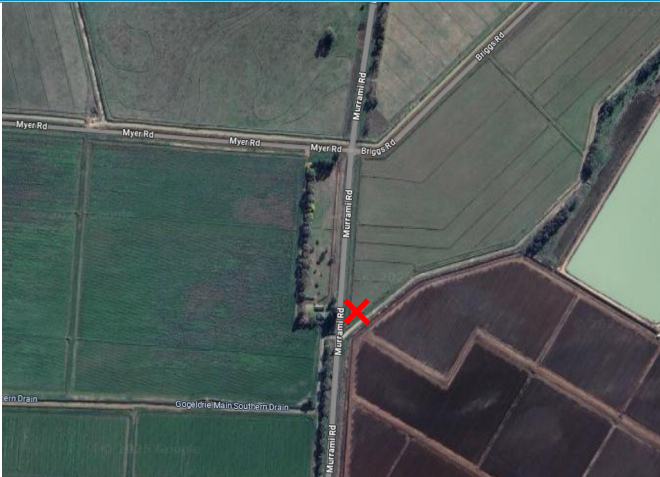


Item	Information
Logger Type	NL-42
Serial number	396932
Address	125 Briggs Road, Stanbridge
Location	Along southwestern corner of the project site.
Facade / free field	Free field
Environment	Rural open paddocks, general wildlife sounds controlling background.

Measured noise levels

Logging date	Rating Background Level			L _{Aeq,period}		
	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am	Daytime 7am-6pm	Evening 6pm-10pm	Night-time 10pm-7am
Sun 3 Aug 2025	-	55	-	79	69	63
Mon 4 Aug 2025	35	24	21	54	39	50
Tue 5 Aug 2025	32	23	19	46	39	37
Wed 6 Aug 2025	26	23	17	58	42	35
Thu 7 Aug 2025	27	22	18	66	39	36
Fri 8 Aug 2025	30	25	17	46	39	36
Sat 9 Aug 2025	43	52	20	70	61	57
Sun 10 Aug 2025	53	57	44	70	68	60
Mon 11 Aug 2025	33	32	21	68	51	48
Tue 12 Aug 2025	-	-	-	-	-	36
Summary	32	25	19	71	62	56

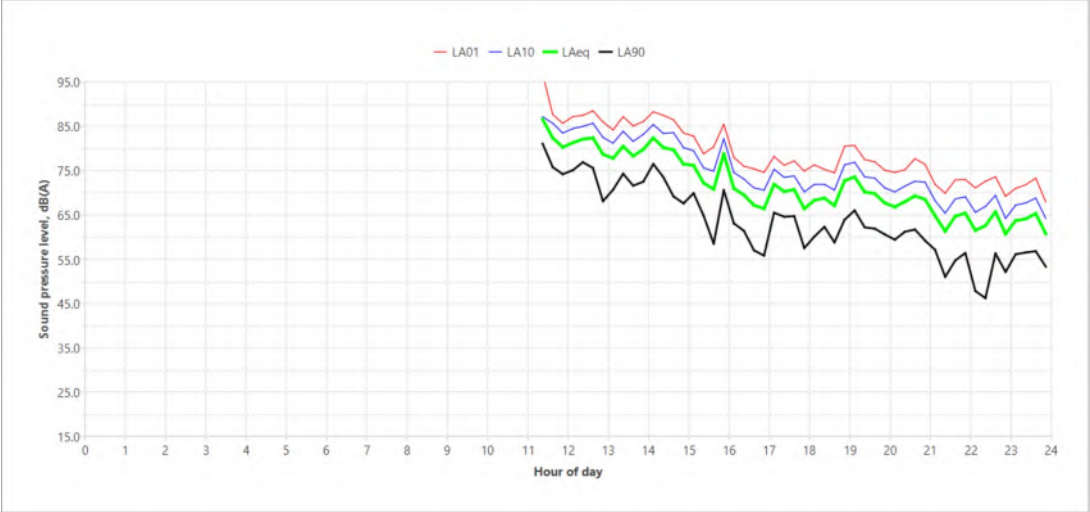
Note: Results with a '-' identify that there were not enough measurements available to correctly calculate the level, in accordance with the Noise Policy for Industry. The data has been excluded either from weather or manual exclusions. See the charts for more information

Logger location	Logger deployment photo
	

Typical Day



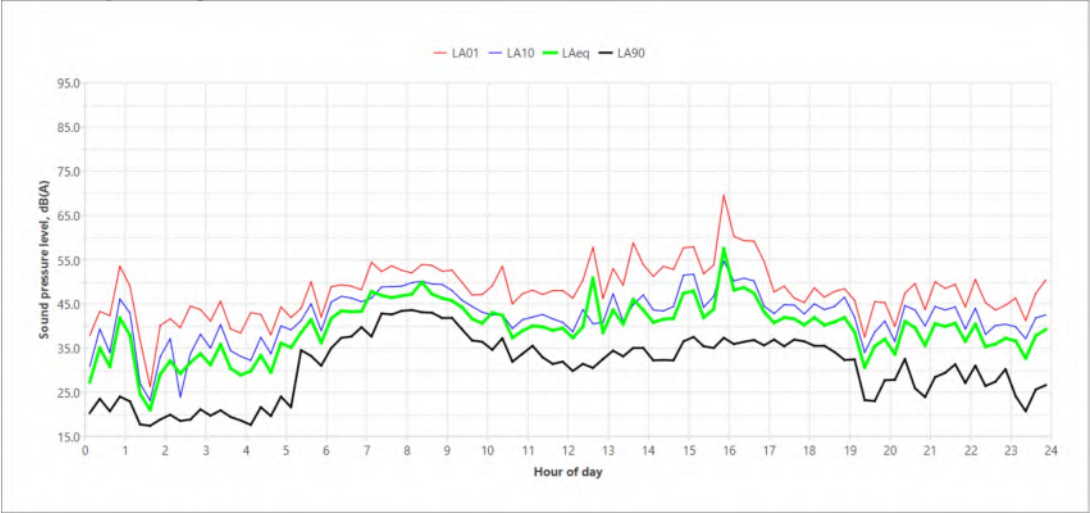
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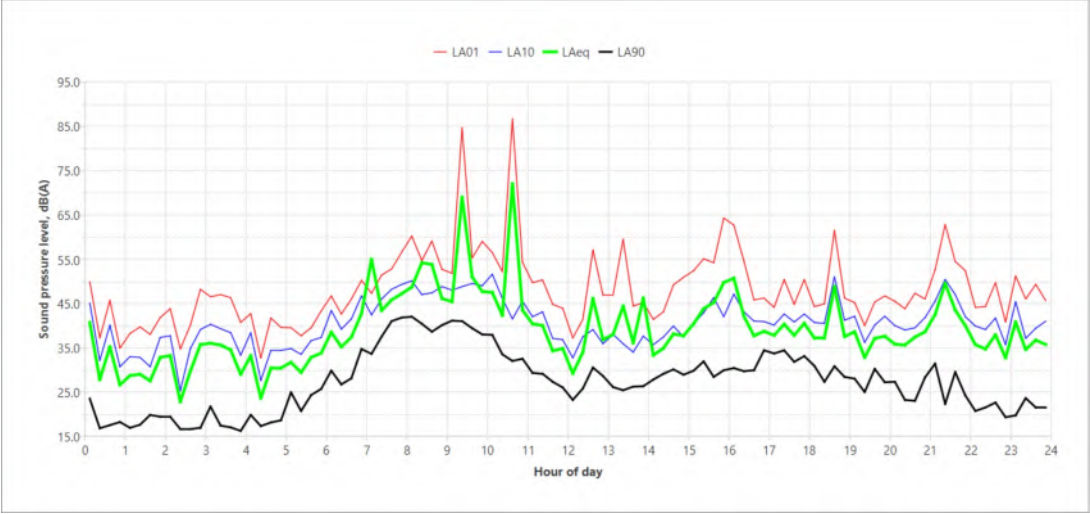
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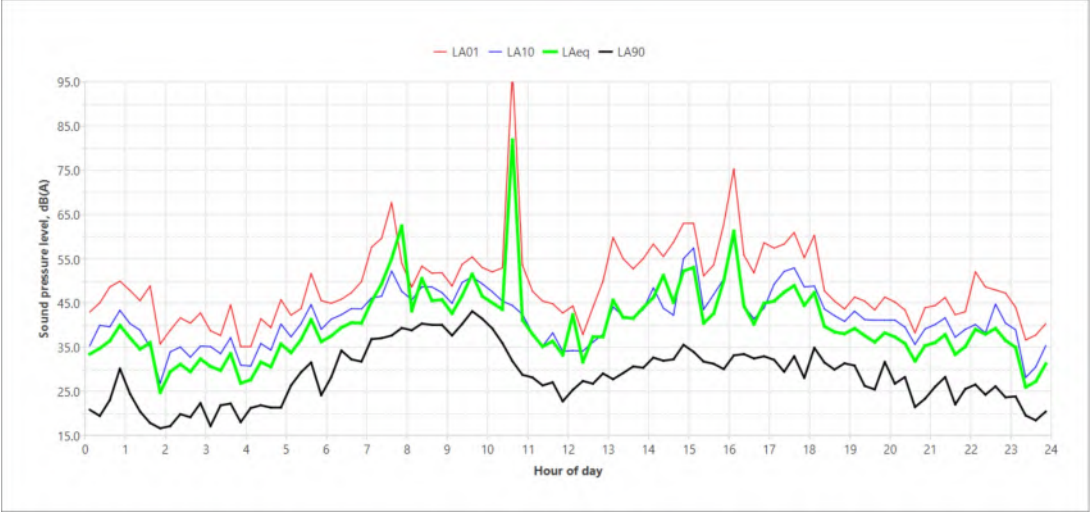
Tuesday, 5 August 2025



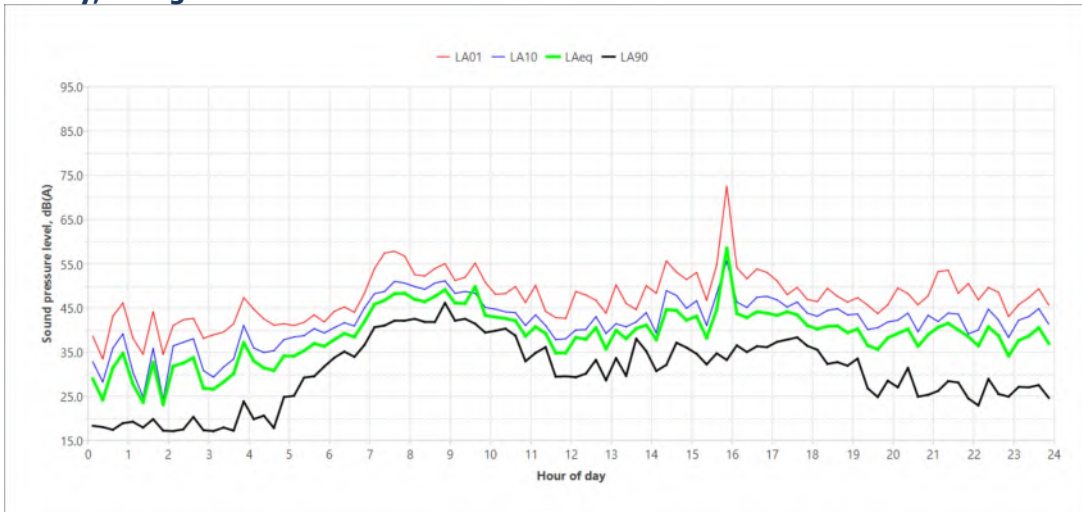
Wednesday, 6 August 2025



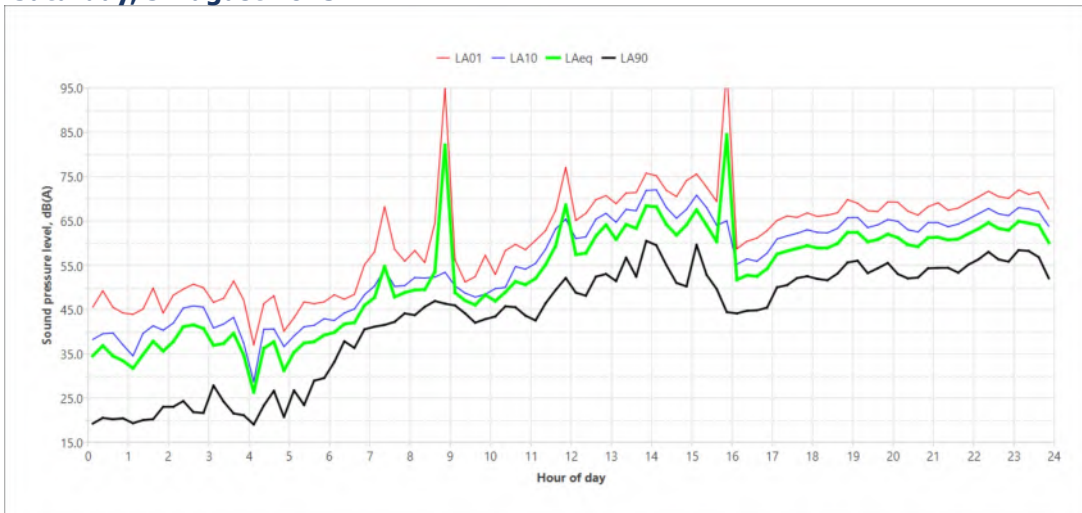
Thursday, 7 August 2025



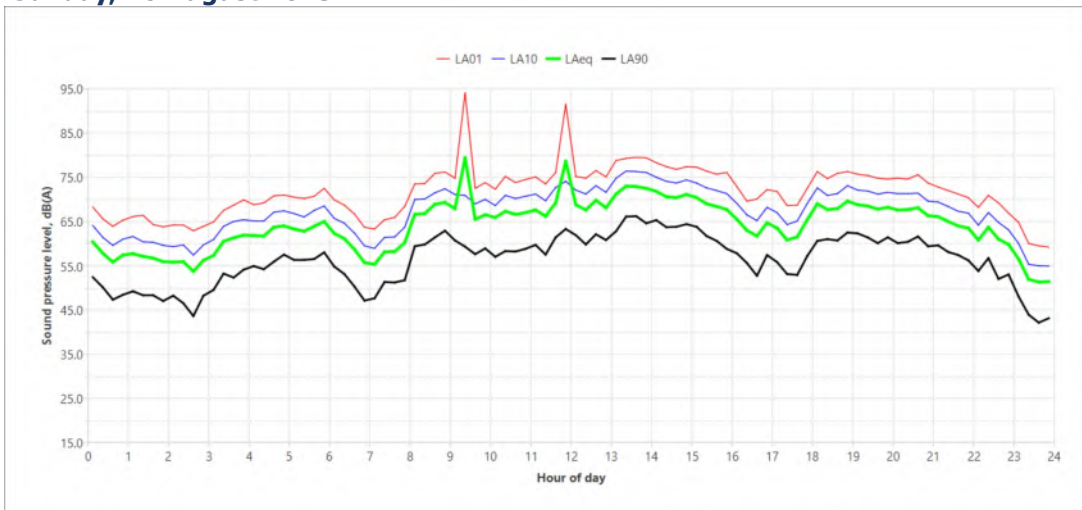
Friday, 8 August



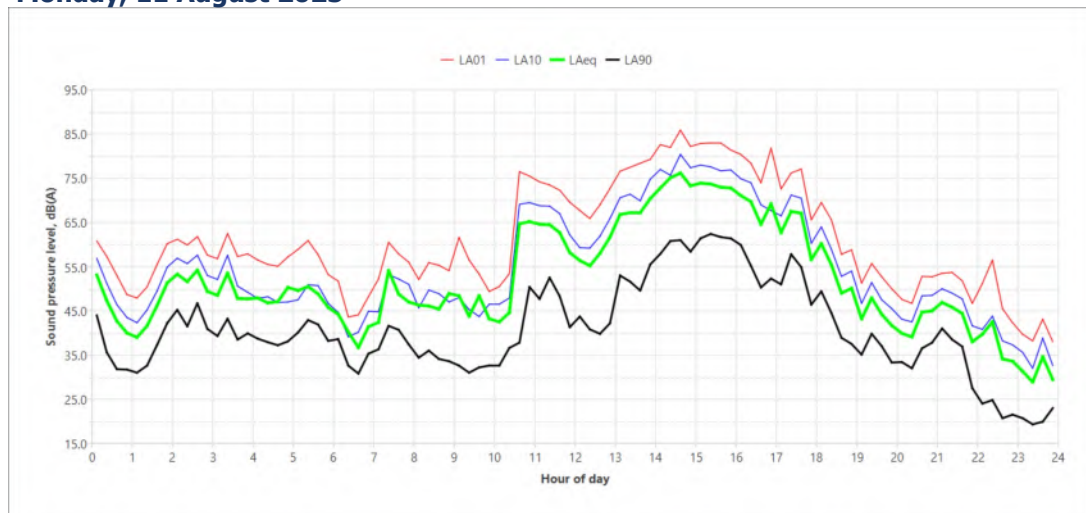
Saturday, 9 August 2025



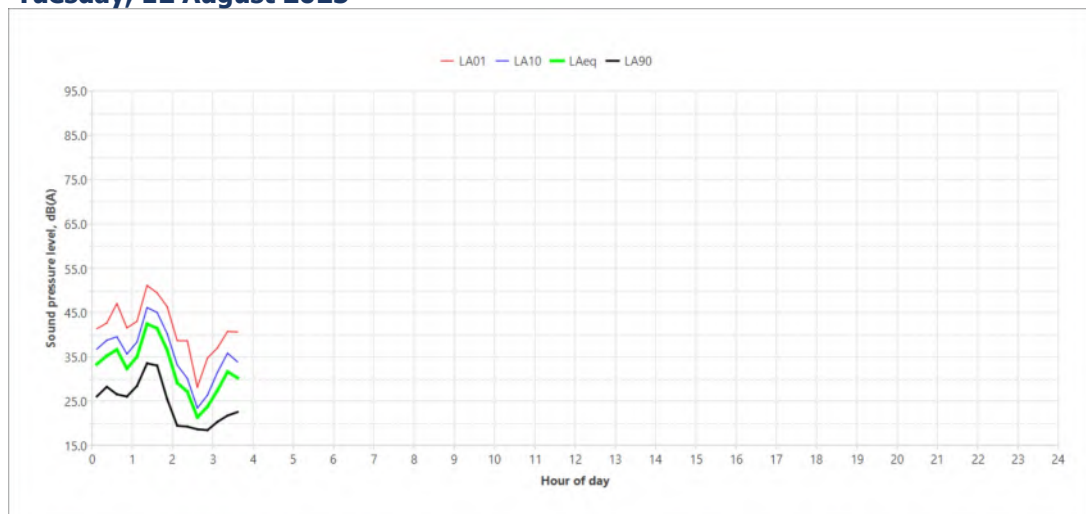
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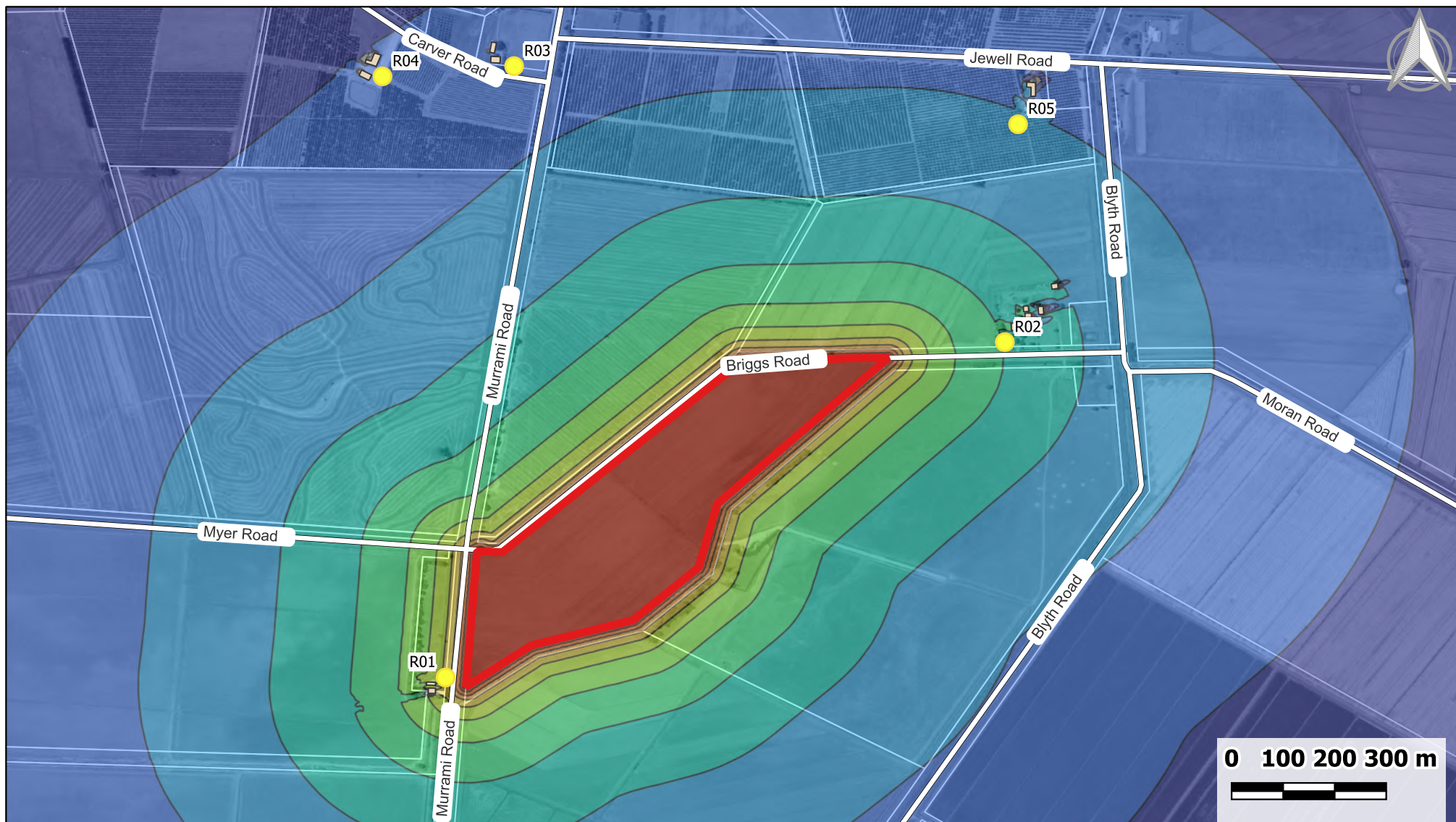
Monday, 11 August 2025



Tuesday, 12 August 2025



APPENDIX C. CONSTRUCTION NOISE IMPACT CONTOURS



$L_{Aeq,15min}$ noise levels, dB(A)

35 - 40

40 - 45

45 - 50

50 - 55

55 - 60

60 - 65

65 - 70

70 - 75

75 - 80

80 - 85

85 - 90

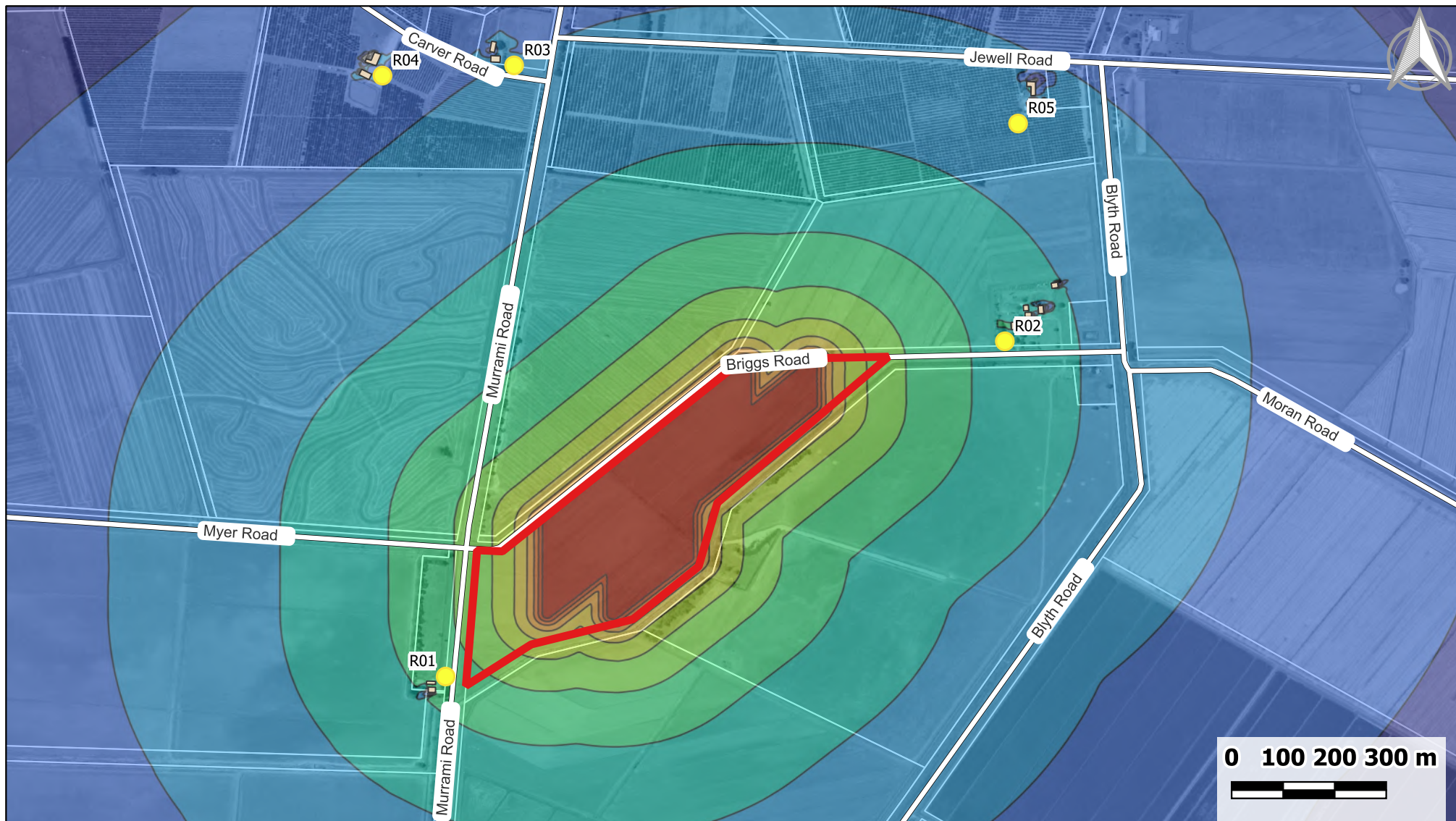
>90

125 Briggs Road, Stanbridge
Stage 1 Construction noise contours
 - Preparation of Solar Farm site

$L_{Aeq,15 \text{ minute}}$ noise impacts
 No Mitigation

Contour Height - 1.5 m





$L_{Aeq,15min}$ noise levels, dB(A)

35 - 40

40 - 45

45 - 50

50 - 55

55 - 60

60 - 65

65 - 70

70 - 75

75 - 80

80 - 85

85 - 90

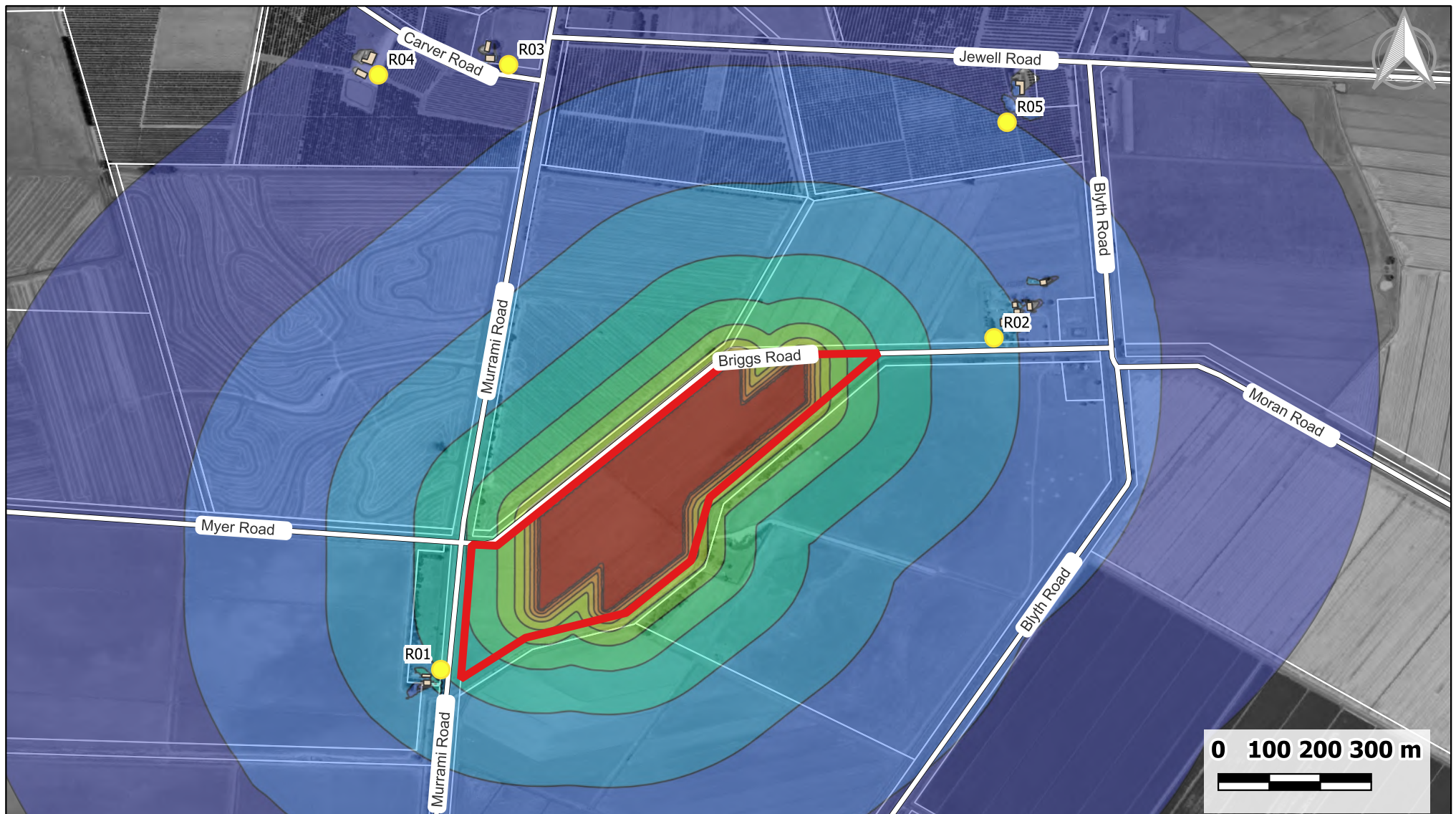
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125 Briggs Road, Stanbridge
Stage 2 Construction noise contours
- Post installation

$L_{Aeq,15 \text{ minute}}$ noise impacts
No Mitigation

Contour Height - 1.5 m





$L_{Aeq,15min}$ noise levels, dB(A)

35 - 40

40 - 45

45 - 50

50 - 55

55 - 60

60 - 65

65 - 70

70 - 75

75 - 80

80 - 85

85 - 90

>90

125 Briggs Road, Stanbridge

Stage 3 Construction noise contours

- Installation of solar plant / equipment

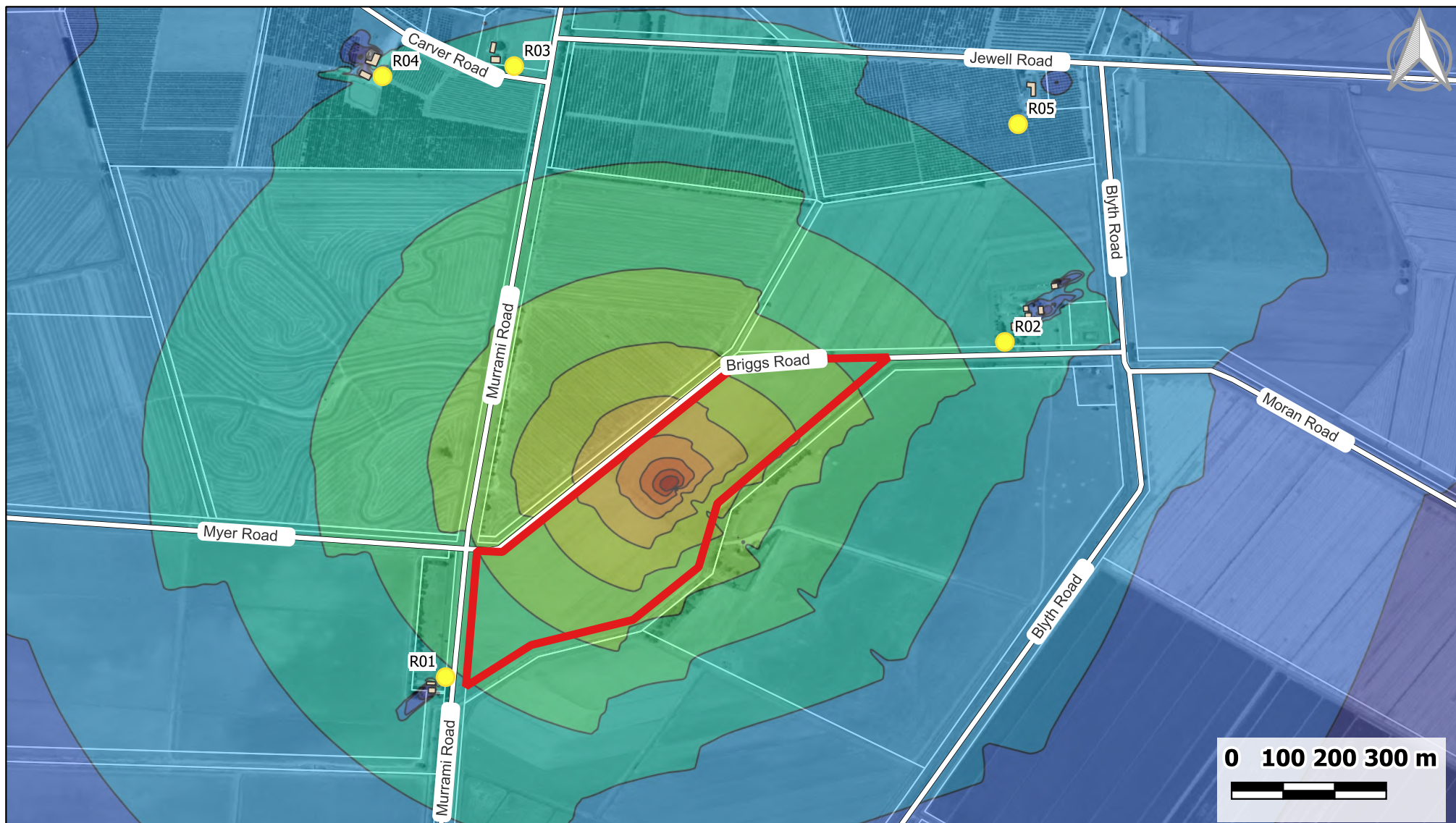
$L_{Aeq,15}$ minute noise impacts

No Mitigation

Contour Height - 1.5 m



APPENDIX D. OPERATIONAL NOISE IMPACT CONTOURS – ENHANCING METEOROLOGICAL



$L_{Aeq,15min}$ noise levels, dB(A)

15 - 20

20 - 25

25 - 30

30 - 35

35 - 40

40 - 45

45 - 50

50 - 55

55 - 60

60 - 65

65 - 70

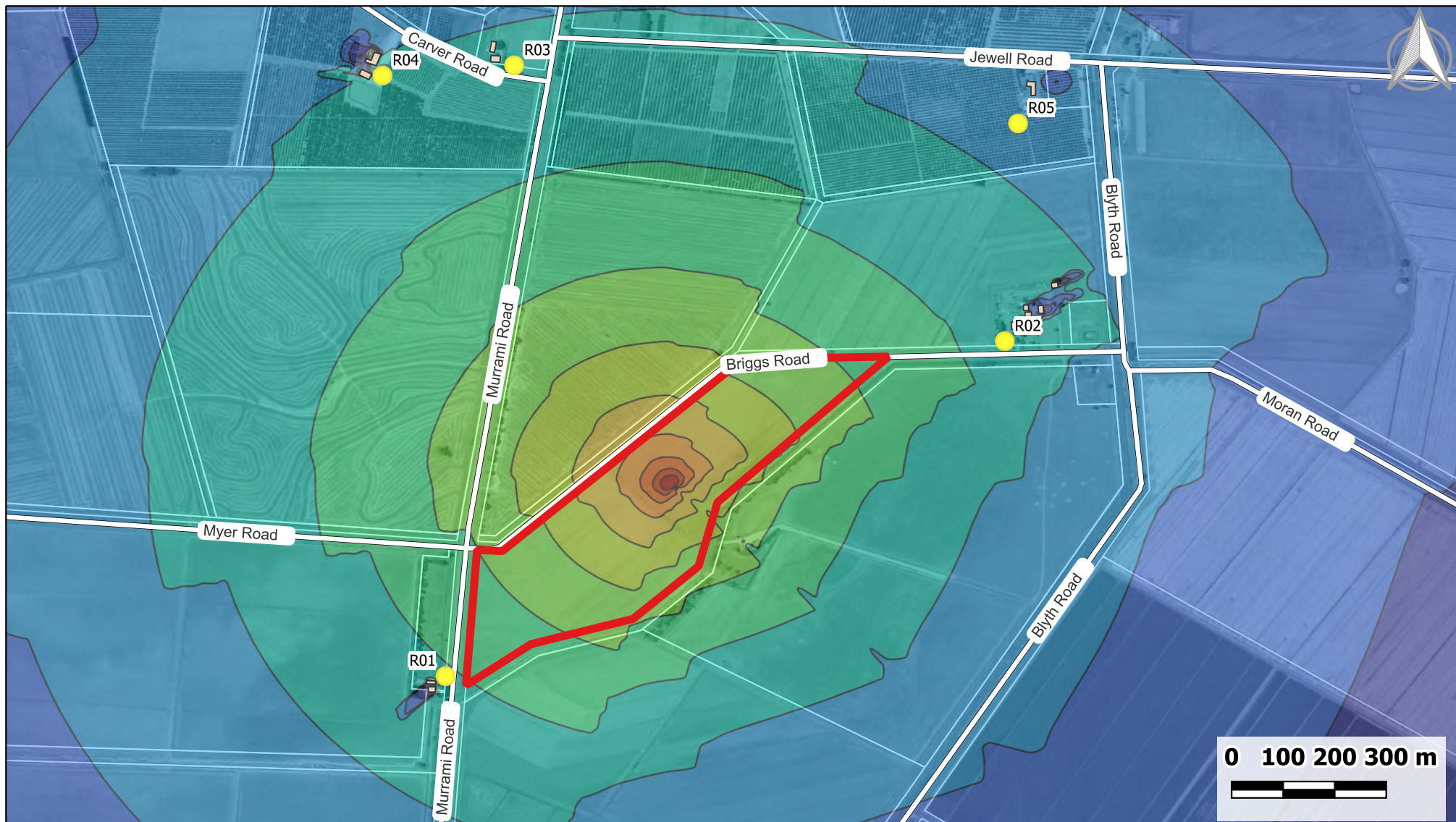
>70

125 Briggs Road, Stanbridge
Operational Noise Impacts
Daytime / Evening

$L_{Aeq,15 \text{ minute}}$ noise impacts
No Mitigation

Contour Height - 1.5 m





$L_{Aeq,15min}$ noise levels, dB(A)

15 - 20

20 - 25

25 - 30

30 - 35

35 - 40

40 - 45

45 - 50

50 - 55

55 - 60

60 - 65

65 - 70

>70

125 Briggs Road, Stanbridge
Operational Noise Impacts
Nighttime

$L_{Aeq,15 \text{ minute}}$ noise impacts
No Mitigation

Contour Height - 1.5 m



yonder.

APPROVED

Subject to compliance with the accompanying notice
of determination conditions of:

Development Application No:

DA 134-2025

Date:

3 July 2026

Solar Renewable Energy Facility

125 Briggs Road, Stanbridge NSW

Visual Impact Assessment

Date: 8 July 2025 Revision A

Prepared for Bison Energy by

YONDER LANDSCAPE ARCHITECTURE ©

Project: Stanbridge Solar Farm - Visual Impact Assessment
Commissioned by: Bison Energy
Prepared by Yonder Landscape Architecture, PO Box 1198, Albury NSW 2640 Australia ABN 68 437 343 209

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STATUS	DATE	BY	REVISION
Client review	08.07.22	FS	A

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Introduction

Purpose

Yonder Landscape Architecture has been commissioned by Bison Energy to undertake a visual impact assessment for a 5MW Solar PV facility and associated 11MWh Battery Energy Storage System at 125 Briggs Road, Stanbridge (Lot 109 in DP751703). The proposal covers an area of approximately 23 hectares (Ha), in the Local Government Area (LGA) of Leeton Shire Council in Stanbridge New South Wales.

This visual impact assessment delivers an objective statement of the probable impacts on the visual environment resulting from the construction of the proposed development. The report outlines the results from site assessment undertaken in July 2025, describing the present landscape character. It documents the assessment of visual impact resulting from the proposal and provides an indication for suitable mitigation measures.

Methodology

The visual impact assessment involved the following activities:

- ▶ Desktop review using aerial photography to confirm the extents of the proposed development on the site and check for any prominent land features and vegetation in and around the site.
- ▶ Investigation of possible viewsheds along Briggs Road, Murrarni Road, Whitton Lane and Blythe Road where the proposed development may be seen from and document the views with photos as well as descriptions. The views will be documented according to the sensitivity and if the proposed development is visible will be recorded. The nature of the visual impact and rating will also be carried out.
- ▶ Describing and evaluating the existing landscape character and visual environment in order to establish a baseline for the visual assessment.
- ▶ Mapping the visual envelope based on field studies and data while identifying sensitive visual receivers. Sensitive visual receivers are individuals or people who have the potential to be visually affected by the proposal.
- ▶ Undertaking a visual impact assessment using the grading matrix, considering visual sensitivity and the magnitude of the visual change. This report considers the visual impact of the development from Briggs Road, Murrarni Road, Whitton Lane and Blythe Road.
- ▶ The assessment was carried out on the 3 July 2025, commencing at 11.30am. The day was clear with minimal cloud cover.

Visual Impact Assessment Method

The methodology adopted in this Landscape Character and Visual Impact Assessment is based on the NSW Government Roads and Maritime Service Environmental Impact Assessment Guidance Note (2013): Guidelines for landscape character and visual impact assessment. The methodology has been modified to align with the features and requirements of this particular proposal.

The method to measure impact is based on the combination of:

- ▶ the sensitivity of the existing area or view to change.
- ▶ the magnitude (scale, contrast, quality, distance) of the proposal on that area or view.

Sensitivity

Sensitivity refers to the qualities of an area, the number and type of receivers and how sensitive the existing character of the setting is to the proposed nature of change.

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different areas. The assessment is based on the number of people affected, land use, and the distance of the viewer from the proposal (EDAW, 2000).

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

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

Magnitude

Magnitude refers to the physical scale of the project, how distant it is and the visual contrast it presents to the existing condition. Magnitude will also need to consider cumulative impact, which is a consideration of the result of the incremental impact of the proposal when added to other past, current and known likely future activity. Magnitude is also called visual effect.

- ▶ Low level: occurs when a proposal blends in with its existing viewed landscape due to a high level of integration of one or several of the following: form, shape, pattern, line, texture or colour. It can also result from the use of effective screening i.e. Topography and vegetation.
- ▶ Moderate level: occurs where a proposal is visible and contrasts with its viewed landscape however, there has been some degree of integration (e.g. Good siting principles employed, retention of significant existing vegetation, provision of screen landscaping, appropriate colour selection and/or suitably scaled development).
- ▶ High level: results when a proposal has a high visual contrast to the surrounding landscape with little or no natural screening or integration created by vegetation or topography.

Visual Impact Rating

Visual impact refers to the change in appearance of the landscape as a result of development. (EPHC, 2010). Visual impact is the combined effect of visual sensitivity and visual effect. Various combinations of visual sensitivity and visual effect will result in high, moderate and low overall visual impacts as suggested in Table below.

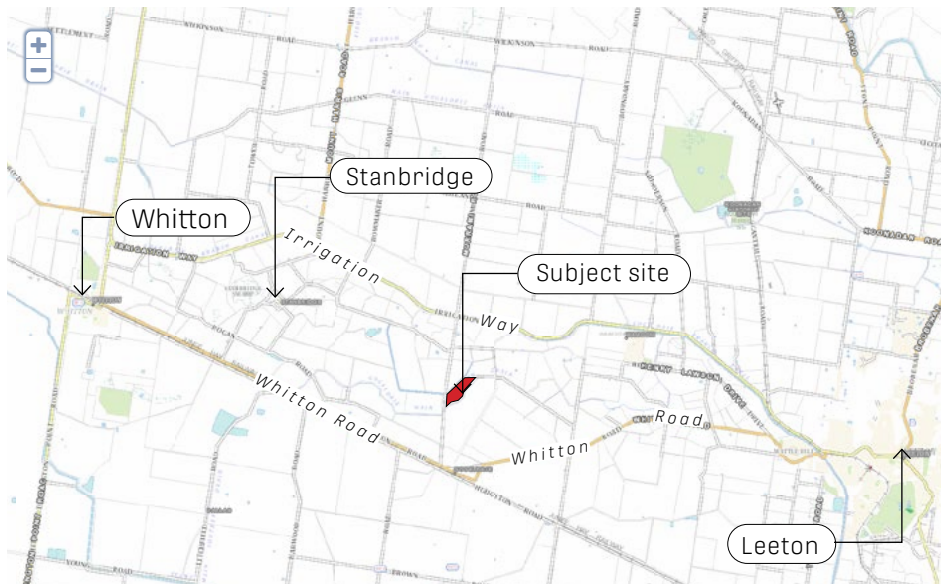
		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High	High-Moderate	Moderate	Negligible
	Moderate	High-Moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Grading matrix

Source: Roads and Maritime Service Environmental Impact Assessment Guidance Note (2013): Guidelines for landscape character and visual impact assessment

The site

The development site is located approximately 12km east from Whitton and approximately 16km west from Leeton. The site is surrounded by agricultural land-use, including orange orchards.



Location Plan

Landscape character

Key site characteristics of the regional and local landscape character include:

- ▶ Mostly flat landform with a mix of open and lightly wooded areas.
- ▶ Agricultural irrigation channels with banks either side.
- ▶ Rural land-use, mainly orchards and livestock grazing defined by unsealed roads, landscape buffers or tree plantings and fencing.
- ▶ Houses, sheds and other rural buildings.
- ▶ Vegetated creek-lines and wind-breaks.
- ▶ Bulk grainstorage facility site on Whitton Road.



Open paddocks with shelterbelts / boundary screen planting



Open paddocks with scattered vegetation



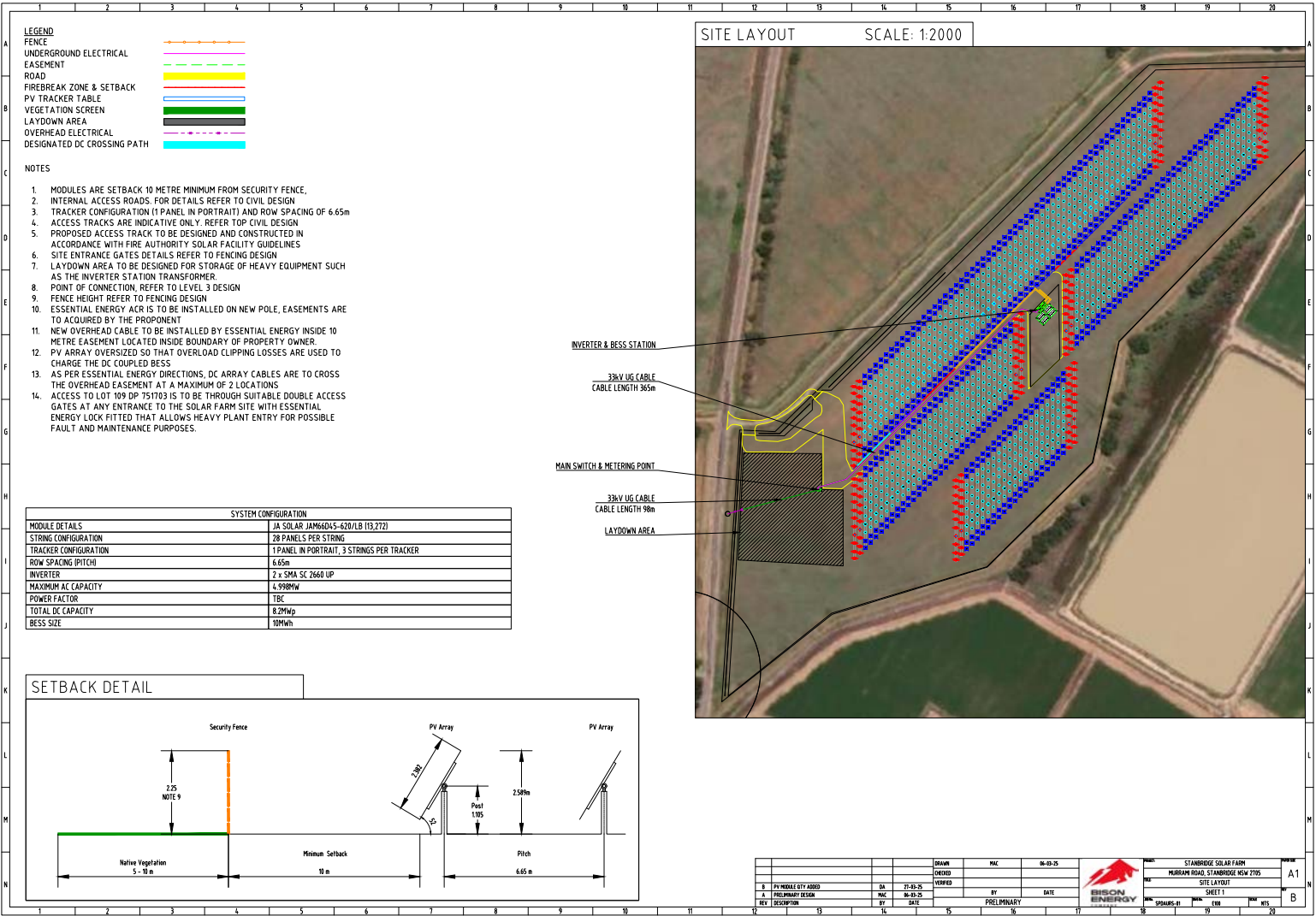
Orange plantations and roadside vegetation



Irrigation channels

The Proposal

The Stanbridge Farm is a proposed 5 MW Solar PV facility and associated 11MWh Battery Energy Storage System



Visual Impact Assessment

Viewshed 1	Sensitivity	Magnitude	Impact
1500m south of site on Blythe Road.	Negligible	Negligible	Negligible

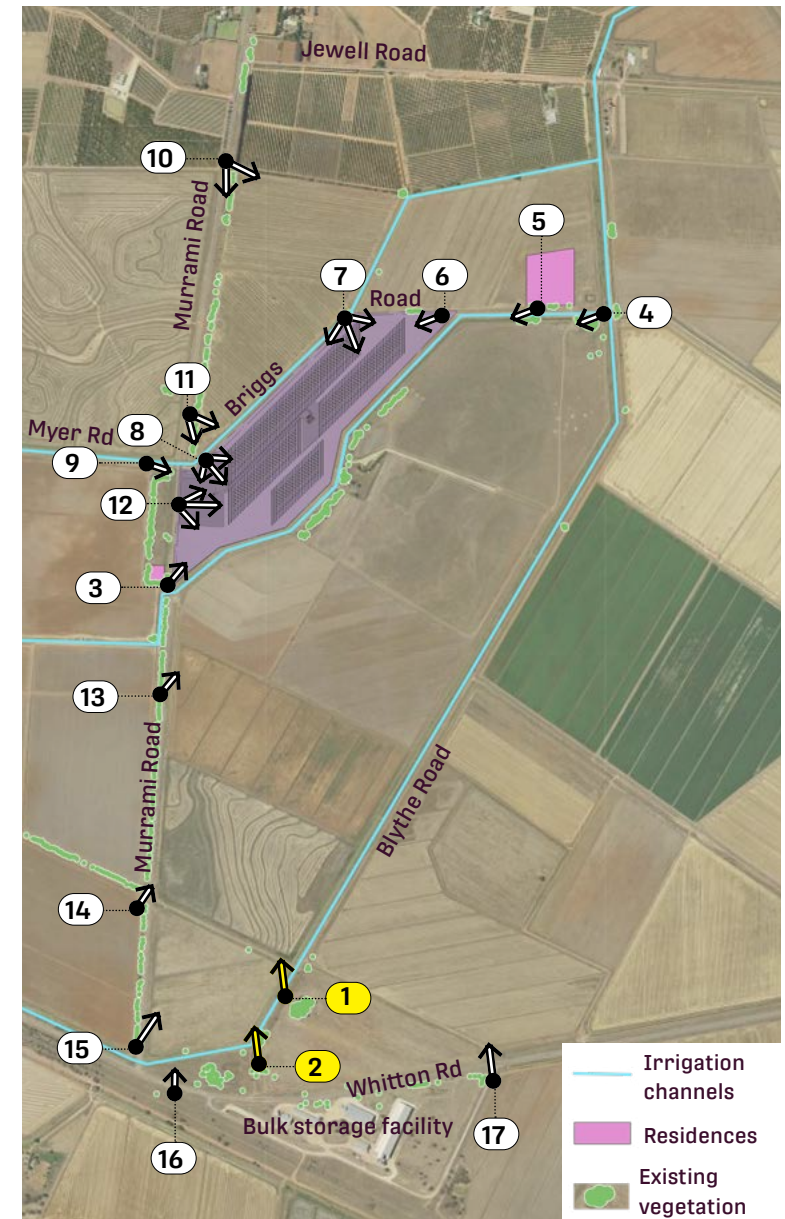


Site in distance, obscured by topography and existing vegetation from unsealed track.

Viewshed 2	Sensitivity	Magnitude	Impact
1600m south of site on Blythe Road	Negligible	Negligible	Negligible



Site in distance, obscured by topography and existing vegetation from unsealed track.



Viewshed 3	Sensitivity	Magnitude	Impact
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Photo A: House at 149 Murrami Road.	Moderate	High	Moderate-high
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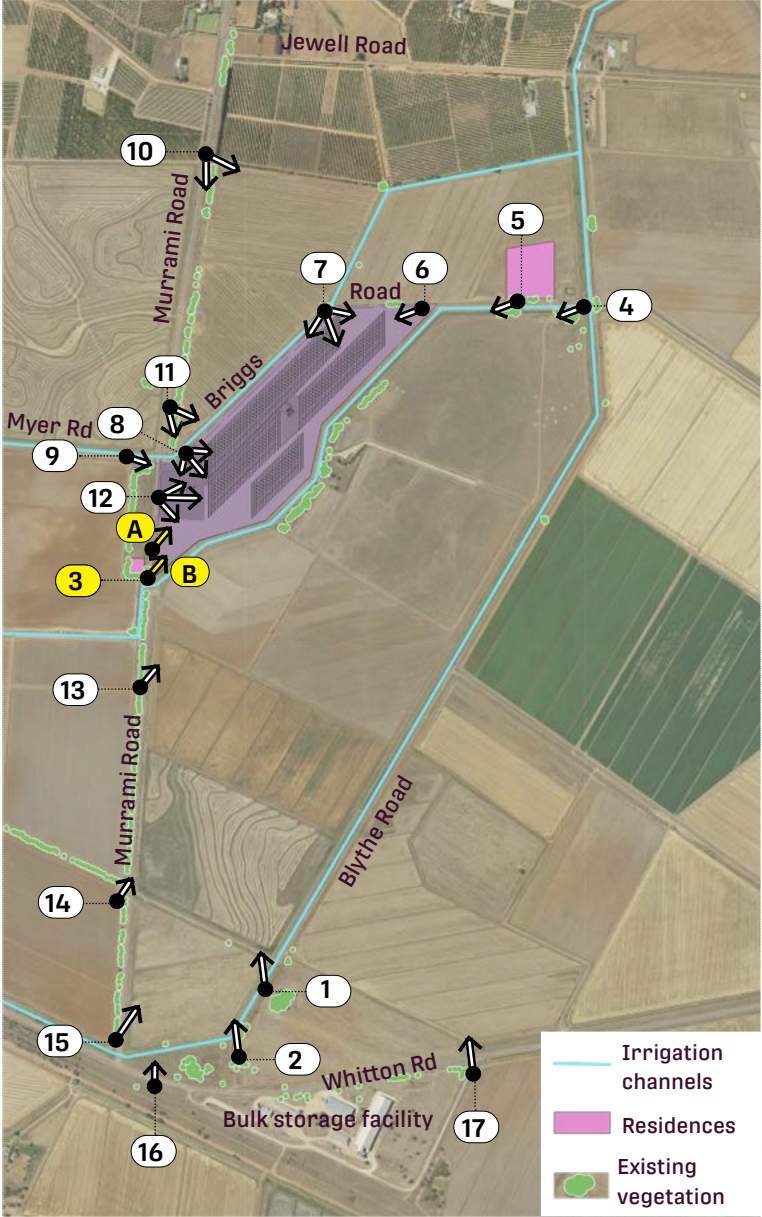
View to the proposed development from the residence on Murrami Road, immediately opposite to the site.

Viewshed 3	Sensitivity	Magnitude	Impact
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Photo B: South of house at 149 Murrami Road	Moderate	High	Moderate-high
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View to the proposed development from the channel crossing on Murrami Road, immediately south of the site.



Viewshed 4	Sensitivity	Magnitude	Impact
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450m from the site at the termination of Briggs Road at the irrigation channel.



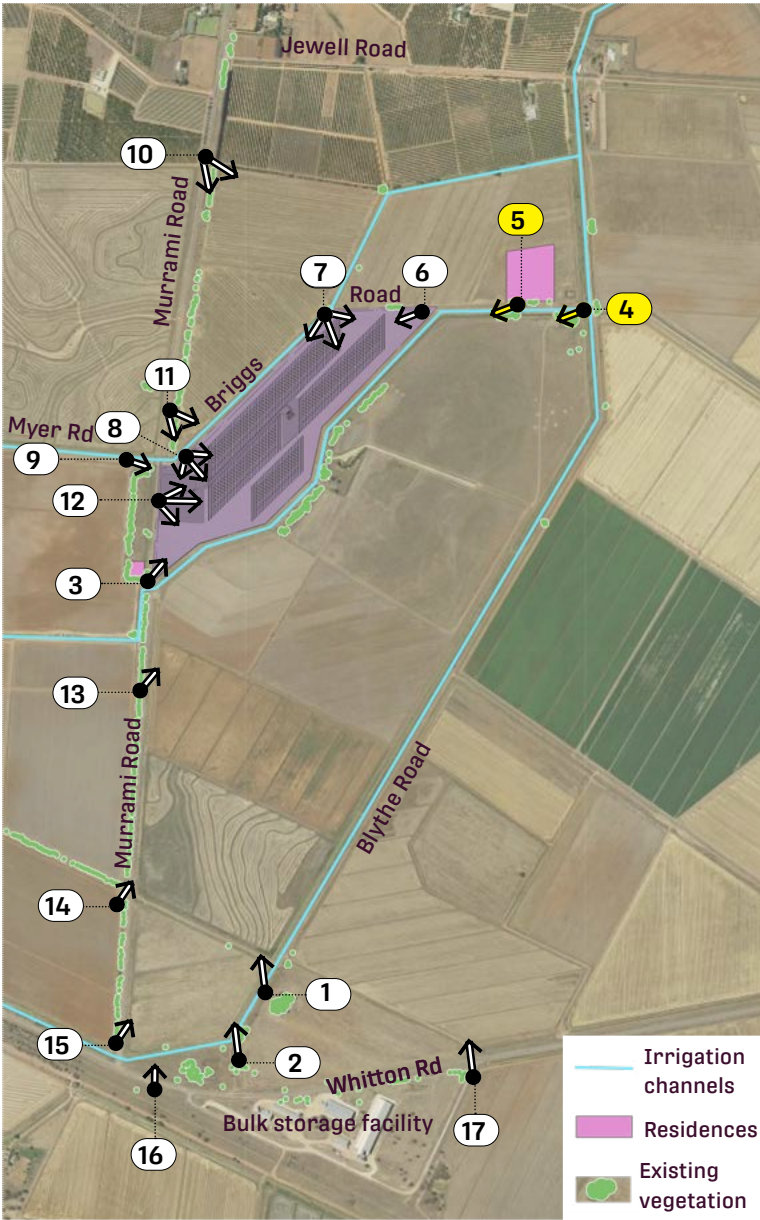
Existing vegetation screens the site.

Viewshed 5	Sensitivity	Magnitude	Impact
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House at 125 Briggs Road, 300m from the site.



View to the proposed development from low traffic unsealed road, partially obscured by existing vegetation.



Viewshed 6	Sensitivity	Magnitude	Impact
Briggs Road at NE corner of the site	Low	High	Moderate

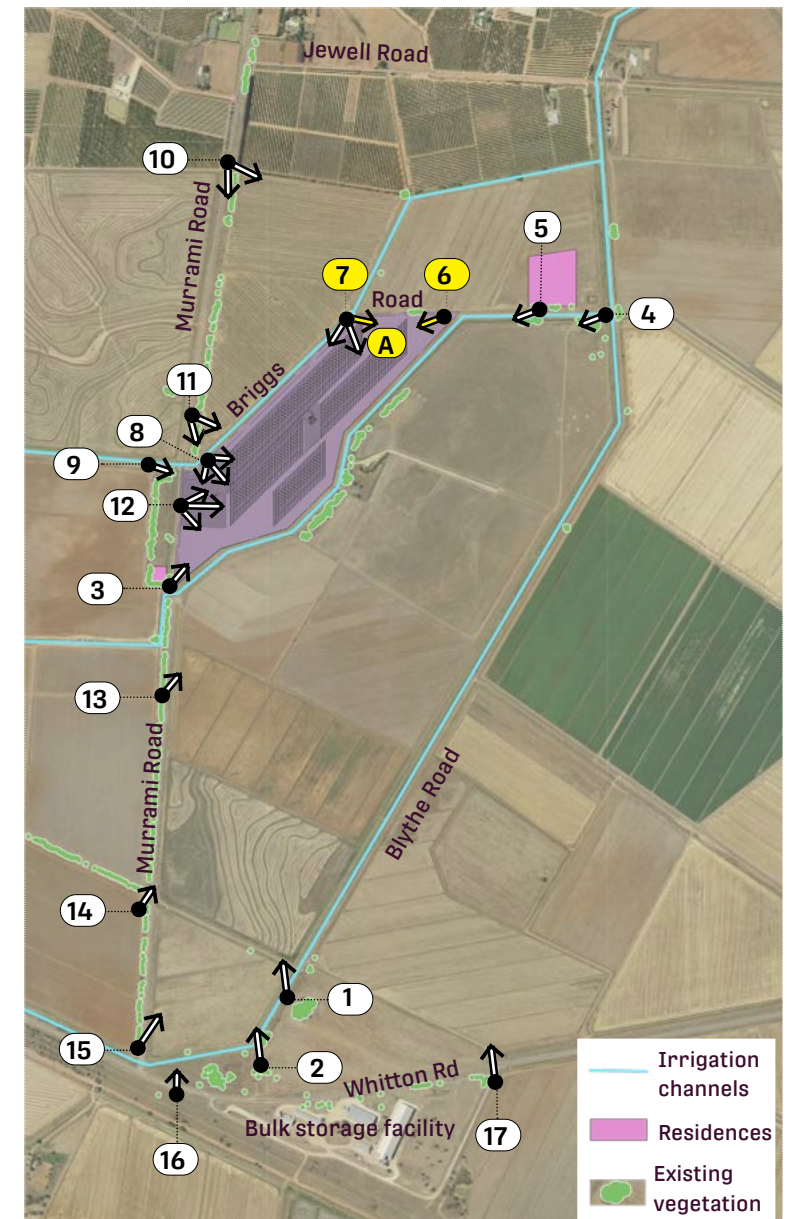


View to the proposed development from low traffic unsealed road.

Viewshed 7	Sensitivity	Magnitude	Impact
Photo A: Briggs Road at bend of the road.	Low	High	Moderate



View to the proposed development from low traffic unsealed road, immediately adjacent to the site.



Viewshed 7	Sensitivity	Magnitude	Impact
Photo B: Briggs Road at bend in the road.	Low	High	Moderate

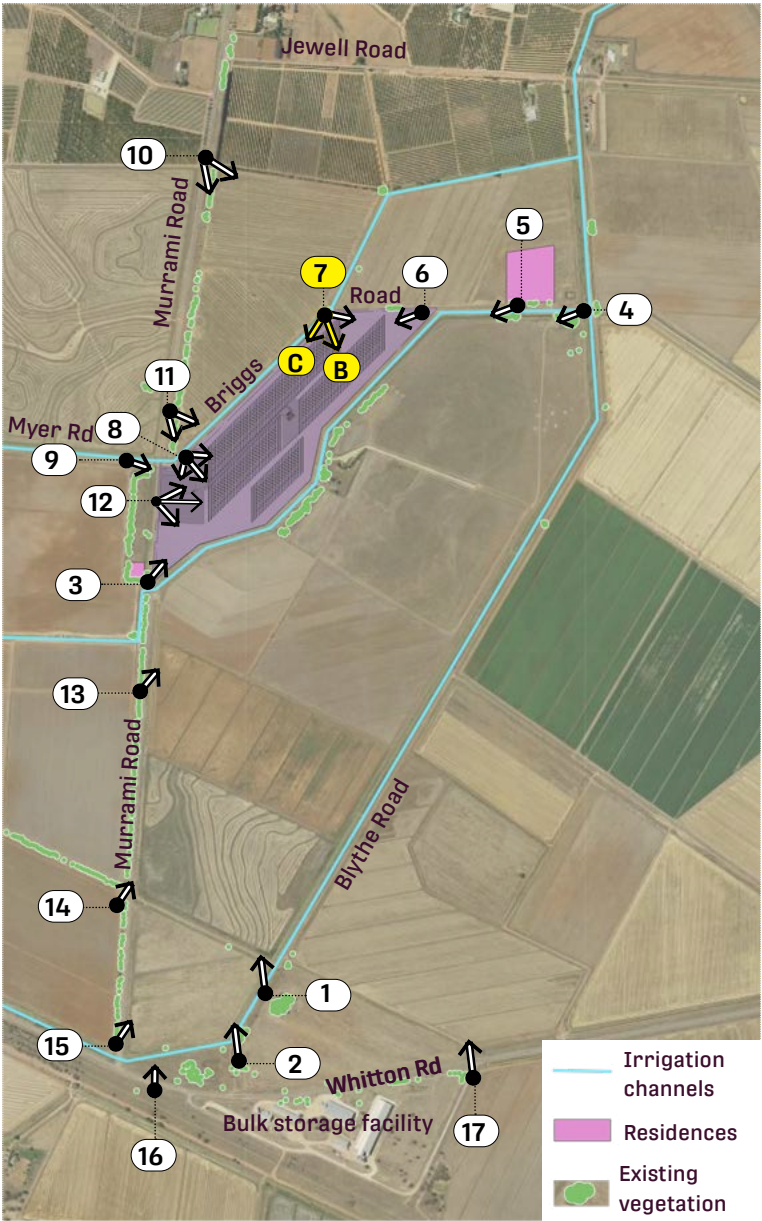


View to the proposed development from low traffic unsealed road, where the channel crosses the road, immediately adjacent to the site.

Viewshed 7	Sensitivity	Magnitude	Impact
Photo C: Briggs Road at bend in the road.	Low	High	Moderate



View to the proposed development from low traffic unsealed road, immediately adjacent to the site.



Viewshed 8	Sensitivity	Magnitude	Impact
Photo A: Briggs Road 50m east of intersection with Murrami Road.	Moderate	Moderate	Moderate

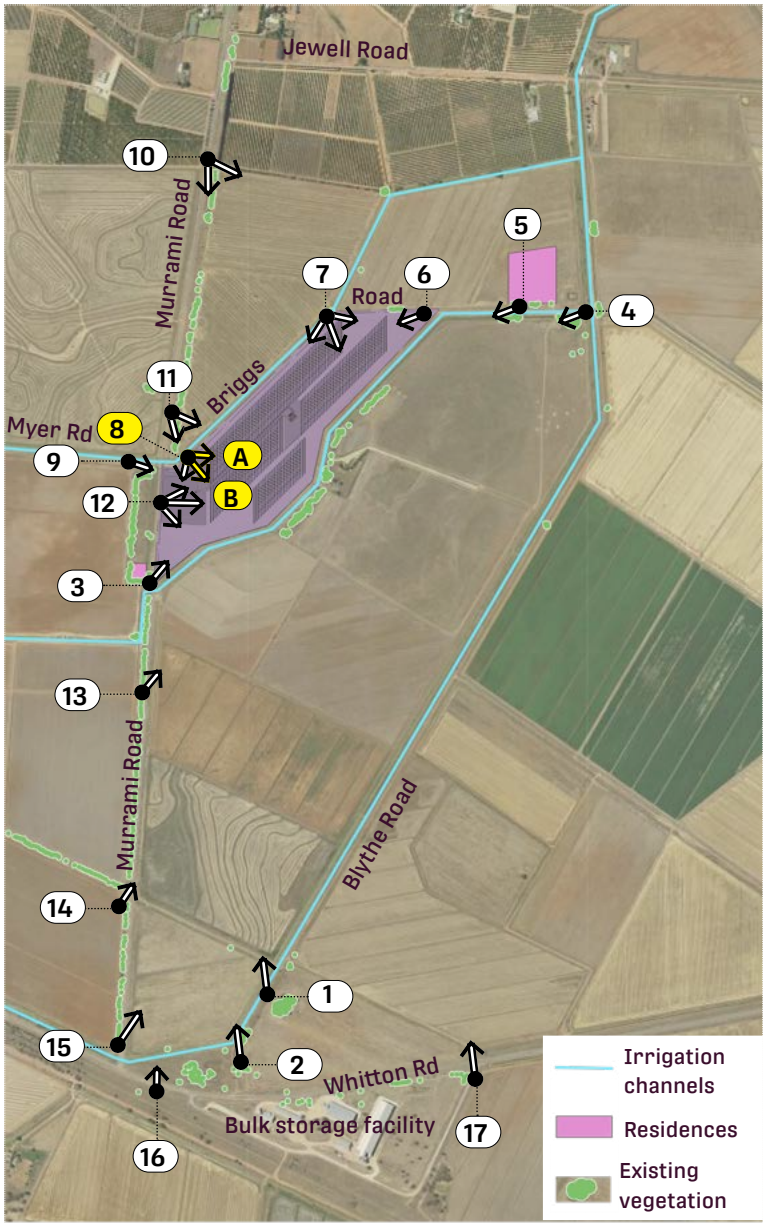


View to the proposed development from low traffic unsealed road, immediately adjacent to the site.

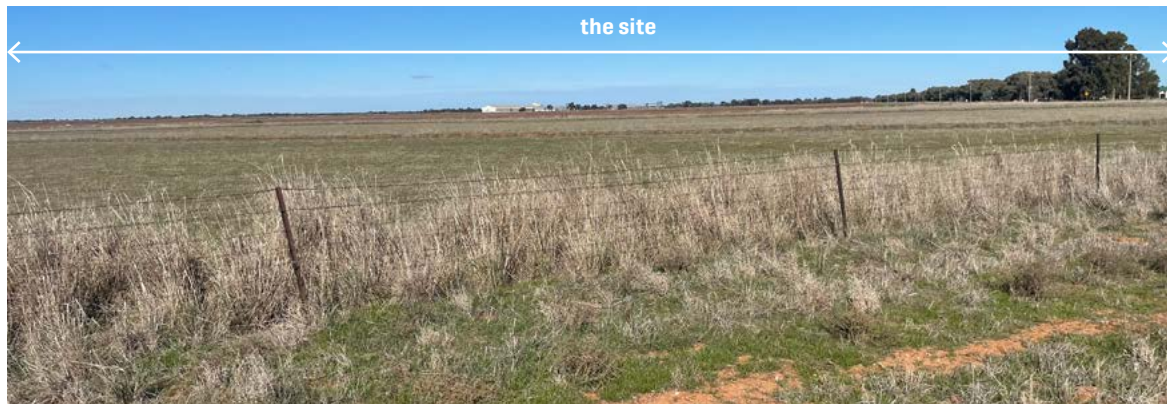
Viewshed 8	Sensitivity	Magnitude	Impact
Photo B: Briggs Road 50m east of intersection with Murrami Road.	Moderate	Moderate	Moderate



View to the proposed development from low traffic unsealed road, immediately adjacent to the site.



Viewshed 8	Sensitivity	Magnitude	Impact
Photo C: Briggs Road 50m east of intersection with Murrami Road.	Moderate	Moderate	Moderate

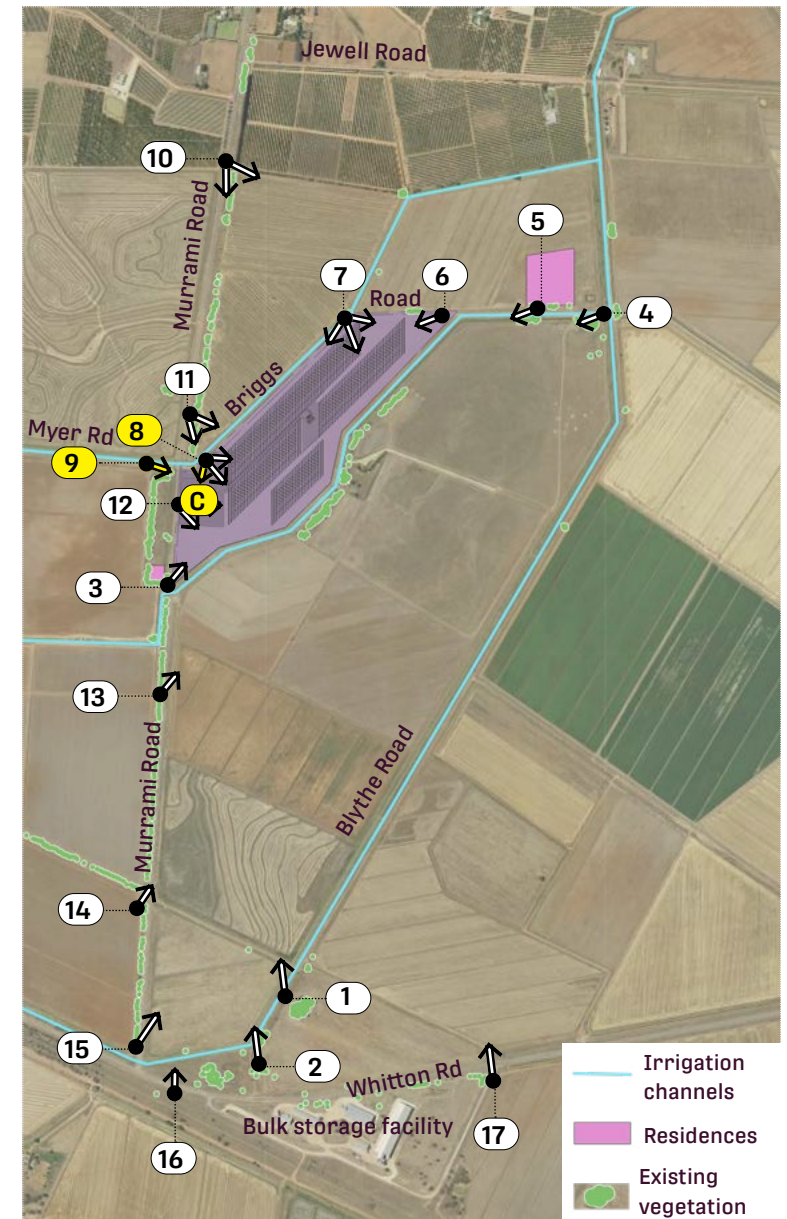


View to the proposed development from low traffic unsealed road, immediately adjacent to the site

Viewshed 9	Sensitivity	Magnitude	Impact
Myer Road.	Low	High	Moderate



View to the proposed development from low traffic unsealed road, immediately opposite the site



Viewshed 10	Sensitivity	Magnitude	Impact
Photo A: 800m from the site at Murrami Road.	Low	Low	Low

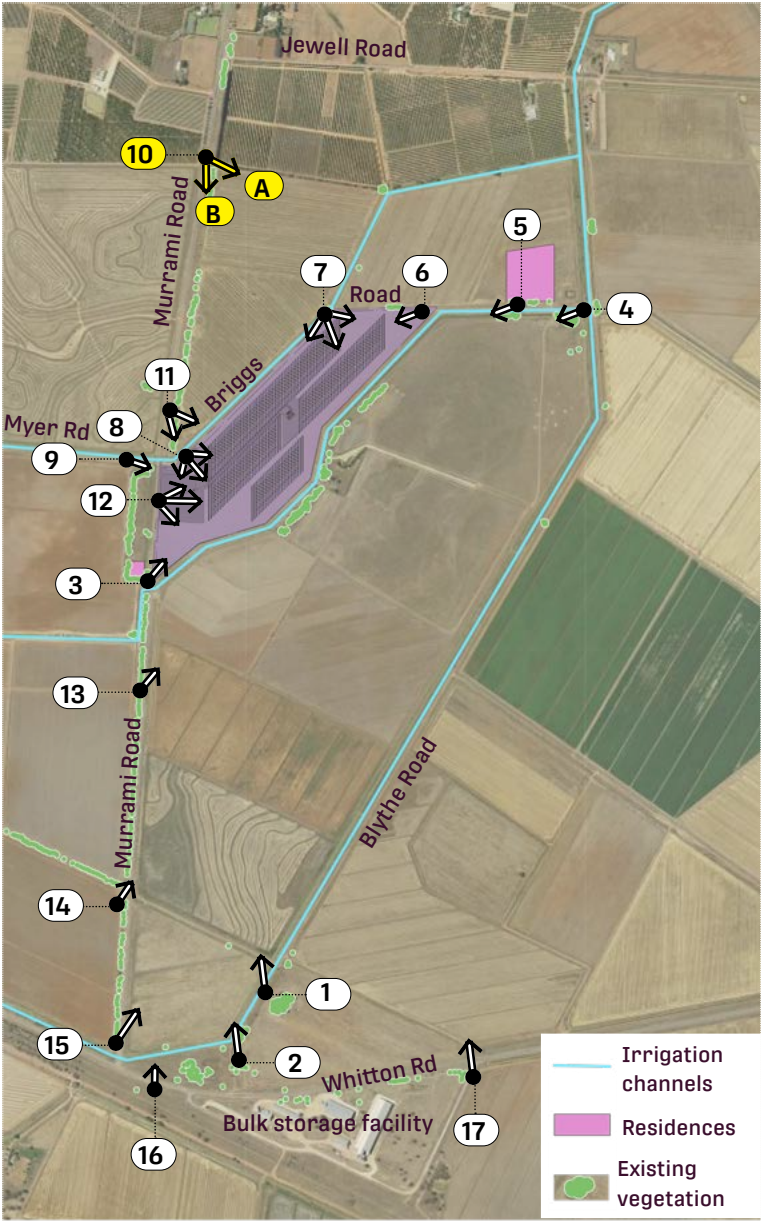


Distant view to the site obscured by vegetation and topography.

Viewshed 10	Sensitivity	Magnitude	Impact
Photo B: 600m from the site at Murrami Road	Low	Low	Low



Distant view to the site obscured by vegetation and topography.



Viewshed 11	Sensitivity	Magnitude	Impact
Photo A: 150m from the site on Murrami Road.	Moderate	Low	Moderate-low

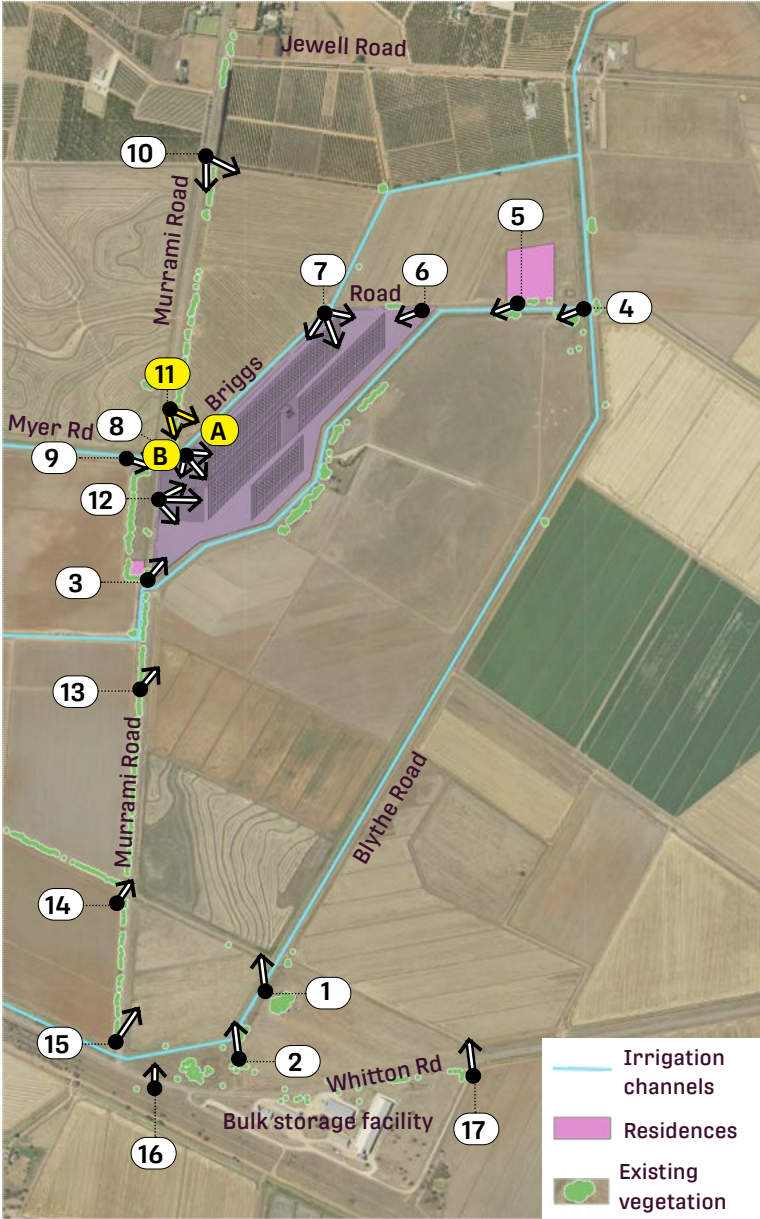


View to the site partially obscured by vegetation and topography

Viewshed 11	Sensitivity	Magnitude	Impact
Photo B: 150m from the site on Murrami Road.	Moderate	Low	Moderate-low



View to the site partially obscured by vegetation and topography



Viewshed 12	Sensitivity	Magnitude	Impact
Photo A: Murrami Road immediately adjacent to the site	Moderate	High	Moderate-high

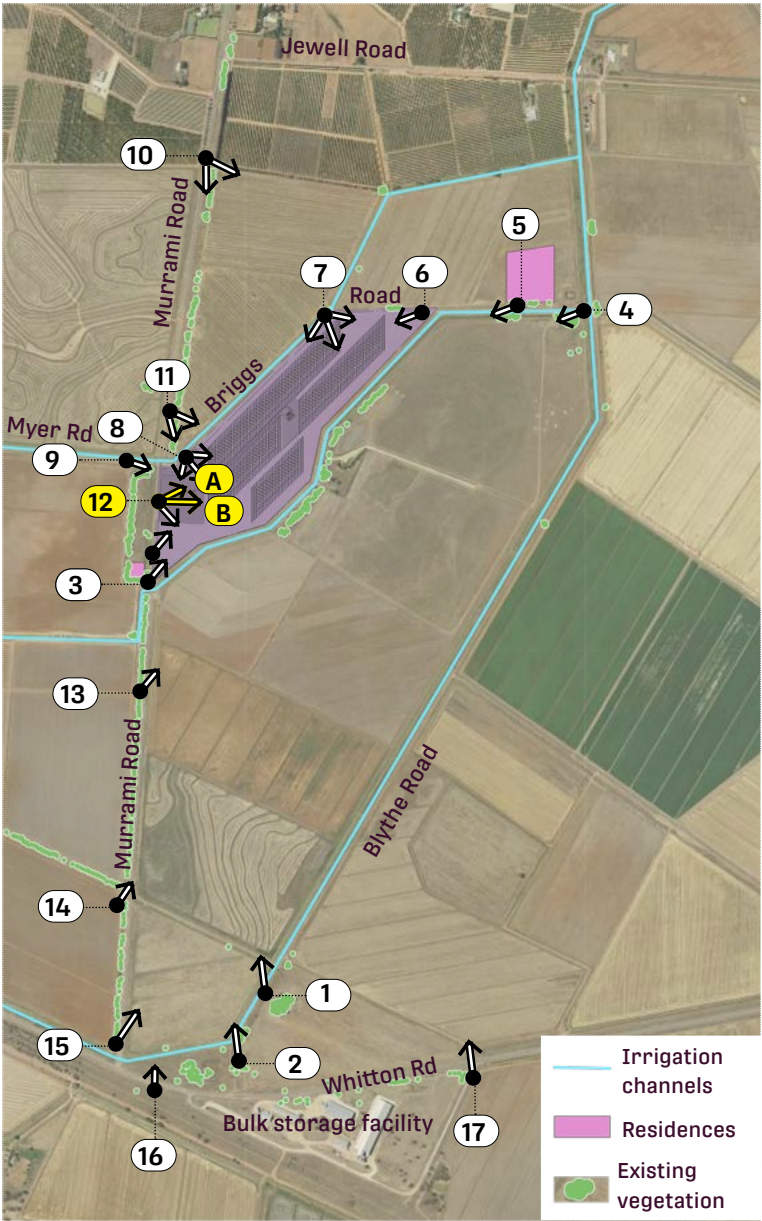


View to the proposed development from moderate traffic sealed road, immediately adjacent to the site

Viewshed 12	Sensitivity	Magnitude	Impact
Photo B: Murrami Road immediately adjacent to the site	Moderate	High	Moderate-high



View to the proposed development from moderate traffic sealed road, immediately adjacent to the site



Viewshed 12	Sensitivity	Magnitude	Impact
Photo C: Murrami Road immediately adjacent to the site	Moderate	High	Moderate-high

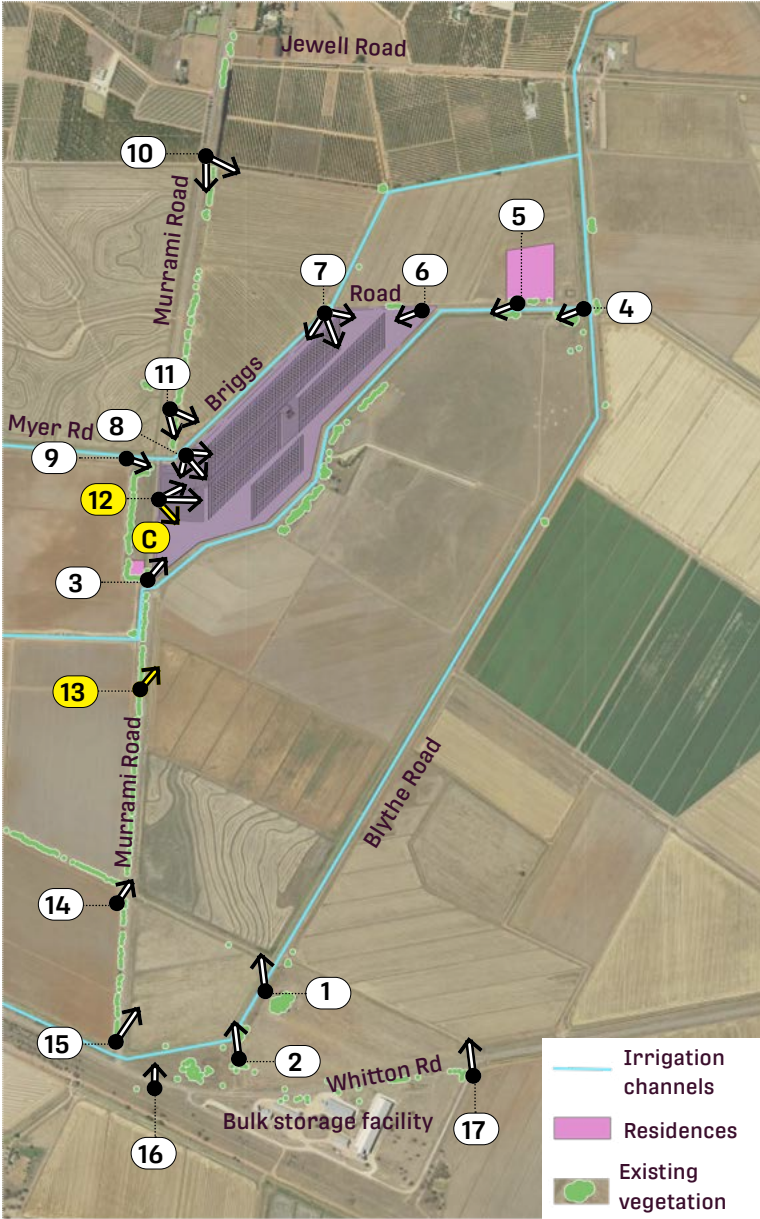


View to the proposed development from moderate traffic sealed road.

Viewshed 13	Sensitivity	Magnitude	Impact
300m south of the site on Murrami Road.	Moderate	Moderate	Moderate



View to the proposed development from moderate traffic sealed road, south of the site.



Viewshed 14	Sensitivity	Magnitude	Impact
950m south of the site at the intersection of Murrami and Blythe Roads	Low	Low	Low

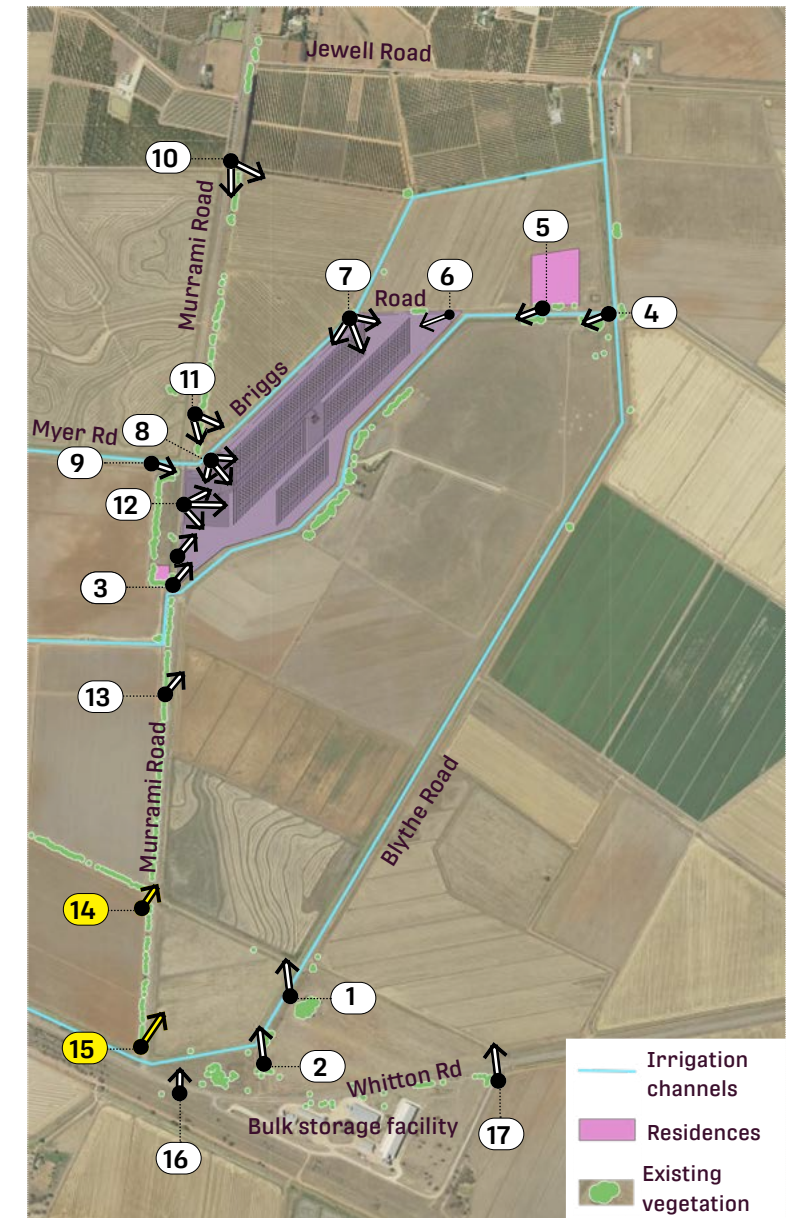


Distant view to the proposed development from moderate traffic sealed road south of the site

Viewshed 15	Sensitivity	Magnitude	Impact
400m south of the site at the existing bus stop	Low	Low	Low



Distant view to the proposed development from moderate traffic sealed road south of the site.



Viewshed 16	Sensitivity	Magnitude	Impact
1600m south of the site at Whitton Road.	Negligible	Negligible	Negligible

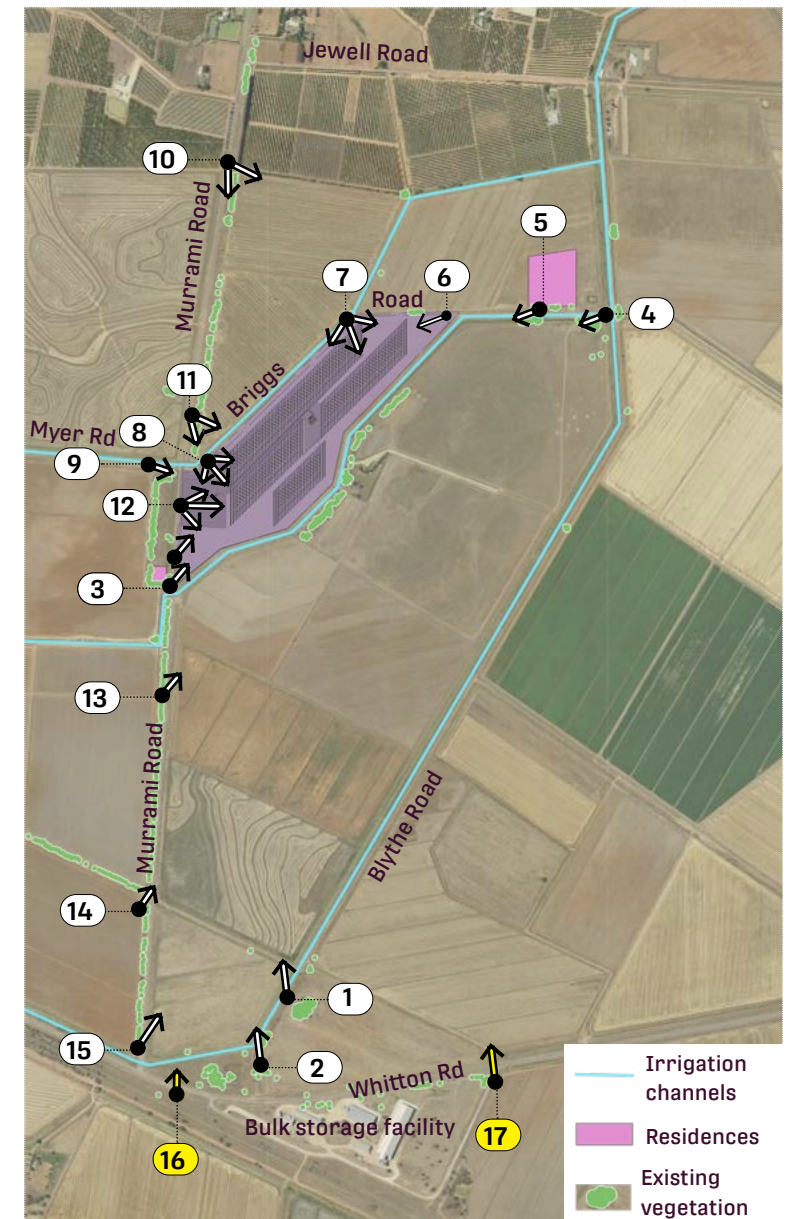


The site is not visible due to vegetation, topography and distance.

Viewshed 17	Sensitivity	Magnitude	Impact
1650m south of the site at Whitton Road.	Negligible	Negligible	Negligible



The site is not visible due to vegetation, topography and distance.



Findings and recommendations

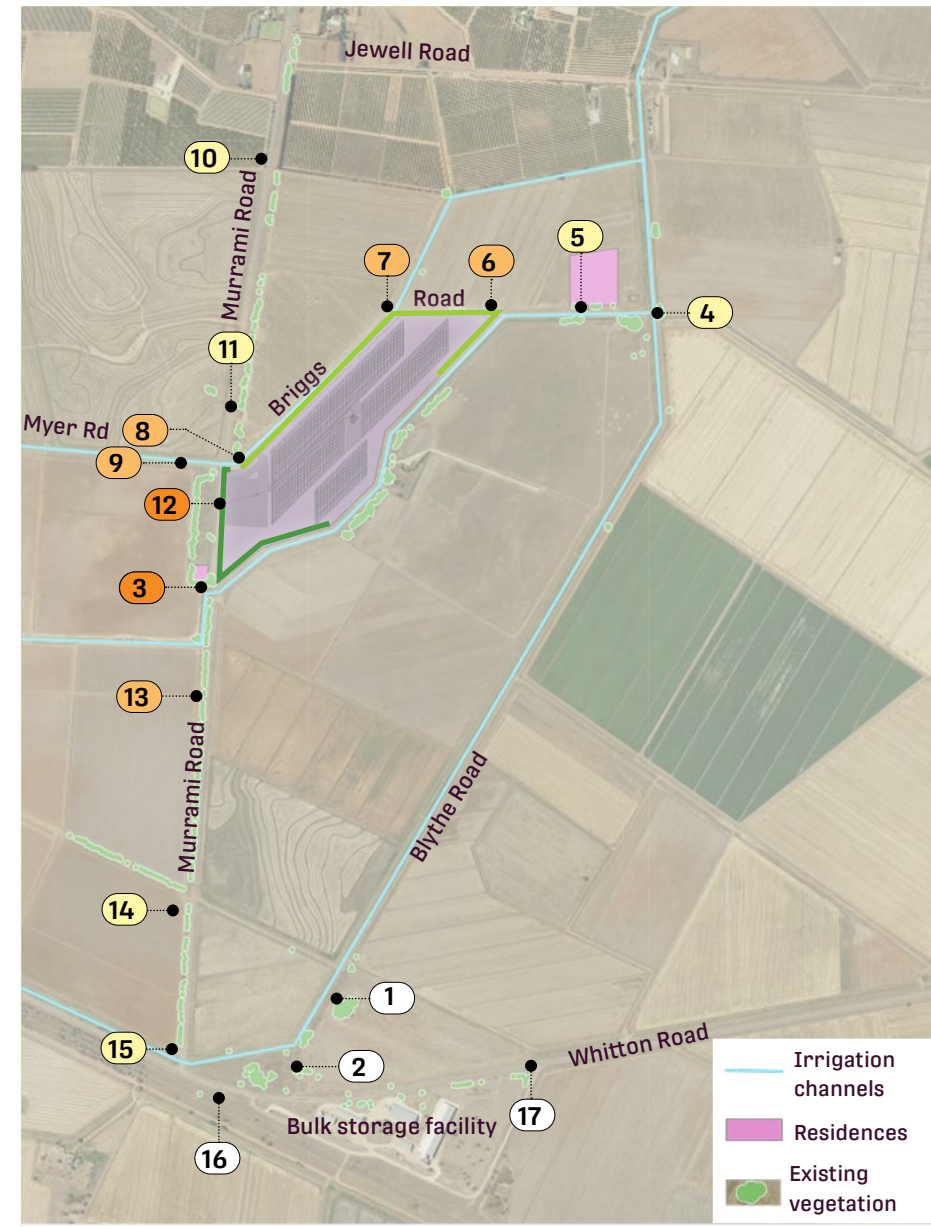
Findings

The visual assessment findings are summarised below:

Viewshed	Impact
1	Negligible
2	Negligible
3	Moderate-high
4	Low
5	Low
6	Moderate
7	Moderate
8	Moderate
9	Moderate
10	Low
11	Moderate-low
12	Moderate-high
13	Moderate
14	Low
15	Low
16	Negligible
17	Negligible

Recommendations

- 3m wide screen planting of shrubs
- 5m wide screen planting of shrubs



yonder.



Glint and Glare Assessment Stanbridge Solar Farm

Bison Energy Company

Draft – May 2025

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1. Introduction

1.1. Overview

Bison Energy proposes to construct and operate a 5MW Renewable Energy Facility (Solar Facility) at 125 Briggs Road, Stanbridge. This facility is to comprise the installation of solar photovoltaic panels mounted in arrays on single-axis trackers, cabling from the solar arrays to panel inverter and Battery Energy Storage Systems (BESS) station and connection to the local electricity network.

As part of the development application, a Glint and Glare assessment must be undertaken to determine the likely impact of glint and glare from the proposed development on nearby sensitive receptors and identify appropriate, feasible and reasonable mitigation strategies if required.

This assessment has been prepared by Bison Energy's Engineers with input from planning and urban design consultants Habitat Planning. This report details the key inputs, methodology and the results of this glare assessment.

The objectives of this study are as follows:

- Carry out an analysis of glare from the proposed single axis tracking system;
- Identify observation points surrounding the proposed solar facility
- Identify and summarise potential glare impacts at various observation points;
- Recommend any mitigation to reduce glare issues

1.2. Glint and Glare

Glint refers to the momentary flash of bright light that can be caused by the reflectivity of solar panels and glare refers to the continuous source of light and is generally associated with stationary objects. Glint and glare from PV panels can have potential safety or amenity impacts to surrounding sensitive receivers, including potential to impair observers through inducing an after image.

1.3. PV Panels Reflectivity

As construction of PV panels primarily utilises glass and steel there is a perception of glint and glare from the reflectivity of solar panels. This leads to potential issues of distractions to motorists, aircraft and eye damage.

Generally, solar panels will not create significant glint or glare compared with other surfaces. PV panels are designed to collect sunlight to convert to energy and therefore absorb the majority of light received. The panels are designed using anti-reflective coatings during manufacture to reduce reflection and will typically absorb 80-90% of the light received.

PV panels are also generally less reflective than other naturally occurring elements such as soils and crops and have been found to be generally less reflective than general rural environments and far less reflective than open water¹.

The angle of incidence of the sunlight is also relevant in considering the reflection of solar development. A fixed axis solar facility will have panels that do not move throughout the day and therefore the angle incidence varies with the time of day. A tracking system, such as that proposed for this development, will follow the sun through the day and can have the angle of incidence reduced. It is also possible to 'back track' panels at certain periods of the day to reduce potential impacts.

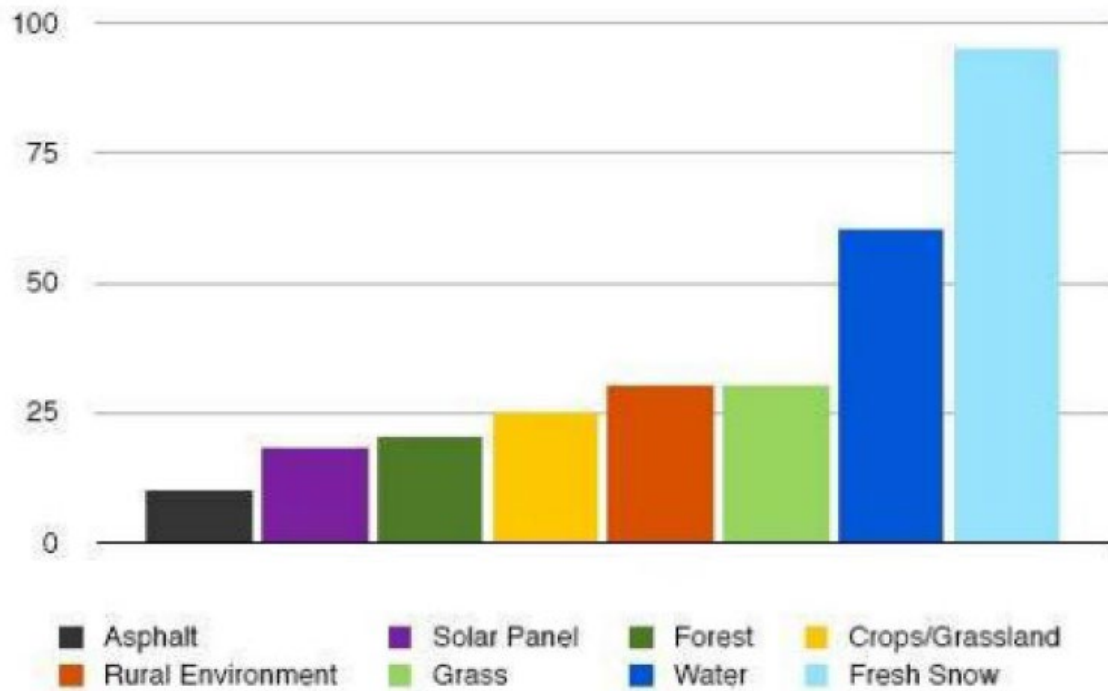


Figure 1 Comparative Reflection Analysis of PV Panels to Other Surfaces (Spaven Consulting 2011, p.5)

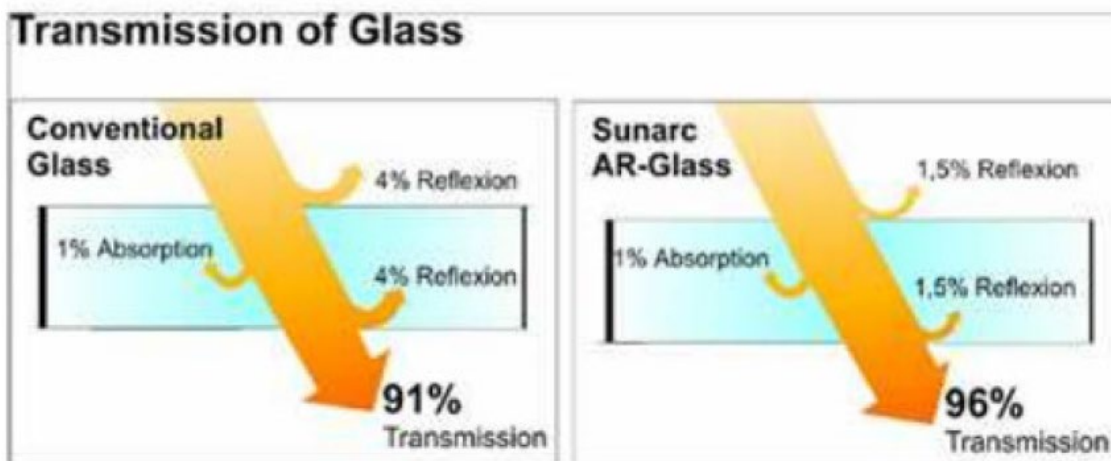


Figure 2 Reflective Values of Conventional Glass and Typical Treated Glass (Spaven Consulting 2011, p.5)

2. Subject Site

2.1. Site description

The subject land to which this application relates is described as Lot 176 in DP751735 and addressed as 125 Briggs Road, Stanbridge NSW 2705. It is located approximately 15km west of Leeton and 11.5km east of Whitton. The location of the site is shown at **Figure 3**.

The lot forms an irregular shape with a depth of approximately 890 metres and a width ranging from approximately 205 metres to 290 metres.

The land is a cleared rural paddock and does not contain any existing structures or significant vegetation. It is used primarily for agricultural purposes including irrigation.

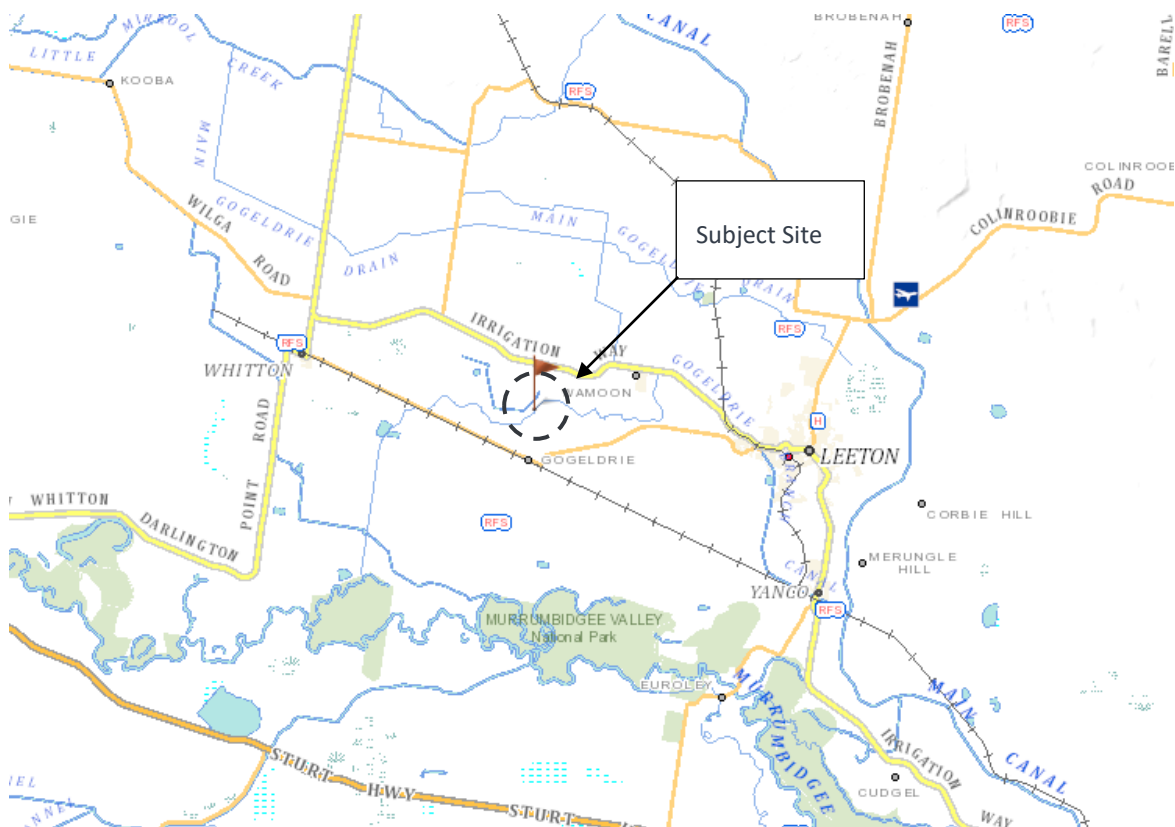


Figure 3: Context Map



Figure 4: Aerial Imagery of the Subject Site

3. Glint and Glare Assessment Methodology

The assessment methodology in this instance is based on guidance documents for Solar Facility design, studies in relation to glint and glare along with industry best practice modelling. The broad methodology followed for this study comprises:

- collate key data and model inputs for solar farm based on specifications and design
- identify primary receptors in the area surrounding the site;
- consider visibility of the panels from the receptor's location and whether or not panels are likely to be visible
- plot the location of all receptors in a Solar Glare Analyses Tool and input data for the proposed facility to model the expected impacts
- based on modelling, determine whether a reflection can occur to receptors and the extent/period of impact;
- determine whether a significant detrimental impact is expected.
- Recommend appropriate mitigation measures as required

3.1. Modelling Tool

This study has used the Glare Gauge modelling tool by ForgeSolar. This is an industry standard technical modelling tool, which utilises the Solar Glare Hazard Analysis Tool (SGHAT) developed by Sandia National Laboratories, to assess the potential glare to receptors around solar arrays. This tool is required by a number of international authorities including the United States Federal Aviation Administration for glint and glare analyses near airports, and it recognised by the UK Civil Aviation Authority, and the Australian Government Civil Aviation Safety Authority.

The Glare Gauge tool uses an interactive Google Maps interface to plot the arrangement of arrays and the location of sensitive receptors including static observation points, routes and flight paths. The elevation of the panels and receptors are automatically captured using ground elevation data of the respective locations. The modelling for consideration of this development utilises the specification and data of the proposed PV panels to be installed, the location of the panels relative to the receptors and the proposed angle of tilt for the panels.

The analysis also allows the user to input the location of each 'observer point' and 'paths' by identifying the location. The locational data for each of these points is also extracted from Google map data.

If glare is found, the analysis calculates the retinal irradiance and subtended angle (size/distance) of the glare upon each of the identified observer points or paths. This output predicts the potential impacts in a range of temporary after-image effects to retinal burn. The results are produced to show when glare will occur throughout the year and the time per day, as well as to show the impact of any glare.

3.2. Glare Hazard Rating

The SGHAT defines three levels of ocular hazard as a result of glare. The hazards are defined as low, moderate or high, depending on the potential to impact vision through producing glare with a potential for afterimage. The following definitions are provided for the glare hazard levels referred to in this report.

No glare	No Glare - No glare predicted.
Green	Low potential hazard – Glare is present, however only a low potential for a temporary after-image. This hazard is shown green on the plots used by the GlareGuage tool, reproduced in Figure 7 of this report.
Yellow	Moderate potential hazard -Glare present with the potential to leave temporary after-image of the glare. This hazard is shown green on the plots used by the GlareGuage tool, reproduced in Figure 7 of this report.
High	High potential hazard – Glare is present with potential for permanent eye damage. This hazard is shown green on the plots used by the GlareGuage tool, reproduced in Figure 7 of this report.

3.3. Model inputs

The proposed solar array associated with the Stanbridge solar facility will consist of panels fixed on single axis tracking. An 'interval' backtracking strategy was also nominated for the project, which is described as a *'step-based method that discretely backtracks the PV modules over time'*.

To accurately determine the potential glare impact of the array, the following array details were input into the GlareGuage tool.

Input	Unit	Value
Time zone	UTC	UTC +10
Peak DNI	kW/m ²	1000
Backtracking method	-	Interval
PV Panel surface material	-	Smooth glass with anti-reflective coating (ARC)
Tracking axis tilt	Degrees	0
Resting angle	Degrees	10
Orientation of tracking axis	Degrees	0
Offset angle of panel	Degrees	0
Maximum tracking angle	Degrees	60
Height above ground (Panels)	Metres	0
Height (OPs)	Metres	0

Height (Routes)	Metres	0
-----------------	--------	---

3.4. Identification of Receptors

In addition to the array inputs outlined above, the locations of the closest four (4) identified receptors were plotted into the GlareGuage tool on the same Google Maps interface. These receptors were input from within a capture area of a radius of approximately 2 kilometres around the location of the proposed facility.

Observation Point receptors are identified as "OP" locations on the analysis. These simulate an observer at a single, discrete location, defined by a latitude, longitude, elevation, and height above ground, all of which are taken from automatically generated map data. Users select the location of a point receptor and the system automatically generates the latitude, longitude, ground elevation, observed height above ground/elevation. For any dwellings or sensitive uses, these are identified as point receptors and taken from the location in which the dwelling or feature is located. By default, the height above natural ground for modelling is 1.5 metres.

A number of Observation Points (OPs) were identified within proximity to the site. These OPs consisted entirely of surrounding dwellings and were measured from a height of 1.5 metres above the ground for a typical viewing angle.

Figure 5 below illustrates the location of the OPs within proximity of the site, identified as the red pinpoints.



Figure 5: Observation Points Assessed for Glint and Glare Within the Immediate Context of the Subject Site

All surrounding routes were recorded for input into the GlareGuage tool similar to the OP's. The height above ground was input as 2.4 metres, which represents the eye height of drivers in larger trucks, being the most susceptible to potential glare. The input height was determined in accordance with the criteria set out in the *Austrroads, Guide to Road Design Part 3: Geometric Design*.

The routes are indicated below in **Figure 6**, identified as the teal line.



Figure 6 Routes assessed for glint and glare within the immediate context of the subject site

3.5. Assessment of Impacts

As discussed, an assessment of the potential impact of the proposal has been undertaken using the GlareGauge Tool. The tool enables the proposed solar facility to be mapped along with relevant data inputs and then uses the data to consider the potential for temporary after-image or more significant retinal burn. The chart presented at **Figure 7** represents the possible severity of glare at receptor locations.

Red glare refers to potential for permanent eye damage from the observation location, yellow glare indicates the potential for after image effects and green glare refers to low potential for after image impacts.

The assessment relies on identifying the potential sensitive receptors surrounding the development and assessing the potential impacts on the receptors. The modelling for consideration of this development utilises the specification and data of the proposed PV panels to be installed, the location of the panels relative to the receptors and the proposed angle tilt for the panels.

It is also noted that the impact of a reflection can decrease with distance. This is because the proportion of an observer's field of vision that is taken up by the reflecting area diminishes as the separation distance increases. Terrain and shielding by vegetation are also more likely to obstruct an observer's view at longer distances.

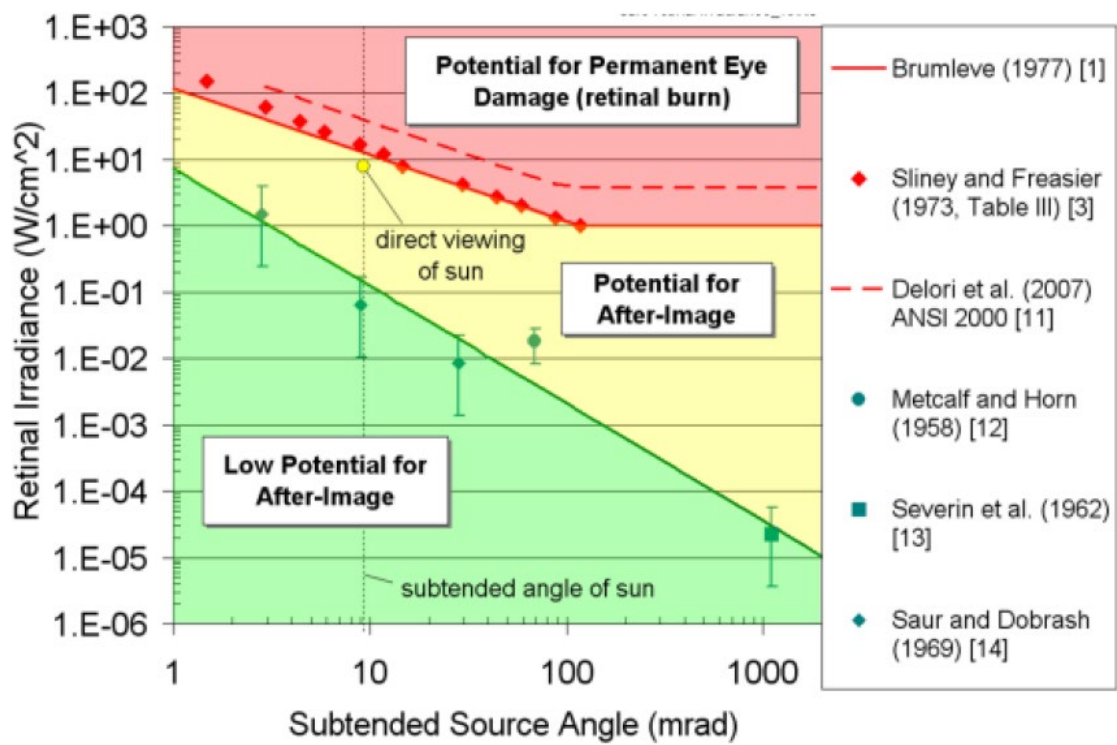


Figure 7 Summary of potential glare impact with regard to total minutes of glare for receptor

4. Results

Of the 4 OPs assessed and surrounding route assessed, none were calculated to be subject to glare. This is achieved because the panels will be single axis trackers and will follow the sun through the day and the proposed tracking system will be limited to only back-track which the panels are outside the reflective range of the sun.

By default, the glare assessment using Forge Solar analysis includes an assumption that the panel system would 'backtrack' to a flat resting position after sunset (when the sun left the angle of rotation of the panel) until sunrise (when the panel was in the angle of rotation of the panels). However, the proposed development will not backtrack. This means that at the end of the day, panels will remain fixed at 60 degree tilt facing west and will rotate back to 60 degrees facing east only when the sun is within the angle of rotation in the morning. Under this arrangement, the panels will not revert to resting flat when the sun is outside of the tracking range.

It should also be noted that based on the results that the use of single axis tracking avoids any potential glare impacts, irrespective of the height configurations analysed, if backtracking is disabled.

Having regard to the above, the modelling within this assessment has determined that the facility will not result in any significant glare on the receptor points provided that backtracking is disabled.

A summary of the receptors which recorded glare, is provided in the attached summary. Note that receptors that did not record any glare are not included in this table.

5. Conclusion & Recommendations

The results indicate that no OPs and routes will be subject to glare. Based on the visual assessment prepared as part of the application, some surrounding Ops and routes may still be subject to a 'visual impact' and it is recommended that landscaping be established surrounding the facility.

Implementation of landscaping is proposed to the perimeter around the PV array around all boundaries which will also assist in avoiding potential for any glare from the property. This landscaping is to be provided in the form of perimeter plantings as detailed by the submitted landscape plans.

Additionally, a temporary screening mesh treatment may be installed along property boundary while perimeter landscaping is being established.

Appendix A: Forge Solar Assessment Summary

FORGESOLAR GLARE ANALYSIS

Stanbridge Solar Farm

Created May 08, 2025
Updated May 08, 2025
Time-step 10 minute(s)
Timezone offset UTC+10
Minimum sun altitude 0.0 deg
Site ID 148726.25020

Project type **Demo**
Project status: active ?



APPROVED

Subject to compliance with the accompanying notice
of determination conditions of:

Development Application No: **DA 134-2025** Date: **3 July 2026**



Glare Analysis Summary PV Array Results

Summary of Results

No glare predicted!

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh
PV array 1	SA tracking	SA tracking	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 19,554 m²

Name: PV array 1
Footprint area: 19,554 m²
Axis tracking: Single-axis rotation
Backtracking: Interval
Tracking axis orientation: 0.0 deg
Maximum tracking angle: 60.0 deg
Resting angle: 10.0 deg
Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total elevation m
1	-34.539313	146.283284	132.73	0.00	132.73
2	-34.538014	146.283305	133.06	0.00	133.06
3	-34.536971	146.284850	133.00	0.00	133.00
4	-34.538332	146.284732	132.62	0.00	132.62



Route Receptor(s)

Name: Route 1
Route type Two-way
View angle: 50.0 deg



Vertex	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total elevation m
1	-34.551155	146.284029	133.89	0.00	133.89
2	-34.549281	146.279218	133.96	0.00	133.96
3	-34.537722	146.280199	133.00	0.00	133.00
4	-34.537701	146.280832	132.85	0.00	132.85
5	-34.533811	146.285913	132.64	0.00	132.64
6	-34.533598	146.294075	134.00	0.00	134.00
7	-34.536532	146.294486	133.79	0.00	133.79
8	-34.551149	146.284083	133.91	0.00	133.91

Discrete Observation Receptors

Number	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total Elevation m
OP 1	-34.540762	146.279514	134.00	0.00	134.00
OP 2	-34.533038	146.291803	133.62	0.00	133.62
OP 3	-34.527972	146.292186	135.00	0.00	135.00
OP 4	-34.537069	146.256071	132.75	0.00	132.75

Misc. Analysis Settings

DNI: varies (1,000.0 W/m^2 peak)
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad

PV Analysis Methodology: **Version 2**
Enhanced subtended angle calculation: **On**

Summary of PV Glare Analysis

PV configuration and predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File 
PV array 1	SA tracking	SA tracking	0	0	-	-

Click the name of the PV array to scroll to its results

PV & Receptor Analysis Results

detailed results for each PV array and receptor

PV array 1

no glare found

Component	Green glare (min)	Yellow glare (min)
OP: OP 1	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
Route: Route 1	0	0

No glare found

Stanbridge Solar Farm-temp-6

Created May 08, 2025

Updated May 08, 2025

Time-step 10 minute(s)

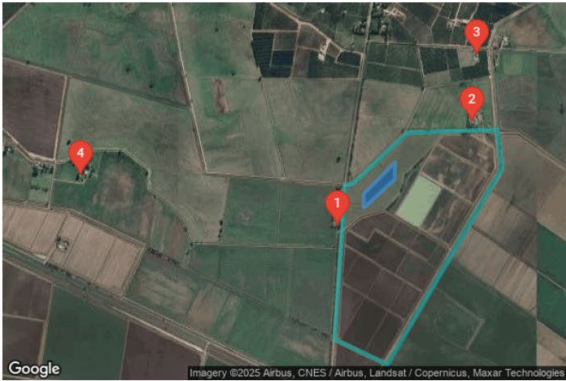
Timezone offset UTC+10

Minimum sun altitude 0.0 deg

Site ID 148733.25020

Project type Demo

Project status: active



Glare Analysis Summary

PV Array Results

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
PV array 2	SA tracking	SA tracking	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 32,207 m^2

Name: PV array 2
Footprint area: 32,207 m^2
Axis tracking: Single-axis rotation
Backtracking: Interval
Tracking axis orientation: 0.0 deg
Maximum tracking angle: 60.0 deg
Resting angle: 10.0 deg
Rated power: -
Panel material: Smooth glass with AR coating
Vary reflectivity with sun position? Yes
Correlate slope error with surface type? Yes
Slope error: 8.43 mrad

Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
	deg	deg	m	m	m
1	-34.536066	146.284738	133.59	0.00	133.59
2	-34.537303	146.284700	133.00	0.00	133.00
3	-34.539422	146.281905	132.00	0.00	132.00
4	-34.538391	146.281897	132.82	0.00	132.82



Route Receptor(s)

Name: Route 1

Route type Two-way

View angle: 50.0 deg



Vertex	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total elevation m
1	-34.551155	146.284029	133.89	0.00	133.89
2	-34.549281	146.279218	133.96	0.00	133.96
3	-34.537722	146.280199	133.00	0.00	133.00
4	-34.537701	146.280832	132.85	0.00	132.85
5	-34.533811	146.285913	132.64	0.00	132.64
6	-34.533598	146.294075	134.00	0.00	134.00
7	-34.536532	146.294486	133.79	0.00	133.79
8	-34.551149	146.284083	133.91	0.00	133.91

Discrete Observation Receptors

Number	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total Elevation m
OP 1	-34.540762	146.279514	134.00	0.00	134.00
OP 2	-34.533038	146.291803	133.62	0.00	133.62
OP 3	-34.527972	146.292186	135.00	0.00	135.00
OP 4	-34.537069	146.256071	132.75	0.00	132.75

Misc. Analysis Settings

DNI: varies (1,000.0 W/m^2 peak)

Ocular transmission coefficient: 0.5

Pupil diameter: 0.002 m

Eye focal length: 0.017 m

Sun subtended angle: 9.3 mrad

PV Analysis Methodology: Version 2

Enhanced subtended angle calculation: On

Summary of PV Glare Analysis

PV configuration and predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File 
PV array 2	SA tracking	SA tracking	0	0	-	-

Click the name of the PV array to scroll to its results

PV & Receptor Analysis Results

detailed results for each PV array and receptor

PV array 2

no glare found

Component

Green glare (min)

Yellow glare (min)

OP: OP 1	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
Route: Route 1	0	0

No glare found

Stanbridge Solar Farm

Created May 08, 2025

Updated May 08, 2025

Time-step 10 minute(s)

Timezone offset UTC+10

Minimum sun altitude 0.0 deg

Site ID 148737.25021

Project type Demo

Project status: active



Glare Analysis Summary

PV Array Results

Summary of Results No glare predicted!

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh
PV array 4	SA tracking	SA tracking	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 32,283 m^2

Name: PV array 4

Footprint area: 32,283 m^2

Axis tracking: Single-axis rotation

Backtracking: Interval

Tracking axis orientation: 0.0 deg

Maximum tracking angle: 60.0 deg

Resting angle: 10.0 deg

Rated power: -

Panel material: Smooth glass with AR coating

Vary reflectivity with sun position? Yes

Correlate slope error with surface type? Yes

Slope error: 8.43 mrad

Vertex	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total elevation m
1	-34.538033	146.282137	133.28	0.00	133.28
2	-34.537114	146.282201	132.59	0.00	132.59
3	-34.534083	146.285959	132.43	0.00	132.43
4	-34.534869	146.285977	133.60	0.00	133.60



Route Receptor(s)

Name: Route 1

Route type Two-way

View angle: 50.0 deg



Vertex	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total elevation m
1	-34.537771	146.280203	133.00	0.00	133.00
2	-34.537809	146.280610	132.81	0.00	132.81
3	-34.537780	146.280854	132.73	0.00	132.73
4	-34.537678	146.281064	132.89	0.00	132.89
5	-34.537071	146.281828	132.34	0.00	132.34
6	-34.533938	146.285678	132.37	0.00	132.37
7	-34.533808	146.285957	132.68	0.00	132.68
8	-34.533746	146.286820	133.00	0.00	133.00
9	-34.533634	146.293860	133.91	0.00	133.91
10	-34.536529	146.294178	133.34	0.00	133.34
11	-34.551116	146.283999	133.86	0.00	133.86
12	-34.549187	146.279207	134.00	0.00	134.00
13	-34.537771	146.280203	133.00	0.00	133.00

Discrete Observation Receptors

Number	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total Elevation m
OP 1	-34.540761	146.279502	134.00	0.00	134.00
OP 2	-34.533041	146.291832	133.62	0.00	133.62
OP 3	-34.527950	146.292162	134.97	0.00	134.97
OP 4	-34.537065	146.256052	132.76	0.00	132.76

Misc. Analysis Settings

DNI: varies (1,000.0 W/m^2 peak)
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad

PV Analysis Methodology: Version 2
Enhanced subtended angle calculation: On

Glare Analysis Summary

PV Array Results

Summary of PV Glare Analysis PV configuration and predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File 
PV array 4	SA tracking	SA tracking	0	0	-	-

PV & Receptor Analysis Results detailed results for each PV array and receptor

PV array 4

no glare found



Component	Green glare (min)	Yellow glare (min)
OP: OP 1	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
Route: Route 1	0	0

No glare found

Stanbridge Solar Farm

Created May 08, 2025

Updated May 08, 2025

Time-step 10 minute(s)

Timezone offset UTC+10

Minimum sun altitude 0.0 deg

Site ID 148735.25021

Project type Demo

Project status: active ?



Glare Analysis Summary

PV Array Results

Summary of Results No glare predicted!

PV Name	Tilt	Orientation	"Green" Glare	"Yellow" Glare	Energy Produced
	deg	deg	min	min	kWh
PV array 4	SA tracking	SA tracking	0	0	-

Component Data

PV Array(s)

Total PV footprint area: 24,376 m^2

Name: PV array 4 Footprint area: 24,376 m^2 Axis tracking: Single-axis rotation Backtracking: Interval Tracking axis orientation: 0.0 deg Maximum tracking angle: 60.0 deg Resting angle: 10.0 deg Rated power: - Panel material: Smooth glass with AR coating Vary reflectivity with sun position? Yes Correlate slope error with surface type? Yes Slope error: 8.43 mrad	Vertex	Latitude	Longitude	Ground elevation	Height above ground	Total elevation
		deg	deg	m	m	m
	1	-34.536898	146.285087	133.00	0.00	133.00
	2	-34.535824	146.285184	134.00	0.00	134.00
	3	-34.533906	146.287649	133.00	0.00	133.00
	4	-34.534785	146.287673	132.20	0.00	132.20



Route Receptor(s)

Name: Route 1

Route type Two-way

View angle: 50.0 deg



Vertex	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total elevation m
1	-34.537771	146.280203	133.00	0.00	133.00
2	-34.537809	146.280610	132.81	0.00	132.81
3	-34.537780	146.280854	132.73	0.00	132.73
4	-34.537678	146.281064	132.89	0.00	132.89
5	-34.537071	146.281828	132.34	0.00	132.34
6	-34.533938	146.285678	132.37	0.00	132.37
7	-34.533808	146.285957	132.68	0.00	132.68
8	-34.533746	146.286820	133.00	0.00	133.00
9	-34.533634	146.293860	133.91	0.00	133.91
10	-34.536529	146.294178	133.34	0.00	133.34
11	-34.551116	146.283999	133.86	0.00	133.86
12	-34.549187	146.279207	134.00	0.00	134.00
13	-34.537771	146.280203	133.00	0.00	133.00

Discrete Observation Receptors

Number	Latitude deg	Longitude deg	Ground elevation m	Height above ground m	Total Elevation m
OP 1	-34.540761	146.279502	134.00	0.00	134.00
OP 2	-34.533041	146.291832	133.62	0.00	133.62
OP 3	-34.527950	146.292162	134.97	0.00	134.97
OP 4	-34.537065	146.256052	132.76	0.00	132.76

Misc. Analysis Settings

DNI: varies (1,000.0 W/m^2 peak)

Ocular transmission coefficient: 0.5

Pupil diameter: 0.002 m

Eye focal length: 0.017 m

Sun subtended angle: 9.3 mrad

PV Analysis Methodology: Version 2

Enhanced subtended angle calculation: On

Summary of PV Glare Analysis PV configuration and predicted glare

PV Name	Tilt deg	Orientation deg	"Green" Glare min	"Yellow" Glare min	Energy Produced kWh	Data File 
PV array 4	SA tracking	SA tracking	0	0	-	-

PV & Receptor Analysis Results detailed results for each PV array and receptor

PV array 4

no glare found



Component	Green glare (min)	Yellow glare (min)
OP: OP 1	0	0
OP: OP 2	0	0
OP: OP 3	0	0
OP: OP 4	0	0
Route: Route 1	0	0

No glare found

Assumptions

- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not automatically account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
- Several V1 calculations utilize the PV array centroid, rather than the actual glare spot location, due to algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
- The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
- Refer to the **Help page** for detailed assumptions and limitations not listed here.



EPBC Act Protected Matters Report

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

Report created: 01-Oct-2025



[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

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

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	5
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	5
Listed Threatened Species:	32
Listed Migratory Species:	7

Other Matters Protected by the EPBC Act

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

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

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

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	15
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

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

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	
Banrock station wetland complex	500 - 600km upstream from Ramsar site	
Fivebough and tuckerbil swamps	Within 10km of Ramsar site	
Hattah-kulkyne lakes	300 - 400km upstream from Ramsar site	
Riverland	400 - 500km upstream from Ramsar site	
The coorong, and lakes alexandrina and albert wetland	600 - 700km upstream from Ramsar site	

Listed Threatened Ecological Communities	[Resource Information]
--	--------------------------

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

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Community may occur within area
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Community may occur within area
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	Community may occur within area
Weeping Myall Woodlands	Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community may occur within area

Listed Threatened Species

[Resource Information]

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

Scientific Name	Threatened Category	Presence Text
BIRD		
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat likely to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat may occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Leipoa ocellata Malleefowl [934]	Vulnerable	Species or species habitat may occur within area
Lophochroa leadbeateri leadbeateri Major Mitchell's Cockatoo (eastern), Eastern Major Mitchell's Cockatoo, Pink Cockatoo (eastern) [82926]	Endangered	Species or species habitat likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area
Pedionomus torquatus Plains-wanderer [906]	Critically Endangered	Species or species habitat likely to occur within area
Polytelis swainsonii Superb Parrot [738]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area
CRUSTACEAN		
Euastacus armatus Murray Crayfish [81537]	Vulnerable	Species or species habitat may occur within area
FISH		
Galaxias rostratus Flathead Galaxias, Beaked Minnow, Flat-headed Galaxias, Flat-headed Jollytail, Flat-headed Minnow [84745]	Critically Endangered	Species or species habitat may occur within area
Macquaria australasica Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
FROG		
Crinia sloanei Sloane's Froglet [59151]	Endangered	Species or species habitat may occur within area
Litoria raniformis Southern Bell Frog, Growling Grass Frog, Green and Golden Frog, Warty Swamp Frog, Golden Bell Frog [1828]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour may occur within area
PLANT		
Brachyscome papillosa Mossgiel Daisy [6625]	Vulnerable	Species or species habitat may occur within area
Lepidium monolocoides Winged Pepper-cress [9190]	Endangered	Species or species habitat likely to occur within area
Swainsona murrayana Slender Darling-pea, Slender Swainson, Murray Swainson-pea [6765]	Vulnerable	Species or species habitat likely to occur within area
Swainsona plagiotropis Red Darling-pea, Red Swainson-pea [10804]	Vulnerable	Species or species habitat may occur within area
REPTILE		
Aprasia parapulchella Pink-tailed Worm-lizard, Pink-tailed Legless Lizard [1665]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat may occur within area
Listed Migratory Species [Resource Information]		
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area
Other Matters Protected by the EPBC Act		
Listed Marine Species [Resource Information]		
Scientific Name	Threatened Category	Presence Text
Bird		

Scientific Name	Threatened Category	Presence Text
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat may occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat may occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals		[Resource Information]	
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval

Caveat

1 PURPOSE

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

The report contains the mapped locations of:

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

2 DISCLAIMER

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

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

3 DATA SOURCES

Threatened ecological communities

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

Threatened, migratory and marine species

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

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

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

4 LIMITATIONS

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

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

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

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

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

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

Acknowledgements

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

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

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

Please feel free to provide feedback via the [Contact us](#) page.

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LEADING THE WAY
IN ENVIRONMENTAL
MANAGEMENT

APPROVED

Subject to compliance with the accompanying notice
of determination conditions of:

Development Application No: Date:

DA 134-2025

3 July 2026



LEETON
SHIRE COUNCIL

BIODIVERSITY ASSESSMENT REPORT

125 BRIGGS ROAD STANBRIDGE, NSW

Habitat Planning Pty Ltd

September 2025



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Document Control Page

Version Control

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Rev 1.0	Final report	Kody Kemp	Harrison Rosnell	29/9/2025

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Abbreviations

Table 1: List of abbreviations used within the report.

BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act</i>
BDAR	Biodiversity Development Assessment Report
Bio. Aus.	Biodiversity Australia
DA	Development Application
DCP	Development Control Plan
DEC	Department of Environment and Conservation
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EEC	Endangered Ecological Community
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act</i>
HBT	Hollow-bearing Tree
KFT	Koala Food Tree
KTP	Key Threatening Process
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
NSW	New South Wales
OEH	Office of Environment and Heritage
PCT	Plant Community Type
SEPP 44	<i>State Environmental Protection Policy No. 44</i>
TEC	Threatened Ecological Community



Executive Summary

This Biodiversity Assessment Report (BAR) has been prepared to assess the presence of ecological values and discuss the potential impacts of a proposed Solar PV facility and associated Battery Storage System at 125 Briggs Road, Stanbridge (Lot 109 DP 751703). The development proposes to install a 5MW Solar PV facility and associated 11MW Battery Energy Storage System including facility structures, hardstand areas and security fencing. The proposed Development Footprint includes an area of approximately 21.54 ha of primarily exotic vegetation previously utilised for cropping.

The proposal is a development requiring consent under Part 4 of the Environmental Planning and Assessment Act 1979. Developments requiring consent must also be assessed against the *Biodiversity Conservation Act 2016* (BC Act 2016), Biodiversity Regulation 2017 (BCR 2017) and *Environmental Protection and Biodiversity Conservation Act* (EPBC Act 1999). Under the BC Act, a Biodiversity Development Assessment Report (BDAR) is only required when the development proposes to:

- Impact areas of Mapped Biodiversity values,
- Exceed the Native Vegetation clearing threshold associated with the Subject Land, &
- Serious and irreversible impacts to threatened species

The Subject Land and Development Footprint is solely contained within areas zoned as RU1 – Primary Production under the Leeton Local Environmental Plan (LEP) with a minimum lot size of 150 ha. In accordance with the Biodiversity Offset Scheme a maximum allowable clearing of Native Vegetation 1ha.

The Subject Land is comprised of an exotic grassland with small, thin strips containing native groundcover species present along the existing fence lines. The field surveys and assessment undertaken within this report outlines that the vegetation within the Subject Land does not correspond with a listed Plant Community Type (PCT) due to the dominance of exotic species and the historical use of the Subject Land for cropping. Whilst native species were recorded along the existing fences, this area totalled only 0.085 ha and still supported a high cover of exotic species. Native Vegetation. The removal of this Native Vegetation does not exceed the clearing threshold of 2 ha. In addition, the Development Footprint does not impact or contain mapped areas of Biodiversity Values. As such, the proposed works do not require the preparation of a BDAR or entry into the BOS.

No threatened flora and fauna species nor any PCTs associated with Threatened Ecological Communities (TECs) or Endangered Ecological Communities (EECs) were identified during the field surveys undertaken within the Subject Land.

A likelihood of occurrence assessment has been undertaken for the Development Footprint. The assessment determined that no threatened species or Threatened Ecological Communities listed under the EPBC Act or the BC Act have the potential to occur within the Development Footprint. This outcome is reflective of the degraded nature of the Subject Land and the lack of Native Vegetation and fauna habitat features (i.e hollow-bearing trees).

A BC Act ‘Test of Significance’ was undertaken to assess whether the proposed development would include is likely to significantly affect threatened species or ecological communities, or their habitats. This identified that the development is unlikely to significantly affect threatened species or ecological communities, or their habitats, thus a BDAR is not required for the proposed development.

Direct impacts of this proposal will be limited to the vegetation and habitat removal of 0.085 ha of Native Vegetation that is not associated with a listed PCT and removal of 21.45 ha of exotic grassland. Indirect impacts that may be associated with the proposal are considered to be minimal and will unlikely significantly affect threatened species or ecological communities, or their habitats or Matters of National Significance.



1. Introduction

Biodiversity Australia (Bio Aus) has undertaken a Biodiversity Assessment Report (BAR) for the proposed development of a 5MW Solar PV facility and associated 11MW Battery Energy Storage System at 125 Briggs Road, Stanbridge. The proposed works are situated entirely within Lot 109 DP 751703 (the Subject Land). All development activities associated with the proposed development will be contained to the north of the adjacent water supply canal as shown in Figure 1.

The Development Footprint consists primarily of an exotic grassland historically used for agricultural purposes. Representative photographs of the Subject Land are provided in Table 2. The location of the Subject Land is provided in Figure 1.

1.1 Location of the Subject Land

The Subject Land is located approximately 11km west of Leeton within the Leeton Local Government Area (LGA). The Subject Land is zoned as RU1 – Primary Production under the Leeton Local Environment Plan 2011. The Subject Land is adjacent to an existing man-made water channel that supplies water throughout the Leeton LGA. Limited Native Vegetation occurs within or adjacent to the Subject Land (Figure 1).

1.2 Key definitions

This report uses the following key definitions:

- **Subject Land:** The Subject Land refers to Lot 109 DP751703, which is an area of 21.69 ha. The location of the Subject Land is presented on Figure 1.
- **Development Footprint:** The Development Footprints represents areas of direct disturbance. This reflects the Solar PV facility, Battery Energy Storage System, associated facilities and fencing. The Development Footprint covers an area of 21.54 ha.

These definitions are in line with the Biodiversity Assessment Method 2020 (BAM), which provides further explanation of definitions and legal terms used throughout this report.

1.3 Development Proposal

The proposed development includes the development of 5MW Solar PV facility, associated 11MW Battery Energy Storage System, hardstand areas and security fencing. The overall development encompasses an area of 21.54 ha which is assumed to be entirely cleared as part of the development works.

1.4 Requirement for a BAR

In accordance with Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), a development must be assessed against the *NSW Biodiversity and Conservation Act 2016* (BC Act 2016) to determine the requirement for entry into the BOS and application of the BAM 2020. Under the BC Act, a Biodiversity Development Assessment Report (BDAR) is only required when the development proposes to:

- Impact areas of Mapped Biodiversity values,
- Exceed the Native Vegetation clearing threshold associated with the Subject Land ,&
- Serious and irreversible impacts to threatened species.

This report has determined that the proposed development does not trigger the requirements for the BOS or BAM 2020 to be applied, as such a BDAR is not required to accompany the development application.





Figure 1: Location of the Subject Land.



LEGEND

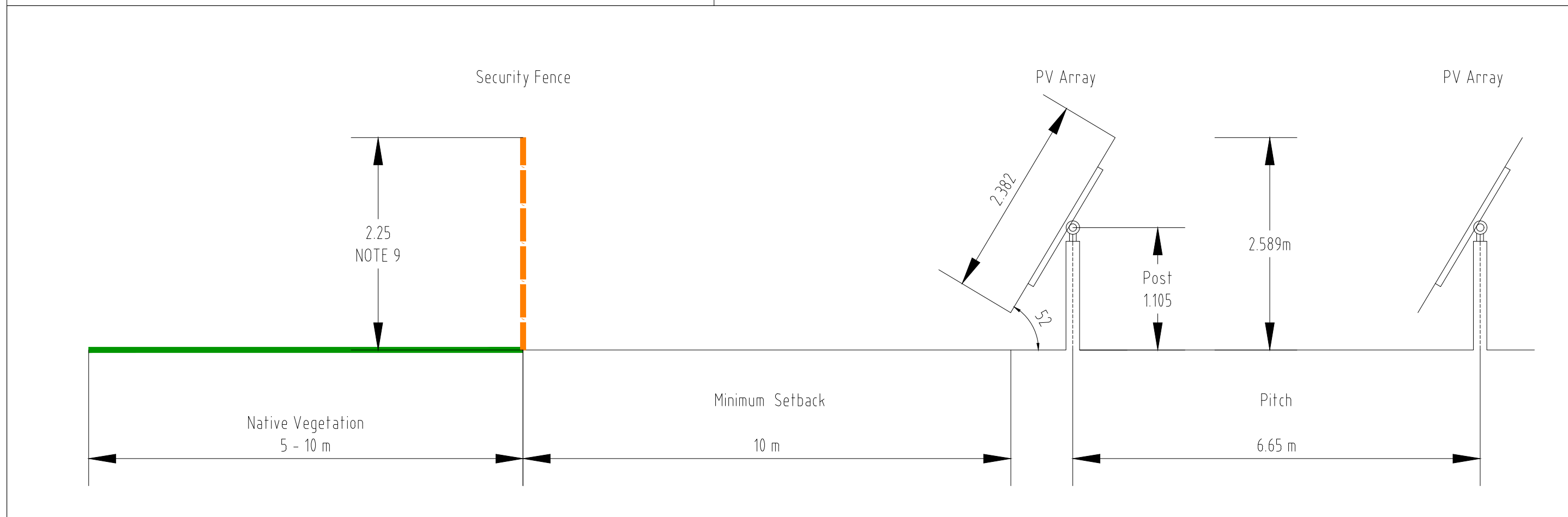
FENCE	
UNDERGROUND ELECTRICAL	
EASEMENT	
ROAD	
FIREBREAK ZONE & SETBACK	
PV TRACKER TABLE	
VEGETATION SCREEN	
LAYDOWN AREA	
OVERHEAD ELECTRICAL	
DESIGNATED DC CROSSING PATH	

NOTES

1. MODULES ARE SETBACK 10 METRE MINIMUM FROM SECURITY FENCE,
2. INTERNAL ACCESS ROADS. FOR DETAILS REFER TO CIVIL DESIGN
3. TRACKER CONFIGURATION (1 PANEL IN PORTRAIT) AND ROW SPACING OF 6.65m
4. ACCESS TRACKS ARE INDICATIVE ONLY. REFER TOP CIVIL DESIGN
5. PROPOSED ACCESS TRACK TO BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH FIRE AUTHORITY SOLAR FACILITY GUIDELINES
6. SITE ENTRANCE GATES DETAILS REFER TO FENCING DESIGN
7. LAYDOWN AREA TO BE DESIGNED FOR STORAGE OF HEAVY EQUIPMENT SUCH AS THE INVERTER STATION TRANSFORMER.
8. POINT OF CONNECTION, REFER TO LEVEL 3 DESIGN
9. FENCE HEIGHT REFER TO FENCING DESIGN
10. ESSENTIAL ENERGY ACR IS TO BE INSTALLED ON NEW POLE, EASEMENTS ARE TO ACQUIRED BY THE PROPONENT
11. NEW OVERHEAD CABLE TO BE INSTALLED BY ESSENTIAL ENERGY INSIDE 10 METRE EASEMENT LOCATED INSIDE BOUNDARY OF PROPERTY OWNER.
12. PV ARRAY OVERSIZED SO THAT OVERLOAD CLIPPING LOSSES ARE USED TO CHARGE THE DC COUPLED BESS
13. AS PER ESSENTIAL ENERGY DIRECTIONS, DC ARRAY CABLES ARE TO CROSS THE OVERHEAD EASEMENT AT A MAXIMUM OF 2 LOCATIONS
14. ACCESS TO LOT 109 DP 751703 IS TO BE THROUGH SUITABLE DOUBLE ACCESS GATES AT ANY ENTRANCE TO THE SOLAR FARM SITE WITH ESSENTIAL ENERGY LOCK FITTED THAT ALLOWS HEAVY PLANT ENTRY FOR POSSIBLE FAULT AND MAINTENANCE PURPOSES.

SYSTEM CONFIGURATION	
MODULE DETAILS	JA SOLAR JAM66D45-620/LB (13,272)
STRING CONFIGURATION	28 PANELS PER STRING
TRACKER CONFIGURATION	1 PANEL IN PORTRAIT, 3 STRINGS PER TRACKER
ROW SPACING (PITCH)	6.65m
INVERTER	2 x SMA SC 2660 UP
MAXIMUM AC CAPACITY	4.998MW
POWER FACTOR	TBC
TOTAL DC CAPACITY	8.2MWp
BESS SIZE	10MWh

SETBACK DETAIL



SITE LAYOUT

SCALE: 1:2000



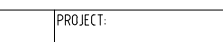
				DRAWN	MAC	06-03-25		PROJECT			STANBRIDGE SOLAR FARM	FARMER SIDE				
				CHECKED				MURRAMI ROAD, STANBRIDGE NSW 2705			A1					
				VERIFIED				SITE LAYOUT								
					BY	DATE		SHEET 1			REV					
B	PV MODULE QTY ADDED	DA	27-03-25				BISON ENERGY COMPANY	REV No.		SPDAURS-01	Drawn By	E100	SCALE	NTS	B	
A	PRELIMINARY DESIGN	MAC	06-03-25													
REV	DESCRIPTION	BY	DATE	PRELIMINARY												



Figure Name: Photopoint Locations	Location: Stanbridge, NSW	Client: Habitat Planning		
This mapping is to be considered indicative only and all derivations (e.g., vegetation communities) are best approximations and subject to errors including individual interpretation and reliance on information provided to Bio Aus where were not independently verified. All information is intended to be indicative only and no reliance for extrapolation, mapping etc. should be placed upon this map without independent validation of the information by the user. Bio Aus takes no responsibility for any subsequent error losses etc. that may arise from the use of this data without independent verification.		Job Number: ENS7115		
		Date: September 2025	Project Manager: HR	Drawn by: KK
		Scale: 1:5000	Spatial Reference: WGS 84 / Pseudo-Mercator	

Figure 3: Photo point locations



Table 2: Representative photographs of the Subject Land

Representative photographs of the Subject Land	
	
	
Representative photographs of Subject Land illustrating native grassland outside of Development Footprint	Representative photographs of Subject Land illustrating scattered trees within Development Footprint
	



2. Site Context

2.1 IBRA Bioregions and Subregions

The Subject Land is located in the Riverina IBRA bioregion and the Murrumbidgee subregion. The majority of the Subject Land is located on the Murrumbidgee Scalded Plains and the Murrumbidgee Source-bordering Dunes Mitchell Landscape.

The distribution of Mitchell Landscapes within the Subject Land is present on Figure 5.

2.2 Native Vegetation Extent in 1500m Buffer

A 1500 m buffer was established around the Subject Land. GIS analysis determined that there is approximately 0.2% Native Vegetation cover within 1500 m buffer. This is reflective of the Subject Land being situated within an agricultural landscape largely utilised for cropping and grazing practices.

2.3 Cleared Areas

The entirety of the Subject Land has been historically cleared for agricultural purposes. Native tree species are shown to be regenerating along the southern boundary of the Development Footprint as shown in Table 2. However these species are juvenile and present only as shrubs.

2.4 Soils, Topography and Geology

The Subject Land is comprised of the Cenozoic Shepparton Formation comprised of poorly consolidated clay, silt sand and gravel.

2.5 Wetlands and watercourses

No Coastal Wetlands or NSW Wetlands are mapped within or adjacent to the Subject Land. Gogeldrie Main Southern (Strahler order 0) is a man-made water channel that runs adjacent to the Subject Land.

Watercourse mapping is provided on Figure 6.

2.6 Biodiversity Values Mapping

No Biodiversity Values are mapped within the Subject Land. Additionally, no Biodiversity values are mapped within a 1500m buffer of the Subject Land.



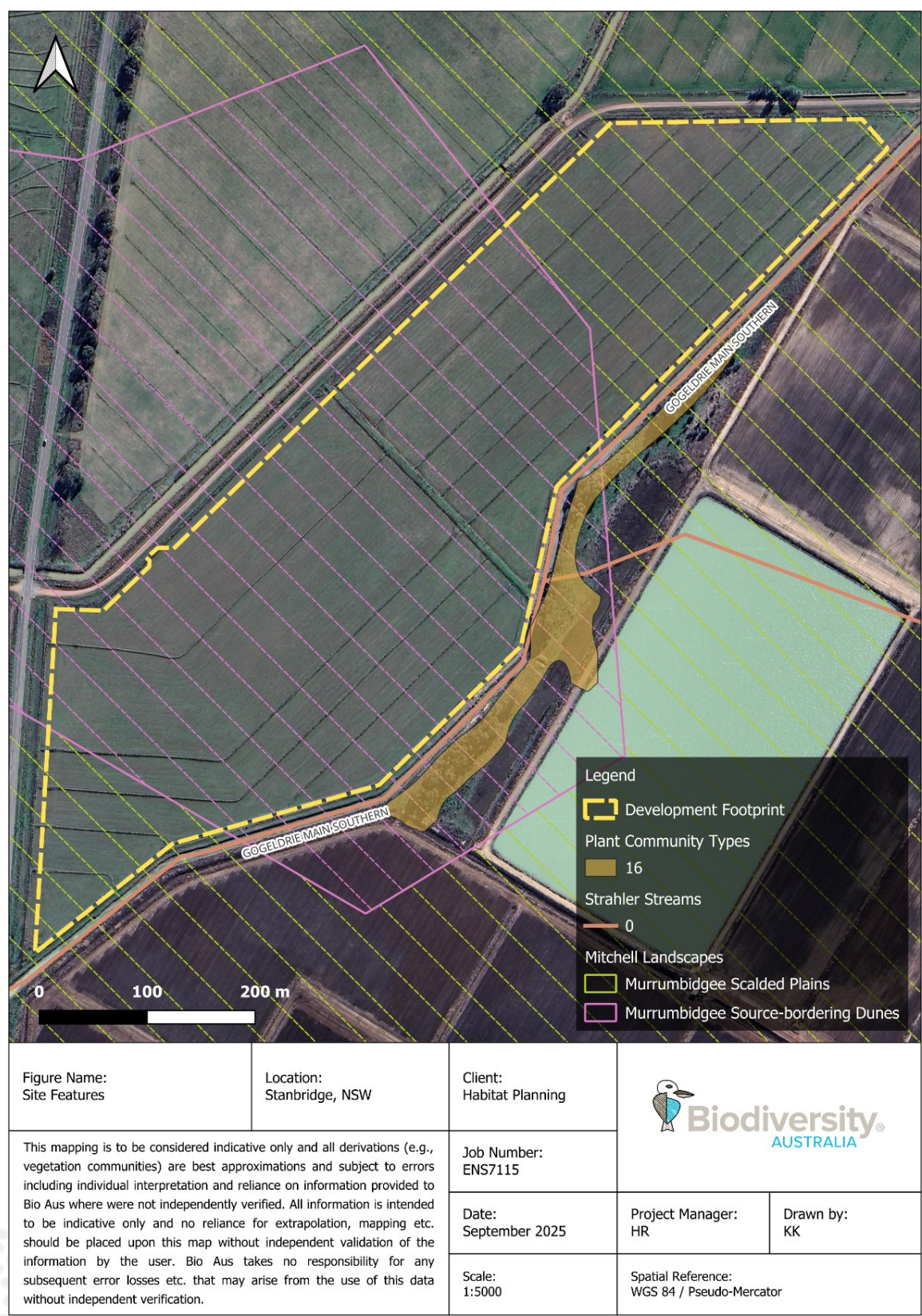


Figure 4: Subject Land Features



3. Methods

3.1 Desktop assessment

A desktop study was carried out prior to the field survey to identify ecological values potentially occurring on site and allow for a suitable field investigation design. The following databases and Geographic Information System (GIS) layers were searched/obtained:

- Department of Climate Change, Energy, the Environment and Water Protected Matters Search Tool (DCCEEW 2022a);
- Office of Environment and Heritage NSW BioNet/Atlas of Wildlife (DPIE 2022a).
- Office of Environment and Heritage Threatened Biodiversity Data Collection (DPIE 2022b).
- NSW Government - Biodiversity Values Map and Threshold Tool and digital data layer (DPIE 2022c).
- eSPADE (DPIE, 2022). A portal providing access to soil profile and soil map information published by the NSW Department of Planning, Industry and Environment.

3.2 Field survey

A single field survey of the Subject Land has been undertaken as part of the Project. This survey was undertaken to confirm the absence of Plant communities within the Subject Land.

The field survey were undertaken by Ecologist Kody Kemp under Biodiversity Australia’s scientific licence and animal research authority.

Weather Conditions

Weather conditions experienced during the field survey are summarised in Table 3.

Weather data was obtained from the Coffs Harbour Airport (Station ID 059151), located 9.3 km away 9BoM, 2024).

Table 3: Summary of weather conditions during the field surveys

Date	Conditions	Temperature		Rainfall	Wind	
		Min °C	Max °C		9 am	3 pm
26 August 2025	Sunny and clear.	14.2	20.1	0.0	NE 11km	N 24km

3.2.1 Flora Survey

The flora survey consisted of three main components:

- General flora survey conducted via random meanders and plots consistent with the Biodiversity Assessment Method (BAM 2020) to describe flora species present onsite. Plants were identified to species level where able.
- Identification, mapping, and condition assessment of any Threatened Ecological Communities listed under the BC Act and EPBC Act.
- Identification of any threatened species.



Vegetation Classification and Mapping

Vegetation communities were assessed on the 26th August by Bio Aus Ecologist Kody Kemp, who is experienced identifying and mapping vegetation communities in accordance with the NSW Plant Community Type methods. These methods are briefly described below:

- Random meanders and Vegetation Integrity plots in accordance with the BAM 2020 were undertaken to describe flora within the Development Footprint and Subject Land. Additionally, searches for threatened flora and fauna habitat were undertaken in the study area to develop a more comprehensive flora inventory that would better inform the vegetation community mapping.
- Vegetation classifications were based on the NSW Plant Community Type (PCT) Classification. Identification of possible EPBC Act Threatened Ecological Communities (TECs) was based on the data collected in the survey and review of the relevant listings on the OEH website (www.environment.nsw.gov.au) and the Department of Environment and Energy– MNES SPRAT website (DCCEEW 2022).
- Plant species were identified to species or subspecies level, and nomenclature conforms to that currently recognised by the Royal Botanic Gardens and follows Harden (1990, 2007) and PlantNET (Royal Botanic Gardens 2019) for changes since Harden.

3.2.2 Fauna Survey

A fauna survey was undertaken across the site on 26th August by Bio Aus Ecologist Kody Kemp under Biodiversity Australia's scientific license and animal research authority. The following survey methods were utilised to assess fauna habitats present within the Subject Land and threatened fauna species with the potential to occur.

- Habitat evaluation
- Searches for secondary evidence e.g. scats and tracks
- Incidental diurnal reptile and bird survey
- Hollow-bearing tree survey
- Koala food tree survey

Each survey method is described in Table 4, below.

Table 4: Fauna Survey Methods

Survey Type	Description
Habitat Evaluation	A habitat evaluation was used to assess the suitability of site habitats for threatened species recorded in the region's locality or broadly similar habitats. Habitats within the Subject Land were defined and assessed according to parameters such as: • Structural and floristic characteristics of the vegetation • Degree and extent of disturbance • Presence of water in any form • Size and abundance of hollows and fallen timber • Availability of shelter, e.g., rocks, logs, hollows, undergrowth • Wildlife corridors, refuges, and proximate habitat types • Presence of mistletoe, nectar, gum, seed and sap sources.



Survey Type	Description
	This information is analysed for evaluating the potential occurrence of threatened species on or adjacent to the site based on cited ecology and personal experience/knowledge of the species.
Secondary Evidence	Secondary evidence searches involved the inspection of trees for Koalas and claw markings, binocular inspections of trees, and searches for nests, scats, owl regurgitation pellets, tracks, and scratches.
Diurnal/Opportunistic Searches	Direct observations involved passive and active surveillance of any fauna on or directly adjacent to the Subject Land during survey activities. Birds and mammals were the main focus of the surveys, with searches for Koalas and birds' nests in the crowns of trees. Bird surveys involved passive (e.g., listening for bird calls) and active observation/binocular searches while walking around the Subject Land and opportunistically during other activities. Reptile and amphibian searches involved lifting and examining any timber, rocks and debris, dense vegetation and leaf litter for frogs and reptiles.
Hollow-bearing trees	Searches for hollow-bearing trees (HBTs) within the Subject Land were undertaken. Any potential hollows were to be inspected for signs of usage, e.g., chewed or worn edges and assessed for potential habitat value. Searches were also undertaken for habitat features, including preferred Koala food trees, nests, dreys and hollow logs.
Koala food trees	Locally significant koala food trees were identified and GPS mapped if they occurred within the Development Footprint and thus require removal. Locally significant trees were determined by the species lists provided on the NSW DPE Koala Habitat and Feed Trees website for the Riverina management area.

3.2.3 Survey Limitations

Fauna and flora detectability is limited by seasonal, behavioural or lifecycle characteristics of each species and even by habitat variations (e.g., flowering periods), which can occur within a year, between years, decades, etc. (DEC, 2004). Furthermore, whilst the majority of the Subject Land was accessible, recent rainfall limited access immediately adjacent to the creek. This restricted access to the central, northern boundary

Flora

The weather conditions at the time of the flora surveys were generally favourable for plant growth and production of features required for identification. Despite this, it is unlikely that all flora species present within the Subject Land would have been recorded during the surveys. However, it is probable that the vast majority of species, and all of the endemic, native species present at the time of the survey were recorded and it is considered that sufficient information has been collected to satisfactorily assess issues including conservation significance of the flora, condition and viability of bushland and likely impact on Native Vegetation. An assessment of the threatened species recorded within a 5 km radius of the Subject Land (the desktop assessment) was undertaken to supplement the threatened flora survey. These species have been assessed as part of the Potential Occurrence Assessment.

Fauna

A targeted fauna survey was not performed for all threatened species identified during the desktop assessment. Rather, opportunistic observations, secondary evidence searches, and habitat evaluation was undertaken as part of the field assessment.

The data produced by the surveys is intended to be indicative of the types of species that could occur and not an absolute census of all vertebrate fauna species occurring within the Subject Land. Therefore, the



survey type may be considered a minor limitation to the detection of some threatened fauna species. Database searches and habitat evaluations were undertaken to supplement the fauna surveys, and the combination of these techniques is considered appropriate for assessing the habitat values of the site for threatened fauna within the Subject Land. Habitat evaluation conservatively estimates the potential occurrence of threatened species based on potentially suitable habitat and local records, predicting the likelihood of a particular threatened species occurring in the study area (DEC 2004, DECC 2007). This approach is considered the best practice to address the Principle of Uncertainty.



4. Results

4.1 Plant Community Types

4.1.1 Desktop Mapping

No PCTs are mapped within the Subject Land using the NSW BioNet desktop vegetation mapping. However, PCT 16 *Black Box grassy open woodland wetland of rarely flooded depressions in south western NSW* was identified as occurring across the water canal on the southern boundary of the Subject Land.

Desktop PCT mapping is presented on Figure 4.

4.1.2 Field results

The field assessment included the completion of six (6) vegetation integrity plots across three (3) vegetation zones. The vegetation data obtained from these plots was imported to the BAM-C calculator and assessed as PCT 16, which resulted in the following calculations for the three (3) identified vegetation zones.

Section 9.2 of the BAM 2020, defines that offsets for all impacts of proposals on PCTs that are associated with a vegetation zone that has a vegetation integrity score of:

- ≥ 15 , where the PCT is representative of an EEC or CEEC
- ≥ 17 , where the PCT is associated with a threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community
- ≥ 20 , where the PCT does not represent a TEC and is not associated with threatened species habitat.

The below vegetation integrity scores for the identified vegetation zones fall below the required threshold for the assessment of ecosystem credits. However, species credit species are required to be addressed, this has been undertaken within Appendix A-1.

In combination with the historical agricultural usage of the Subject Land and the recorded vegetation integrity scores being below the required thresholds for ecosystem credit impact assessment, it is justified that the entirety of the Subject is not associated with a listed Plant Community Type.

Table 5: Vegetation Integrity Score

Vegetation Zone	Description	Area	Composition Condition Score	Structure Condition Score	Function Condition Score	Current Vegetation Integrity Score
1	Exotic Grassland	21.46	0.3	0	3.1	1.5
2	Scattered Trees	0.075	19	5.8	23.7	13.8
3	Mixed Grassland	0.01	4.8	4.7	8.9	8.9



Table 6: PCT 0 - Unclassified

Criteria	Description
PCT	0
Vegetation Formation	No Associated Vegetation Formation
Vegetation Class	No Associated Vegetation Class
Area	21.54 ha
EEC Status	No associated EPBC Act or BC Act listing
Vegetation Zones	Three (3) Zones, as described below.
Number of Plots	Six (6)
Location	Entirety of the Development Footprint
Description	Vegetation Zone 1: Exotic Grassland This vegetation zone is primarily comprised of an open pasture that has been historically utilised for cropping. Intensive agriculture has reduced the regenerative capacity of this vegetation zone, allowing primarily exotic species to flourish within these areas. Canopy: Absent Midstory: Absent Ground layer: Comprised primarily of exotic species due to intensive historical cropping Vegetation Zone 2: Scattered Trees This vegetation zone approximately five meters wide exists along the southern boundary north of the mapped PCT 16 across the adjacent water channel. This management zone is restricted to the drainage line and associated embankment along a small portion of the southern border where historical agricultural practices would have had a reduced impact on the underlying soil profile. The height and location of the existing tree species within this vegetation zone suggest that these individuals have germinated from windblown seed from the existing Native Vegetation across the adjacent channel. Canopy: No canopy present. Midstory: Consists of regenerating Black Box (<i>Eucalyptus largiflorens</i>). Ground layer: Comprised of a mixture of native grasses and exotic species. Native cover primarily consisting of Swamp Wallaby Grass (<i>Amphibromus nervosus</i>). Vegetation Zone 3: Mixed Grassland This vegetation zones approximately 5 meters wide exists primarily along the fence lines of the Subject Land, drainage areas and less accessible areas which correlate with areas that would have been subject to a reduced management intensity under the historical agricultural purposes. This management zone also corresponds with area of heightened soil moisture content. Canopy: Absent Midstory: Absent Ground layer: Comprised of a mixture of native grasses and exotic species. Native cover primarily consisting of Swamp Wallaby Grass (<i>Amphibromus nervosus</i>) with the addition of a few Black (<i>Sclerolaena muricata</i>).

4.2 Endangered Ecological Communities (EECs)

No Endangered Ecological Communities are associated with the recorded vegetation present within the Development Footprint.

4.3 Threatened Flora

No threatened flora species were recorded within the Subject Land. However, Furthermore, no historical records for threatened flora species listed under the BC Act occur within the Subject Land.





Figure 5: Field verified PCT mapping within the Subject Land



4.4 Fauna Survey Results

4.4.1 Habitat Evaluation, Corridors and Linkages

Table 7 below summarises the habitat evaluation results and comments on regional/local corridors and habitat linkages of relevance to the Subject Land.

Table 7: Summary of site habitat values

Habitat feature	Subject Land	Potential Values to Threatened Species
Groundcover	Groundcover was primarily consistent throughout the Subject Land except for the areas identified within Vegetation Zone 2 and 3. Throughout these vegetation zones the proportion of native grasses increased in response to increased soil moisture content and historical land use. Vegetation zone 1 consisted primarily of exotic species with minimal native species recorded throughout the vegetation zone, as a direct correlation with intensive historical agricultural practices.	Dense groundcover throughout Vegetation Zone 3 may provide refuge for ground dwelling fauna.
Hollows	Tree species are largely absent from the Subject Land. The existing tree species are not at a maturity where the presence of hollows can be achieved.	Not applicable
Nests/Dreys	No nests observed during the field survey.	Not applicable
Nectar Sources	Canopy trees within the Subject Land are likely to provide a winter flowering and nectar source. Key canopy species are likely to provide a year-round nectar supply.	Eucalypts in the Subject Land may represent a minute foraging resource as the individuals are young.
Primary preferred Koala browse trees	The site contains one (1) species of Koala feed trees identified for the Riverina Koala Management Area (KMA), this being <i>Eucalyptus largiflorens</i> .	Potential forage species for Koalas. The closest record of Koalas is 8km to the south of the Subject Land within the Murrumbidgee Valley National Park.
Aquatic/wetland habitats	The Subject Land contains remnant drainage lines that would have been used for overland flow during irrigation and periods of high rainfall within the Subject Land. These drainage lines did not contain pooling water; however, some areas were noted to have a heightened moisture content due to the presence of <i>Amphibromus nervosus</i> .	No threatened wetland species are predicted to occur within the Subject Land.
Corridors	The Subject Land is situated within an agricultural landscape largely cleared of Native Vegetation (see Section 2.2). As such, the Subject Land does not fall within an OEH-mapped regional or sub-regional corridor. No important corridors are mapped within or adjacent to the Subject Land.	Vegetation within the Subject Land does not significantly contribute to mapped regional and sub-regional corridors.
Habitat Linkages	The Subject Land is not connected to any mapped habitat corridors or key habitats. Habitat within the Subject Land is limited due to the historical land use.	Limited native canopy species exist within the Subject Land. The individuals recorded within the Subject Land are not connected to Native Vegetation outside of the Subject Land and would not contribute to local habitat linkages.
Important Habitat	The Subject Land is not mapped as Important Habitat by DPE.	Not applicable



4.4.2 Hollow-Bearing Trees

The Subject Land contained ten (10) *Eucalyptus largiflorens*, these individuals are likely the product of wind dispersal from the mature tree on the southern bank of the adjacent water channel. The individuals within the Subject Land have not reached maturity where hollows are supported or created.

4.4.3 Koala Feed Trees

The Subject Land contained ten (10) juvenile *Eucalyptus largiflorens*, these individuals are a product of wind dispersal from the mature tree on the southern bank of the adjacent water channel. These individuals are young and would unlikely provide a suitable food source for the Koala.

A single SAT survey was undertaken around all individuals identified within the Subject Land.

Representative photographs of the juvenile *Eucalyptus largiflorens* are provided in Plate 1.



Plate 1: Representative photographs of juvenile *Eucalyptus largiflorens* along the Subject Land boundary

4.4.4 Threatened Fauna

No threatened fauna, secondary evidence or suitable habitat for threatened species was identified during the field surveys. Furthermore, no threatened fauna were assessed as 'likely to occur' within the Potential Occurrence Assessment (Appendix A-1).



5. Impact Assessment

5.1 Direct Impacts

The development proposes to install a 5MW Solar PV facility and associated 11MW Battery Energy Storage System with associated fencing and hardstand areas within Lot 109 DP751703. The Development Footprint consists of 21.54 ha, primarily consisting of exotic grasses and herbaceous species with native grasses present only along the boundary of the Development Footprint. The proposed development will impact approximately 0.085 ha of land containing Native Vegetation, however these areas are not considered to be consistent with a listed PCT. Ten (10) juvenile trees will also be removed as part of the development however, these trees pose minimal value to native fauna species as they have not reached maturity.

5.2 Indirect Impacts

The following potential indirect impacts may be associated with the proposal:

- a) **Fragmentation and landscape change:** The Subject Land is already fragmented from nearby patches of Native Vegetation to north, west and south of the Subject Land. The proposed development will likely have a minimal impact on species utilising the Subject Land as a security fence will be installed along the boundary of the Development Footprint. It is unlikely that a change in connectivity associated with the removal of the trees will surpass current levels of fragmentation, due to the existing land clearing present on the land and surrounding agricultural land use.
- b) **Injury/mortality during clearing:** Due to the absence of the hollow bearing trees, understorey, limited native groundcover, logs and other debris on the ground the potential habitat for most terrestrial fauna species is reduced and as such the likelihood for injury or mortality is low.
- c) **Edge effects:** The Subject Land is bound by roads to the north and west, a water channel on the south and cropping land to the east. Edge effects will not increase as a result of the proposed development.
- d) **Fencing:** The Subject Land is bound by a rural barbed wire fence; the development proposed the establishment of a security fence (chain-link mesh) along the boundary of the Development Footprint to ensure the safety of the proposed development. Despite the proposed security fence posing as a barriers to native fauna, sufficient corridors in the adjacent land exist ensuring that impacts will be minimised.
- e) **Weed invasion:** Weeds currently occur across the site at high density. The proposal has the potential to introduce new weed species through planting of undesirable species or garden escapees into the already highly modified landscape.
- f) **Erosion and sedimentation:** Standard mechanisms and controls will be required to ensure that erosion and sedimentation impacts do not extend beyond the Development Footprint where they could potentially impact other vegetation and drainage lines on adjacent land. Prior to the commencement of works a Soil and Water management plan as part of the Construction Environmental Management to manage stormwater runoff during the construction of the preschool. Stormwater and runoff will need to be managed adequately to ensure that potential impacts are minimised.
- g) **Noise and vibration:** The construction phase will temporarily increase noise levels however this will be diurnal only and is not expected to pose significant impacts to potentially occurring threatened species.



- h) Introduction of feral species:** The proposed development is unlikely to bring an increase in feral species.
- i) Increased human presence:** The proposed development will increase human activity within the area, particularly during the construction phase. However, it is likely that minimal human presence except for the conduction of required maintenance will be required for the Subject Land. There are very few ecological values within and adjacent to the Subject Land and as such potential impacts from human presence are not predicted to increase significantly beyond current levels.
- j) Artificial Lighting:** The proposed development is likely to incorporate external lighting for security purposes. It is likely that this lighting will be motion activated sensory lights.

5.3 Impact Avoidance

The proponent has selected the Subject Land based on the historical land use, absence of biodiversity values, and the low likelihood of generating ecological impacts. The proponent selected the Subject Land for the proposed development as the historical land use has depleted the presence of Native Vegetation, resulting in a predominantly exotic landscape. The Subject Land is not connected to Native Vegetation within the region and provides minimal habitat for native fauna.



6. Biodiversity Conservation Act Assessment

Assessment Pathway

Under the NSW *Biodiversity Conservation Act 2016* and Biodiversity Conservation Regulation 2017, Part 4 developments under the *Environmental Planning & Assessment Act 1979* (other than State Significant Development) are assessed through the following process:

- If the proposed development is likely to significantly affect threatened species, the application for development consent must be accompanied by a Biodiversity Development Assessment Report.

However, based on the below table, the above requirements and the test of significance provided within Appendix 3, determine that a BDAR and no further assessment is required for the proposed development.

Table 8: Biodiversity Development Assessment Report Criteria

Criteria	Response
Will the development require clearing of Native Vegetation?	Yes
Has the development been granted Biodiversity Certification?	No
Is the development considered State Significant Infrastructure?	No
Does the development affect an area mapped in the NSW Biodiversity Values Map?	No
Minimum lot size on which the development is located.	150ha
Will the development require the removal of >0.25 ha of Native Vegetation?	No – the vegetation within the Development Footprint is not associated with a PCT (Section 4.1.2). The Vegetation Zones containing Native Vegetation does not exceed 0.1 ha.
Result	BDAR not required

Test of significance

The Test of Significance is prescribed under Part 7, Division 1, Section 7.3 of the *Biodiversity Conservation Act 2016*. The purpose of the Test of Significance is to determine whether a proposed development or activity is likely to significantly affect threatened species or ecological communities, or their habitats. If it is determined that a development or activity will have a significant effect, a Biodiversity Development Assessment Report will be required.

As per section 2.1 of the *Threatened Species Test of Significance Guidelines* (OEH, 2018):

A species does not have to be considered as part of the test of significance if recent and reliable data, relating to the study area and Subject Land and derived from field surveys consistent with OEH guidelines, clearly show that the species:

- *does not occur in the study area, and*
- *will not use on-site habitats on occasion, and*
- *will not be influenced by off-site impacts of the proposal.*



A test of significance was undertaken for the development and is presented below:

Table 9: Test of Significance

Criteria	Assessment
a) in the case of a threatened species, whether the proposed development or activity is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction.	The Development Footprint is situated solely within the bounds of historical cropping pasture. As such the vegetation within the Subject Land is primarily exotic and contains minimal habitat features that may be utilised by threatened species during their lifecycle. The proposed development will utilise existing modified areas removing the least amount of Native Vegetation possible within the Subject Land. No important areas such as Grey-Headed Flying Fox camps or mapped important habitat for threatened species reside within the Subject Land.
b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity: i. Is it likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii. is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction,	The Development Footprint is situated solely within the bounds of historical cropping pasture. As such the vegetation within the Subject Land is primarily exotic which does not conform to a listed PCT (Section 4.1.2). No EECs were confirmed present during the field survey. No EECs are likely to occur due to the absence of Native Vegetation.
c) in relation to the habitat of a threatened species or ecological community: i. The extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality.	The Development Footprint is situated solely within the bounds of historical cropping pasture. As such the vegetation within the Subject Land is primarily exotic and contains minimal habitat features that may be utilised by threatened species. The land surrounding the Development Footprint exists primarily in a fragmented condition due to the regional scale agricultural land use. The proposed development is unlikely to increase fragmentation within the region as the landscape is already fragmented.
d) whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly)	There are no areas of outstanding biodiversity value or biodiversity mapped within the Subject Land. It is unlikely that indirect impacts will impact areas of outstanding biodiversity.
e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.	The proposed development contains two (2) Key Threatening Processes (KTPs) as outlined in Table 10.

The following table outlines the current Key Threatening Processes (KTPs) listed under the BC Act and whether the proposed activity is recognised as a threatening process.



Table 10: Contribution to Key Threatening Processes

Key Threatening Processes	Will Proposal Affect KTP?
Aggressive exclusion of birds from woodland and forest habitat by abundant Noisy Miners <i>Manorina melanocephala</i>	Unlikely to increase the proportion of Noisy Minors within the regions.
Alteration of habitat following subsidence due to longwall mining	The proposed development does not include longwall mining.
Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands	The proposed development will not impact any rivers, streams. The adjacent water channel is a controlled flow. The proposed development is unlikely to impact any associated floodplains and wetlands of the controlled channel.
Anthropogenic Climate Change	Vegetation removal and construction of the 5MW Solar PV facility and associated 11MW Battery Energy Storage System will increase greenhouse gas emissions. However, as the proposed development includes the development of a 5MW Solar PV facility and associated 11MW Battery Energy Storage System, which aims at reducing the local reliance for energy created from fossil fuels.
Bushrock removal	No bushrock will not be removed as part of the construction woks.
Clearing of Native Vegetation	The vegetation within the Development Footprint is not associated with a listed PCT (Section 4.1.2). Some Native Vegetation persists within the Development Footprint totalling approximately 0.085 ha.
Competition and grazing by the feral European Rabbit, <i>Oryctolagus cuniculus</i>	The proposed development is unlikely to increase competition and grazing by the European Rabbit in adjacent areas.
Competition and habitat degradation by Feral Goats, <i>Capra hircus</i>	The proposed development is unlikely to increase competition and habitat degradation by Feral Goats in adjacent areas.
Competition from feral honey bees, <i>Apis mellifera</i>	The proposed development is unlikely to increase competition from feral honey bees in adjacent areas.
Death or injury to marine species following capture in shark control programs on ocean beaches	The Subject Land is not located within a marine or estuarine environment.
Entanglement in or ingestion of anthropogenic debris in marine and estuarine environments	The Subject Land is not located within a marine or estuarine environment
Forest eucalypt dieback associated with over-abundant psyllids and Bell Miners	The proposed development is unlikely to increase Forest eucalypt dieback associated with overabundant psyllids and Bell Miners
Herbivory and environmental degradation caused by feral deer	The proposed development is unlikely to increase herbivory ad environmental degradation caused by feral deer in adjacent areas
High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition	The proposed development will be maintained and is unlikely to result in a high frequency of fire resulting in the loss of vegetation and disruption of plant an animal processes.
Importation of Red Imported Fire Ants <i>Solenopsis invicta</i>	The proposed development is unlikely to import Fire ants
Infection by <i>Psittacine Circoviral</i> (beak and feather) Disease affecting endangered psittacine species and populations	The proposed development is unlikely to increase beak and feather disease within psittacine populations
Infection of frogs by amphibian <i>chytrid</i> causing the disease chytridiomycosis	The proposed development is unlikely to increase the spread of chytrid fungus within the local area
Infection of native plants by <i>Phytophthora cinnamomi</i>	The proposed development is unlikely to increase the infection of Phytophthora within the local area
Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae	The proposed development is unlikely to increase the introduction and establishment of Exotic Rust Fungi in to the local area



Key Threatening Processes	Will Proposal Affect KTP?
Introduction of the Large Earth Bumblebee <i>Bombus terrestris</i>	The proposed development is unlikely to increase the presence of Large Earth Bumblebees within the local area
Invasion and establishment of exotic vines and scramblers	The proposed development is unlikely to increase the invasion and establishment of exotic vines and scramblers
Invasion and establishment of Scotch Broom (<i>Cytisus scoparius</i>)	The proposed development is unlikely to increase the invasion and establishment of Scotch broom within the local area
Invasion and establishment of the Cane Toad (<i>Bufo marinus</i>)	The proposed development is unlikely to increase the invasion and establishment of the cane toad within the local area
Invasion of native plant communities by African Olive <i>Olea europaea subsp. Cuspidata</i> .	The proposed development is unlikely to increase the invasion of native plant communities by African olive in the local area
Invasion of native plant communities by Bitou Bush <i>Chrysanthemoides monilifera</i>	The proposed development is unlikely to increase the invasion of bitou bush in the local area
Invasion of native plant communities by exotic perennial grasses	The proposed development is unlikely to increase the invasion of native plant communities by exotic perennial grasses in the local area
Invasion of the Yellow Crazy Ant, <i>Anoplolepis gracilipes</i> into NSW	The proposed development is unlikely to increase the invasion of the Yellow Crazy Ant into NSW
Invasion, establishment and spread of Blackberry	The proposed development is unlikely to increase the spread of Blackberry within the local area
Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	The proposed development is unlikely to increase habitat invasion of escaped garden plants
Loss of Hollow-bearing Trees	No Hollow bearing trees are within the Development Footprint
Loss or degradation (or both) of sites used for hill-topping by butterflies	The Subject Land is not utilised by the hilltop butterfly
Predation and hybridisation by Feral Dogs, <i>Canis lupus familiaris</i>	The proposed development is unlikely to increase predation and hybridisation by feral dogs
Predation by <i>Gambusia holbrooki</i> (Plague Minnow or Mosquito Fish)	The proposed development is unlikely to increase predation by <i>Gambusia</i>
Predation by the European Red Fox <i>Vulpes vulpes</i>	The proposed development is unlikely to increase predation by the European Red Fox in the local area
Predation by the Feral Cat <i>Felis catus</i>	The proposed development is unlikely to increase predation by Feral cats in the local area
Predation by the Ship Rat <i>Rattus rattus</i> on Lord Howe Island	The proposed development is not on Lord Howe Island
Predation, habitat degradation, competition and disease transmission by Feral Pigs, <i>Sus scrofa</i>	The proposed development is unlikely to increase predation, habitat destruction, competition and disease by Feral Pigs.

The Test of Significance has determined that due to the intensive historical agricultural usage of the Subject Land and absence of Native Vegetation and habitat features, the proposed development is unlikely to result in a significant impact on threatened species or ecological communities.



7. EPBC Act MNES Significance Assessment

The provisions of the EPBC Act (1999) require the determination of whether the proposal will or is likely to have a significant impact on a “Matter of National Environmental Significance”. These matters are listed and addressed in summary as follows:

The PMTS search was undertaken using a 5 km radius from the Subject Land. The results of the PMST search are summarised in Table 11.

Table 11: Results of the PMST search

Category	Result
World Heritage Properties	0
National Heritage Places	0
Wetlands of International Importance	5
Great Barrier Reef Marine Park	0
Commonwealth Marine Area	0
Listed TECs	5
Listed Threatened Species	35
Listed Migratory Species	8

7.1 Summary

The Protected Matters Search Tool (DCCEEW 2025) identified a range of MNES that could potentially occur in the locality. Threatened species and ecological communities listed as MNES were not recorded in the study area during the field surveys. Entities with potential to occur are discussed in the following sections

Significance Assessment

A summary of the findings of the protected matters search is provided below. The likelihood of occurrence of all entities returned in the search as well as threatened species recorded within five kilometres (5 km) and candidate species associated with PCT 16 which was recorded adjacent to the Subject Land.

World Heritage Properties

There are no world heritage properties mapped within 5 km of the Development Footprint. No impacts to World Heritage properties are expected as a result of the proposed action.

National Heritage Places

There are no national heritage properties mapped within 5 km of the Development Footprint. No direct or indirect impacts to national heritage places are expected to as a result of the proposed action.

Wetlands of international significance (Ramsar)

Five (5) Ramsar wetlands were identified within the PMST search. The proposed development does not propose any direct or indirect impacts to the below listed RAMSAR sites.



Table 12: Listed RAMSAR sites within proximity to the Subject

Ramsar Site Name	Proximity
Hattah-Kulkyne Lakes	300 - 400km upstream from Ramsar site
Fivebough and Tuckerbil Swamps	Within 10km of Ramsar site
The Coorong and lakes Alexandria and Albert Wetland	600 - 700km upstream from Ramsar site
Riverland	400 - 500km upstream from Ramsar site
Banrock Station Wetland Complex	500 - 600km upstream from Ramsar site

Great Barrier Reef Marine Park (GBRMP)

The proposed action is approximately 312 km inland and is in southwestern NSW. As such, direct and indirect impacts to GBRMP as a result of the proposed action area unlikely.

Commonwealth marine area

There are no Commonwealth marine areas mapped within 5 km of the Development Footprint.

Threatened Entities

The likelihood of occurrence assessment found that no threatened fauna species, no threatened flora species, no threatened ecological communities and no migratory species required further assessment under *Statement 1.1 Significant Impact Guidelines Matters of National Environmental Significance*.

Threatened Ecological Communities (TECs)

Five (5) TECs were identified within the PMST Report with the potential to occur within the Study Area, based on their indicator PCTs and the IBRA Bioregion. Of the reported potential TECs, none have been identified to have the potential to occur within the Subject Land based on the ground-truther vegetation from targeted surveys (Table 13) and the intensive historical agricultural land use. The full likelihood of occurrence is in Table 13.



8. Conclusion

This Biodiversity Assessment Report (BAR) has been prepared to assess the presence of ecological values and discuss the potential impacts of a proposed Solar PV facility and associated Battery Storage System at 125 Briggs Road, Stanbridge (Lot 109 DP 751703). The development proposes to install a 5MW Solar PV facility and associated 11MW Battery Energy Storage System including facility structures, hardstand areas and security fencing. The proposed Development Footprint includes an area of approximately 21.54 ha of primarily exotic vegetation previously utilised for cropping.

The proposal is a development requiring consent under Part 4 of the Environmental Planning and Assessment Act 1979. Developments requiring consent must also be assessed against the *Biodiversity Conservation Act 2016* (BC Act 2016), Biodiversity Regulation 2017 (BCR 2017) and *Environmental Protection and Biodiversity Conservation Act* (EPBC Act 1999). Under the BC Act, a Biodiversity Development Assessment Report (BDAR) is only required when the development proposes to:

- Impact areas of Mapped Biodiversity values,
- Exceed the Native Vegetation clearing threshold associated with the Subject Land ,&
- Serious and irreversible impacts to threatened species

The Subject Land and Development Footprint is solely contained within areas zoned as RU1 – Primary Production under the Leeton Local Environmental Plan (LEP) with a minimum lot size of 150 ha. In accordance with the Biodiversity Offset Scheme a maximum allowable clearing of Native Vegetation 1ha.

The Subject Land is comprised of an exotic grassland with small, thin strips containing native groundcover species present along the existing fence lines. The field surveys and assessment undertaken within this report outlines that the vegetation within the Subject Land does not correspond with a listed Plant Community Type (PCT) due to the dominance of exotic species and the historical use of the Subject Land for cropping. Whilst native species were recorded along the existing fences, this area totalled only 0.085 ha and still supported a high cover of exotic species. Native Vegetation. The removal of this Native Vegetation does not exceed the clearing threshold of 2 ha. In addition, the Development Footprint does not impact or contain mapped areas of Biodiversity Values. As such, the proposed works do not require the preparation of a BDAR or entry into the BOS.

No threatened flora and fauna species nor any PCTs associated with Threatened Ecological Communities (TECs) or Endangered Ecological Communities (EECs) were identified during the field surveys undertaken within the Subject Land.

A likelihood of occurrence assessment has been undertaken for the Development Footprint. The assessment determined that no threatened species or Threatened Ecological Communities listed under the EPBC Act or the BC Act have the potential to occur within the Development Footprint. This outcome is reflective of the degraded nature of the Subject Land and the lack of Native Vegetation and fauna habitat features (i.e hollow-bearing trees).

A BC Act 'Test of Significance' was undertaken to assess whether the proposed development would include is likely to significantly affect threatened species or ecological communities, or their habitats. This identified that the development is unlikely to significantly affect threatened species or ecological communities, or their habitats, thus a BDAR is not required for the proposed development.

Direct impacts of this proposal will be limited to the vegetation and habitat removal of 0.085 ha of Native Vegetation that is not associated with a listed PCT and removal of 21.45 ha of exotic grassland. Indirect impacts that may be associated with the proposal are considered to be minimal and will unlikely significantly affect threatened species or ecological communities, or their habitats or Matters of National Significance.



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Appendices

A-1 Potential Occurrence Assessment

The following tables are used as a summary to address threatened species under the BC Act and EPBC Act in terms of potential occurrence and requirement for formal assessment. A threatened species has been assessed if it is:

- a) Recorded on-site; or
- b) Not recorded on site, but recorded within a 5 km radius (the locality), and may occur to some degree on-site due to potential habitat, key habitat component (Figure 6), etc.
- c) Identified within the PMST,&
- d) Identified as a candidate species under the BAM-C.

The likelihood of occurrence is based on the probability of occurrence in terms of:

- Habitat extent (e.g., sufficient to support an individual or the local population; comprises all of the home range; forms part of a larger territory, etc.); quality (i.e. condition, including an assessment of threats, historical land uses on and offsite, and future pressures); interconnectivity to other habitats; and ability to provide all the species lifecycle requirements (either the site alone or other habitat within its range);
- Occurrence frequency (i.e. on-site resident; portion of larger territory or seasonal migrant); and
- Usage, i.e. breeding or non-breeding; opportunistic foraging (e.g., seasonal, migratory or opportunistic); marginal fringe of core range; refuge; roosts; etc.

An indicative 1-5 scale used by the author to indicate the likelihood of the species to potentially occur in the habitat on the study sites (if they have not been recorded in the locality) is as follows:

- 0: *Unlikely* (<1% probability) - no potentially suitable habitat; too disturbed; or habitat is very poor. No or few records in region or records/site very isolated, e.g., by pastoral land, urbanisation, etc.
- 1: *Low* (1-25%) - few minor areas of potential habitat; highly modified site/habitat; or few habitat parameters present, but others absent or relatively insignificant (sub-optimum habitat). Usually very few records in locality.
- 2: *Fair* (25-50%) - some significant areas of potential habitat, but some habitat parameters limited. Potential for occasional foraging e.g., from nearby more optimal areas or known habitat. Records at least within 10-15 km radius of site.
- 3: *Moderate* (50-75%) - quite good potentially suitable habitat on and adjacent to the site, and/or good quality and abundance of some vital habitat parameters. Records within <10km, or adjacent to the site, or adjacent to high quality habitat where species are likely to occur.
- 4: *High* (>75%) - very good to optimum habitat occurring on or adjacent to the site (support breeding pair or population). Recorded within 5-10 km of site in same or similar habitat.

Note: Marine species have not been included within the below tables as there is no suitable habitat within the Subject Land



Table 13: Threatened Ecological Community Likelihood of Occurrence

Ecological Community	EPBC Status	Distribution	Required Habitat	Associated Plant Community Types	Likelihood of Occurrence	Justification
Poplar Box Grassy Woodland on Alluvial Plains	Endangered	The ecological community mostly now occurs as scattered remnant patches inland of the Great Dividing Range in New South Wales and Queensland, within the Brigalow Belt North, Brigalow Belt South, Cobar Penepplain, Darling Riverine Plains, NSW South Western Slopes and Riverina IBRA bioregions.	Occurring on a variety of soil landscapes, this TEC persists as a grassy woodland to grassy open woodland structure but may occasionally exhibit an open forest structure with an overstory dominated by Poplar box.	56, 87, 88, 101, 244	Unlikely to occur	The vegetation within the Subject Land is not consistent with the TEC.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	In New South Wales (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' is listed as Critically Endangered	Characterized by dominance or prior dominance of white box, yellow box, and Blakely's red gums. These trees may all occur but also exist in multiple combinations.	74, 75, 83, 101, 250, 266, 267, 268, 270, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 298, 302, 312, 341, 342, 347, 350, 352, 356, 367, 381, 382, 395, 401, 403, 421, 433, 434, 435, 436, 437, 451, 483, 484, 488, 492, 496, 508, 509, 510, 511, 516, 528, 538, 544, 563, 567, 571, 589, 590, 597, 599, 618, 619, 622, 633, 654, 702, 703, 704, 705, 710, 711, 796, 797, 799, 800, 805, 840, 847, 851, 921, 1099, 1103, 1303, 1304, 1305, 1310, 1324, 1329, 1330, 1331, 1332, 1333, 1334, 1354, 1383, 1399, 1401, 1512, 1606, 1608, 1611, 1693, 1695, 1698, 3314, 3359, 3363, 3373, 3376, 3387, 3388, 3394, 3395, 3396, 3397, 3398, 3399, 3406, 3415, 3533	Unlikely to occur	The vegetation within the Subject Land is not consistent with the TEC.



Ecological Community	EPBC Status	Distribution	Required Habitat	Associated Plant Community Types	Likelihood of Occurrence	Justification
Weeping Myall Woodlands	Endangered	Occurs in the inland alluvial plains west of the Great Dividing Range in NSW and Queensland. Occurring within the Riverina, NSW Southwestern Slopes, Darling Riverine Plains, Brigalow Belt South, Brigalow Belt North, Murray-Darling depression, Nandewar, and Cobar Peneplain IBRA bioregions.	Described as open woodlands to woodlands generally 4-12m in height in which Weeping Myall trees are the sole dominant overstorey species	26, 27, 1766	Unlikely to occur	The vegetation within the Subject Land is not consistent with the TEC.
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	SW New South Wales, NW Victoria, and eastern South Australia. In NSW occurs in the Riverina and Murray-Darling Depression Bioregions. In the north of the Murray-Darling Depression bioregion, restricted to near freshwater river systems (notably the Murray and Wimmera Rivers) or adjacent to sites of ground water discharge, such as Pink Lakes, the Raak Plain and Rocket Lake.	Dominated by Allocasuarina luehmannii or grey box Eucalyptus microcarpa and slender cypress-pine Callitris gracilis. Presence of clayey and/or alkaline sub-soils.	20, 22	Unlikely to occur	The vegetation within the Subject Land is not consistent with the TEC.
Grey Box (Eucalyptus microcarpa) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	Endangered	Predominantly occurs in the drier edge of the temperate grassy eucalypt woodland belt, ranging from Narrabri through to Victoria and south australia.	This TEC is described as containing a dominating canopy of Eucalyptus microcarpa, with an associated sparse shrub layer and species rich ground layer of grasses, herbs, and chenopods	76, 80, 81, 82, 110, 237, 248, 250, 267, 3405	Unlikely to occur	The vegetation within the Subject Land is not consistent with the TEC.



Table 14: Potential Occurrence Assessment (Flora and Fauna)

Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
Flora							
<i>Lepidium monoplocoides</i>	Winged Peppergrass	Endangered	Endangered	Occurs on seasonally moist to waterlogged sites, on heavy fertile soils, with a mean annual rainfall of around 300-500 mm Predominant vegetation is usually an open woodland dominated by <i>Allocasuarina luehmannii</i> (Bulloak) and/or eucalypts, particularly <i>Eucalyptus largiflorens</i> (Black Box) or <i>Eucalyptus populnea</i> (Poplar Box).	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species.
<i>Sclerolaena napiformis</i>	Turnip Copperburr	Endangered	Endangered	This species is confined to remnant grassland of <i>Austrostipa nodosa</i> and <i>chloris truncata</i>	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species.
<i>Austrostipa wakoolica</i>	A spear-grass	Endangered	Endangered	This species is confined to the floodplains of the Murray River tributaries in open woodland on grey, silty clay or sandy loams. Associated with <i>Callitris glaucophylla</i> , <i>Eucalyptus microcarpa</i> , <i>Austrostipa eremophila</i> , <i>A. drummondii</i> , <i>Austrodanthonia eriantha</i> and <i>Einadia nutans</i> .	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species. Historical intensive cropping practices also reduced the likelihood of this species being present.
<i>Swainsona murrayana</i>	Slender Darling Pea	Vulnerable	Vulnerable	Occurs in a variety of habitats on clay-based soils and have been found within remnant native grasslands and grassy woodlands that have been intermittently grazed. Commonly found with <i>Maireana</i> species.		0	The Subject Land does not conform to the requirements of this species.
<i>Swainsona plagiotropis</i>	Red Darling Pea	Vulnerable	Vulnerable	Occurs within the upper Murray River valley. Grows on flat grassland in heavy red soil often on roadsides	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species.



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
				and in table drains. This species appears to be an indicator species of Enteropogon and Austrostipa grassland communities.			species. Historical intensive cropping practices also reduced the likelihood of this species being present.
<i>Solanum karsense</i>	Menindee Nightshade	Vulnerable	Vulnerable	Grows in occasionally flooded depressions with heavy soil, including level river floodplains of grey clay with Black Box and Old Man Saltbush, and open treeless plains with solonized brown soils - Habitats are generally lake beds or floodplains of heavy grey clays with a highly self-mulching surface. Also found on sandy floodplains and ridges and in calcareous soils, red sands, red-brown earths and loamy soils. - This species is ephemeral in nature, appearing following rainfall events. It also tolerates disturbance		0	The Subject Land does not conform to the requirements of this species.
<i>Brachyscome papillosa</i>	Mossgiel Daisy	Vulnerable	Vulnerable	Endemic to NSW this species is primarily recorded in clay soils on bladder saltbush and leafless blue bush plains but also found in grassland and in inland grey box – cypress pine woodland.	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species. Historical intensive cropping practices also reduced the likelihood of this species being present.
<i>Eucalyptus leucoxylon subsp. pruinosa</i>	Yellow Gum	Vulnerable		Occurs at the bases of sandy rises and on loamy clay flats on the floodplains of the Murray River and its tributaries	Unlikely to occur	0	The Subject Land only contained 10 trees which were identified as Black Box. The Subject Land does not conform to the requirements of this species. Historical intensive cropping practices also reduced



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
							the likelihood of this species being present.
<i>Pilularia novae-hollandiae</i>	Austral Pillwort	Sensitivity class 3, Endangered		Grows in shallow swamps and waterways often among grasses and sedges. Often recorded in drying out mud.	Unlikely to occur	0	The Subject Land does not match the criteria for this species
Birds							
<i>Aphelocephala leucopsis</i>	Southern Whiteface	Protected, Vulnerable	Vulnerable	Inhabits a wide range of open woodlands and shrublands where there is an understory of grasses or shrubs.	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species.
<i>Ardeotis australis</i>	Australian Bustard	Endangered, Protected		Inhabits inland Australia, predominantly found in tussock and hummock grasslands, also occurring in low shrublands and low open grass woodlands.	Unlikely to occur	0	Subject Land is primarily comprised of exotic species and does not conform to the requirements of this species
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered, Protected	Endangered	Occurs from southern Queensland to Tasmania and south eastern South Australia. In NSW this species has been recorded along the coast as well as inland wetlands and rivers (NPWS, 1999). The Australasian Bittern occurs in estuarine and freshwater wetlands with tall dense vegetation, including sedges, spike rushes, reeds and bulrush (NPWS, 2000; NPWS, 1999). Feeds mostly at night upon frogs, yabbies, spiders, insects, snails, small fish and mice (Schodde and Tidemann, 1993; NPWS, 2000).	Unlikely to occur	0	The Subject Land does not contain the habitat features required for this species.
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Protected, Vulnerable	Vulnerable, China Migratory, Jap migratory, Korea migratory	This species is a migratory shorebird.	Unlikely to occur	0	This species is a migratory shorebird



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
<i>Calidris ferruginea</i>	Curlew Sandpiper			The curlew sandpiper is widely distributed around Australia; though occurs in high densities in coastal areas (DCCEEW, 2024; Menkhorst et al., 2019). Small numbers are known to occur in inland Australia (DCCEEW, 2024). Preferred habitats include intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and non-tidal swamps, lakes and lagoons (DCCEEW, 2024). They are also recorded inland around ephemeral and permanent lakes, dams, waterholes and bore drains (DCCEEW, 2024).	Unlikely to occur	0	This species is a migratory shorebird
<i>Calyptrorhynchus lathamii lathamii</i>	South-eastern Glossy Black-Cockatoo			The glossy black-cockatoo is distributed throughout eastern and southern Australia, from Mackay in the north, to Kangaroo Island in the south (Menkhorst et al., 2019). The species predominantly occurs within coastal and subcoastal regions and is heavily restricted by the availability of their required foraging resource. Preferred habitats represent woodlands or open sclerophyll forests with a dominant stratum of Allocasuarina (Glossy Black Conservancy, 2010).	Unlikely to occur	0	The Subject Land does not contain suitable foraging habitat for this species.
<i>Circus assimilis</i>	Spotted harrier		Vulnerable	Found throughout mainland Australia except for densely forested or wooded habitats of the coast, escarpment and ranges. Occurs in grassy open woodland including acacia and mallee remnant, inland riparian woodland, grassland and shrub steppe.	Unlikely to occur	1	The Subject Land does not contain suitable foraging habitat for this species.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper	Protected, Vulnerable	Vulnerable	Found in Eucalypt woodland and dry open forests dominated by	Unlikely to occur	0	The Subject Land does not conform to the



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
	(eastern subspecies)			stringybarks or other rough-barked eucalypts.			requirements of this species
<i>Falco hypoleucos</i>	Grey Falcon	Protected, Vulnerable, Sensitivity class 2	Vulnerable	Habitat includes lightly treed inland plains; gibber deserts, sand ridges, pastoral lands, timbered watercourses; seldom in driest deserts (Pizzey and Knight, 2007). Resident or nomadic visitor to inland parts of all mainland states (Pizzey and Knight, 2007).	Unlikely to occur	0	The Subject Land contains minimal habitat for prey for this species. No records of this species have been identified within 5km of the Subject Land.
<i>Gallinago hardwickii</i>	Latham's Snipe	Protected, Vulnerable	Vulnerable, Jap migratory, Korea migratory	Soft wet ground or shallow water with tussocks and other green or dead growth; wet parts of paddocks; seepage below dams; irrigated areas; scrub or open woodland from sea level to alpine bogs over 2000m ; 'samphire' on saltmarshes and mangrove fringes (Pizzey and Knight, 2007).	Unlikely to occur	0	The Subject Land does not meet the requirements for this species
<i>Grantiella picta</i>	Painted Honeyeater	Protected, Vulnerable	Vulnerable	Habitat includes mistletoes in eucalypt forests, box-ironbark-yellow gum woodlands, paperbarks, casuarinas, mulgas/acacias (Birds Australia, 2010; Pizzey and Knight, 2007). Rare migrant/nomad with range extending across eastern Australia (Pizzey and Knight, 2007).	Unlikely to occur	0	The Subject Land does not contain mistletoes.
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	Protected, Vulnerable		The White-bellied Sea-eagle is distributed around the Australian coastline and can occur inland along major rivers and wetlands (EOH, 2025). Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea (Menkhorst et al., 2019). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest), with nest trees typically	Unlikely to occur	0	The Subject Land is adjacent to a man-made channel which may provide potential habitat. The limited vegetation and lack of records within 5km of the Subject Land reduce the likelihood of this species occurring.



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
				large emergent eucalypts (EOH, 2025).			
<i>Hirundapus caudacutus</i>	White-throated Needletail	Vulnerable	Vulnerable	Requires intact grassland, woodland and forest vegetation.	Unlikely to occur	1	Th Subject Land does not conform to the requirements of this species.
<i>Lathamus discolor</i>	Swift Parrot			The swift parrot breeds in Tasmania during the summer, before migrating north to mainland Australia for the winter (DCCEEW, 2024). The species inhabits dry sclerophyll forests and woodlands, particularly areas supporting winter-flowering species (DCCEEW, 2024). Mostly recorded in box-ironbark woodlands (Menkhorst et al., 2019). Routinely returns to winter foraging habitat.	Unlikely to occur	0	The Subject Land does not conform to the habitat requirements of this species, nor is it mapped as important habitat.
<i>Leipoa ocellata</i>	Malleefowl	Endangered, Protected	Vulnerable	Occurs in semi-arid and arid zones of temperate Australia, where it occupies shrublands and low woodlands that are dominated by mallee vegetation. It also occurs in eucalypt or native pine woodlands, acacia scrublands, Broombush vegetation or coastal heathlands (SPRAT, 2010).	Unlikely to occur	0	The habitat within the Subject Land does not match the requirements for this species.
<i>Lophochroa leadbeateri</i>	Pink Cockatoo	Protected, Vulnerable, Sensitivity class 2	Endangered	Inhabits a wide variety of semi-arid and arid inland habitats (Pizzey and Knight, 2007). Near water on timbered watercourses; surrounding grasslands, gibber, saltbush; mulga and other acacias; stands of native cypress, casuarinas; larger male eucalypts with suitable nest hollows; mallee associated with riverine woodlands (Pizzey and Knight, 2007).	Unlikely to occur	0	The Subject Land does not conform to the requirements for this species.
<i>Lophoictinia isura</i>	Square-tailed Kite			The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia	Unlikely to occur	0	The Subject Land does not conform to the



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
				Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state. Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. Appears to occupy large hunting ranges of more than 100 square km.			requirements of this species.
<i>Melanodryas cucullata cucullata</i>	South-eastern Hooded Robin	Endangered, Protected	Endangered	Prefers lightly wooded country usually open eucalypt woodland acacia scrub and mallee. Requires structurally diverse habitats featuring mature eucalyptus, saplings, small shrubs and a ground layer of moderately tall native grasses. Habitat present within the Subject Land is not consistent with the requirements of this species	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species.
<i>Neophema chrysostoma</i>	Blue-winged Parrot	Protected, Vulnerable	Vulnerable	Occurs within a variety of habitats however tend to favour grasslands and grassy woodlands and are often found near wetlands. The species may occur temporarily.	Unlikely to occur	0	The Subject Land contains very minimal suitable habitat for this species. The historical cropping and lack of records within a 5km radius of the Subject Land reduce the probability of this species to occur.
<i>Pedionomus torquatus</i>	Plains-wanderer	Sensitivity class 3, Endangered, Protected	Critically Endangered, Endangered, China Migratory	Inhabits sparse, treeless. Lowland native grasslands on hard, red-brown clay soils (SPRAT, 2010).	Unlikely to occur	0	The Subject Land is primarily comprised of exotic species.
<i>Polytelis anthopeplus monarchoides</i>	Regent Parrot (eastern subspecies)	Sensitivity class 3, Endangered, Protected	Vulnerable	Primarily inhabits riparian or littoral River Red Gum forests or woodlands and adjacent Black Box woodlands. Nearby open mallee woodland or shrubland, usually with a ground cover of spinifex or other grasses,	Unlikely to occur	0	The lack of Native Vegetation within and surrounding the site reduces the potential for this species to occur.



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
				supporting various eucalypts, especially Christmas Mallee and Yellow Mallee, as well as Belah, Buloke or Slender Cypress Pine also provide important habitat for this subspecies. They often occur in farmland, especially if the farmland supports remnant patches of woodland along roadsides or in paddocks. Found in semi-arid interior of New South Wales, South Australia and Victoria.			
<i>Polytelis swainsonii</i>	Superb Parrot	Sensitivity class 3, Protected, Vulnerable	Vulnerable	Mainly inhabits forests and woodlands dominated by eucalypts, especially River Red Gums, Yellow Box or Grey Box. The species also seasonally occurs in box-pine (<i>Callitris</i>) and Boree woodlands (SPRAT, 2010).	Unlikely to occur	4	Despite records of this species within 5km of the Subject Land, the lack of Native Vegetation within and surrounding the site reduces the potential for this species to occur.
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered, Protected	Endangered	Inhabits well-vegetated shallows and margins of wetlands, dams, sewage ponds and other water courses; wet pastures, marshy areas, irrigation systems, lignum, tea-tree scrub and open timber (Geering et al., 2007; Pizzey and Knight, 2007). Occurs mostly in southeastern Australia but dispersive in response to rainfall (Pizzey and Knight, 2007).	Unlikely to occur	0	Despite the adjacent water channel, BioNet records and vegetation within the Subject Land does not conform to the species requirements reducing the potential for this species to occur.
<i>Stagonopleura guttata</i>	Diamond Firetail	Protected, Vulnerable	Vulnerable	Found in grassy eucalypt woodlands including box gum woodlands and snow gum woodlands. Also occurs in open forest and in secondary grassland derived areas. Often found in riparian areas and in lightly wooded farmland.	Unlikely to occur	0	The Subject Land does not conform to the requirements of this species.
<i>Stictonetta naevosa</i>	Freckled Duck		Vulnerable	Primarily occurs in south-eastern and south-western Australia (Pizzey and Knight, 2007), however the	Unlikely to occur	2	The Subject Land does not conform to the



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
				species occasionally occurs in coastal NSW and Victoria, particularly during drought. Breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. May also utilise lakes, reservoirs, farm dams and sewage ponds (DEC, 2007). During drier times, the Freckled Duck moves to more permanent waters such as lakes, reservoirs, farm dams and sewerage ponds (Pizzey and Knight, 2007).			requirements of this species.
<i>Tringa nebularia</i>	Common Greenshank	Endangered, Protected	Endangered, China Migratory, Jap migratory, Korea migratory	Requires coastal areas, mudflats, mangrove swamps.	Unlikely to occur	0	This species is migratory. The Subject Land does not conform to the species requirements.
Amphibians							
<i>Crinia sloanei</i>	Sloane's Froglet	Endangered, Protected	Endangered	Associated with periodically inundated areas in grassland and disturbed habitats.	Unlikely to occur	0	Despite the Subject Land being adjacent to an established water channel, the vegetation and landforms present within the Subject Land does not conform to the species requirements.
<i>Litoria raniformis</i>	Southern Bell Frog	Endangered, Protected	Vulnerable	Usually found in or around permanent or ephemeral Black Box/Lignum/Nitre Goosefoots swamps, Lignum/Typha Swamps and River Red gums swamps. Some habitat present onsite	Unlikely to occur	0	Despite the Subject Land being adjacent to an established water channel, the vegetation and landforms present within the Subject Land does not conform to the species requirements.



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
Mammals							
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	Protected, Vulnerable	Vulnerable	Can forage over large distances. Captures have been made in open dry woodland and forest of mass flowering natives. Mainly in the Brigalow Belt South Bioregion (Curtis L.K & Dennis A.J, 2012).	Unlikely to occur	0	Limited flowering native species are present within the Subject Land. The Subject Land does not conform to the requirement of this species.
<i>Phascolarctos cinereus</i>	Koala	E	E	The koala is widely distributed through eastern and southern Australia, from Cairns in the north, to Adelaide (DCCEEW, 2024). Throughout its distribution, the koala occurs within dry eucalypt woodlands and open forests (Melzer et al., 2018). The koala is regarded as a specialist feeder, feeding exclusively on the leaves of various eucalyptus, Corymbia, Lophostemon, angophora and melaleuca species (Martin and Handasyde, 1999). The distribution and density of koalas is influenced by numerous factors, including habitat connectivity, habitat quality, population dynamics and the presence of threats (Rhodes et al., 2015).	Unlikely to occur	0	The Subject Land contains ten (10) Koala feed trees, the closest koala sign is approximately 8km south of the Subject Land.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	This species occurs in the coastal belt from Rockhampton in central Queensland to Melbourne in Victoria (DCCEEW, 2024). The species is organised around roost sites commonly formed in gullies, typically not far from water and usually in vegetation with a dense canopy. Bats commute daily to foraging areas, typically within 15 km of the day roost where they feed on a wide variety of flowering and fruiting plants including the	Unlikely to occur	0	The subject contains limited flowering native species. The closest GHFF camp is in Albury over 180km southeast of the Subject Land. The Subject Land does not conform to the requirement of this species.



Species name	Common name	EPBC Act Listing	BC Act Listing	Distribution and habitat requirements	Likelihood of Occurrence	Records within 5km	Justification
				blossoms of eucalypts (DCCEEW, 2024).			
Reptiles							
<i>Hemiaspis damelii</i>	Grey Snake	Endangered, Protected	Endangered	Queensland, records are known from near Goondiwindi and the adjacent Darling-Riverine Plain, from the Darling Downs and from the Lockyer Valley. Several isolated records also occur in the Rockhampton area. It favours woodlands, usually on heavier, cracking clay soils, particularly in association with water bodies. They shelter under rocks, logs and other debris as well as in soil cracks.		0	The Subject Land does not conform to the requirement of this species.
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	Protected, Vulnerable	Vulnerable	Inhabits open woodlands with predominantly native grassy ground layers particularly those dominated by kangaroo grass.		0	The Subject Land does not conform to the requirement of this species.
Fish and Crustaceans							
<i>Euastacus armatus</i>	Murray Crayfish	Vulnerable	V	Found in a range of habitats from pasture lands to sclerophyll forest preferring cool, flowing well oxygenated water.	Unlikely to occur	0	The Subject Land does not conform to the requirement of this species.
<i>Galaxias rostratus</i>	Flathead Galaxias	Critically Endangered	CE	Found within the Murray Darling Basin usually below 150m ASL generally with connected rivers.	Unlikely to Occur	0	The Subject Land does not conform to the requirement of this species.
<i>Macquaria australasica</i>	Macquarie Perch	Endangered	E	Found in connected rivers and lakes.	Unlikely to occur	0	The Subject Land does not conform to the requirement of this species.





Figure 6: BioNet Threatened Species Sightings



APPROVED

Subject to compliance with the accompanying notice
of determination conditions of:

Development Application No:

DA 134-2025

Date:

3 July 2026



LEETON
SHIRE COUNCIL



125 Briggs Road, Stanbridge Solar Farm and BESS

Aboriginal Due Diligence Assessment

Final Report

Prepared for Habitat Planning on behalf of Bison Energy

11 September 2025

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Biosis acknowledges the Aboriginal and Torres Strait Islander peoples as Traditional Custodians of the land on which we live and work.

We pay our respects to the Traditional Custodians and Elders past and present and honour their connection to Country and ongoing contribution to society.

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Summary

Biosis Pty Ltd (Biosis) has been commissioned by Habitat Planning on behalf of Bison Energy (the client) to undertake an Aboriginal Due Diligence Assessment (ADDA) for the development and construction of a 5-Megawatt Solar photovoltaic facility and associated 11 megawatt-hour Battery Energy Storage System at 125 Briggs Road, Stanbridge NSW (Lot 109 Deposited Plan [DP] 751703) (the project). The proposed development will be assessed against Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a).

Background research suggested that the study area is located within an alluvial floodplain deposit geological formation and the Murrumbidgee Irrigation Area (MIA) in the Riverina region, constructed from 1903 to control and divert naturally occurring water channels. Artefact and PAD sites have been recorded across a variety of similar geological formations. A search of the Aboriginal Heritage Information Management System (AHIMS) database conducted on 19 May 2025 (Client service ID: 1005678) identified 97 sites within a 16-kilometre search radius. There are no sites located within the study area, with the closest site located approximately 7 kilometres north-east of the study area (AHIMS 49-2-0296/Tuckerbil ST01). The low-density distribution of sites within the 16-kilometre search radius of the study area is likely due to low numbers of cultural heritage assessments conducted in the area. This may be due to its colonial history dominated by agriculture and pastoralism, in combination with the lack of development in the area requiring approvals under the EP&A Act, *National Parks and Wildlife Act 1974 (NSW)* (NPW Act) etc.

A review of historical aerials and parish maps shows that the current study area boundaries, drainage, and roadways were extant by 1911. No structures are visible from the earliest 1965 aerial to the present day. However, the majority of trees had been cleared from 1965, and extensive disturbances appear to include divisions of the land into discrete areas of agricultural farming and terracing, likely separated by tracks or fence lines.

An archaeological investigation of the study area was undertaken on 19 June 2025. The inspection confirmed that this historical disturbance within the study area has greatly affected the natural landforms, drainage systems, and topsoil integrity. This disturbance has resulted in there being low potential for archaeology in the study area. No artefacts or other archaeological objects were detected during the physical inspection. No areas of archaeological potential were detected within the study area due to extensive agricultural disturbance.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW, NSW Department of Climate Change, Energy, the Environment and Water (Heritage NSW). Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW' Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

Definitions

ADDA	Aboriginal Due Diligence Assessment
AHIMS	Aboriginal Heritage Information Management System
AREA	AREA Consultants & Communication
Biosis	Biosis Pty Ltd
CBD	Central business district
The Code	<i>The Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW</i>
DP	Deposited Plan
Due Diligence Code	<i>Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
GSV	Ground Surface Visibility
Heritage NSW	Heritage NSW, NSW Department of Climate Change, Energy, the Environment and Water
ICOMOS	International Council on Monuments and Sites
LALC	Local Aboriginal Land Council
LGA	Local Government Area
MIA	Murrumbidgee Irrigation Area
NPW Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
PAD	Potential Archaeological Deposit
Study area	125 Briggs Road, Stanbridge (Lot 109 DP751703)

1 Introduction

1.1 Background

Biosis has been commissioned by Habitat Planning on behalf of Bison Energy to undertake an ADDA for the development and construction of a 5-megawatt Solar PV facility and associated 11 megawatt-hour Battery Energy Storage System at 125 Briggs Road, Stanbridge NSW (Lot 109 DP751703) (the project).

An assessment in accordance with the *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* (DECCW 2010a) has been undertaken for the study area in order to inform responsibilities with regards to Aboriginal cultural heritage in the area. In addition to the basic tasks required for a due diligence assessment, an extended background review, as well as an archaeological survey in accordance with the *Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b) (the Code) was conducted to adequately map areas of high, moderate and low archaeological sensitivity.

1.2 Location of the study area

The study area is located within the Leeton Shire Local Government Area (LGA), Parish of Gogeldrie, County of Cooper as shown in Figure 1. The study area is 22 hectares incorporating Lot 109 DP751703 and is bounded by Briggs Road to the north, the Gogeldrie Main Southern Drain to the south and east, and Murrarni Road to the west (refer to Figure 2). The proposed works involve the installation of photovoltaic panels across the study area, with a centrally located medium voltage power station inverter and batteries. Associated works include construction of security fencing and driveway, with a hardstand/laydown area in the west (Figure 3).

1.3 Planning approvals

The proposed development will be assessed against Part 4 of the EP&A Act. Other relevant legislation and planning instruments that will inform the assessment include:

- NPW Act.
- *National Parks and Wildlife Amendment Act 2010 (NSW)*.
- *Leeton Local Environmental Plan 2014*.
- *Leeton Development Control Plan 2022*.

1.4 Scope of the assessment

The following is a summary of the major objectives of the assessment:

- Conduct background research in order to recognise any identifiable trends in site distribution and location, including a search of the Aboriginal Heritage Information Management System (AHIMS).
- Undertake archaeological survey as per Requirement 5 of the Code, with particular focus on landforms with high potential for Aboriginal heritage within the study area, as identified through background research.
- Record and assess sites identified during the survey in compliance with the guidelines endorsed by Heritage NSW.

- Determine levels of archaeological sensitivity of the study area.
- Make recommendations to mitigate and manage any cultural heritage values identified within the study area.

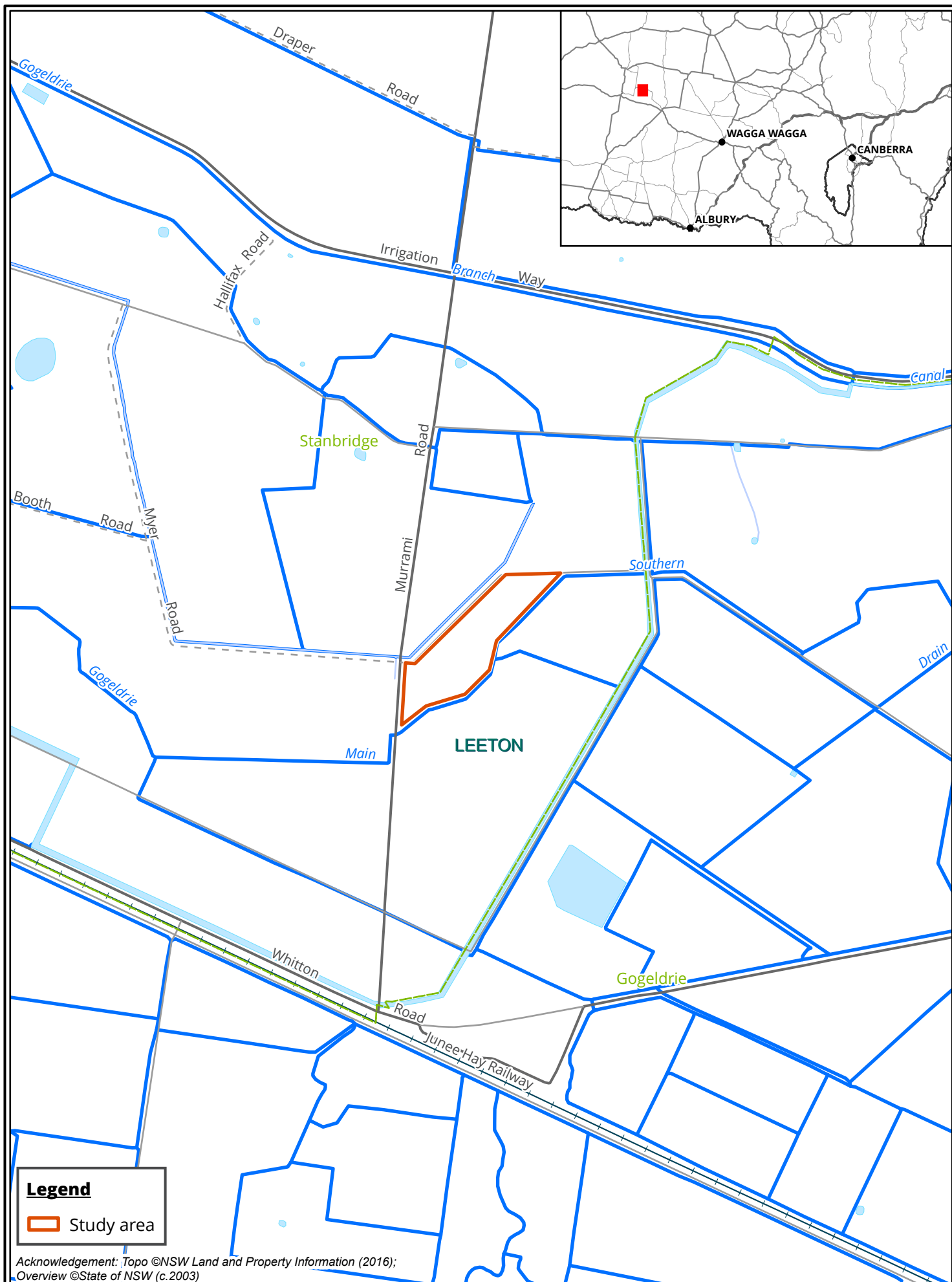


Figure 1 Location of the study area

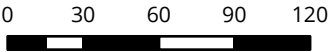
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Legend

- Study area
- Lot

Figure 2 Study area detail



Metres
Scale: 1:3,000@ A3
Coordinate System:
GDA2020 MGA Zone 55



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Legend

- Study area
- Lot
- Proposed works**
- Point of connection and feeder line to HV switchgear
- 100m setback from nearest neighbour
- Security fence
- Proposed PV panel area
- MVPS Inverter and batteries
- Laydown/hardstand area
- Driveway

Figure 3 Proposed works

0 20 40 60 80 100
Metres
Scale: 1:3,000 @ A3
Coordinate System: GDA2020 MGA Zone 55



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2 Desktop assessment

A brief desktop assessment has been undertaken to review existing archaeological studies for the study area and surrounding region. This information has been synthesised to develop some Aboriginal site predictive statements for the study area and identify known Aboriginal sites and/or Places recorded in the study area. This desktop assessment has been prepared in accordance with Requirements 1 to 4 of the Code.

2.1 Landscape context

It is important to consider the local environment of the study area any heritage assessment. The local environmental characteristics can influence human occupation and associated land use and consequently the distribution and character of cultural material. Environmental characteristics and geomorphological processes can affect the preservation of cultural heritage materials to varying degrees or even destroy them completely. Lastly, landscape features can contribute to the cultural significance that places can have for people.

The study area is located in a highly rural environment, surrounded by flat, agricultural fields with minimal structural development approximately 10 kilometres west of the Leeton Central Business District (CBD).

2.2 Geology, hydrology, landforms and soils

Geology, landforms, hydrology and soils provide useful information for determining the potential for Aboriginal sites and objects. Geology can aid in determining if there were useful raw material resources that could be exploited; soils can be used to determine the likelihood of preservation of archaeological materials; and hydrology is often an indicator of the potential for sites to be present depending on the perennially and size of the water sources.

The study area is located within an alluvial floodplain deposit geological formation, composed of unconsolidated to poorly consolidated mottled variegated clay, silty clay with lenses of polymictic, coarse to fine sand and gravel; partly modified by pedogenesis, with inclusions of intercalated red-brown paleosols (NSW DCCEEW 2024) (Figure 5). Artefact and Potential Archaeological Deposit (PAD) sites have been recorded across a variety of similar geological formations and are more likely to occur within the study area than those associated with sandstone formations, such as grinding grooves, rock shelters, and art sites.

Stream order is recognised as a factor which helps the development of predictive modelling in Aboriginal archaeology in NSW. Predictive models which have been developed for the region have a tendency to favour permanent water courses as the locations of campsites as they would have been more likely to provide a stable source of water and by extension other resources which would have been used by Aboriginal groups, and are more likely to be found upon well drained topographies associated with permanent watercourses (creek banks, flats, terraces) (Dyall 1979, Dean-Jones 1990, Biosis 2017).

The stream order system used for this assessment was originally developed by Strahler (1952). It functions by adding two streams of equal order at their confluence to form a higher order stream, as shown in Photo 1. As stream order increases, so does the likelihood that the stream would be a perennial source of water. Hydrological features identified within the study area would have most likely been associated with temporary land use due to their non-perennial nature, and Aboriginal sites within the study area are more likely to be identified within well-drained topographies such as foot slopes and gentle slopes within proximity to these water sources.

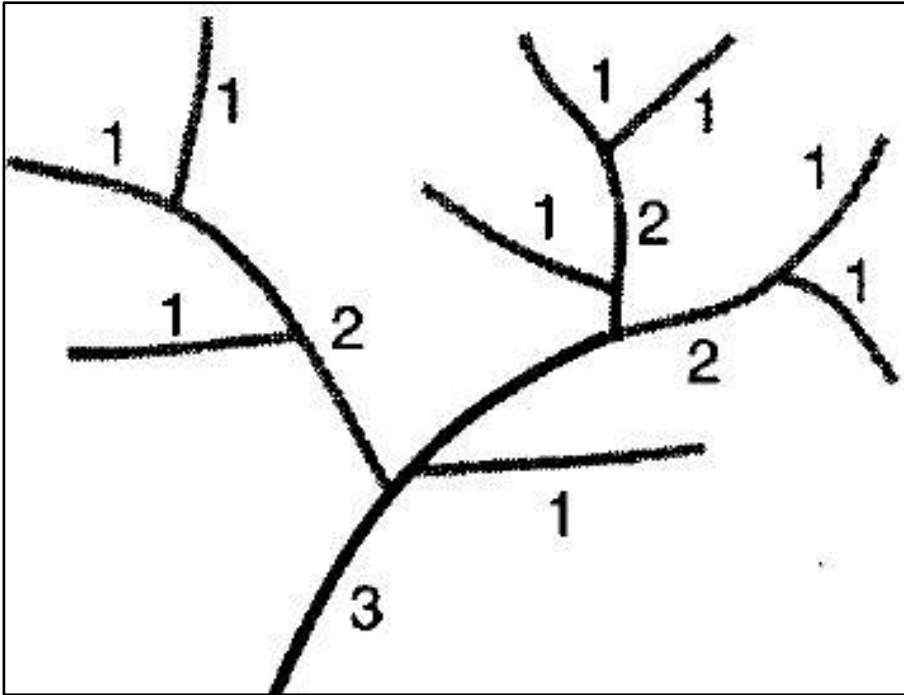


Photo 1 Diagram showing Strahley stream order (Ritter, Kochel, & Miller 1995, pp. 151)

The study area exists within the MIA in the Riverina area, constructed from 1903 to control and divert naturally occurring water channels. The natural hydrology of the study area appears to have been destroyed by the elaborate system of weirs, channels, and holding ponds, as seen in the 1956 aerial photograph (Photo 3) (NSW Spatial Services n.d.) and in Figure 4. As the nearest natural water sources are no longer discernible, analysis was expanded out to the Murrumbidgee River approximately 8 kilometres to the south. The Murrumbidgee River is a major perennial water source that makes up a major part of the wider Murray-Darling Basin hydrological network. Whilst the various non-perennial watercourses within and near the study area would not have provided a consistent source of fresh water to Aboriginal peoples, they could have likely sustained a variety of other material and food resources to exploit, in addition to permanent freshwater resources in the Murrumbidgee River.

Hydrological systems are also prone to change over time. Archaeological evidence of early occupation is more likely to relate to palaeochannels which are extinct or extant in a significantly diminished state. Post-depositional processes like erosion, sedimentation, and the superimposition of later archaeological materials may reduce the likelihood and ability to detect earlier evidence of occupation associated with these palaeochannels (Klaver 1998 reproduced in Pardoe & Martin 2011). Therefore, the perennialism and Strahler order of current watercourses can only be used to predict general patterns in the distribution of archaeological materials throughout the study area.

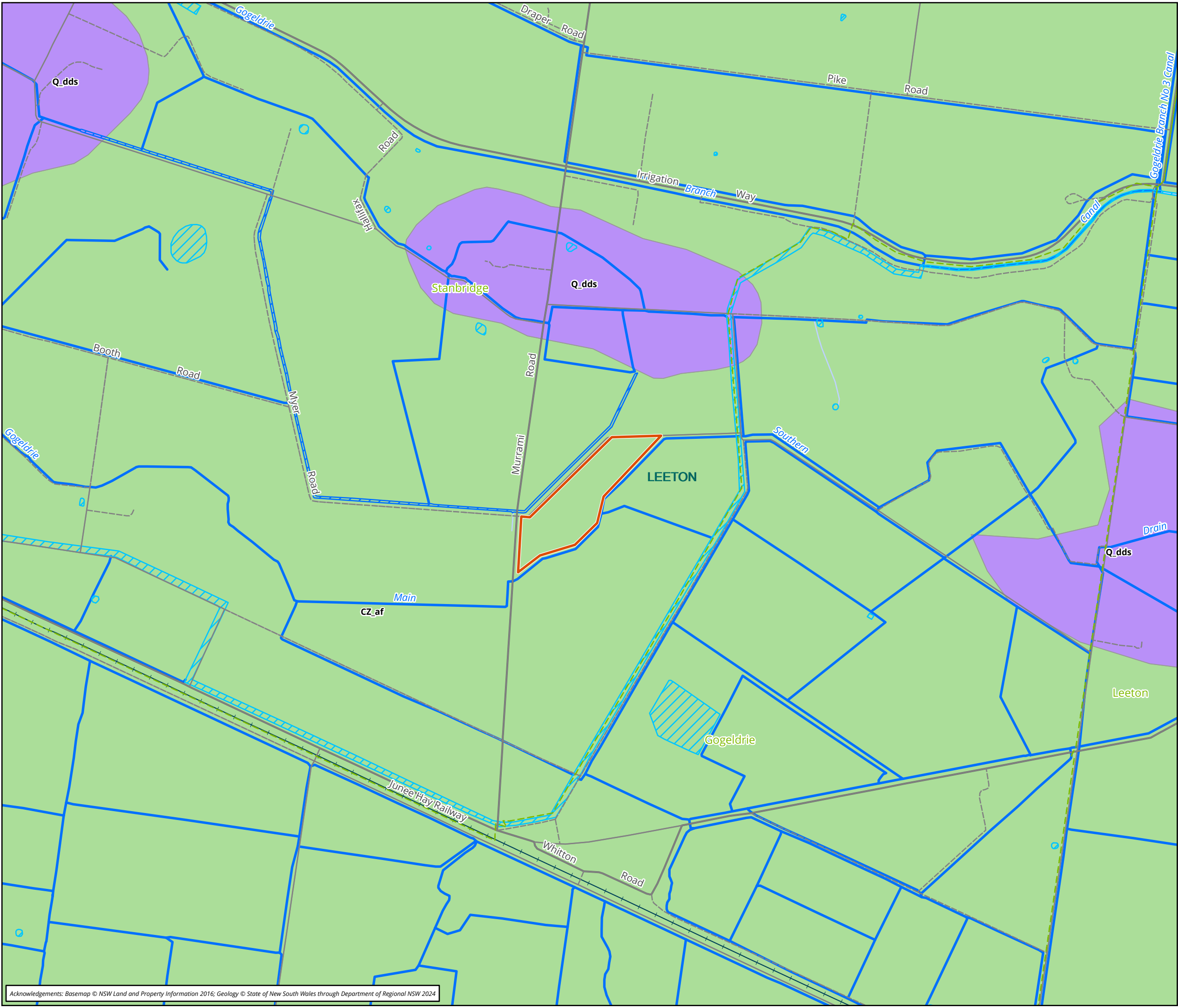
Soil landscapes have distinct morphological and topological characteristics that result in specific archaeological potential. They are defined by a combination of soils, topography, vegetation and weathering conditions. Soil landscapes are essentially terrain units that provide a useful way to summarise archaeological potential and exposure.

The study area is contained within two Mitchells soil landscapes: Murrumbidgee Scalded Plains; and Murrumbidgee Source-bordering Dunes (Figure 6). The Murrumbidgee Scalded Plains soil landscape, characterised as Quaternary alluvial plains with extensive relic (scald) floodplains or terraces (Mitchell 2002). Grey, brown and red cracking clays and red brown soils contrast with these relic profiles (Mitchell 2002). Alluvial soils are subject to regular flooding. Flooding events often result in the deposition of soils which can

preserve archaeological deposits. However, water and soil movement during flood events can also result in disturbances to these deposits. This indicates that if archaeological deposits are present, they may not be in situ. This landscape therefore has low to moderate potential for archaeological deposits in areas subject to flooding.

The Murrumbidgee Source-bordering Dunes are characterised by sandy rises adjacent to river channels and along prior streambeds, consisting of deep red and brown sands and loams with relief of 3-12 metres. These landscapes are often heavily grazed and subject to wind erosion. Source bordering dunes are deposits of sand, which form when wind blows sand from an adjacent water source onto the banks of the water source. The dunes are located on downwind margins of major fluvial systems (Quinn et al. 2023). Sands that are accumulated by aeolian processes can bury artefacts and thus preserve them. Dune landforms are often archaeologically sensitive and have been associated with high density and highly culturally significant sites. However, aeolian processes can cause major transformations to the archaeological record due to the destruction and abrasion of objects as well as intense erosion (Rapp & Hill 2006, pp. 64–65).

Raised landforms are unlikely to be affected by flooding and are likely to have been favoured by Aboriginal people for occupation as a result (Kelly & Price 2003, Brooke & Jacobs 2009, Border Archaeology 2007), and therefore hold higher archaeological potential as deposits are more likely to be found in situ. However, as there are no topographic or elevation variations within the study area this increased potential is greatly reduced.



Legend

Study area

Geological units

CZ_af - Alluvial floodplain deposits

Q_dds - Source-bordering dunes

HydroArea

Canal-Drain

NaturalWatercourse

HydroLine

NonPerennial

Perennial

Figure 4 Geological units in the vicinity of the study area

0 160 320 480 640 800

Metres

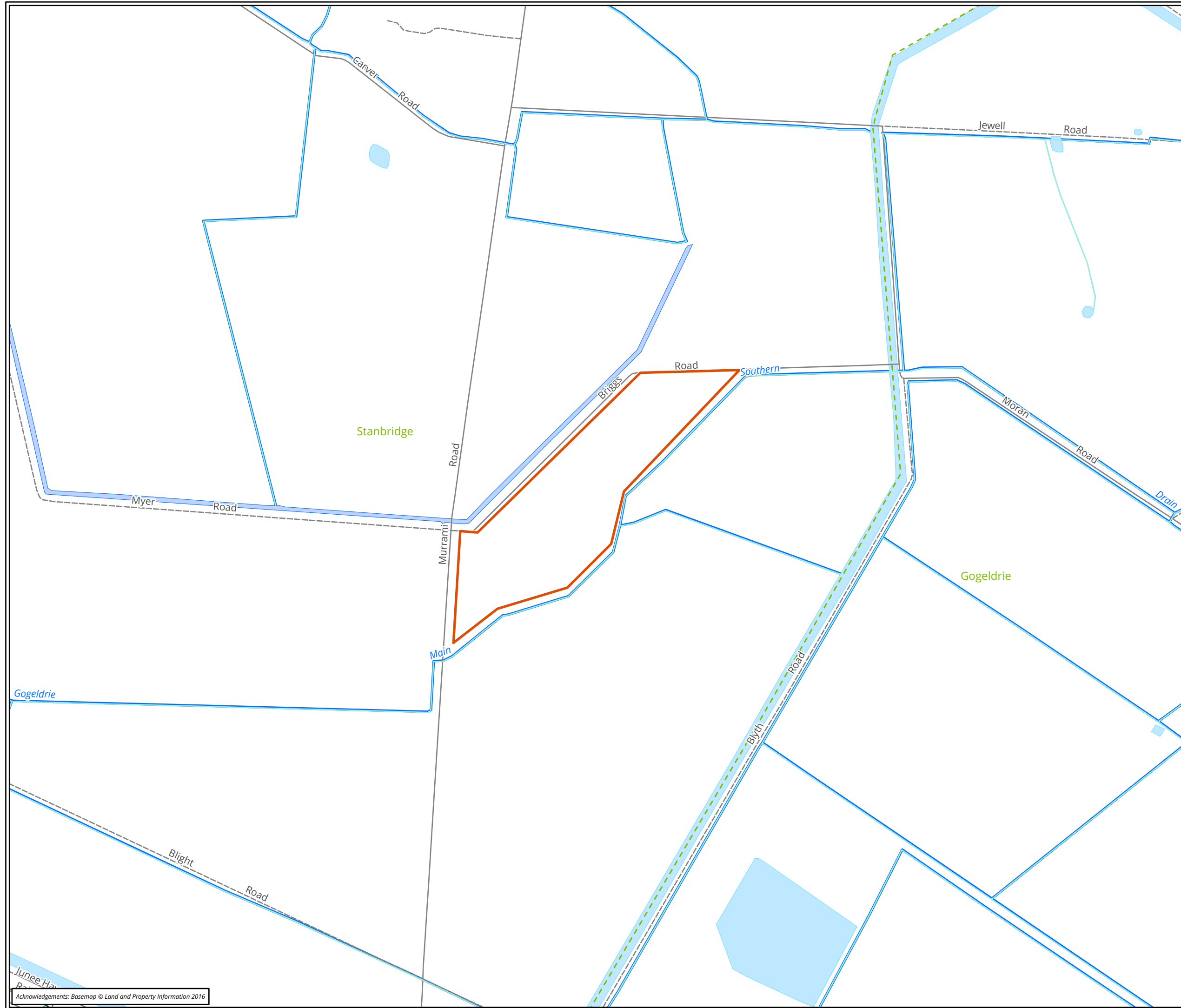
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Legend

 Study area

Strahler Order

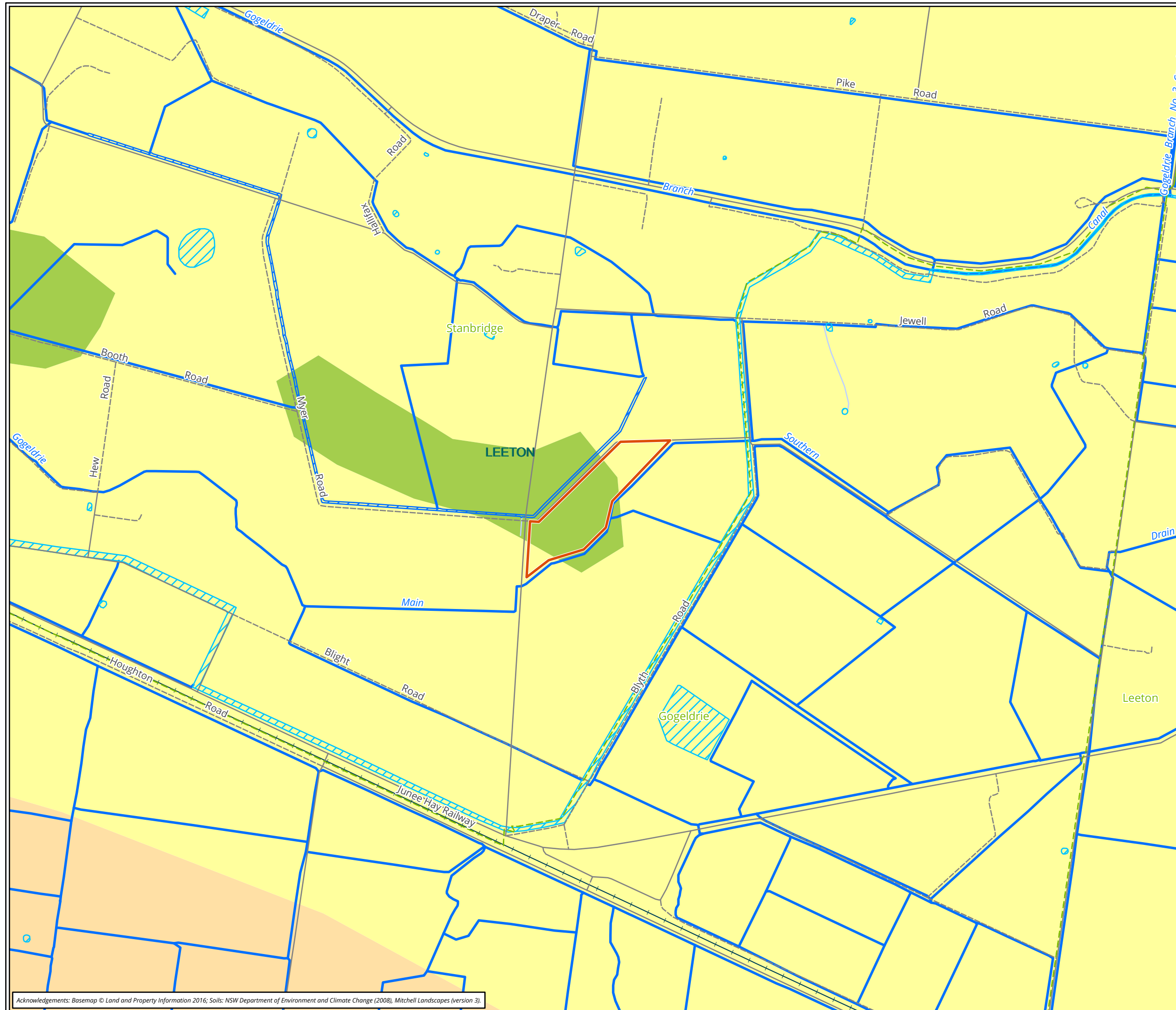
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Figure 5 Hydrology and topography in the vicinity of the study area

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Metres
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Legend

Study area

Mitchell landscapes (1:250,000)

- Murrumbidgee Channels and Floodplains
- Murrumbidgee Scalded Plains
- Murrumbidgee Source-bordering Dunes

HydroArea

- Canal-Drain
- Natural Watercourse

HydroLine

- Non Perennial
- Perennial

Figure 5 Soil landscapes in the vicinity of the study area

0 160 320 480 640 800

Metres

Scale: 1:20,000 @ A3

Coordinate System: GDA2020 MGA Zone 55



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2.3 Flora and fauna

The wider Murrumbidgee corridor region includes distinct ecological zones, including Eucalypt woodlands, with riparian vegetation extending along many of the major watercourses. Each ecological zone hosts a different array of floral and faunal species, many of which can be utilised according to seasonal availability. Aboriginal inhabitants of the region would have had access to a wide range of avian, terrestrial and aquatic fauna and repeated firing of the vegetation would have opened up the foliage allowing ease of access through and between different resource zones.

Aboriginal use and occupation of the Leeton Shire region was seasonally driven. In the spring, rising river levels filled billabongs and creek lines, making kangaroo, emu, lizards, possums, wombats, fish, mussels, water birds, and yabbies, as well as birds' eggs and witchetty grubs available for food. Springtime floods also brought abundant seeds and water vegetation, including native lilies with nutritious tuberous roots. In the summer, water levels declined and many plant species died or fell dormant, with grasses flourishing sporadically after rains. Groups would remain near water sources like swamps, billabongs, and rivers, weaving fish traps to catch food. As in the spring, water birds and seeds were also good summer food sources (Greenwood 2015). Autumn brought a cooler climate and rivers ran low, reducing vegetation growth across the plains. While animals drew closer to the rivers, waterholes and other channels where resources were localised, Wiradjuri peoples moved away from these areas where it was too cold and foggy to remain. Animals hibernated and had to be sought and dug out with additional time and energy expense (Greenwood 2015).

Plant resources are used in a variety of ways. Fibres were twisted into string, which was used for many purposes, including the weaving of nets, baskets and fishing lines. String was also used for personal adornment. Bark was used in the provision of shelter; a large sheet of bark being propped against a stick to form a gunyah (Attenbrow 2002).

Some of the tree resources present within 5 kilometres of the study area include Bibil/Yellow Box *Eucalyptus melliodora*, Kurrajong *Brachychiton populneus*, and River/Black Box *Eucalyptus largiflorens* (Atlas of Living Australia 2025). Yellow Box trees are a common species for cultural scarring in the region (Long 2005) and provide good firewood and hard, strong, durable timber (Atlas of Living Australia 2025). The Kurrajong tree provides a range of resources for local Aboriginal use. Its seeds are high in protein and fat, and can be harvested, cleaned, and roasted for food, and its gum and young roots can also be eaten (Greenwood 2015). Boring the trunk provides a source of fresh water, and the soft, spongy wood can be made into shields. The bark can be used for fibre, and the seed pods can be crafted into rattles and toys for children. The seeds of the River/Black Box were eaten raw by Aboriginal people when grass seeds were scarce, but requiring a water source to soak and treat them before being ground and eaten (Atlas of Living Australia 2025, Cribb & Cribb 1975).

Grass resources near the study area include Rough Spear-Grass *Austrostipa scabra*, Plains Grass *A. aristiglumis*, Windmill Grass *Chloris truncata*, and Common Wallaby-grass *Rytidosperma caespitosum* (Atlas of Living Australia 2025). Other plant resources that would have been accessible from the study area include the Lomandra *Lomandra multiflora* and Blueberry Lily *Dianella revoluta*. The long leaves of the Lomandra bush can be woven into baskets and mats, and its nectar collected as food (Atlas of Living Australia n.d.), while the tufts of its leaves can be pulled and the white bases chewed for food (Greenwood 2015). The berry of the Blueberry Lily can be eaten and the tuberous roots of other native lily species can sometimes be roasted (Greenwood 2015).

The leaves and stems of the Kangaroo Grass can be harvested to make string, often for fishing nets, and the plant can also be used in traditional medicine. Its grains can be ground into flour to make either a porridge or a traditional bread with a nutty flavour, sometimes known as damper. The grain of the Kangaroo Grass is

considered to be an especially important food source to arid areas, with evidence of its use in food production dating to at least 30,000 years ago (Atlas of Living Australia NA). Although not identified in immediate proximity to the study area, grasses that were previously recorded, such as the Wallaby Grass and Windmill Grasses could also be used in this way in the late summer and autumn (Greenwood 2015).

As well as being important food sources, animal products were also used for tool making and fashioning a myriad of utilitarian and ceremonial items. For example, tail sinews are known to have been used to make fastening cord, while 'bone points', which would have functioned as awls or piercers, are often an abundant part of the archaeological record. Kangaroo teeth were incorporated into decorative items, such as head bands (Attenbrow 2002). Animal skins could be made into water containers, and their dried dung could be used as a fire-starter (Greenwood 2015). Some of the animal species found near the study area include the Eastern Grey Kangaroo *Macropus giganteus*, Swamp Wallaby *Wallabia bicolor*, Australian Magpie *Gymnorhina tibicen*, Galah *Eolophus roseicapilla*, and varieties of snake including Eastern Brown *Pseudonaja textilis* and Red-bellied Black *Pseudechis porphyriacus*.

2.4 Land use history

Wiradjuri peoples have been caring for the region around the study area for at least 40,000 years (Greenwood 2015), shaping the landscape with fire-stick farming methods (Walster 2009). Houlaghan's Creek was a significant channel of movement for Wiradjuri peoples between the Murrumbidgee and Lachlan Rivers, important for both ceremonial and economical purposes (Walster 2009).

After colonial encroachment, the study area fell into the Gogeldrie Parish in Cooper County, approximately 9 kilometres east of Whitton and 10 kilometres west of the Leeton CBD. Whitton is a historic village originally established as 'Hulong' in 1881 along the South Western Railway from Junee to Hay. The railway line valuably connected the Riverina wool trade with Sydney, the Lachlan River wheat stations, Mt. Hope copper mines, and with livestock, mail, and commercial supplies. The larger town of Leeton was purposely built in the early part of the twentieth century as part of the MIA, which covers an area of 378,911 hectares (of which up to 190,000 hectares are irrigated) and would have profoundly impacted the landscape, particularly in relation to landforms and hydrological resources (Murrumbidgee Irrigation 2024). An increase in immigration after World War II introduced experienced European farming families to the area (Leeton Shire Council 2022). Despite limited fresh water, agriculture and pastoralism became an important part of the local economy.

The study area is a 57-acre grant awarded by at least 1919 to "R. from S&L", seen in the Parish map of Gogeldrie map in Photo 2. The grant is shown to abut the current study area's boundaries, including the drain line along the south-eastern side. The first aerial imagery available for the study area dates to 1965 and shows the same drain line and extant roadways (Photo 3). No structures are visible, and the majority of trees have been cleared from the area. Extensive disturbances appear to include divisions of the land into discrete areas of agricultural farming and terracing, likely separated by tracks or fence lines.

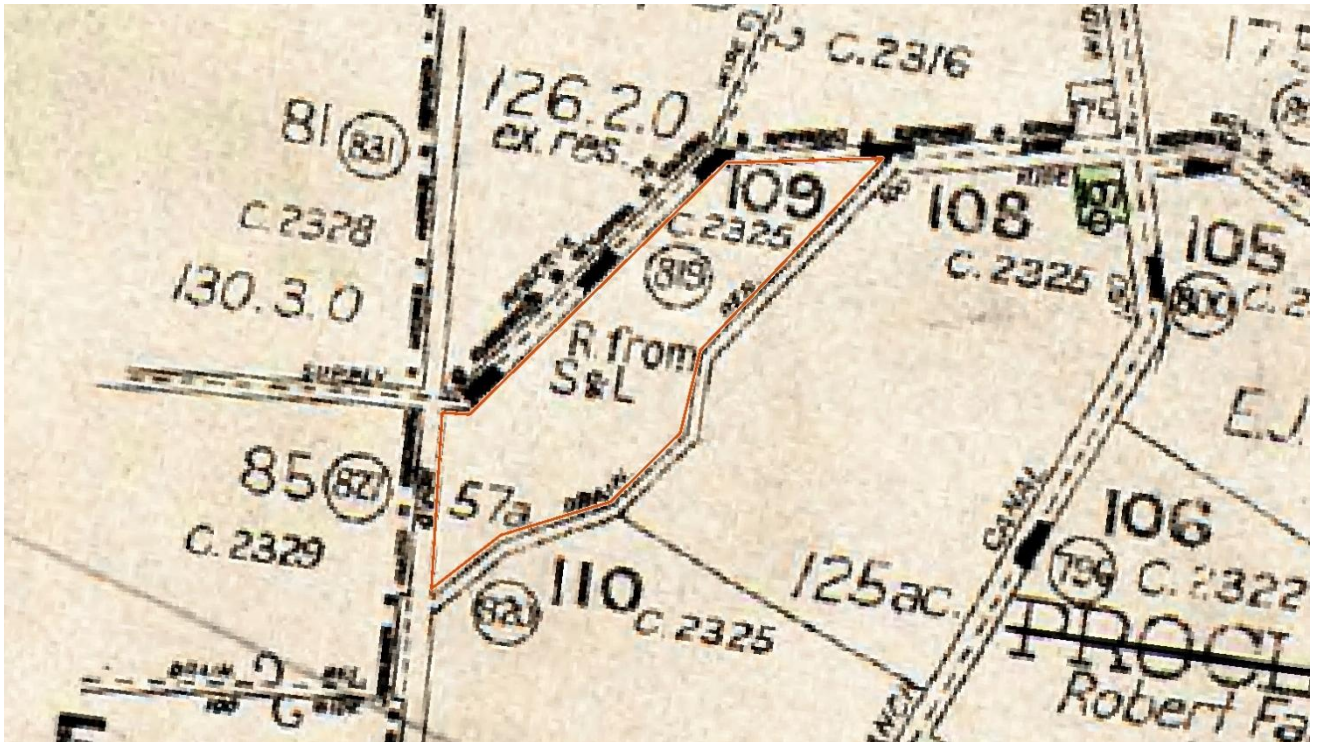


Photo 2 1919 Parish map of Gogeldrie, Country of Cooper with the study area outlined in orange (Source: Department of Lands, Sydney 1919)



Photo 3 1965 aerial imagery of the study area with the study area outlined in orange (Source: NSW Spatial Services 2025)

By 1977, aerial imagery shows continued agricultural use, as well as the addition of some terracing in the north-eastern section of the study area (Photo 4). Any trees which may have been present in 1965 are unlikely

to remain. The next available aerial imagery from 1992 shows the southern portion of the study area continued to be subjected to terraced farming, but the northern portion has been altered to a more linear format of agricultural management (Photo 5). By 2025, all agricultural terracing has ceased, with new tracks related to pastoral activities present throughout (Photo 6).



Photo 4 1977 aerial imagery of the study area with the study area outlined in orange (Source: NSW Spatial Services 2025)



Photo 5 1992 aerial imagery of the study area with the study area outlined in orange (Source: NSW Spatial Services 2025)



Photo 6 Current aerial imagery of the study area with the study area outlined in orange (Source: NSW Spatial Services 2025)

3 Aboriginal context

3.1 Ethnohistory and contact history

It is generally accepted that Aboriginal people have inhabited Australia for the last 65,000 years (Allen & O'Connell 2003, Hamm et al. 2016).

Despite a proliferation of known Aboriginal sites, there is considerable ongoing debate about the nature, territory and range of pre-contact Aboriginal language groups in the region. These debates have arisen largely due to the lack of ethnographic and linguistic information recorded at the time of European contact. By the time colonial diarists, missionaries and proto anthropologists began making detailed records of Aboriginal people in the late-19th century, pre-European Aboriginal groups had been broken up and reconfigured by European settlement activity.

Tindale (1974) compiled information regarding Aboriginal groups and their boundaries. The study area is located within the Wiradjuri area. Tindale talks of an aged Wiradjuri person who described how the Wiradjuri spoke of their country as:

a 'line' rather than as an enclosed area... the line passes through Brungle, Gobarlong, Jugiong, Harden, Cowra, Orange, Dubbo, Condobolin, Hillston, Hay, Darling Point (south of Griffith), Wagga Wagga, Tarcutta, Adelong, and returning to Brungle. Tumut was on the 'line' of an adjoining tribe for which he gave the name Gurmäl. 'Gurmäl' is the Wiradjuri name for Ngarigo (Tindale 1974, pp. 129)

Our knowledge of Aboriginal people and their land-use patterns and lifestyles prior to non-Aboriginal contact is mainly reliant on documents written by non-Aboriginal people. The inherent bias of the class and cultures of these authors necessarily affect such documents. They were also often describing a culture that they did not fully understand – a culture that was in a heightened state of disruption given the arrival of colonisers and disease. Early written records can, however, be used in conjunction with archaeological information and surviving oral histories from members of the Aboriginal community to gain a picture of Aboriginal life in the region.

At the time of European settlement, it is estimated that approximately 3,000 Wiradjuri people were living in the region. Oxley, Hume and Hovell, Sturt and Mitchell were the first Europeans to travel through Wiradjuri country. Sturt noted that there were larger populations of people along the Tumut River than on adjacent areas of the Murrumbidgee River. It is also likely that the impacts of smallpox, influenza and pneumonia epidemics had already impacted these numbers at this stage (Walster 2009).

The Leeton and District Local Aboriginal Land Council (LALC) also assert that Wiradjuri warriors were largely successful in driving settlers out from the Leeton–Narrandera area in the late-1830s and early-1840s. In response, many Wiradjuri people were forcibly relocated to Aboriginal Reserves and Mission Stations at locations including Darlington Point (25 kilometres west) and Euabalong (160 kilometres north) (Leeton and District Local Aboriginal Land Council 2011a). With the establishment of the Aboriginal Protection Board in 1883, many reserves and missions were developed, including Warangesda at Darlington Point (Go Green Services 2002). The suppression of language by Mission managers greatly eroded traditional knowledges and customs, with only a few people returning to the Koonadan area (9 kilometres north-east from the study area) to live off the land by the 1950s (Leeton and District Local Aboriginal Land Council 2011a).

Throughout the wider region pastoral runs continued to develop, with some employing Aboriginal people. During European settlement, many Aboriginal campsites were located near water, within areas that were well-draining, elevated, level, and nearby local resources, which were often also good locations to construct

homes. Many early conflicts were associated with these areas, particularly at permanent water sources and ceremonial areas. By the early-1870s there were also several large-scale massacres recorded to have taken place within Wiradjuri Country, including Murdering Island, Nanderra (41 kilometres south-east), and the Bathurst War (University of Newcastle & Centre for 21st Century Humanities 2024).

3.2 Regional context

There have been a number of cultural heritage investigations conducted in the wider Riverina region in the last 50 years. A selection of these are outlined below.

Wood (1992) carried out preliminary surveys for a proposal by the Department of Defence to modernise and relocate naval communications from the Australian Capital Territory to the Wagga Wagga region of NSW, approximately 100 kilometres south-east of the study area. Due to time constraints, the surveys were primarily carried out by vehicle, in consultation with local Aboriginal community groups. Predicted site types included mounds, hearths, scarred trees, campsites/open sites and possibly burial sites. In total, 38 sites were recorded. These consisted of eight oven mounds (from approximately 4 metres to 20 metres) 22 scarred trees and eight surface scatters of stone artefacts. Six of the eight mounds were associated with watercourses and the rest located near the Bullenbong Plains that typically experience heavy rains. Agricultural activities such as ploughing and grazing had greatly impacted the integrity of the mounds.

Artefact scatter sites were similarly located adjacent to watercourses and all the open campsites in the Gum Creek area were located on eroded sand sheets, covering an area located 60 kilometres west of the study area. A total of 107 recorded artefacts included flakes, flaked pieces, cores and a thumbnail scraper. These were produced primarily from quartz (81.3%) and red/grey/pink silcrete (12.1%), but other raw materials included quartzite, fine-grained volcanic material, chert, granite, and 12 sandstone grindstone fragments. Ten (45.5%) of the identified scarred trees were located in remnant native vegetation stands, seven (31/8%) lining banks of watercourses, and the remaining five (22.7%) on trees forming windbreaks along boundary fences (Wood 1992, pp. 27). The bark was thought to have been used for shields, dishes or shelters given the relatively small size of the scars.

Williams (1993) undertook archaeological investigation of the proposed route of the Optus communications fibre optic cable between Albury and Wagga Wagga, located approximately 118 kilometres south-east of the study area. Background research identified scarred trees as the most recorded site type in the nearby area, as well as artefact scatters, rock engravings and grinding grooves. Based on previous assessments, including Smith (1992) who had previously assessed the same area, it was concluded that:

- All permanent or temporary sources of water, including swamps and springs are likely to be the location of open sites. These sites are likely to be located within large, well-drained, sandy deposits up to the creek bank or in raised and sheltered areas surrounding swamps.
- Creek terraces have high potential to contain Aboriginal sites, namely stratified sites due to alluvial deposition.
- All areas in the vicinity of granite outcrops are likely to contain artefact scatters where raw materials are processed.
- Quartz outcrops have the potential to be used as quarries and striking formations may have been natural mythological sites.
- Saddles and ridge lines have potential to contain artefact scatters. When located away from water, artefact scatters are likely to be smaller. As erosion is also common within this landform, sites are unlikely to be stratified.

- Mature trees have potential to contain scars or carvings.

A subsequent survey revisited PAD sites identified by Smith (1992) and additional landforms of potential identified by Williams (1993). High archaeological potential was associated with banks, flats and associated water courses around the Murrumbidgee River. Low potential was identified within low lying and poorly draining areas, and areas of high disturbance. The original proposed route through North Wagga was altered to be in an area of low archaeological potential.

Navin Officer (1995) carried out a historical, anthropological and Aboriginal archaeological investigation for a proposed natural gas pipeline along a 146 kilometre line from Wodonga in Victoria to Wagga Wagga in NSW. The investigated area was approximately 118 kilometres south of the study area at its closest and 175 kilometres south at its furthest. At the Wagga Wagga end, Officer anticipated artefact scatters to be the most common site type, followed by scarred trees, mound sites and burials. Field surveys targeted areas of high and moderate archaeological potential. The five identified sites comprised four artefact scatters, one scarred tree, and four isolated finds. The survey confirmed that artefact scatters are likely to be in well-drained contexts within riparian zones and adjacent to water sources.

Officer (1996) carried out additional field investigations over three days, targeting areas in proximity to water sources, foothills, ridgelines, saddles. No sites were selected for investigation in Wagga Wagga, and ground visibility was consistently poor. The report concluded similar findings as above.

Archaeo Analysis (2007) completed an Aboriginal survey of the Livingstone National Park and State Conservation area in Wagga Wagga, approximately 130 kilometres south of the study area. Previous surveys by Dearling and Grinbergs in 2002 had identified 21 sites, artefact scatters and isolated artefacts within the Livingstone National Park boundaries. As such, field investigation centred on relocating the previously recorded sites, with 18 of the 21 sites located and recorded. Of the 18 sites, additional artefacts were identified at nine sites, five contained the recorded amount, and 3 sites contained less artefacts than recorded. This may be due to erosion and a long drought in the region and the sites being located adjacent to or on trails, resulting in extensive disturbance. Artefact material identified quartz as the most common material type, with sites also containing silcrete and chert. The analysis on the artefact assemblage and locations of artefacts in the scatters identified that the sites had potential be larger and wider spread than previously recorded.

3.3 Local context

Limited archaeological investigations have been conducted within vicinity of the study area. A summary of studies expanded to 45 kilometres of the study area can be found below.

Witter (1982) surveyed the potential developmental impact of a transmission line between Yanco and Darlington Point, including existing impacts to previously recorded sites and a new 10-kilometre deviation. Pedestrian survey took care to cover all exposed soil and all trees within 20 metres of a centre development line. The assessment area is located approximately 13 kilometres south of the study area. Witter made recommendations concerning the re-assessment of existing sites, including:

- Within the study area, gilgai mounds are associated with grey clay soils found in old flood channels and back swamp plains.
- Considerably more research is required to distinguish between naturally and artificially fired clay deposits within the study area as there is a good supply of naturally occurring fired clay present in stumps and termite logs.

- Although research is currently limited, it is possible that mounds identified on natural levees may indicate intensive occupation. These are likely now covered by flood plain sediments.

Additional suggestions following the new survey included:

- Box channel and flood areas present low domestic occupation potential but high potential for “field activities” (Witter 1982, pp. 13).
- The two occupation sites were located within 100 metres of Black box flood channels, indicating the landforms may have been favoured for occupation.
- Aboriginal mounds are likely a rarer form of occupation that only occur in restricted types of landforms. These are likely indications of economic intensification around the end of the Holocene period.

Gollan (1982) undertook a survey between Griffith and Darlington Point in 1982, and area passing within 24 kilometres west of the study area. The works were undertaken for the proposed 132kV Transmission Line. Gollan’s survey identified a number of scarred River Red Gums on the southern bank of the Murrumbidgee River on Tubbo Station, and an artefact scattered on the banks of Mirrool Creek where artefacts were observed within eroded pans disturbed by stock movement.

A stone quarry was also recorded, with stone material extracted for flaking. While the area was heavily disturbed, cores, flakes and hammerstones were identified produced from quartz, quartzite, chert, greenstone and basalt. The site exhibited signs of excavation or quarrying, and Gollan suggested the stone source was pebbles within the pebbly sandstone and conglomerate beds. The area covered 40 by 50 metres and was considerably disturbed by modern quarrying. While the site is described as being located on Whitton Road, which passes the study area, the coordinates indicated within Gollan’s report place the quarry site approximately 20 kilometres north of the study area. Review of the site card (AHIMS 49-2-0010/Griffith Quarry) confirms this, as further investigation was undertaken by NGH Environmental who mapped the site to the west of Irrigation Way 21 kilometres north.

Following identification of artefacts by NPWS officers, Palmer (1984) undertook an archaeological survey for the proposed reservoir within Scenic Hill Reserve, Griffith, approximately 36 kilometres north-west. Artefacts had been identified on a graded track, including a ground edge axe, pecked axe, two cores and a unifacial pebble implement. Palmer also identified a number of additional scattered artefacts. Based upon the low density and scattered nature of the sites, Palmer concluded that the location was infrequently occupied.

Bonhomme (1987) investigated Aboriginal burial sites located within sand dunes on the broad Riverine Plain area overlapping the study area. This report was undertaken for the National Parks and Wildlife Service as a basis for a potential predictive model. The investigation included field survey and a survey of historic, ethnographic, and archaeological evidence, including AHIMS 49-2-0012/Koonadan approximately 8.5 kilometres north-east of the study area. The study found that 29 burials were located on source bordering dunes (a landform present within the study area), grey floodplain clays, and prior stream sediments. Bonhomme concluded that whereas source bordering dunes did not regularly contain large numbers of burials and were not always utilised for burials, prior stream sediments were likely to contain burials, particularly if they are the only sandy landform above the floodplain. AHIMS 49-2-0012/Koonadan is associated with Koonadan Aboriginal Place, which is listed as an Aboriginal Place under the NPW Act and located approximately 7.5 kilometres north-east of the study area. The sand hills are thought to be a large pre-historical burial site containing up to 2,000 graves and the nearby wetlands were traditional hunting and fishing places for the Wiradjuri people (Leeton and District Local Aboriginal Land Council 2011b).

OzArk (2015) prepared an Aboriginal Archaeological Assessment for the proposed Euroley Poultry Production Complex, to the east of Narrandera and located approximately 16 kilometres south of the study area. The site

was topographically flat, with no watercourses except shallow, wide ephemeral streams thought to hold water temporarily following inundation. The site was located a distance of 9 kilometres to the Murrumbidgee River, and disturbed by intensive agricultural use. OzArk developed the following predictive statements:

- Due to the distance from reliable water, the high levels of existing disturbance and the absence of distinctive landform features, few or no sites of Aboriginal heritage are expected to occur.
- It is acknowledged that there may have been prior streams carrying reliable water through the Study Area that are no longer evident on the surface. This would increase the likelihood of sites within 200m of them should they exist.
- Scarred trees are the most common site type, particularly in this environmental context. Many mature trees have been cleared, however there are many remnant within the Project Area. Scarred tree sites are likely to have the following characteristics:
 - Scarred tree sites are just as likely to have associated stone artefacts as not; and
 - Scars are most likely to occur on box trees (for practical or socio-cultural purposes) and Cypress pines (for socio-cultural purposes);
 - Small open camp sites and isolated stone artefact sites may occur anywhere but are most likely to be adjacent to the ephemeral floodways or swamps within the Project Area. However, due to the high level of disturbance across the Study Area water, this site type, if present, has a high likelihood of being disturbed and/or of low integrity;
 - Ground ovens or hearths may occur within the Project Area. If so, they would most likely to be adjacent to the ephemeral floodways or swamps; and
 - Burials are possible but very unlikely within the northern fringes of the Project Area (being where the access track leaves the Sturt Highway) where the landscape is undulating and the soils are sandy (OzArk EHM 2015, pp. 14).

A survey was subsequently conducted, identifying three sites within the project area consisting of two scarred trees and one hearth; EPPC-ST1, EPPC-ST2 and EPPC-H1. AHIMS site numbers were not included, and the sites were not included within the search results undertaken for this assessment. The results were considered to be consistent with the predictive model, as scar trees are relatively frequent within the region. It was also noted that disturbance within the project area could have distorted the archaeological record within the study area, given the intensive agricultural land use and natural flooding/erosion. The following statement was made by the Leeton & District LALC regarding the sites identified and historical Aboriginal occupation/land use:

Although it is impossible to say for sure what type of Scarred tree is on the site it could have been used for shelter, coolamons or could have been for ceremony. A common practice for Wiradjuri people when identifying scarred trees was by painting them to identify their significance and use. Due to the landscape of most of Wiradjuri country most painting/artwork around the country was done on scarred trees. Over the years though due to weather conditions and other significant impacts most of the artwork is no longer visible.

The hearth's significance is because of its location and because of the visible water line which could have been a creek in the area originally which could indicate it was possibly a campsite with traditional hunting and gathering been undertaken in the area (OzArk EHM 2015, pp. 24).

NGH Environmental (2016) prepared an Aboriginal Cultural Heritage Assessment for the Griffith Solar Farm, a site that covered 120 hectares, located approximately 28 kilometres north-west of the study area. The survey was severely impeded by very poor visibility. Recent cropping of the bay had left a mat of cut stubble and visibility of the ground surface as a result was limited. Despite the poor visibility encountered during the

survey, there were 11 artefacts found, recorded as three separate sites; AHIMS 49-2-0150/Griffith Solar Isolated Find 1, AHIMS 49-2-0148/Griffith Solar Isolated Find 2 and AHIMS 49-2-0149/Griffith Solar Artefact Scatter 1 (NGH Environmental 2016, pp. v). The artefacts were later relocated to an area outside the development footprint, with the location recorded as AHIMS 49-2-0156/Griffith Solar Relocated Artefacts. Based on the land use history, it was assessed that there was negligible potential for the presence of intact subsurface deposits. Land use at the Griffith Solar Farm was similar to that within the study area, with previous impacts from irrigation and consistent farming practices (NGH Environmental 2016, pp. 7). NGH Environmental suggested that predictive models for the Griffith area should indicate that sites can occur at least 600 m from water sources and that Aboriginal artefact scatters, or campsites, exist within the broader floodplain environments, despite intensive agricultural practices (NGH Environmental 2016, pp. vi).

NGH Environmental (2019) prepared an Aboriginal Cultural Heritage Assessment for the Yanco Solar Farm project 10 kilometres south-east of the study area. Modelled predictions proposed that stone artefacts would be the most likely indications of Aboriginal occupation. However, only one Aboriginal object was identified within the search area. This led to a re-assessment of historical disturbances as much higher than anticipated. A predicted absence of scarred trees due to a lack of old growth trees was positively confirmed. As a result, the authors proposed that:

- Aboriginal occupation of the area may have focused on larger permanent sources of water and resources, such as the Murrumbidgee River.
- *In situ* artefacts are unlikely due to high levels of agricultural disturbances.

OzArk (2020) prepared an Aboriginal Archaeological Impact Assessment and Historic Heritage Impact Assessment for the Strontian Quarry at Narrandera, located approximately 43 kilometres south-east of the study area. The site has been historically cleared of vegetation and cultivated for irrigated pastures, as well as being used for quarrying. OzArk concluded that while Aboriginal occupation and land use was likely to have occurred, limited environmental resources were available; the site was located 4.5 kilometres from the Murrumbidgee River. Surrounding landforms featured more favourable conditions for occupation, with more elevated areas offering increased vantage points within the landscape. Resources suitable to support a large population of people would have been more readily available closer to permanent water sources, such as along the Murrumbidgee River, that are lacking in the vicinity of the study area (OzArk EHM 2020, pp. 15).

AREA Consultants & Communication (AREA) (2021) were engaged to prepare the Murrumbidgee Land Use Plan (Aboriginal Cultural Heritage Review) at Darlington Point, 25 kilometres west of the study area. The study also included Coleambally and Jerilderie, 46 and 103 kilometres south-west respectively. ARE developed the following predictive statement for the region:

The archaeological context indicates a strong association between evidence of Aboriginal occupation and reliable water sources. More specifically, sites are more likely near the junctions of major waterways with other waterways. There is also an increased likelihood of sites near ephemeral water courses. The main water courses relevant to the study area are the Murrumbidgee River, which is adjacent to the Darlington Point study area, and Billabong and Algodgerie creeks adjacent to the Jerilderie study area.

Previous archaeological studies have identified culturally-modified trees as a very common site type. Stone artefact sites are common in the broader region but are in low numbers nearby to the study area. Burial mounds, hearths and ceremonial sites also appear in the archaeological record of the Murrumbidgee region. (AREA 2021, pp. 16)

The Darlington Point site was located adjacent to the Murrumbidgee River. A number of sites were identified in vicinity of the river, leading AREA to conclude that additional heritage works, likely including survey to produce site-specific recommendations would be required prior to work in these areas. The Coleambally site was distant from any water courses, with the area relying on irrigation and disturbed. Accordingly, it was assessed to hold low archaeological potential with the caveat that any remnant mature vegetation be

inspected prior to clearance, due to the presence of modified trees in vicinity of the study area. The Jerildie site was situated between Algudgerie Creek and Billabong Creek. The site was assessed to hold areas of moderate and high potential near Billabong Creek, where modified trees were identified and relatively undisturbed areas were located. The same requirement for inspection of mature trees was made.

3.3.1 Identified Aboriginal archaeological sites

An extensive search of the AHIMS database was conducted on 19 May 2025 (Client service ID: 1005678). The search identified 97 Aboriginal archaeological sites and one Aboriginal Place within a 16-kilometre search area, centred on the study area (Table 1). None of these registered sites are located within the study area (Figure 7). The mapping coordinates recorded for these sites were checked for consistency with their descriptions and location on maps from Aboriginal heritage reports where available. These descriptions and maps were relied upon where notable discrepancies occurred.

It should be noted that the AHIMS database reflects Aboriginal sites that have been officially recorded and included on the list. Large areas of NSW have not been subject to systematic, archaeological survey; hence AHIMS listings may reflect previous survey patterns and should not be considered a complete list of Aboriginal sites within a given area. Some recorded sites consist of more than one element, for example artefacts and a modified tree, however for the purposes of this breakdown and the predictive modelling, all individual site types will be studied and compared. This explains why there are 108 results presented here, compared to the 97 sites identified in AHIMS.

Table 1 AHIMS sites within the 16 kilometre search radius centred on the study area

Site type	Occurrences	Frequency (%)
Modified Tree (Carved or Scarred)	70	64.81
Artefact	25	23.15
Hearth	4	3.70
PAD	3	2.78
Earth Mound	2	1.85
Burial	2	1.85
Aboriginal Ceremony and Dreaming	1	0.93
Shell	1	0.93
Grand Total	108	100

A simple analysis of the Aboriginal cultural heritage sites registered within a 16 kilometre search radius centred of the study area indicates that the dominant site type is modified trees, representing approximately 64.81% (n=70), followed by artefacts at 23.15% (n=25). Hearths, and PADs represent approximately 4% (n=4) and 3% (n=3) respectively, with earth mounds and burials approximately 2% (n=2) and Aboriginal ceremony and dreaming sites and shells approximately 1% (n=1).

The low-density distribution of sites within the 16-kilometre search radius of the study area is likely due to low numbers of cultural heritage assessments conducted in the area. This may be due to its colonial history dominated by agriculture and pastoralism.

There are six registered sites within 10 kilometres of the study area and none are within 8 kilometres of the study area. These sites include:

- AHIMS 49-2-0012/Koonadan
- AHIMS 49-2-0296/Tuckerbil ST01
- AHIMS 49-2-0297/Tuckerbil Swamp Scarred Tree
- AHIMS 49-5-0099/Amesbury Common/Leeton
- AHIMS 49-5-0101/Amesbury common 2
- AHIMS 49-5-0097 Amesbury Common

Koonadan Aboriginal Place

Koonadan Aboriginal Place is located approximately 7.5 kilometres north-east of the study area. The site is a burial site and traditional/contemporary hunting and food gathering area associated with ceremonial grounds. Pre-contact, the Koonadan and Tuckerbil Swamp area were used for hunting and fishing. The area is linked to ceremonial and corroboree sites. After a corroboree, Wiradjuri people would go to Koonadan and surrounds to gather food. However, ceremonial grounds have been erased by modern land use. Koonadan is an ancestral Wiradjuri burial ground. In the early 1980s, Aboriginal skeletal remains were found in the sand dune at Koonadan, later reburied by the local Aboriginal community. Shortly afterwards sand mining recommenced on the site which was only halted after extensive protest from the local Aboriginal community. Stone tools and “ovens” have also been identified (State Heritage Inventory & Heritage NSW 2015).

3.3.2 Predictive statements

A series of predictive statements have been formulated to broadly predict the type and character of Aboriginal cultural heritage sites likely to exist throughout the study area and where they are more likely to be located.

These statements are based on:

- Local and regional site distribution in relation to landform features identified within the study area.
- Consideration of site type, raw material types and site densities likely to be present within the study area.
- Findings of the ethnohistorical research on the potential for material traces to present within the study area.
- Potential Aboriginal use of natural resources present or once present within the study area.
- Consideration of the temporal and spatial relationships of sites within the study area and surrounding region.

Based on this information, a series of predictive statements has been developed, indicating the site types most likely to be encountered during the survey and subsequent sub-surface investigations across the present study area (Table 2). The definition of each site type is described firstly, followed by the predicted likelihood of this site type occurring within the study area.

Table 2 Aboriginal site prediction statements

Site type	Site description	Potential
PADs	Potential sub surface deposits of cultural material.	Moderate: PADs have been previously recorded in the region across a wide range of landforms. PADs are likely to be present within areas adjacent to water courses or on high points in undisturbed landforms. The study area is highly disturbed but may have been adjacent to a naturally occurring water source prior to landform and hydrological modification.
Flaked stone artefact scatters and isolated artefacts	Artefact scatter sites can range from high-density concentrations of flaked stone and ground stone artefacts to sparse, low-density 'background' scatters and isolated finds.	Moderate: Stone artefact sites have been previously recorded in the region on level, well-drained topographies in close proximity to reliable sources of fresh water. Due to the distance from permanent freshwater resources and the high degree of pastoral disturbance, the potential for artefacts to be present within the study area is assessed as low.
Shell middens	Deposits of shells accumulated over either singular large resource gathering events or over longer periods of time.	Low: Shell midden sites have not been recorded within the vicinity of the study area. There is a potential for shell middens to be located in the study area as the types of naturally occurring water sources is unknown. However, the site is highly disturbed. One shell site was included within the AHIMS search; AHIMS 49-5-0224/Cudgel

Site type	Site description	Potential
		Sandhills Channel Site 1 located over 20 kilometres from the study area and located on the bank of Cudgel Creek.
Quarries	Raw stone material procurement sites.	Low: While one quarry site has been recorded 21 kilometres north of the study area (AHIMS 49-2-0010/Griffith Quarry, outside the search radius), the geological landform underlying the study area is not favourable for the extraction of suitable raw materials, decreasing the likelihood of quarry sites.
Modified trees	Trees with cultural modifications	Low: Scarred trees are the most common site type within the vicinity of the study area. Due to extensive vegetation clearance evident in historical aerial photographs, no mature native trees have survived within easternmost part of the study area.
Burials	Aboriginal burial sites.	Low: Aboriginal burial sites are generally situated within deep, soft sediments, caves or hollow trees. Areas of deep sandy deposits, such as the Murrumbidgee Source-bordering Dunes, will have the potential for Aboriginal burials. However, due to extensive disturbances within the study area it is unlikely that burial sites are located within the study area. Furthermore, only two burial sites have been recorded within vicinity of the study area; AHIMS 49-5-0025/Tom Bullen Swamp, 18 kilometres south, and AHIMS 49-2-0012/Koonadan (see Section 3.3.1).
Aboriginal Ceremony and Dreaming sites	Such sites are often intangible places and features and are identified through oral histories, ethnohistoric data, or Aboriginal informants.	Low: There are currently no recorded mythological stories for the study area. AHIMS 49-2-0012/Koonadan is a recorded Aboriginal Ceremony and Dreaming site, approximately 8.5 kilometres north-east of the study area and associated with the Koonadan Aboriginal Place.
Post-contact sites	These are sites relating to the shared history of Aboriginal and non-Aboriginal people of an area and may include places such as missions, massacre sites, post-contact camp sites and buildings associated with post-contact Aboriginal use.	Low: There are no post-contact sites previously recorded in the study area and historical sources do not identify one. Aboriginal community members occupying the area were forcibly displaced to missions including the Warangesda Aboriginal Mission at Darlington Point (25 kilometres west).
Aboriginal Places	Aboriginal Places may not contain any 'archaeological' indicators of a site, but are nonetheless important to Aboriginal people. They may be places of cultural, spiritual or historic significance. Often they are places tied to community history and may include natural features (such as swimming and fishing holes), places where Aboriginal	Low: There are currently no recorded Aboriginal historical associations for the study area. The closest recorded Aboriginal Place is Koonadan, located approximately 7.5 kilometres north-east of the study area.

Site type	Site description	Potential
	political events commenced or particular buildings.	
Grinding grooves	Grooves created in stone platforms through ground stone tool manufacture.	Nil: Underlying geology is alluvial floodplains which is not suitable for this site type.
Rock shelters with art and / or deposit	Rock shelter sites include rock overhangs, shelters or caves, and generally occur on, or next to, moderate to steeply sloping ground characterised by cliff lines and escarpments. These naturally formed features may contain rock art, stone artefacts or midden deposits and may also be associated with grinding grooves.	Nil: The sites will only occur where suitable sandstone exposures or overhangs possessing sufficient sheltered space exist, which are present only at one small part in the east of the study area, within Hawkesbury Sandstone Soil Landscape.

4 Archaeological investigation

An archaeological investigation of the study area was undertaken on 19 June 2025 by Madeleine Lucas (Heritage Consultant, Biosis). The survey sampling strategy, methodology and a discussion of results are provided below.

4.1 Archaeological survey aims

The principle aims of the survey were to:

- Undertake a systematic survey of the study area targeting areas with the potential for Aboriginal heritage.
- Identify and record Aboriginal archaeological sites visible on the ground surface.
- Identify and record areas of Aboriginal archaeological and cultural sensitivity.

4.2 Survey methods

The survey was conducted on foot. Recording during the survey followed the archaeological survey requirements of the Code and industry best practice methodology. Information that recorded during the survey included:

- Aboriginal objects or sites present in the study area during the survey.
- Survey coverage.
- Any resources that may have potentially been exploited by Aboriginal people.
- Landform elements, distinguishable areas of land approximately 40 metre across or with a 20 metre radius (CSIRO 2009).
- Photographs of the site indicating landform.
- Ground surface visibility (GSV) and areas of exposure.
- Observable past or present disturbances to the landscape from human or animal activities.
- Aboriginal artefacts, culturally modified trees or any other Aboriginal sites.

Where possible, the identification of natural soil deposits within the study area was undertaken. Photographs and recording techniques were incorporated into the survey including representative photographs of survey units, landform, vegetation coverage, GSV and the recording of soil information for each survey unit were possible. Any potential Aboriginal objects observed during the survey were documented and photographed. The location of Aboriginal cultural heritage and points marking the boundary of the landform elements were recorded using a hand-held Global Positioning System and the Map Grid of Australia (2020) coordinate system.

4.3 Constraints to the survey

With any archaeological survey there are several factors that influence the effectiveness (the likelihood of finding sites) of the survey. The factors that contributed most to the effectiveness of the survey within the study area were the high degree of disturbance from extensive agricultural use and the MIA.

4.4 Visibility

In most archaeological reports and guidelines visibility refers to GSV and is usually a percentage estimate of the ground surface that is visible and allowing for the detection of (usually stone) artefacts that may be present on the ground surface (DECCW 2010b).

GSV was generally moderate (15-20%) across the study area as a whole. The main detractor to GSV was extensive vegetation cover, including both short and long grasses (Photo 7 and Photo 8). Areas of increased GSV occurred along livestock tracks (Photo 9), in areas of poor vegetation growth (Photo 7), around drainage infrastructure (Photo 10), levee walls (Photo 11), and gates (Photo 12).



Photo 7 Area of visibility (15%) within the centre of the study area, photo facing south-west showing agricultural field



Photo 8 Area of no visibility (0%) within the south-west of the study area, photo facing west showing long grass



Photo 9 Area of visibility (15%) within the centre of the study area, photo facing north-east showing animal track



Photo 10 Area of higher visibility (20%) within the east of the study area, photo facing south showing drainage infrastructure



Photo 11 Area of higher visibility (20%) within the north-east of the study area, photo facing south-west showing a slightly elevated track extending into a paddock



Photo 12 Area of visibility (15%) within the north of the study area, photo facing north showing entrance gate and disturbance

4.5 Exposure

Exposure differs from visibility in that it is a percentage estimate of the amount of ground surface in which buried artefacts or deposits may be identified rather than a simple observation of the amount of ground surface that is visible (Burke & Smith 2004, DECCW 2010b). Overall, the study area displayed limited exposure averaging between 0-5%. Exposure of natural stratigraphy was noted along canal (Photo 13) and levee walls (Photo 14), though this was noted to be from disturbance rather than natural processes. Some exposure was noted along the top of levees and mounds across the study area (Photo 11); however, these areas likely show disturbed redeposited local soils rather than natural stratigraphy.



Photo 13 Area of exposure (5%) within the north-west of the study area, photo facing south-west showing a dry canal wall



Photo 14 Area of exposure (5%) within the north-east of the study area, photo facing south-west showing a levee wall

4.6 Disturbances

Disturbance in the study area was primarily due to its extensive use for agriculture. This included levelling and ploughing of paddocks (Photo 7), drainage infrastructure (Photo 10), levees (Photo 11) and canals (Photo 13), and gates (Photo 12) and fences (Photo 15). Natural disturbances were also noted, including water erosion and weathering (Photo 16), and insect and burrowing animal bioturbation (Photo 17).



Photo 15 Disturbance associated with a dry canal bank within the north-west of the study area, photo facing north-east



Photo 16 Disturbance associated with water erosion and weathering in the south of the study area, photo facing north



Photo 17 Disturbance associated with burrowing animal bioturbation in the north-east of the study area, photo facing north-east

4.7 Investigation results and discussion

The archaeological investigation consisted of a total of one meandering transect walked across the entire study area. The results of the field investigation have been summarised below and transect locations are provided in Figure 8. No artefacts or other archaeological objects were detected during the physical inspection.

The archaeological survey consisted of a single meandering transect throughout the extent of the study area, located within a flat landform that has been subject to extensive agricultural disturbance (Photo 18, Photo 19). The use of the study area for agriculture will have likely disturbed any Aboriginal archaeology present in the natural topsoils. The soils throughout the study area have undergone mass earth movements to construct canals and levees to manage and retain water under schemes such as the MIA. Works in vicinity of the study area commenced for canals west of Narrandera as early as 1903, and the associated infrastructure now comprises over 1700 kilometres of supply channels and over 1500 kilometres of drainage channels (Murray Darling Basin Authority, Australian Government 2025, Murrumbidgee Irrigation 2024, pp. 1). These works significantly impacted landforms, hydrological systems and resulted in extensive disturbances throughout the water catchment area, with artificially created waterways visible in hydrological mapping (Figure 5). Agricultural land use has also resulted in impacts to Aboriginal sites or objects that may have been present within the study area. The paddocks within the study area would have been routinely flooded to hold water

for particular crops. While the construction of MIA infrastructure would have caused significant disturbance, the continued movement of water would also cause disturbance through water erosion, which is evident within several locations of the study area. Cultivation and cropping of the paddock would also add to this disturbance. It is unlikely that natural stratigraphy remains in topsoils within the study area, resulting in little chance of surviving in situ archaeological deposits.



Photo 18 Overview of study area showing agricultural land use and soil disturbances from centre, photo facing north



Photo 19 Overview of study area showing agricultural land use from north, photo facing south

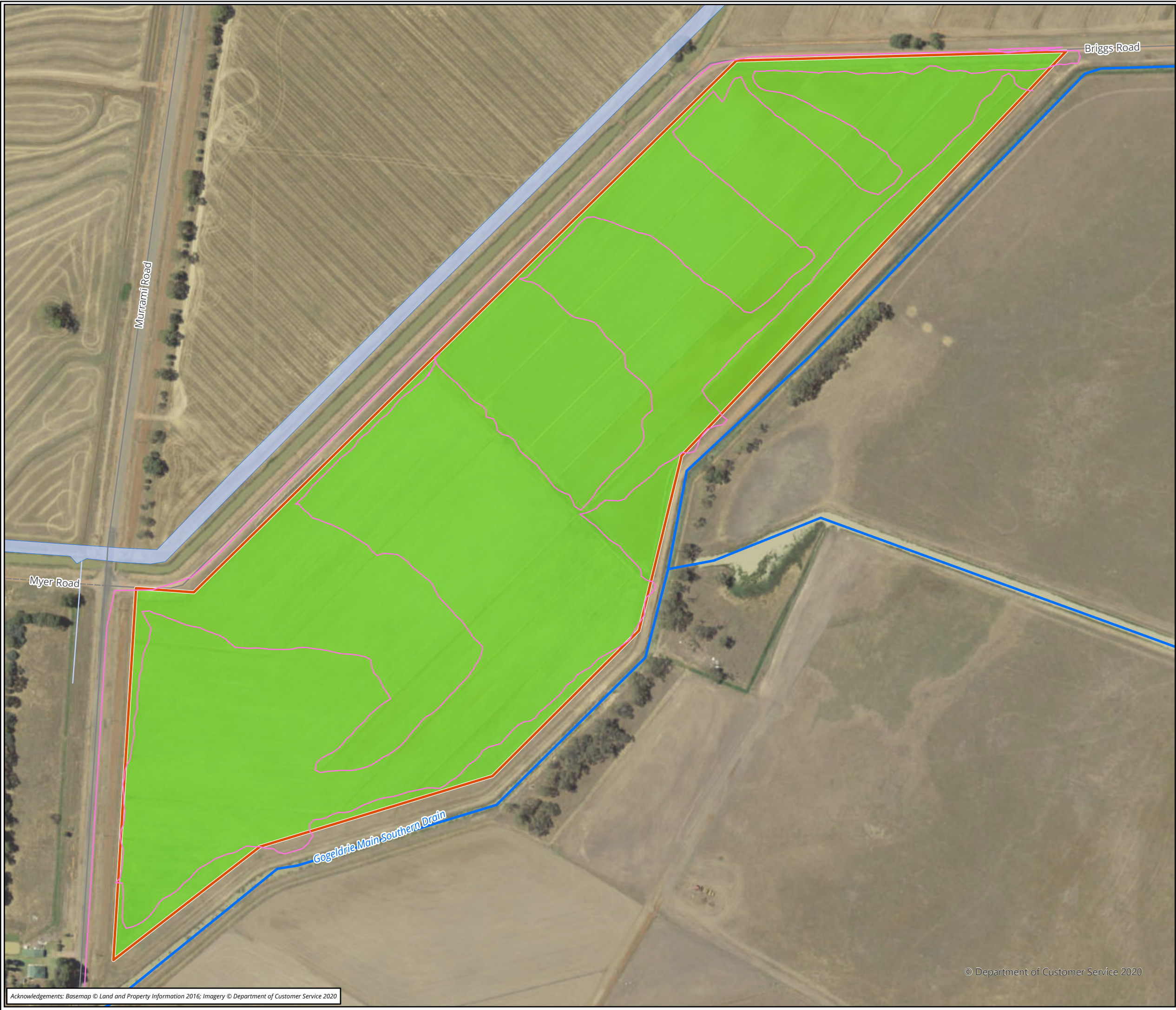
In addition to previous disturbances, the study area is located approximately 8 kilometres from the Murrumbidgee River (the nearest significant, perennial waterway). While waterways that may have previously been present within the study area or surrounding areas are no longer present due to MIA landscape modification, permanent waterways offer more reliable resources and were favoured for occupation, further decreasing the likelihood that the study area was subject to long term or repeated occupation. This is consistent with predictive models generated for the region, particularly the statements below prepared by OzArk:

- *Due to the distance from reliable water, the high levels of existing disturbance and the absence of distinctive landform features, few or no sites of Aboriginal heritage are expected to occur.*
- *It is acknowledged that there may have been prior streams carrying reliable water through the Study Area that are no longer evident on the surface. This would increase the likelihood of sites within 200m of them should they exist.*

- *Small open camp sites and isolated stone artefact sites may occur anywhere but are most likely to be adjacent to the ephemeral floodways or swamps within the Project Area. However, due to the high level of disturbance across the Project Area water, this site type, if present, has a high likelihood of being disturbed and/or of low integrity;*(OzArk EHM 2015, pp. 14)

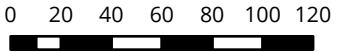
Some models also favour modified trees as a likely site type to occur, though no potential remains within the study area due to extensive vegetation clearance (OzArk EHM 2015, AREA Environmental Consultants & Communication 2021).

The archaeological survey of the study area confirmed the extensive disturbance throughout the study area previously reported and no Aboriginal sites were identified. Due to the likelihood that limited to no intact soil deposits remain, and no sites or areas of archaeological potential have been identified, the study area has been determined to contain low archaeological potential. This assessment considers the distance from the study area to reliable water sources, the results of the field investigation, investigations undertaken in the region, and the unfavourable underlying geology. Lands to the south of the study area in proximity to the Murrumbidgee River were likely more highly favoured for occupation.



- Legend**
- Study area
 - Survey track
 - Archaeological potential**
 - Low

Figure 8 Survey effort and results



Metres
Scale: 1:3,000@ A3
Coordinate System:
GDA2020 MGA Zone 55



5 Conclusions and recommendations

5.1 Conclusions

Desktop predictions assessed that the study area held moderate likelihood for PADs and stone artefact sites, and low to nil potential for all other site types. This was due to the prevalence of PAD sites registered on AHIMS in the surrounding 16-kilometre search radius centred on the study area, as well as its proximity to the Murrumbidgee River. The high degree of historical disturbance from the extensive agricultural use of the Murrumbidgee area was noted early in desktop research as a detractor for the likelihood of undisturbed archaeology existing within the study area.

The physical inspection confirmed that this historical disturbance within the study area has greatly affected the natural landforms, drainage systems, and topsoil integrity. This disturbance has resulted in there being low potential for archaeology in the study area. The Due Diligence Flow Chart (Figure 9) outlines future steps, and recommendations are detailed below.

5.2 Recommendations

The following management recommendations have been developed relevant to the study area and influenced by:

- Predicted impacts to Aboriginal cultural heritage.
- The planning approvals framework.
- Current best conservation practise, widely considered to include:
 - Ethos of The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance (Australia ICOMOS 2013).
 - The Code.

Prior to any impacts occurring within the study area, the following is recommended:

Recommendation 1: No further archaeological assessment is required

No further archaeological work is required in the study area due to the entire study area assessed as having low archaeological potential.

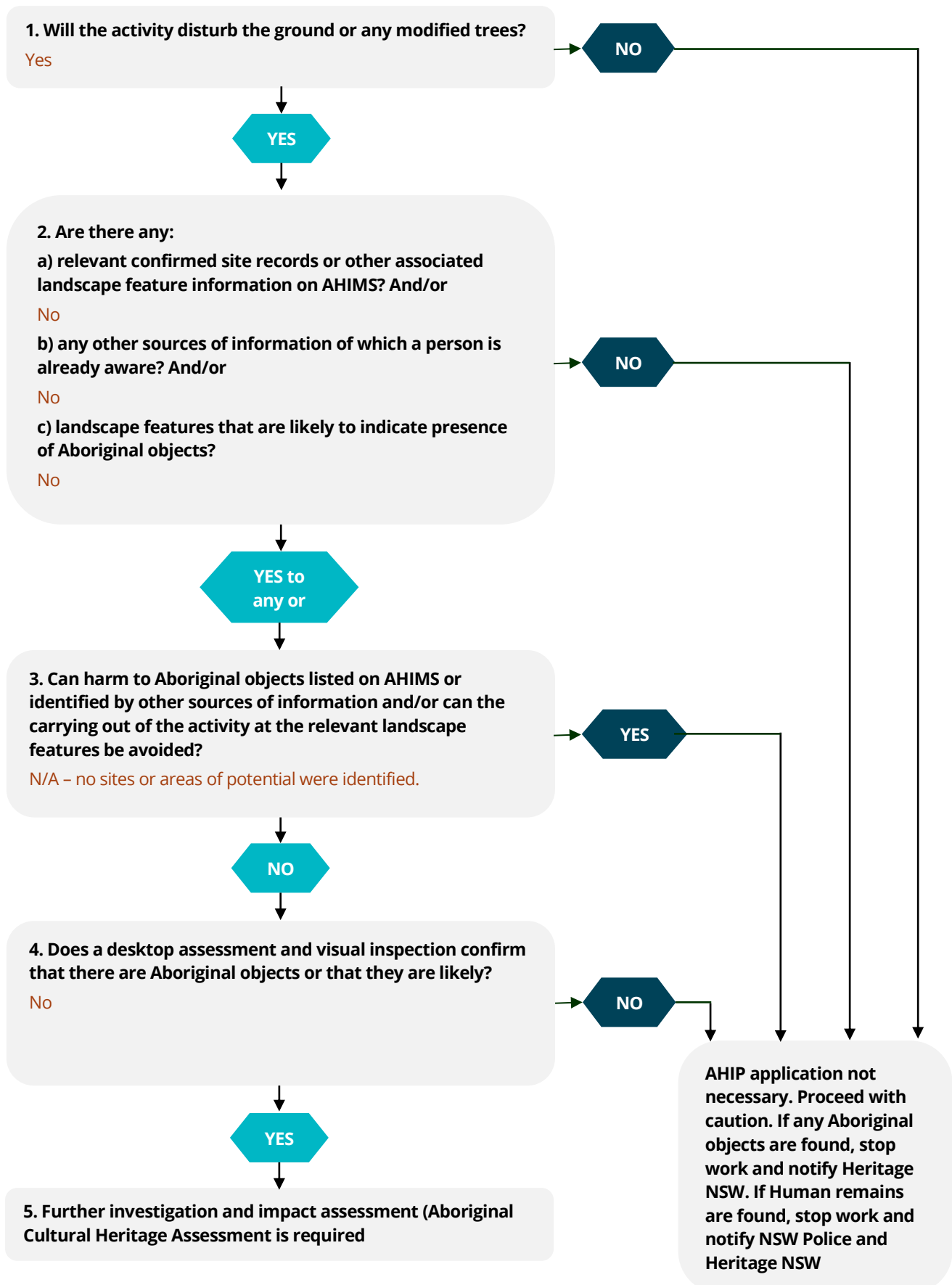
Recommendation 2: Discovery of Unanticipated Aboriginal Objects

All Aboriginal objects and Places are protected under the NPW Act. It is an offence to knowingly disturb an Aboriginal site without a consent permit issued by Heritage NSW. Should any Aboriginal objects be encountered during works associated with this proposal, works must cease in the vicinity and the find should not be moved until assessed by a qualified archaeologist. If the find is determined to be an Aboriginal object, the archaeologist will provide further recommendations. These may include notifying Heritage NSW and Aboriginal stakeholders.

Recommendation 3: Discovery of Aboriginal Ancestral Remains

Aboriginal ancestral remains may be found in a variety of landscapes in NSW, including middens and sandy or soft sedimentary soils. If any suspected human remains are discovered during any activity, you must:

1. Immediately cease all work at that location and not further move or disturb the remains.
2. Notify the NSW Police and Heritage NSW Environmental Line on 131 555 as soon as practicable and provide details of the remains and their location.
3. Not recommence work at that location unless authorised in writing by Heritage NSW.

Figure 9 Due diligence flow chart

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Appendix 1 AHIMS results

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : 42451 - MP

Client Service ID : 1005678

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
49-5-0105	Cuba Sandhills 1	GDA	55	418020	6168739	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Griffith Local Aboriginal Land Council					<u>Permits</u>		
49-5-0018	Tom Bullen swamp 17;	AGD	55	422169	6164663	Open site	Valid	Artefact : -	Open Camp Site	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0026	Tubbo 1-4;	AGD	55	421592	6167583	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	336,1216
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0047	Yanco;	AGD	55	435410	6165983	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0100	Tubbo Gravel Pit 9	AGD	55	418430	6165120	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0101	Amesbury common 2	AGD	55	443780	6175350	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Michelle Cooper					<u>Permits</u>		
49-5-0142	The Homestead 3	GDA	55	419677	6179293	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Peter Ingram					<u>Permits</u>		
49-5-0221	MIA 3 modified tree a	GDA	55	425451	6170013	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Angela Lewis (nee Seymour),National Parks and Wildlife Service - Blackheath					<u>Permits</u>		
49-5-0245	Whitton TSR Scarred Tree 8	GDA	55	424335	6170246	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		
49-5-0246	Whitton TSR Scarred Tree 9	GDA	55	424224	6170357	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		
49-5-0096	TIBBO GRAVEL PIT 8	AGD	55	418440	6165120	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		

Report generated by AHIMS Web Service on 19/05/2025 for Samantha Keats for the following area at Datum :GDA, Zone : 55, Eastings : 417943.0 - 450801.0, Northings : 6161633.0 - 6194457.0
with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 97

This information is not guaranteed to be free from error omission. Heritage NSW and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omission.

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
49-5-0230	ST1 Mod Tree	GDA	55	448440	6166479	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu Permits							
49-5-0229	Tubbo Station OS-1	GDA	55	418167	6163230	Open site	Valid	Artefact : -		104352
	Contact	Recorders	OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher Permits							
49-5-0003	Tom Bullen Swamp 15;	AGD	55	421249	6165294	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	Contact	Recorders	ASRSYS Permits							
49-5-0015	Tom Bullen Swamp 2;	AGD	55	420630	6165170	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	Contact	Recorders	ASRSYS Permits							
49-5-0017	Tom Bullen Swamp 3;	AGD	55	420883	6165291	Open site	Valid	Artefact : -	Open Camp Site	577
	Contact	Recorders	ASRSYS Permits							
49-5-0036	Tubbo;	AGD	55	417990	6162062	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	711
	Contact	Recorders	ASRSYS Permits							
49-5-0040	Tubbo (Ab15)	GDA	55	428181	6164200	Open site	Valid	Artefact : -, Hearth : -	Open Camp Site	711
	Contact	Recorders	ASRSYS,OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher Permits							
49-5-0044	Yanco;	AGD	55	432495	6165040	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	Contact	Recorders	ASRSYS Permits							
49-5-0050	Eurolly;	AGD	55	436414	6166176	Open site	Valid	Earth Mound : -, Hearth : -	Mound (Oven)	711
	Contact	Recorders	ASRSYS Permits							
49-5-0058	Tombullen Swamp No.D-Y2;Tubbo;	AGD	55	418320	6163350	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711,739
	Contact	Recorders	Dan Witter Permits							
49-5-0060	Euwarderry Lagoon;Whitton;	AGD	55	424309	6170078	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	Contact	Recorders	M Fernado Permits							
49-5-0102	MIA 3	AGD	55	424347	6169907	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	Contact	Recorders	Mr.Dean Freeman Permits							

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
49-5-0008	Tom Bullen Swamp 10;	AGD	55	421249	6165294	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0218	Scar tree c	GDA	55	425337	6169951	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Angela Lewis (nee Seymour),National Parks and Wildlife Service - Blackheath					<u>Permits</u>		
49-5-0251	Whitton TSR Scarred Tree 14	GDA	55	424270	6170384	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0232	RR5	GDA	55	449555	6167110	Open site	Destroyed	Artefact : -		104431
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0092	Tubbo Gravel Pitt 5	AGD	55	418990	6164800	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0038	Tubbo;	AGD	55	419181	6161800	Open site	Valid	Artefact : -	Open Camp Site	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0041	Tubbo;	AGD	55	427568	6164077	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0042	Tubbo (Ab17)	GDA	55	428773	6164360	Open site	Valid	Artefact : -, Hearth : -	Open Camp Site	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS,OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churcher					<u>Permits</u>		
49-5-0048	Eurolly;	AGD	55	435777	6165896	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0098	EUROLY BRIDGE	AGD	55	442450	6166530	Open site	Valid	Artefact : -		98067
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0099	Amesbury Common/Leeton	AGD	55	443700	6175410	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Michelle Cooper					<u>Permits</u>		
49-5-0219	Scar tree b	GDA	55	425368	6169958	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Angela Lewis (nee Seymour),National Parks and Wildlife Service - Blackheath					<u>Permits</u>		

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
49-5-0238	Whitton TSR Scarred Tree 1	GDA	55	424611	6169963	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		
49-5-0243	Whitton TSR Scarred Tree 6	GDA	55	424525	6170058	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		
49-5-0250	Whitton TSR Scarred Tree 13	GDA	55	424254	6170395	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0237	RR2 and PAD	GDA	55	448940	6166653	Open site	Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0224	Cudgel Sandhills Channel Site 1	GDA	55	447996	6161963	Open site	Valid	Artefact : 3, Shell : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.Allan Lance					<u>Permits</u>		
49-5-0225	Coononcoabil Lagoon Site 1	GDA	55	436849	6169456	Open site	Valid	Artefact : 18, Hearth : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.Allan Lance					<u>Permits</u>		
49-2-0296	Tuckerbil ST01	GDA	55	439871	6183223	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Crown Lands - Wagga, Miss.Layne Holloway					<u>Permits</u>		
49-5-0088	Tobbo Gravel Pitt 2	AGD	55	418956	6164990	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0147	Warby Sandhills	GDA	55	438307	6166274	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Peter Ingram					<u>Permits</u>		
49-5-0005	Tom Bullen Swamp 13;	AGD	55	421249	6165294	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0007	Tom Bullen Swamp 11;	AGD	55	421249	6165294	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0039	Tubbo;	AGD	55	427126	6162519	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711

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Extensive search - Site list report

Your Ref/PO Number : 42451 - MP

Client Service ID : 1005678

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0049	Yanco;	AGD	55	435774	6166170	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0063	Euwarderry Lagoon;TS&CR No:42897;	AGD	55	424310	6169987	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Peter Higgins					<u>Permits</u>		
49-5-0240	Whitton TSR Scarred Tree 3	GDA	55	424566	6169901	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0242	Whitton TSR Scarred Tree 5	GDA	55	424525	6170056	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0247	Whitton TSR Scarred Tree 10	GDA	55	424185	6170346	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		
49-5-0231	RR1 ART	GDA	55	448588	6166525	Open site	Destroyed	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0234	RR3 and PAD	GDA	55	449624	6166877	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0236	RR7	GDA	55	449910	6167877	Open site	Destroyed	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0090	Tubbo Gravel Pitt 3	AGD	55	419020	6165020	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0093	Tubbo Gravel Pitt 6	AGD	55	418920	6164900	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0013	Tom Bullen Swamp 5;	AGD	55	420967	6166023	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		

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with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 97

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Extensive search - Site list report

Your Ref/PO Number : 42451 - MP

Client Service ID : 1005678

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
49-5-0001	Tom Bullen Swamp 16;	AGD	55	423255	6165771	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0011	Tom Bullen Swamp 1;	AGD	55	420967	6166023	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577,105452
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0012	Tom Bullen Swamp 4;	AGD	55	420967	6166023	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0052	Euroolly;	AGD	55	436507	6165994	Open site	Valid	Artefact : -	Open Camp Site	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0056	Coleambally Canal No. O-Y3;Tubbo;	AGD	55	422590	6163280	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711,739
	<u>Contact</u>	<u>Recorders</u>	Dan Witter					<u>Permits</u>		
49-5-0248	Whitton TSR Scarred Tree 11	GDA	55	424173	6170327	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		
49-2-0297	Tuckerbil Swamp Scarred Tree	GDA	55	441117	6182797	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.Gary Currey					<u>Permits</u>		
49-5-0313	Fivebough 1	GDA	55	446564	6179231	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Moon,Heritage and Spatial Pty Ltd					<u>Permits</u>		
49-5-0091	Tubbo Gravel Pitt 4	AGD	55	418970	6164860	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0211	YSF_IF_001	GDA	55	444530	6171053	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Mr.Matthew Barber,NGH Heritage - Fyshwick					<u>Permits</u>		
49-5-0006	Tom Bullen Swamp 12;	AGD	55	421249	6165294	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0009	Tom Bullen Swamp 8;	AGD	55	421791	6165940	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577

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with a Buffer of 0 meters.. Number of Aboriginal sites and Aboriginal objects found is 97

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Extensive search - Site list report

Your Ref/PO Number : 42451 - MP

Client Service ID : 1005678

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0043	Yanco;	AGD	55	431125	6164844	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0059	Tubbo;Bareena Creek No. O-Y4;	GDA	55	426385	6163697	Open site	Valid	Artefact : -, Modified Tree (Carved or Scarred) : -	Open Camp Site,Scarred Tree	711,739
	<u>Contact</u>	<u>Recorders</u>	Dan Witter,OzArk Environmental and Heritage Management - Dubbo,Mr.Ben Churc					<u>Permits</u>		
49-5-0239	Whitton TSR Scarred Tree 2	GDA	55	424522	6169930	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0270	Gogeldrie Weir OCS	GDA	55	432139	6169195	Open site	Valid	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Ms.Rebecca Chalker					<u>Permits</u>		
49-5-0273	Whitton Oven	GDA	55	423000	6170690	Open site	Valid	Earth Mound : -		
	<u>Contact</u>	<u>Recorders</u>	R Reid					<u>Permits</u>		
49-5-0255	Yanco scar tree	GDA	55	447596	6163901	Closed site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	EPA,Mr.Simon Taylor					<u>Permits</u>		
49-5-0233	RR4 ART	GDA	55	449707	6167058	Open site	Destroyed	Artefact : -		
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0045	Yanco;	AGD	55	433952	6165603	Open site	Valid	Artefact : -	Open Camp Site	711
	<u>Contact</u>	<u>Recorders</u>	Mr.Peter Thompson					<u>Permits</u>		
49-5-0051	Yanco;	AGD	55	436233	6165991	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0053	Yanco;	AGD	55	440251	6166397	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0097	Amesbury common	AGD	55	443809	6175383	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	NPWS - Blackheath Office					<u>Permits</u>		
49-5-0220	Scar tree a	GDA	55	425355	6169883	Open site	Valid	Modified Tree (Carved or Scarred) : -		
	<u>Contact</u>	<u>Recorders</u>	Miss.Angela Lewis (nee Seymour),National Parks and Wildlife Service - Blackheath					<u>Permits</u>		

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<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
49-5-0241	Whitton TSR Scarred Tree 4	GDA	55	424623	6170027	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0235	RR6 and PAD	GDA	55	449251	6166996	Open site	Partially Destroyed	Artefact : -, Potential Archaeological Deposit (PAD) : -		104431
	<u>Contact</u>	<u>Recorders</u>	Cultural Heritage Management Australia - (Australian Archaeological Survey Consu					<u>Permits</u>	4862	
49-5-0094	Tubbo Gravel Pitt 7	AGD	55	419050	6165160	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0103	Euroley Bridge 1	AGD	55	442450	6166530	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u> T Russell	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0089	Tubbo Gravel Pitt 1	AGD	55	418990	6165200	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	
	<u>Contact</u>	<u>Recorders</u>	Ms.Vanessa Edmonds					<u>Permits</u>		
49-5-0002	Tom Bullen Swamp 9;	AGD	55	421764	6168682	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577,1216
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0004	Tom Bullen Swamp 14;	AGD	55	421249	6165294	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-2-0012	Koonadan	AGD	55	441084	6183774	Open site	Valid	Aboriginal Ceremony and Dreaming : -, Burial : -	Aboriginal Place,Burial/s	1216
	<u>Contact</u>	<u>Recorders</u>	Harry Creamer					<u>Permits</u>		
49-5-0010	Tom Bullen Swamp 7;	AGD	55	421791	6165940	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0014	Tom Bullen Swamp 6;	AGD	55	420967	6166023	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0016	MTom Bullen Swamp 18;	AGD	55	421876	6166580	Open site	Valid	Artefact : -	Open Camp Site	577
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		

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Extensive search - Site list report

Your Ref/PO Number : 42451 - MP

Client Service ID : 1005678

<u>SiteID</u>	<u>SiteName</u>	<u>Datum</u>	<u>Zone</u>	<u>Easting</u>	<u>Northing</u>	<u>Context</u>	<u>Site Status **</u>	<u>SiteFeatures</u>	<u>SiteTypes</u>	<u>Reports</u>
49-5-0025	Tom Bullen Swamp;	AGD	55	421068	6165110	Open site	Valid	Burial : -	Burial/s	1216
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0046	Yanco;	AGD	55	435319	6165982	Open site	Valid	Modified Tree (Carved or Scarred) : -	Scarred Tree	711,1460
	<u>Contact</u>	<u>Recorders</u>	ASRSYS					<u>Permits</u>		
49-5-0244	Whitton TSR Scarred Tree	GDA	55	424465	6170202	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr.William Ingram					<u>Permits</u>		
49-5-0249	Whitton TSR Scarred Tree 12	GDA	55	424173	6170327	Open site	Valid	Modified Tree (Carved or Scarred) : 1		
	<u>Contact</u>	<u>Recorders</u>	Miss.Courtney Davy					<u>Permits</u>		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

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5MW Solar Energy Facility and Associated
Infrastructure

125 Briggs Road, Stanbridge

APRIL 2026

Submitted to Leeton Shire Council
On behalf of Bison Energy

Contact

David Hunter, Director
 Patrice McMullen, Consultant

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DRAFT

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PROJECT NUMBER
 25002

REVISION NO	ISSUE DATE	VERSION STATUS	AUTHOR	APPROVED
1.0	27/03/2026	Draft	PM	

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Introduction

1.1. Background and Purpose

The following Land Use Conflict Risk Assessment (LUCRA) has been prepared by Habitat Planning on behalf of Bison Energy and is submitted to Leeton Shire Council in support of a Development Application (DA) for a 5 MW electricity generating works facility with associated infrastructure, including single-axis tracker solar arrays and a 10 MWh battery energy storage system on Lot 109 DP751703, addressed as 125 Briggs Road, Stanbridge NSW 2705. The objective is to identify, assess and manage risks to neighbouring land uses in accordance with contemporary planning and environmental management practices.

1.2. Scope of Works

This assessment has been undertaken to determine the potential land use conflicts between the electricity generating works facility and existing activities in the locality. Potential sources of conflicts between the development and existing residential and agricultural activities include:

- Air quality due to agricultural and rural industry including odour, pesticides, dust, smoke and particulates.
- Visual impact to sensitive receivers and loss of agricultural views

1.3. Methodology

The methodology used within the assessment is based on the New South Wales (NSW) Government Land Use Conflict Risk Assessment Guide prepared by the Department of Primary Industries (DPI) in 2011. The key steps involve:

1. Information gathering and contextual analysis: Understand the proposed development, site conditions and potential interactions with surrounding land uses.
2. Identification and preliminary risk assessment: Identify potential land use conflict sources and assess their initial risk level based on likelihood and consequence.
3. Risk management and mitigation strategy development: Identify and document practical strategies to reduce risk scores to acceptable levels.
4. Reporting and integration: Document findings and integrate LUCRA into the broader planning and approval process.

2. Site Analysis

2.1. Site Location and Context

The report relates to land located within the township of Stanbridge as detailed in the table below. It is bounded by RU1 Primary Production land mainly used for agricultural activities such as cropping.

Legal Description	Approx. Size
Lot 109 DP751703	21.7Ha



Figure 1 | Aerial imagery of site and surrounds (Nearmaps 2025)

2.2. Proposed Use and Operational Details

The proposed use of the site is for a 5 MW electricity generating works facility with associated infrastructure, including single-axis tracker solar arrays and a 10 MWh battery energy storage system. The purpose of the development is to support the local electricity network by generating renewable energy to supply nearby farms, including their ongoing operations such as irrigation pumps and packing sheds while also contributing to the stability and resilience of the local energy system. Specific operation details are outlined in Section 3 of the Statement of Environmental Effects (SEE).

2.3. Surrounding Development

The subject site is located in a rural agricultural setting within the locality of Stanbridge. The surrounding area is dominated by primary production, with large, irregularly shaped lots used for irrigation cropping and grazing. The landscape is flat and largely cleared with minimal vegetation or built form. To the north, south and east of the site is existing agricultural land utilised for cropping and grazing which is in keeping with the larger locality character. To the west, the site adjoins the intersection of Briggs Road and Murrumbidgee Road.

2.4. Typography, Climate and Natural Features

The subject land at 125 Briggs Road, Stanbridge is generally flat to gently undulating, characteristic of the broader Riverina plain. The site and surrounding properties are highly modified for agricultural purposes, comprising predominantly cleared cropping land with defined paddocks, access tracks and irrigation infrastructure, including farm dams and channels.

The site does not contain significant native vegetation, with land use dominated by broadacre agriculture. Surrounding land uses are consistent, comprising irrigated and dryland cropping with scattered rural infrastructure.

The soils within the locality are associated with the Cenozoic Shepparton Formation, typically consisting of clay, silt, sand and gravel deposits. These soils are common across the Riverina and are suitable for agricultural production.

Climatic conditions for the site are consistent with the wider Leeton region. The region experiences a warm temperate climate, with hot summers regularly exceeding 35°C and cooler winters with minimum temperatures commonly below 10°C.

2.5. Site History

The first available aerial image of the site dates to 1965 and shows extensive clearing of the land into areas of agricultural farming. By 1977, aerial imagery shows continued agricultural use which has remained the primary use of the site.

2.6. Consultation

Consultation was undertaken with the community and relevant government agencies during the exhibition period from 31 January 2026 to 28 February 2026.

3. Land Use Conflict Risk Assessment

3.1. Initial Risk Identification and Ranking

The risk identification process involves the identification of actions which could potentially cause disruption to other people or activities in the area. In applying the DPI guidelines, each potential conflict element with surrounding agricultural uses is ranked and assessed utilising the tables as follows.

Table 1 | Risk Ranking Matrix (R)

Probability	A	B	C	D	E
Consequence					
1	25	24	22	19	15
2	23	21	18	14	10
3	20	17	13	9	6
4	16	12	8	5	3
5	11	7	4	2	1

Table 2 | Probability Table (P)

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

Table 3 | Measure of Consequence (C)

Level: 1		Descriptor: Severe
Description		- Severe and/or permanent damage to the environment - Irreversible - Severe impact on the community - Neighbours are in prolonged dispute and legal action involved
Example/Implication		- 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		Descriptor: Major
Description		- Serious and/or long-term impact to the environment - Long-term management implications - Serious impact on the community - Neighbours are in serious dispute
Example/Implication		- 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		Descriptor: Moderate
Description		- Moderate and/or medium-term impact to the environment and community - Some ongoing management implications - Neighbour disputes occur
Example/Implication		- Water, soil or air known to be affected, probably in the short term - No serious harm to animals, fish, birds or plants - Public largely unaware and few complaints to Council - May contravene the conditions of Council's Licences and the POEO Act - Unlikely to result in prosecution

Level: 4		Descriptor: Minor
Description		• Minor and/or short-term impact to the environment and community • Can be effectively managed as part of normal operations • Infrequent disputes between neighbours
Example/Implication		• 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		Descriptor: Negligible
Description		• Very minor impact to the environment and community • Can be effectively managed as part of normal operations • Neighbour disputes unlikely
Example/Implication		• No measurable or identifiable impact on the environment • No measurable impact on the community or impact is generally acceptable

Assessment

Activities that will be undertaken on the site have been assessed using the above tables and summarised in Table 4 below. Each potential conflict is given a risk ranking based on probability (likelihood) and consequence. Risk rankings 10 or above are regarded as unacceptable and need to be addressed. Once mitigation measures have been applied, they are reassessed.

Table 4 | LUCRA Table for Potential Activities (Without Measures)

Activity	Probability	Consequence	Risk Ranking
Glint and glare	C	3	13
Dust generated during construction	B	3	17
Vehicle / equipment noise and movement during construction	B	3	17
Visual impact	C	3	13
Increased vehicle heavy vehicle traffic on roads	B	3	17
Contamination from construction machinery	C	3	13

Activity	Probability	Consequence	Risk Ranking
Vegetation disturbance and weed spread	C	3	13
Stormwater and erosion impacts	D	4	5
Noise from inverters / transformers (operation)	D	3	9

3.2. Management Strategies and Revised Risk Scores

Separation of land uses, buffer areas, landscaping and on-site management protocols are all effective means to reduce land use conflict. In most areas of potential conflict listed above, one or more of those techniques will reduce the risk of conflict to manageable and acceptable levels.

Table 5 | LUCRA Table for Potential Activities (With Measures)

Activity	Management Strategy	Probability	Consequence	Revised Risk Ranking
Glint and glare impacts	- Glint and glare assessment undertaken. Findings of the glint and glare assessment note that no significant impacts were identified for nearby sensitive receivers or road users. - Panel orientation is designed to minimise reflection by disabling backtracking functionality, meaning the solar panels will not revert to resting flat when the sun is outside the tracking range, which can position the modules to reflect more glare into the surrounding area - Compliance with relevant guidelines including the NSW Large Scale Solar Energy Guideline	D	4	5
Dust generation during construction	- Watering of exposed areas on a regular basis to reduce the potential for dust generation - The Statement of Environmental Effects for the development includes directions to avoid works during periods of high wind	C	4	8

Activity	Management Strategy	Probability	Consequence	Revised Risk Ranking
	Works to stabilise access tracks will be incorporated into a site Construction Management Plan to be prepared after development determination			
Vehicle equipment noise during construction	- Standard construction hours - Maintain equipment - Complaints register	C	4	8
Visual impact	- Landscaping screening - Setbacks from receivers	C	4	8
Increased heavy vehicle traffic on roads	- Traffic impact assessment - Scheduled deliveries - Designated routes	B	5	7
Contamination from vehicles	- Bunding in accordance with AS - Spill kits on site - Staff training - Farm Biosecurity Management Plan implemented to monitor the above matters.	D	3	9

Activity	Management Strategy	Probability	Consequence	Revised Risk Ranking
Vegetation disturbance and weed spread	• Weed management plan • Vehicle hygiene • Grazing/slashing regime • Farm Biosecurity Management Plan implemented to monitor the above matters.	D	3	9
Stormwater erosion impact	• Erosion and sediment controls will be in place for the construction phase in accordance with best practice guidelines to prevent sediment migration off-site • Maintain groundcover • Minimal disturbance design	E	3	6
Noise from inverters/transformers	• Equipment selection to meet criteria • Appropriate siting	E	4	3

4. Conclusions and Recommendations

A Land Use Conflict Risk Assessment (LUCRA) has been undertaken in accordance with the relevant guidelines to identify potential land use conflict risks associated with the proposed solar energy facility. Table 5 demonstrates the effect of the recommended management strategies in reducing identified risks. In accordance with the adopted risk matrix, risk rankings of 10 or less are considered acceptable and can be achieved through the implementation of the proposed mitigation measures.

The assessment demonstrates that all identified risks can be reduced to acceptable levels. Accordingly, the proposal is considered compatible with the existing and surrounding land uses, with any potential land use conflicts able to be effectively managed through standard design, siting and operational measures.

DRAFT

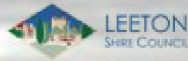
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DA 134-2025

3 July 2026



Agricultural Assessment Report Stanbridge Solar Farm and BESS

Prepared: J Shovelton

Final – 6 April 2026

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3				

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Agricultural Assessment Report Stanbridge Solar Farm and BESS

Executive Summary

This Agricultural Assessment Report examines the impact of the installation of a solar farm and Battery Energy Storage System (BESS) at 125 Briggs Road Stanbridge.

The site is located in the Murrumbidgee Irrigation area, but has no water right associated with it.

The block has only been used for low intensity dryland sheep grazing since 2016. In the absence of the solar project this low intensity grazing would continue. Sheep grazing at a similar intensity could be undertaken as a fire management strategy after the solar farm and BESS are constructed resulting in minimal loss of stock productivity for the region.

There is no BSAL overlay on the site. While the soil on the site is of reasonable quality, if properly managed, it is of inferior quality to the soils north of the site which are used for horticulture.

The loss of production from the site during its planned 30 year life is negligible in terms of Regional or State production.

The proposed solar project at this site would have no long term detrimental effect on the productive capacity of the soil, nor would it have a significant impact on the overall productivity of the region or state, nor impact on the ability of neighbouring businesses to operate.

Background

An agricultural assessment of a 5 MW solar farm and a 10 MWh BESS on approximately 21.7 ha at 125 Briggs Road Stanbridge (Lot 109 DP751703) has been requested by Habitat Planning Pty Ltd on behalf of Bison Energy Pty Ltd.

The NSW Large-Scale Solar Energy Guideline¹ recommends that large-scale solar energy development applicants consider the location and nature of important agricultural lands, including Biophysical Strategic Agricultural Land (BSAL), irrigated cropping land and land capability classes 1, 2 and 3 in the site selection and design process. The guideline also recommends that consideration be given to any significant fragmentation or displacement of agricultural industries and any cumulative impacts of multiple developments.

The site falls within the Rural Zone (RU1) of the Leeton Shire. The requirements for this zone outlined in the Leeton Planning Scheme² are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.

¹ <https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/shift-renewables/solar-energy>

² Clause 2.3 Land Use Table – Leeton LEP 2014

- To minimise conflict between land uses within this zone and land uses within adjoining zones.

The report also considers aspects including:

- the impact on the loss of the site if it has high quality soils, particularly soils that are niche to a type of crop or other agricultural activity.
- the potential loss of reliable, accessible water (such as irrigated areas) and its impact at a local or regional scale.
- the impact of fragmentation and a change of land use to non-agriculture activity on local and regional productivity and output.
- the impact of a change of land use on recent and/or current efforts to modernise and reform agricultural activity in the area.
- whether the land has specifically been set aside or defined for agricultural use and development in a planning scheme or other strategic document.
- whether the change in land use is to the detriment of a government's previous or existing investment and support for the site or the area.
- whether the proposed solar energy facility can co-locate with other agricultural activity, to help diversify farm income without reducing productivity.

In preparing this report I have examined relevant information sources which are referenced as footnotes and have interviewed the owner of the land.

The proposed site (shown in

Figure 1) located approximately 6.25 km west of the Leeton town centre, is situated west of the Gogeldrie Main Southern Drain and bounded by Briggs Road on the north and west and Murrumbidgee River on the south.



Figure 1 Location of the Stanbridge solar project (shown in white).

The location of the project site is shown in more detail in Figure 2. The site is surrounded by broad acre cropping on all sides. There is a large reuse dam to the east of the Gogeldrie Main Southern Drain on a neighbouring property. Orange orchards are located to the north of the site.

Stanbridge solar farm. Agricultural Assessment

Meridian Agriculture

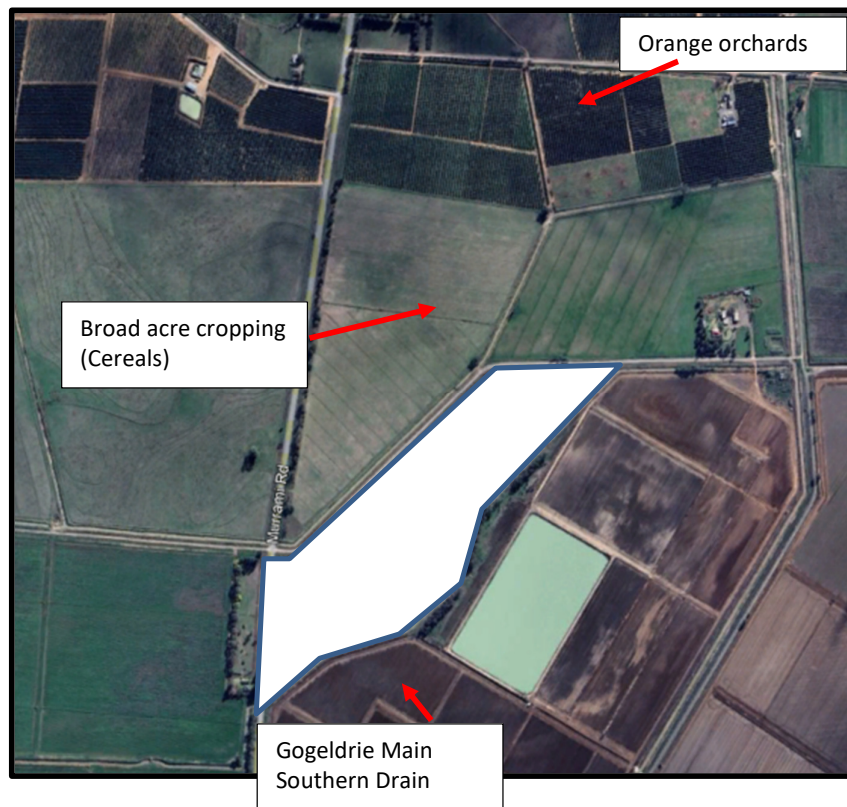


Figure 2 Paddock location of the Stanbridge solar project.

Figure 3 shows the indicative layout of the project.



Figure 3. Site plan for the solar panels and BESS

Stanbridge solar farm. Agricultural Assessment

Meridian Agriculture

The area occupied by the solar farm and BESS will be approximately 22 ha and will operate for 30+ years.

Regional and State Planning Considerations

At a regional level, land with high quality soil and water resources capable of sustaining high levels of productivity has been identified as Biophysical Strategic Agricultural Land (BSAL).

BSAL lands intrinsically have the best quality landforms, soil and water resources, are naturally capable of sustaining high levels of productivity and require minimal management practices to maintain this high quality. The site is not designated as BSAL.³

Site Characteristics

Figure 4 (image taken 2011) shows the flat topography of the site which has a fall of around 0.7% to the southwest.



Figure 4 View of the solar farm site from Murrami Road (Google Earth image, Jan 2026)

The soil associations for the Stanbridge area are shown in Figure 5.⁴

The soils at the site are derived recent sediments and are classified as vertosols (VE). There is a band of chromosols (CH) to the north of the site.

³https://geo.seed.nsw.gov.au/Public_Viewor/index.html?viewer=Public_Viewor&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.79.SALBiophysical

⁴ <https://geo.seed.nsw.gov.au/vertigisstudio/web/?app=cabd04d595ec43c1aaf4298e80e83ec2>

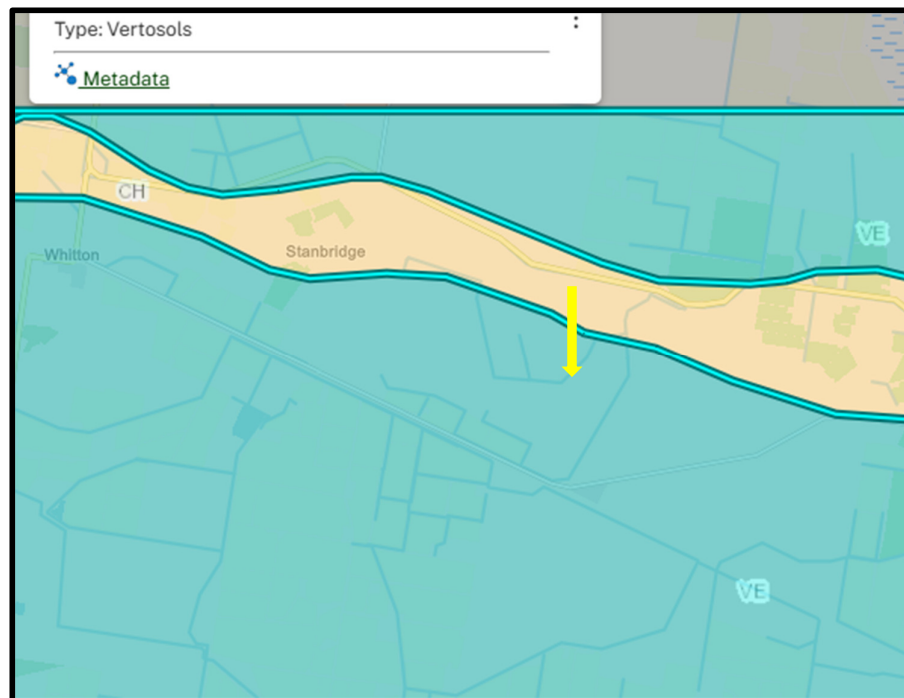


Figure 5. Soils of the Leeton area. (Project site arrowed)⁵

Vertosols are deep clay soils with shrink-swell properties that exhibit strong cracking when dry. The depth of clay is important to reduce infiltration when sown to rice and reduces the amount of irrigation water required. The poor draining characteristics of the soil can create waterlogging issues for winter crops and for horticultural crops without adequate drainage. However, there are always soil variation within any location. While a considerable proportion of the soils at the site are vertosols, according to the owner there are a number of prior stream courses running through the site which have higher infiltration characteristics than vertisols and make the site less suitable for rice production.

The other nearby soil association is chromosols. Chromosols are characterized by a strong texture contrast between loamy/sandy topsoils and structured clay subsoils, typically with a non-sodic, neutral-to-acidic profile. They are highly valuable for agriculture. The orange orchards to the north of the site are located on these chromosol soils.

Acid Sulphate Soil Risk

There no recorded acid sulphate soils at or adjacent to the site ⁶

Erosion Risk

Modelled annual bare soil erosion indicates a low rate of erosion in soils which have maintained ground cover – 0.5-0.2 t/ha/year⁷

⁵ h

[au/vertigisstudio/web/?app=cabd04d595ec43c1aaf4298e80e83ec2](https://geo.seed.nsw.gov.au/vertigisstudio/web/?app=cabd04d595ec43c1aaf4298e80e83ec2)

⁶ <https://geo.seed.nsw.gov.au/vertigisstudio/web/?app=cabd04d595ec43c1aaf4298e80e83ec2>

⁷ <https://espade.environment.nsw.gov.au/>

Land Capability Rating

The land capability of the site is shown in Figure 6. The landscape at this site has a capability rating of “3”⁸ and has not been identified as BSAL.

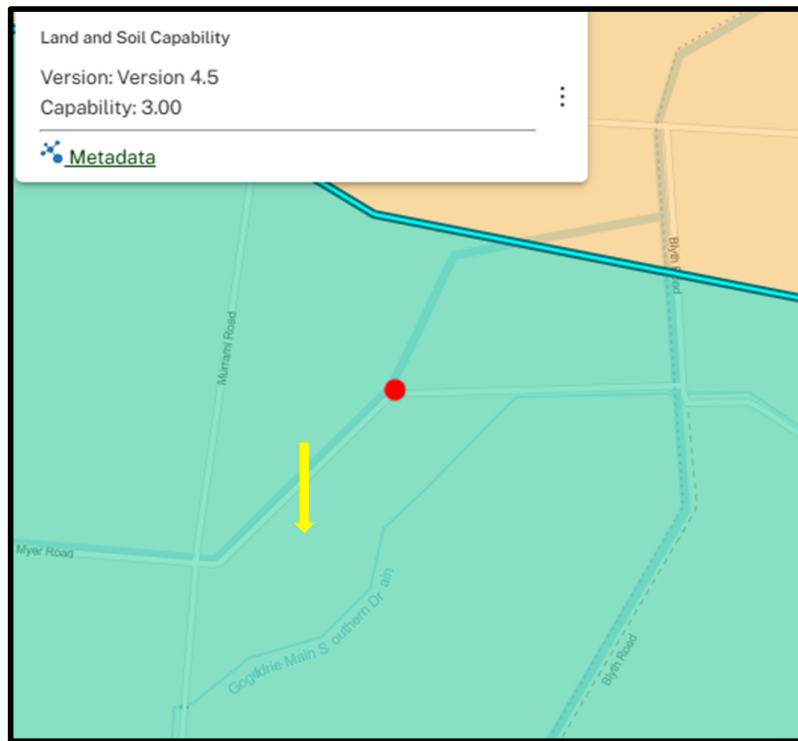


Figure 6. Land capability of solar farm site. (Solar farm site arrowed)

Land in this capability category has moderate limitations but 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.

Agricultural Context

Regional

The site falls within the Murrumbidgee Irrigation Area (Figure 7).

⁸ https://geo.seed.nsw.gov.au/Public_Viewor/index.html?viewer=Public_Viewor&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.111

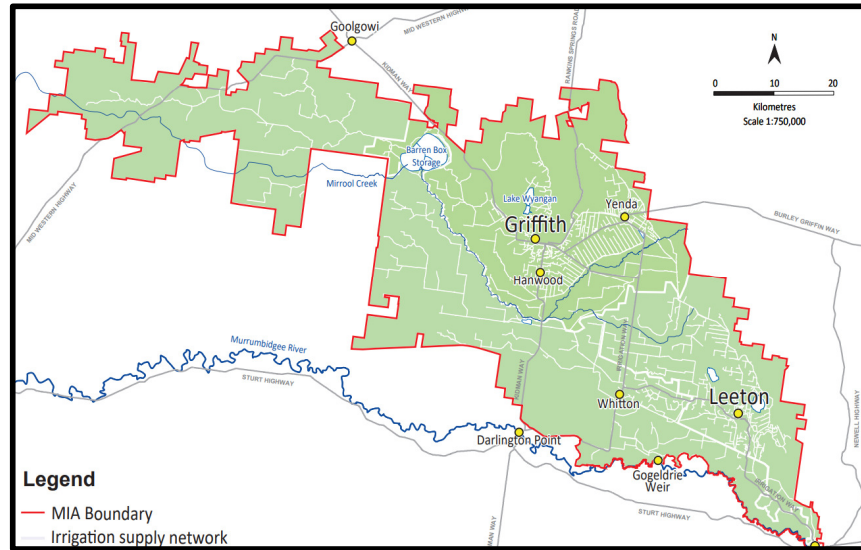


Figure 7 Murrumbidgee Irrigation Area 9

The agricultural background to irrigated farming in the Murrumbidgee catchment is outlined below.

“The irrigated annual and perennial crops planted in the catchment adjust to market forces that result in the shifts in water and land uses over time. Water availability in the southern Murray-Darling Basin is strongly influenced by rainfall in the upper catchments, which varies significantly between years. Allocations of available water among crops are decided by individual farmers who may have contracts for rice or cotton production or less flexible contracts for fixed perennial crops of citrus, grapes or nuts. Most flexible are the choices to grow other annual crops which can be altered year to year according to water availability and price, as well as anticipated commodity prices.

The most significant water user in the Murrumbidgee catchment has been the rice industry, which faced the greatest cutbacks during the drought years (2007-09). Cotton areas have expanded to the point of recently exceeding the total water use by rice or any other crop. Grapevines have maintained relatively constant water use over time. Almond plantations are an emerging presence in the catchment with regard to water use; many young plantations are expected to require greater water volumes as they mature.¹⁰”

Agricultural Assessment

Previous agricultural use

The site was used for irrigated cropping until about 2016. The site is less than ideal for broadacre irrigation for the following reasons:

- The dimensions of the site make it difficult to irrigate. The bays are short.
- The site is very flat which means that it takes a long time to irrigate and uses a lot more water than better irrigation soils - up to 1 ML/ha more.

⁹ https://www.mirrigration.com.au/ArticleDocuments/255/MIA%20fact%20sheet_July%202022.pdf.aspx?embed=Y

¹⁰ <https://www.csu.edu.au/research/grahamcentre/news/newsletters/2020/summer-2020/water-use-and-dollar-values-of-irrigated-crops-in-the-murrumbidgee-catchment>

- There are a couple prior stream beds on the block which render it unsuitable for rice because the site doesn't retain water.

Current agricultural use and productivity

The block is laid out for broadacre flood irrigation but irrigation ceased in 2016 since which time the site has been used for dryland sheep grazing. The property retains an irrigation delivery entitlement but has no associated water right.

The property, including the solar project site, covers approximately 73 ha and, according to the owner, is used to run a flock of between 60 and 100 Dohne merino ewes. Allowing a rating of 2 Dry Sheep Equivalents (DSE)¹¹/head, this equates to 120 - 200 DSE for the property, or a stocking rate of 1.6 to 2.75 DSE/ha (0.8 – 1.35 ewes/ha). This is a low stocking rate. For the solar farm site of approximately 22ha, this would equate to a stocking level of 18 – 30 ewes.

The length of growing season can be used to provide an estimate of potential stock carrying capacity¹² of dryland pastures. The growing season is a function of amount of rain and its distribution. Realisation of this potential depends on consistent good agronomy and husbandry and the absence of inherent soil constraints.

Based on the rainfall data for the area, the likely average growing season is about 5 months for the property. This indicates a potential stocking rate of around 7.5 DSE/ha. For a sheep operation this would equate to a maximum of 82 breeding ewes on the project site. Farmers normally run less than potential stocking rate to manage the risks associated with adverse seasons. On this basis, a long-term stocking rate of around 66 ewes (or equivalent) would be a reasonable potential carrying capacity of the site.

The loss of stock numbers potentially or currently carried on the site, is insignificant in relation to the State's sheep flock of 4.4 million head.¹³ The loss of this level of production will have an unmeasurable impact on the economy of the district. However, as noted below, any potential loss of stocking rate could be offset by a grazing under the panels.

Cropping

While it is possible to crop the area, its small size would limit its appeal to a broad acre cropping farmer. As the site has no water right, any cropping would be undertaken as a dryland operation.

Horticulture

The other agricultural uses include irrigated horticultural crops. The total area of irrigated horticultural crops in NSW is 67,106 ha¹⁴. Again the footprint of the solar farm and BESS is insignificant in relation the state figures. While the development of irrigated horticulture would be possible, the proximity of nearby more suitable land such as that associated with the orange orchards to the north of the site, means that there is no compelling justification for the land to be retained for horticulture.

¹¹ Dry Sheep Equivalent is a standard animal (non lactating/non pregnant 50 kg sheep) that is used to compare carrying capacity, profitability, etc., between different stock types. For example, one breeding ewe is equivalent to two DSE over a year and a cow and calf is equivalent to 17 DSE over a year.

¹² Saul G.R and Kearney, G.A (2003) Potential carrying capacity of grazed pastures in southern Australia, Department of Natural Resources and Environment, Victoria.

¹³ <https://www.mla.com.au/news-and-events/industry-news/herd-and-flock-numbers-for-each-region-released/>

¹⁴ <https://dbr.abs.gov.au/region.html?lyr=ste&rgn=1>

Offsite impacts

The establishment of the project will have no disruptive impact on the long term operation of neighbouring properties or on the operation of the remainder of the owner's property.

Agrovoltaic considerations

The paddock vegetation in the project area will require management to reduce the fire risk over summer. Grazing the site with sheep will be feasible at levels comparable to those undertaken in the absence of the project with little overall reduction in production/income.

Impact on future agricultural use of land

The facility is intended to remain in operation for a period of up to 30 years to contribute to the sustainable electricity power supply to the state of NSW. This period represents the useable life of a solar facility, after which the infrastructure and components would need to be upgraded to latest technologies for ongoing efficient operation.

If the facility ceases operations at this point, all infrastructure, panels, mounting frames including footings, inverters, cabling and other sub-surface materials would be disassembled and removed from the site to enable the site to be re-cultivated for cropping or grazing purposes. All gravel surfacing of accessways would be removed unless required for a future use.

At decommissioning there will be no residual detrimental impact on the productivity of the site. Soil fertility will decline over time, but this can be corrected effectively through the addition of suitable amendments. Some mechanical correction of soil compaction may be required.

Cumulative Impacts.

Within 50km radius of Leeton there are two operational solar facilities (Leeton and Fiveborough), one approved at Yanco and four proposed (Comet Park, Fiveborough expansion, Gogeldrie and Cudgel).

There are unlikely to be any cumulative effects on agriculture from the establishment of an additional small scale solar farm and BESS at this intensity of infrastructure development.

Conclusion

The proposed Stanbridge solar farm and BESS, 6.25 km west of Leeton, will cover an area of approximately 22 ha which has been used for low intensity grazing in recent years. While the vertosol soils on the site are of reasonable quality there are higher quality chromosol soils north of the site.

The loss of production from the diversion of this land to a solar farm and BESS will have an insignificant impact on both Leeton LGA and the State's agricultural production and is unlikely to impact on the activities of surrounding farming properties.

Given the small area of the site, its lack of a water right and the presence of higher quality soils to the north of the site which are used for intensive horticultural production, there is no compelling reason for the area to be excluded from the solar facility development.

J Shovelton
Senior Consultant
Meridian Agriculture
6 April 2026

Stanbridge solar farm. Agricultural Assessment

Meridian Agriculture

Farm Biosecurity Action Planner

The essentials

APPROVED

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Date:

DA 134-2025

3 July 2026



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**“Take biosecurity seriously.
Pathogens have no respect
for spin.”**

Peter and Frances Bender
Salmon and trout farmers, Dover, Tasmania

Farm biosecurity

Simple everyday practices can help protect your property from biosecurity risks. The Farm Biosecurity website has resources for all Australian producers, including:

- crop and livestock specific information
- templates for records and signs
- biosecurity manuals
- checklists
- personal biosecurity toolkits
- information on exotic plant pests
- videos
- links to useful sites
- biosecurity action planner.

Find out more at:
farmbiosecurity.com.au

Secure your farm
...against diseases, pests and weeds

Preparing an on-farm biosecurity plan

The best defence against pests and diseases is to implement sound biosecurity practices on your farm. Quick and simple measures built into everyday practice will help protect your farm and your future.

This farm biosecurity planner will help assess the biosecurity risks on your farm and illustrate steps to address them. Refer to the planner periodically to check on progress and prioritise actions.

A biosecurity action plan will help you identify and prioritise the implementation of biosecurity practices relevant to your property. When devising a plan for your farm, the biosecurity essentials are a good place to start. The essentials are:

- Farm inputs
- Farm outputs
- People, vehicles and equipment
- Production practices
- Ferals, pests & weeds
- Train, plan & record

Completing a self-assessment checklist will also help you to identify biosecurity strengths and weaknesses on your property. It might be helpful to have a map of your property to consider the best places to locate biosecurity zones or 'check points'. This could include signs at entrances to the property, parking areas near the house or site office, where deliveries are picked-up or dropped-off in relation to storage facilities, vehicle wash down areas, existing roads or tracks for movement within the property.

Think about what you can do to minimise the risk of introducing diseases, pest and weed seeds at each of the checkpoints. If you build your plan around daily, monthly or yearly farm routines, then biosecurity should become a habit.

The actual management practices you choose to use will vary from site to site, depending on the size of your property(s), the physical facilities available and the day-to-day management of operations.

If you are already following an accreditation scheme or industry best management practice guidelines they often include a biosecurity component. For example the cotton industry's myBMP.

With each action, set-out the steps needed to achieve the task – this is especially helpful if a group is working on the plan. A responsible person will need to be appointed to oversee the implementation of the actions.

Good practices need not be expensive, but they do need to be easy to follow. They may also take a little of your time, but they are beneficial in the long run.

After you have ranked your priorities, think about which ones you can achieve in the short and long term. Go back to the plan periodically and check progress towards your goals.

As a guide, short-term activities can:

- be planned and implemented within 12 months
- help your business comply with regulatory requirements
- be financially feasible in the short-term
- fit in with the time commitments of your enterprise.

Long-term activities:

- are planned and implemented over more than one year
- need additional financial or personnel resources that are not currently available
- enhance the overall quality of service, aesthetics or administrative procedures.





FARM INPUTS

Almost anything moved onto your property can be a potential source of pests and diseases for livestock and plants. Monitor animals or plant materials that enter the property, as well as sources of water, feed, bedding and fertiliser.

FARM INPUTS	Potential risk	Actions to reduce the risk	Action(s) to take	✓/✗
New plants or animals 	Introducing new plants and animals on to your property can allow unwanted diseases, pests and weeds to enter. Isolating new plants or animals for a quarantine period limits the risk of exposing your entire stock to new pests and diseases and spreading weeds into production areas.	When possible, isolate new plants or animals away from production areas for 21 days before mixing them with your existing stock. This provides: a) animals a chance to shed weed seeds they may have ingested with feed b) plants and animals to show signs of disease that were not obvious when purchased. Regularly check newly planted areas and stock holding areas for the presence of pests and weeds, and treat before they become established.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation, with the exception of limited herbicide use for targeted weed control where necessary. Any materials brought onto site (e.g. gravel, ...	☒
Animal feed 	Animal feed can harbour diseases, pests and weed seeds.	Always request a commodity vendor declaration and ensure any feed you purchase is fit for purpose.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation.	☐
Banned animal feed 	Feeding restricted animal materials (RAM) to ruminants is illegal in Australia as it is linked to the spread of mad cow disease. It is illegal to feed swill to pigs in Australia. It is a dangerous practice which has led to the spread of diseases such as foot and mouth disease in many countries.	Always read the label of any stock feed you purchase and store feed containing RAM separate from feed for ruminants. Pigs should never be fed any kind of swill, including leftover food from the kitchen table. Always read the label of any purchased stock feed to ensure compliance with these laws.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation.	☐

FARM INPUTS	Potential risk	Actions to reduce the risk	Action(s) to take	✓/✗
Water sources 	Many pest and disease-causing organisms can survive for a long time in water sources until they find a suitable host.	Ensure water sources are secure from contamination by wild animals and pests. Prevent algal blooms by aerating or treating water that is stored in dams and is high in nutrients.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation.	☐
Animal bedding material 	Animal bedding material can harbour diseases, pests and weed seeds.	Ensure bedding material is fit for purpose, refreshed regularly and is stored in a clean, dry and vermin free environment.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation.	☐
Hives 	Bees from wild and managed hives pollinate many fruit and vegetable crops. Bees can act as vectors for the spread of pests and diseases.	Make sure you know where any bee hives have been prior to your property. Check the health of the bees regularly, and advise your hive provider of any intended use of any potentially harmful chemicals.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation.	☐
Fertiliser 	Organic fertilisers such as manure and compost can be a source of weeds if not composted thoroughly.	Ensure that animal manure and green waste is aged and thoroughly composted to destroy weed seeds and disease causing organisms present in the material. Maintain a record of the source of organic fertilisers, the application dates and where applied. Check that the supplier is following the industry Purchasing Code of Practice or equivalent quality controls.	No agricultural inputs (e.g. fertilisers, chemicals, livestock feed) are required for the solar facility operation, with the exception of limited herbicide use for targeted weed control where necessary.	☒



FARM OUTPUTS

Responsibility for biosecurity doesn't end when plant products or animals leave the farm gate. The measures in place on your property support biosecurity in your region.

FARM OUTPUTS	Potential risk	Actions to reduce the risk	Action(s) to take	✓/✗
Moving plants and animals off the property 	Crops and livestock can spread diseases, pests and weeds from your property and put the status or productivity of the entire region or industry at risk.	Ensure plant products and animals are fit to travel, your records are up to date and that the transport vehicle is clean. Provide copies of supporting paperwork such as National Vendor Declarations, Animal Health Statements or Interstate Certification Assurances. Update the National Livestock Identification System database if moving cattle, sheep, goats or pigs.	Where grazing is implemented, livestock movement on and off site will be managed to minimise biosecurity risks.	☒
Shows and sales 	Events where animals are brought together are an opportunity for disease to spread: a) directly from animal to animal b) via contact with contaminated soil, food and water. Stock can be exposed to disease by mixing with other plants or animals or coming into contact with contaminated pens, vehicles, people or equipment.	Only take healthy plants, produce or livestock to shows, sales and markets. Do not share equipment with others and have a separate supply of feed and water for livestock. When possible, isolate returning stock as you would for any new stock entering the property.	Where grazing is implemented, livestock movement on and off site will be managed to minimise biosecurity risks.	☒
Product transport 	Dirty bins used for harvesting can transfer insect pests and diseases to subsequently harvested crops. Soil and plant material adhering to harvested crops can carry insect pests and disease organisms.	Ensure no soil, waste plant material or pests are left on or in bins or transport containers by removing organic matter and disinfecting the bins.	Outputs from the site are minimal and limited to waste materials generated during construction and maintenance, which will be	☒

FARM OUTPUTS	Potential risk	Actions to reduce the risk	Action(s) to take	✓/✗
Product packing 	Soil and plant material adhering to harvested crops can carry insect pests and disease organisms.	Remove loose soil and plant material from harvested crops. Minimise post-harvest contamination. Only potable water should be used for washing fruit and vegetable produce as part of packaging operations. A 'spray diary' record should accompany each consignment of vegetables, fruits and nuts.	Outputs from the site are minimal and limited to waste materials generated during construction and maintenance, which will be removed and disposed of appropriately at licensed	☒

Biosecurity toolkit

The Farm Biosecurity website has a range of material to help you to implement biosecurity on-farm, including animal health declarations and statements, crop and livestock specific biosecurity manuals, and templates for records.

Go to farmbiosecurity.com.au/toolkit

“Biosecurity has always been at the forefront of the production processes in the nursery.”

Peter Young

Production nursery owner, Woombye, Queensland



PEOPLE

If it can move, it can carry diseases, pests and weeds. For this reason, people, vehicles and equipment pose a high biosecurity risk and should be managed accordingly.

PEOPLE	Potential risk	Actions to reduce the risk	Action(s) to take	✓/✗
Property access 	Multiple, unsecured entry points to your property make it difficult to control visitor access and manage high risk visitors such as those who visit multiple properties each day.	Limit the number of access points to your property (lock unused gates). Use signs to direct visitors to designated parking or reception areas. Access to production areas (fields, paddocks or sheds) should be limited to a restricted range of personnel only.	Site access will be restricted to authorised personnel only.	☒
Signage 	Never assume that people know what to do when they arrive at your property. Without signage, visitors and staff may be unaware of the biosecurity procedures enforced on your property.	Erect signs to instruct visitors. Use clear instructions and provide relevant contact details.	Signage will be provided to the site to instruct staff and provide relevant contact details.	☒
Visitor risk assessment 	Visitors can unknowingly carry diseases, pests and weeds on their clothes and personal items. The risk is greater if they've been in contact with other livestock or crops, or have recently been interstate or overseas.	Conduct a risk assessment before you allow a visitor onto your property. If required, provide cleaning equipment or a change of clothing or footwear to reduce the risk. If you cannot reduce the risk, refuse entry to high risk visitors.	All staff, contractors and visitors will undergo a site induction, which includes biosecurity protocols and hygiene requirements.	☒

PEOPLE	Potential risk	Actions to reduce the risk	Action(s) to take	✓/✗
Visitors to the property 	If you don't know where visitors have come from or what they have been doing, it will be difficult to trace back or trace forward in the event of an incursion or disease outbreak.	Direct all visitors to a designated parking area away from livestock or crops and ask them to report to management and sign a visitor register.	Site access will be restricted to authorised personnel only. A visitor register will be maintained to record all personnel entering and exiting the site.	☒
Visitor contact with plants and animals 	Visitors can unknowingly carry diseases, pests and weeds on their clothes and personal items.	Limit access to and contact with crops and livestock, and eliminate any unnecessary contact altogether.	Site access will be restricted to authorised personnel only. All staff, contractors and visitors will undergo a site induction, which includes biosecurity protocols and hygiene requirements.	☒
General hygiene 	Pests, disease causing organisms and weed seeds can be present on hands, clothing, footwear and personal items of people.	Provide hand washing facilities, foot baths or alternative clothing and footwear for visitors to use while on-farm.	Personnel will be required to comply with site-specific hygiene measures, including avoiding movement through vegetated areas	☒

“The management of people and product onto the property have high priority.”

Ron Creagh

Grain and sheep producer, Nungarin, Western Australia

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VEHICLES & EQUIPMENT

Diseases, pests and weeds can enter a farm and be spread by equipment and vehicles, either directly or in plant material, soil or manure. It is important to maintain equipment hygiene and ensure all vehicles that visit your property are clean and well maintained.

VEHICLES & EQUIPMENT	Explanation of risk	Actions to reduce the risk	Action(s) to take	✓/✗
Equipment hygiene 	Tools and equipment can carry diseases, pests and weeds seeds. The risk for disease spread is higher when equipment is borrowed, lent or bought second-hand from other properties.	Clean and disinfect tools and equipment before and after use on crops or livestock. Clean and disinfect equipment between rows of plants (eg secateurs) or between different batches, mobs or herds of animals. Clean and disinfect second-hand, borrowed or lent equipment before and after use.	Tools and equipment will be regularly inspected to ensure compliance with hygiene requirements.	☒
Dedicated equipment 	Practically, it may be best to have dedicated tools, clothing and footwear for use on crops or livestock affected by pests or diseases. This equipment should never be used in clean areas of your property.	Have dedicated tools, clothing and footwear available for use in production areas or on animals and plants affected by pests or disease. Always work with sick plants or animals last (work from clean to dirty).	Tools and equipment will be regularly inspected to ensure compliance with hygiene requirements.	☒
Storage areas 	Some pests and diseases can live in the natural environment for months or years.	Clean and disinfect equipment storage areas regularly.	Tools and equipment will be regularly inspected to ensure compliance with hygiene requirements.	☒
Vehicle entry points 	Multiple, unsecured entry points to your property make it difficult to control access and manage high risk visitors such as utility providers who visit multiple properties every day.	Encourage visitors to enter the property via one or two routes only. Use signs to inform visitors about property access points.	Vehicle movements will be limited to designated access tracks to minimise disturbance and spread of	☒

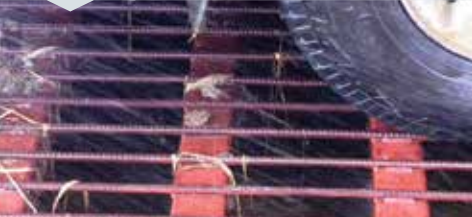
VEHICLES & EQUIPMENT	Explanation of risk	Actions to reduce the risk	Action(s) to take	✓/✗
Vehicle movement and parking 	All parts of a vehicle can carry disease causing organisms, pests and weeds seeds. Without restricting parking and vehicle movements within the property, it is difficult to control and monitor the spread of diseases, pests and weeds.	Minimise the number of vehicles you allow onto the property and restrict them to designated visitor parking areas. Monitor areas next to parking facilities for signs of diseases, pests and weeds. Not all vehicles need to access production areas. It may be easier to have vehicles that are for use only on-farm. If possible, use your own farm vehicles to transport visitors around the property.	Where necessary, a designated clean-down area will be established during construction.	☒
Vehicle hygiene and washes 	All parts of a vehicle can carry disease causing organisms, pests and weeds seeds.	Provide a wash area for vehicles that need to enter production areas, or before moving crops or livestock. If possible, use a high pressure wash down (or blow down) facility located well away from crops or livestock for cleaning vehicles and equipment. For maximum protection, it is recommended that you also disinfect after washing.	All vehicles and machinery entering the site must be clean and free of soil, plant material and contaminants.	☒
Run-off from wash areas 	Run-off from vehicle washing can contain diseases, pests and weed seeds.	Collect run-off from vehicle wash areas in a sump, or direct it away from production areas. Monitor areas next to cleaning facilities for signs of pests and diseases, and treat weeds before setting seed or becoming established.	Where necessary, a designated clean-down area will be established during construction.	☒
Roads and tracks 	There is an increased risk of introducing diseases, pests and weeds when vehicles travel off or divert from established roads and tracks.	Ask visitors to stay on established roads or tracks. Check areas next to roads and tracks for signs of diseases, pests and weeds, and treat before becoming established.	Vehicle movements will be limited to designated access tracks to minimise disturbance and spread of weeds.	☒

Image: DAFWA



PRODUCTION PRACTICES

Good on-farm hygiene reduces the risk of spreading pests and diseases. Implement simple hygiene practices for feed and water, product packaging, storage facilities, livestock husbandry, waste materials and plant propagation activities.

PRODUCTION PRACTICES	Explanation of risk	Action(s) to reduce the risk	Action(s) to take	✓/✗
Water management 	The management of water supplies is important for the maintenance of healthy plants and animals. If water sources become contaminated they can spread pests throughout production areas.	Prevent algal blooms by aerating or treating water that is high in nutrients and is stored in dams. Where possible, use drip irrigation for recycled water to avoid aerosol formation. Make sure livestock cannot drink from waste water storage dams. Prevent young and vulnerable livestock from grazing pastures irrigated with recycled effluent during the 'withholding period' after each irrigation.	No irrigation or intensive agricultural practices are proposed as part of the development.	☒
Plant waste 	Leaf material or fallen fruit, abandoned orchards or vineyards can attract or harbour pests and diseases. It is important to break the life cycle of insect pests.	Collect all plant waste that shows signs of pests or disease and dispose of it by deep burial or burning, well away from water sources, nursery and production areas. For cuttings or healthy waste plant material, use a dedicated waste management facility or compost it thoroughly.	Groundcover beneath and between solar arrays will be managed through controlled grazing (where applicable), and/or periodic slashing and targeted weed control.	☒

PRODUCTION PRACTICES	Explanation of risk	Action(s) to reduce the risk	Action(s) to take	✓/✗
Animal manure and waste 	Effluent, waste and dead animals can harbour disease causing organisms. Disease agents in effluent can contaminate pastures, stockfeed and water sources.	Dispose of animal carcasses and waste as soon as practical in a segregated area that cannot be accessed by livestock, or wild and feral animals. Select disposal areas to avoid the potential spread of contaminants by water, wind or animals. Manage effluent dispersal to minimise disease spread through the contamination of pastures, stockfeed and water. Maintain grazing intervals (21 days) between applications of these materials to paddocks and grazing of livestock. Always ensure you are adhering to government and industry requirements for carcase, effluent and waste management.	Noted, to be managed on-site where required as part of grazing process.	☒
Feed storage 	Poor feed storage encourages pests and diseases which may contaminate feed or reduce its usefulness. Old feed can harbour disease organisms and pests that may be harmful to your livestock. Wet and mouldy feed is a potential source of disease or poisoning.	Keep feed in a clean, dry storage area. Regularly inspect feed supplies for insects, pests, mould and damage and ensure they remain secured and fit for purpose.	Noted, to be managed on-site where required as part of grazing process.	☒
Feed and water troughs 	Contaminants can accumulate in animal feed and water troughs if they are not cleaned regularly. Old feed or water left in the trough can contaminate new feed or water.	Clean feed and water troughs regularly to prevent the build-up of contaminants. Implement a cleaning roster to ensure they are always clean. Provide cover for animal feed and water where possible, and keep the troughs high enough so they cannot be contaminated by animal faeces.	Noted, to be managed on-site where required as part of grazing process.	☒

PRODUCTION PRACTICES	Explanation of risk	Action(s) to reduce the risk	Action(s) to take	✓/✗
Monitoring and surveillance 	Early detection of pests and diseases gives you the best chance of preventing pests or diseases from establishing on your property and ongoing additional expenses for their control. Early detection also increases the chances of eradicating a new pest or disease. Recording the absence of pests or diseases is just as important as recording what you do see.	Regularly monitor your crops and livestock. Become familiar with pests and diseases commonly found in your region so you will know if you see something different. Sentinel plants or livestock can provide early warning of emerging pest problems. Display posters showing common pests and diseases to help staff with identification.	Noted, to be managed on-site where required as part of grazing process.	☒
Monitoring frequency 	The optimum frequency of monitoring depends on the type of crop or livestock being managed, and the production intensity. Additional monitoring may be required during disease outbreaks, seasonal presence of insects, or growing periods. This can minimise the chance of diseases, pests and weeds entering and spreading on your property.	Increase the frequency of inspections of crops and livestock during periods of higher risk, such as known disease outbreaks, increased insect and wildlife activity or growing periods for weeds.	Noted, to be managed on-site where required as part of grazing process.	☒
Silo storage of grain  Image: DAFWA	Spilled grain around grain storage areas can attract insect pests and vermin. Silos need to be gas tight to ensure fumigation treatments are effective and to prevent insects becoming resistant to treatments such as phosphine. There is a high risk that the first grain to pass through harvesters at the start of the season contains storage pests.	Maintain good hygiene around your storage areas. Clean and pressure test sealable silos and repair any faulty rubber seals before filling with grain. Separate the first grain to pass through harvesters at the start of each season.	Not applicable to proposal, no silo storage proposed.	☒
Fencing 	Damaged fences can allow livestock to stray. It could also allow your neighbour's livestock to mix with your stock.	Ensure fences prevent livestock from straying onto/off your property. Use double fencing if possible to prevent livestock from making direct contact with neighbours' animals. Fenced-off vegetation planted as wind breaks or corridors can also act as a buffer zone between properties.	Noted, fencing to be installed and maintained for site.	☒

PRODUCTION PRACTICES	Explanation of risk	Action(s) to reduce the risk	Action(s) to take	✓/✗
Feed spills & disposal 	Spilt feed can be spread around the property by wind or other means (eg birds).	Dispose of spilt, old or contaminated feed safely and promptly, keeping it away from livestock and pests.	Not applicable to proposal.	☐
Product storage 	Stored products, feed and equipment can attract or harbour pests and diseases. Soil and plant material adhering to harvested crops can carry insect pests and disease organisms.	Clean equipment before storage. Remove loose soil and plant material from harvested crops before storage. Products, feed and equipment should be stored securely to avoid attracting pests. Minimise post-harvest contamination.	Not applicable to proposal.	☐
Agvet chemicals 	Chemical residues on plants and animal products can result in rejection from international and domestic markets, and can pose a risk to human health. The misuse of chemicals can also lead to the development of resistance by pests, potentially creating new biosecurity risks and management challenges.	Be sure to follow the instructions on the label and observe withholding periods after treatments. Where necessary, seek training in appropriate use of agvet chemicals.	Ongoing monitoring will be undertaken to identify and manage.	☒
Insect resistance to chemicals  Image: GRDC	Inappropriate use of chemicals can cause insects to become resistant, making control difficult. This can cause more widespread and ongoing biosecurity problems.	If you suspect insects in your stored grain are resistant to chemicals, contact your nearest Department of Primary Industries or agronomist to have the insects tested.	Ongoing monitoring will be undertaken to identify and manage.	☒
Vaccination 	Some organisms that cause disease in animals can infect humans.	Ensure all personnel working on-farm are vaccinated for identified risk diseases (eg Q Fever and tetanus). Where necessary, vaccinate livestock against zoonotic (animal to human) diseases (eg Hendra and leptospirosis).	Noted, staff to maintain.	☒



FERALS & WEEDS

Feral animals, plant pests and weeds are a widespread nuisance but can also cause harm to your business, so they need to be actively controlled.

FERALS & WEEDS	Explanation of risk	Action(s) to reduce the risk	Action(s) to take	✓/✗
Wild and feral animals 	Wild or feral animals and vermin may carry disease causing organisms.	Develop a wild and feral animal control program to protect livestock and cropping land. Ensure farm buildings are in good repair and that feed and water sources are free from contamination. Work with neighbours and other producers in your local area to implement a coordinated approach to feral animal control.	A baseline assessment of existing weed presence will inform management measures. Ongoing monitoring will be undertaken to identify and manage.	☒
Boundary fences 	Wild or feral animals may carry disease causing organisms.	Ensure boundary fences are secure.	Boundary fences to be secure and maintained for duration of operations.	☒
Property cleanliness 	Spilled food, rubbish dumps and carcasses can attract pests or wild animals that carry diseases onto the property.	Remove or contain anything that is likely to attract vermin, insect pests or wild animals.	Ongoing monitoring will be undertaken to identify and manage.	☒

FERALS & WEEDS	Explanation of risk	Action(s) to reduce the risk	Action(s) to take	✓/✗
Weeds 	Weed species are significant biosecurity problems in their own right, as well as being alternative hosts of some agricultural and horticultural pests. Some weeds can also make livestock sick. Grain export markets have zero tolerance for weed seeds, and may cause shipments to be rejected.	Establish a weed management plan for your property, including plans for eradicating, containing or managing current weeds on your property, and preventing the introduction of new species. Control weeds along dirt tracks and roads, in areas used to isolate new stock, and next to vehicle parking or cleaning areas. Look for outbreaks of weeds, especially after drought, fire and flood.	Weed management will be implemented where required in accordance with relevant legislation and best practice.	☒
Volunteer plants 	Volunteer plants that have escaped from production areas and created a 'green bridge' can harbour pests or diseases between growing seasons.	Control volunteers or green bridges including, where necessary, plants external to the paddock (eg roadways, and head ditches).	Pest management will be implemented where required in accordance with relevant legislation and best practice.	☒
Property and land destruction 	Property and land destruction through excavation activities, fire, flood or storms provide an opportunity for pests and weeds to become established, and for feral animals to enter your property.	Control weeds in fields and paddocks after flooding, drought or fire. Inspect any areas that have been recently landscaped (eg new roads or dams) or affected by land destruction (eg fences) and treat weeds before they have a chance to set seed and become established.	Weed management will be implemented where required in accordance with relevant legislation and best practice.	☒

“Biosecurity measures start at the farm gate with washing vehicles, footwear and anything else that has come into contact with soil.”

Shannon Paton
Banana grower, Nerada, Queensland



TRAIN, PLAN & RECORD

Ensure that staff are well trained and that you have the ability to trace where animals or plants have come from and where they went. Keep accurate records of purchases, sales and movement of all products entering or leaving the property.

TRAIN, PLAN & RECORD	Explanation	Action(s) to reduce the risk	Action(s) to take	✓/x
Biosecurity planning 	An on-farm biosecurity plan will help you prioritise the implementation of biosecurity practices relevant to your property.	Devise a plan for your property, prioritise actions, and update the implementation table as you achieve goals.	All personnel will receive a site-specific induction prior to commencing work.	☒
Record keeping 	A property owner or manager should to be able to 'trace back' and 'trace forward' if there is a disease, pest or weed incursion on their property.	Keep records of purchases and sales, health certificates and declarations, and pest and disease monitoring activities.	Noted, record management to be implemented.	☒
Vendor declarations and statements 	Animals and plants entering your property can carry pests, disease causing organisms or weed seeds. Simple visual inspection of plants or animals may not be enough to know they are healthy.	Always request history and supporting paperwork, such as National Vendor Declaration, commodity vendor declaration, Animal Health Statement, seed or nursery stock certification.	Noted, record management to be implemented.	☒

TRAIN, PLAN & RECORD	Explanation	Action(s) to reduce the risk	Action(s) to take	✓/✗
Staff training 	Anyone working on the property (including friends and family) may not know how easily diseases, pests and weeds can spread and how to prevent this from happening.	Inform staff of the biosecurity standards required on site. Provide biosecurity training or information sessions for staff. Have posters to remind staff of the importance of farm biosecurity	All personnel will receive a site-specific induction prior to commencing work.	☒
Monitoring and surveillance 	Active monitoring and surveillance can provide early warning of potential or emerging problems with pests and diseases. Monitoring data can be used to support continued access to domestic and international markets. Recording the absence of pests or diseases is just as important as recording what you do see.	Keep a record of all crop or livestock monitoring, even if you don't see anything.	Noted, record management to be implemented.	☒
Suspect diseases, pests and weeds 	You have a responsibility to report unusual diseases, pests or weeds to an agronomist, vet, state DPI, the Emergency Animal Disease Watch Hotline or the Exotic Plant Pest Hotline.	Know who to call if you suspect you have an emergency animal disease or plant pest. Keep details of state DPIs, vets, agronomists, Emergency Animal Disease Watch Hotline or Exotic Plant Pest Hotline at hand. Develop an Emergency Animal Disease Action Plan. (go to farmbiosecurity.com.au/about/emergency-animal-diseases/)	Noted, record management to be implemented.	☒

“Everyone should take responsibility for their own properties to guard themselves against diseases.”

Richard Halliday

Sheep producer, Bordertown, South Australia

Need help?

If you need help with your plan or have any questions about on-farm biosecurity, you can contact the Grains Biosecurity Officers or Animal Health and Biosecurity Extension team.

Animal Health and Biosecurity Extension team

animalhealthaustralia.com.au

Rachel O'Brien 0418 722 461 robrien@animalhealthaustralia.com.au

Sarah Simpson 0499 077 213 ssimpson@animalhealthaustralia.com.au

Grains Farm Biosecurity Program

<https://grainsbiosecurity.com.au>

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South Australia	Shafiya Hussein	0437 723 295	shafiya.husseini@sa.gov.au
Victoria	Jim Moran	0418 377 930	jim.moran@agriculture.vic.gov.au
Western Australia	Jeff Russell	0447 851 801	jeff.russell@dpird.wa.gov.au

Other industries have also appointed biosecurity specialists to help producers to implement biosecurity measures on-farm. Contact your peak industry body for details.



