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Our Ref: 23485_GRSF_Response to RFI Letter_V02_Final

5 April 2024

Iwan Davies
Director, Energy Assessments
Department of Planning, Housing and Infrastructure

E| Iwan.Davies@planning.nsw.gov.au

Dear Iwan,

RE: Goulburn River Solar Farm - Response to DPHI RFI dated 31 January 2024

1.0 Introduction

Umwelt was engaged by Lightsource bp Development Services (Lightsource bp) to prepare the Environmental Impact Statement (EIS), Response to Submissions (RtS) Report and Amendment Report 1 (Part A and B) for the Goulburn River Solar Farm Project (the Project). Following review of the RtS and Amendment Report 1 by government agencies, the Department of Planning, Housing and Infrastructure (DPHI) have requested additional information whilst they continue to assess the Project.

This letter has been prepared to provide clarification and/or additional information in response to agency comments on the Amended Project as presented in Amendment Report 1.

2.0 Response to RFI

The Goulburn River Solar Farm RtS Report (Umwelt, 2023a), Goulburn River Solar Farm Amendment Report 1 Part A (Umwelt, 2023b), Amendment Report 1 Part B – Goulburn River Solar Farm Biodiversity Development Assessment Report (BDAR) (Umwelt, 2024a) and Goulburn River Solar Farm Public Road and Culvert Upgrade Works BDAR (Road Upgrades BDAR) (Umwelt, 2024b) were submitted to DPHI to respond to submissions received from agencies and the community on the Project EIS.

Responses to the RtS and Amendment reports were received from the following agencies:

- NSW DPHI;
- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) – Water Team;

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- NSW DPHI (Industrial Assessment) Team;
- Transport for NSW (TfNSW);
- Heritage NSW;
- Upper Hunter Shire Council (UHSC); and
- Mid-Western Regional Council (MWRC).

It is understood that NSW Biodiversity Conservation Division (BCD) is still in the process of formulating a response to the Amended Project. A separate letter will be prepared to address BCD's response, once available and as required.

Lightsource bp met with the following agencies during the Response to RFI process. A summary of these discussions is provided in **Table 2.1** below. Agency advice covered a range of Project aspects, which have been categorised into the following topics and form the subsequent sections below:

- Workforce accommodation
- Traffic and transport
- Hazards and risk
- Heritage
- Water
- Waste
- Other issues

Table 2.1 Summary of consultation during response to RFI stage

Agency consulted with	Consultation date	Consultation summary
DPHI	Ongoing email and phone correspondence following receipt of RFI on 31 January 2024.	• Discussion and email to present Lightsource bp's approach to addressing agency commentary, particularly regarding temporary workforce accommodation and traffic and transport. • Confirmation of an on-site Temporary Workforce Accommodation (TWA) facility being required to support the assessment of the Project. DPHI requested the preparation of an Amendment Report to assess the TWA facility.
TfNSW	21 February 2024	• Discussed Lightsource bp's approach to addressing TfNSW comments on the Amended Project. Attended by TfNSW, DPHI, Lightsource bp, Umwelt, and Turnbull Engineering. • Lightsource bp to undertake additional turn warrant and swept path assessments to further support the assessment of the Amended Project.

Agency consulted with	Consultation date	Consultation summary
UHSC	1. 19 February 2024 2. 26 February 2024 3. 1 March 2024	1. Meeting to confirm Lightsource bp's approach to addressing UHSC's comments on the Amended Project. 2. Lightsource bp presentation to UHSC councillors, including a project update, responses to the issues raised in UHSC's submission, and the key issues raised by the community. 3. Meeting to provide UHSC technical insight into the road upgrades proposed for the Project, and a discussion on how the works might be best delivered.
MWRC	Ongoing email and phone consultation from 13 February to 4 March 2024.	• Email and phone correspondence to confirm Lightsource bp's approach to addressing MWRC's comments on the Amended Project.

2.1 Workforce Accommodation

Both UHSC and MWRC provided commentary regarding TWA required for the Amended Project.

MWRC: "Council notes there is no clear Workforce Accommodation Strategy, and the amendment report refers to multiple options for accommodation for the required construction workforce.

Council notes LSbp has negotiated an option for up to 300 personnel to be accommodated at the proposed Merriwa workforce accommodation camp, with the potential to increase the number of rooms if required. A number of feasible alternatives and complimentary options to the proposed workforce camp at Merriwa have also been identified within the Accommodation & Employment Strategy (AES). On this basis, LSbp note none of the workforce is expected to be accommodated in tourist and visitor accommodation within the Mid-Western region unless they already reside within the LGA.

If the current proposed accommodation strategy changes and LSbp intends to house construction workers in the Mid-Western Region LGA, Council requests approving the AES in addition to other associated Councils prior to consent, as part of the approval process."

UHSC: The Accommodation and Employment Strategy (AES) provided with the Amendment Report proposes that the majority of the construction workforce will be accommodated in a temporary workforce accommodation facility to be built in Merriwa. We note that the development of this proposed facility will require an amendment to the Upper Hunter Local Environmental Plan 2013 and approval of a development application. We also note that construction of the solar farm is expected to commence by mid-2024. Council is concerned that the accommodation strategy relies on the development of a proposed accommodation facility that is yet to be approved and is unlikely to be ready in time to accommodate the construction workforce. We recommend that the applicant put forward a second option if the accommodation facility does not proceed or is not available in time to meet the accommodation needs of the project. The Traffic and Transport Impact Assessment may need to be updated if an alternative accommodation strategy is proposed.

Lightsource bp have consulted further with UHSC and DPHI and confirmed that an alternative accommodation solution is required for the Project, given likely timelines associated with the progression

of the proposed TWA Facility in Merriwa (as described in the Amendment Report 1). Lightsource bp have subsequently identified the option to construct an on-site TWA Facility within the Project Area, which will be assessed as a new Project amendment.

The Goulburn River Solar Farm TWA Facility Amendment Report (Amendment Report 2) will assess the inclusion of the on-site TWA Facility, proposed to be located within the south-western portion of the Project Area, adjacent to the main Project site access point and the construction compound. The on-site TWA Facility is proposed to house up to 400 workers, to meet the workforce requirements during the peak construction period of the Project. In doing so, Lightsource bp reduce the need to rely upon surrounding accommodation options during peak construction. Further details will be provided in Amendment Report 2.

2.2 Traffic and Transport

TfNSW provided commentary in response to the Amended Project:

> *"TfNSW has reviewed the RtS and notes the proponent's endeavours to provide safe and efficient access to the site via Ringwood Road. These endeavours include an upgrade to the intersection of Golden Highway (HW27) and Ringwood Road in addition to a Traffic Management plan (TMP) that all staff, contractors and visitors to the project must adhere to. TfNSW appreciates the effort and work undertaken by the proponent and, in principle is supportive of the proposed mitigation measures, with the following amendments:*
>
> - *The existing Basic Right (BAR) turn treatment on Golden Highway is upgraded to a Channelised Right (Short) {CHR(s)] turn treatment. This is necessary given turn warrant treatments provided in Austroads Guide to Traffic Management Part 6 and the additional traffic that will pass through the intersection (eastbound) by virtue of the proposed TMP left out only turn movement onto Golden Highway and U-turn facility on Barnett Street.*
> - *Measures to be employed to enforce and monitor compliance of the TMP, in particular the turn movement restrictions for vehicles entering the Golden Highway.*
> - *Confirmation from Upper Hunter Shire Council of their approval of the use of Barnett Street for U-turn movements.*
> - *Confirmation that the U-turn movement is performed within the Barnett Street road reserve, or alternatively, land owner's consent where the movement is outside the road reserve."*

Consultation with TfNSW was undertaken on 21 February 2024 to discuss the proposed approach to address TfNSW's response to Amendment Report 1. The key points raised during the meeting are summarised below:

- Lightsource bp to undertake a revised turn warrants assessment using a 1.6% growth factor as per TfNSW guidelines, rather than the conservative 2% previously applied. Should this result in the same outcome, consider committing to traffic movements outside of peak times.
- Lightsource bp to undertake a Swept Path Assessment for the existing BAR into Ringwood Road.
- TfNSW raised no further comment in relation to the three remaining components of their response.

Responses to advice received from TfNSW on the Amended Project as well as through subsequent consultation are presented below.

2.2.1 Turn Warrants Assessment

Following receipt of TfNSW's response to the Project, further traffic assessment was undertaken by Turnbull Engineering (Turnbull), including provision of additional justification regarding the turn warrants assessment and completion of a turn path assessment at the Golden Highway and Ringwood Road intersection. The additional traffic assessment is provided in **Appendix A** and summarised below.

The existing and current treatments at this intersection include:

- Basic right (BAR) treatment for right turn movements from Golden Highway to Ringwood Road.
- Basic left (BAL) treatment for left turn movements from Golden Highway to Ringwood Road.

The Amendment Report 1 (Umwelt, 2023b) proposed to complete upgrades at the intersection including:

- Full auxiliary left-turn (AUL) turn treatment for left turn movements from Golden Highway to Ringwood Road.
- No upgrades were proposed for right turn movements as this movement was not to be undertaken by Project-related construction vehicles and was 'on the threshold' of alternative treatment.

Table 4.4 of **Appendix A** presents the results of the turn warrants assessment for cumulative construction vehicles, which show the Golden Highway left turn being marginally above the threshold for a AUL turn treatment, and the Golden Highway right turn being on the threshold of a BAR or Channelised Right (short) (CHRs) lane turn treatment being warranted during AM peak, being 7:15 am to 8:15 am.

In discussions with TfNSW on 21 February 2024, it was determined that the 2% growth rate applied in the Amendment Report 1 was overly conservative and that TfNSW recommended the assessment was revised using a background growth rate of 1.6% (reduction from 2% per annum). Applying the lower background growth rate had minimal impact on the outcome of the turn warrants assessment, with the results indicating the same outcome as previously assessed: i.e. right turns during the AM peak period continued to remain on the threshold for a CHR(s) turn warrant treatment when considering cumulative construction traffic.

It is noted that the turn warrants assessment represents a worst-case scenario and the actual cumulative traffic volumes would likely be lower than those assessed. In response, Lightsource bp propose to limit Project-related vehicle movements to outside of the AM peak period when cumulative traffic levels along Golden Highway exceed the threshold for a CHRs turn treatment during the AM peak period.

This would be managed through periodic collection of mid-block traffic volumes to determine whether bi-directional traffic volumes on Golden Highway exceed 380 vehicles during the Project construction period, with the 380-vehicle limit being the threshold for movements along Golden Highway (i.e. the 'Qm' value where the orange R would meet the red line in Table 4.3 of **Appendix A**).

2.2.1.1 Turn Path Assessment

TfNSW also requested the preparation of a Turn Path Assessment for the existing BAR for right turn movements at the Golden Highway onto Ringwood Road. The turn path assessment is included in **Appendix A** of this letter and is summarised below.

The Goulburn River Solar Farm design vehicle (i.e. a 19 m prime mover and semi-trailer) has been assessed as able to utilise the existing BAR facility to bypass a 19 m prime mover and semi-trailer (non-Project related design vehicle). Due to the existing design of the intersection, the design vehicle would however be within the shy line of the barrier and end terminal.

Whilst this meets design requirements, it is not the most optimal outcome with respect to vehicle safety. As such, Lightsource bp are proposing additional works to alter the existing barrier and end terminal currently in place at the intersection, to ultimately improve the safety of road users. Lightsource bp propose to relocate the safety barrier approximately 2 m to the east from the existing starting position, which would continue for approximately 35 m south, lining back up with the existing barrier location. This would provide additional space to allow a vehicle to safely overtake a vehicle waiting to turn right onto Ringwood Road. The alteration of the safety barrier would require an extension of the existing road pavement to the altered barrier, creating a disturbance area of approximately 51.3 m^2. The location of the proposed safety barrier alteration, and extent of the safety barrier disturbance area, are presented in **Figure 2.1** below.

This area consists of the existing road batter and vegetated table drain. It contains exotic and previously disturbed vegetation as identified during field inspections undertaken to support the Road Upgrades BDAR (Umwelt, 2024b). Canopy trees in the vicinity of the proposed works were predicted to conform to Plant Community Type (PCT) 483 (Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley), however the alteration of the safety barrier would not impact upon these trees and therefore will not impact on PCT 483. The existing PCTs within the vicinity of the proposed safety battier alteration works are illustrated in **Figure 2.2.** It is also noted that this area was previously surveyed for Aboriginal and historic heritage significance as part of the EIS Project and was deemed to contain no heritage significance.

As a result of the above, it is concluded that no further biodiversity or heritage assessment would be required to support the alteration of the safety barrier.

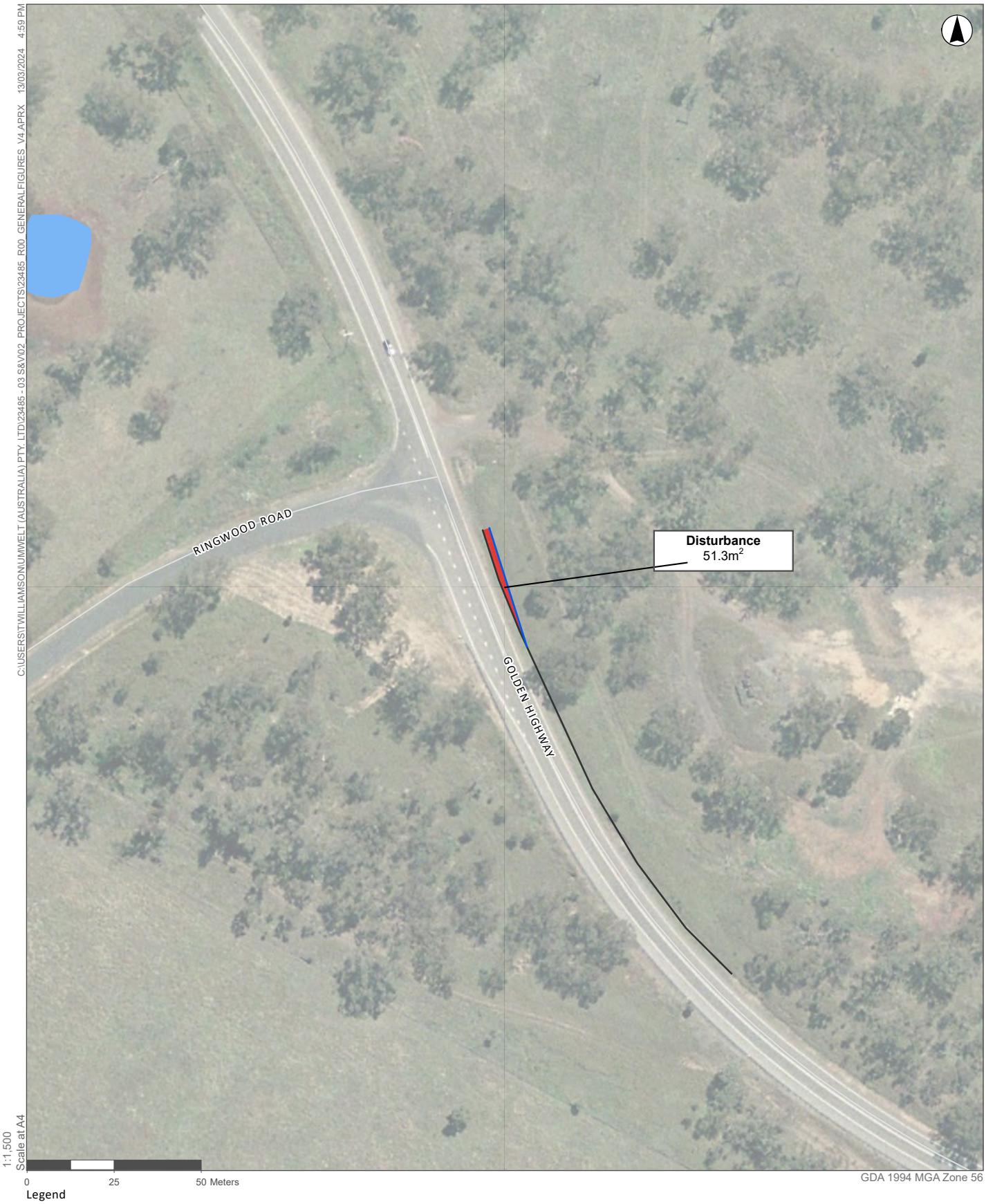


FIGURE 2.1

Altered Safety Barrier Disturbance Area

Image Source: ENSW Public Imagery (2023) **Data source:** NSW LPI (2023), NSW DSFI (2023); NPWS Estate (2023); Lightsource BP (2023)

Legend

- Proposed Indicative Safety Barrier
- Existing Safety Barrier
- Proposed Safety Barrier Disturbance Area
- Waterbodies
- Roads and Tracks

Plant Community Types

- Cleared Land - Road Surface
- Exotic Dominated Grassland
- PCT 483 Grey Box x White Box grassy open woodland on basalt hills in the Merriwa region, upper Hunter Valley

FIGURE 2.2

Mapped PCT's within the Altered Safety Barrier Disturbance Area

Image Source: ENSW Public Imagery (2023) **Data source:** NSW LPI (2023), NSW DSFI (2023); NPWS Estate (2023); Lightsource BP (2023)

2.2.2 Traffic Management Plan (TMP) measures

As previously outlined in Section 5 of the Amended Traffic and Transport Impact Assessment (TTIA), the left-in, left-out arrangement for Project construction vehicles at the Golden Highway and Ringwood Road intersection would be enforced by implementing the following:

- Periodic monitoring camera/s to be installed at the intersection, with footage to be reviewed to ensure necessary corrective measures are taken to ensure compliance.
- Traffic controllers to undertake spot checks at the intersection for compliance.
- Site inductions and daily toolbox talks for drivers to include return route identification.
- Installation of additional signage on Ringwood Road stating that "site traffic must turn left".
- As part of the Construction Traffic Management Plan (CTMP), a Vehicle Movement Plan that clearly shows the construction vehicle routes and permitted movements. The CTMP would also include a Drivers Code of Conduct that construction vehicle drivers would need to read and sign to confirm their responsibilities and reinforce correct behaviour.

It is understood that the preparation and implementation of the CTMP would be included as a condition of consent upon project approval, which is considered as the appropriate mechanism for the enforcement and monitoring of compliance of the CTMP.

2.2.3 Barnett Street – Intended Use and Approval

Appendix J of the Amended TTIA included swept paths for the proposed U-turn area at Barnett Street. Additionally, Upper Hunter Shire Council is the owner of Barnett Street (a Council public road) and provided consent for the use of Barnett Street for the purposes of the amended project. Evidence of this consent was provided as Appendix B of the Amendment Report 1.

No additional confirmation was required following discussion with TfNSW.

2.2.4 Additional Traffic Commentary

UHSC and MWRC provided the following comments in relation to traffic and transport for the Amended Project:

UHSC: "Council is satisfied that the proposed changes to the transport route and upgrades to the intersection of the Golden Highway and Ringwood Road as outlined in the Amendment Report have substantially addressed the concerns raised in our original submission.

In relation to the proposed culvert upgrades on Ringwood Road at Bow River and Killoe Creek (Page 33 of the Traffic and Transport and Impact Assessment), it is requested that the proposed culvert widths be increased from 7 metres to 8.4 metres (between barrier rails) to ensure compliance with Council's road design standards.

In addition to the above, should the application be approved, we recommend that a condition of consent be imposed requiring Barnett Street to be sealed for a minimum distance of 30 metres from the intersection with the Golden Highway to minimise the potential for loose gravel to be deposited on the highway."

Lightsource bp have reviewed the current Project design and have confirmed the following culvert widths included in the Project design are consistent with Council's road design standards:

- Killoe Creek – 9.6 m wide culvert
- Bow Creek – 9.88 m wide culvert

Lightsource bp has provided UHSC with annotated drawings showing the width of the respective culverts during consultation throughout the Response to RFI phase. UHSC will also be provided with Issued for Construction (IFC) Project designs and drawings prior to construction of the Project.

As discussed with UHSC through the Response to RFI phase, Lightsource bp have agreed to support the proposed sealing of Barnett Street, whether that be in the form of financial or in-kind support, which would be confirmed prior to construction. Lightsource bp have been in preliminary discussions with UHSC's Infrastructure Services and Works Delivery teams and confirm that these works will not be led by Lightsource bp as part of the development application for the Project.

MWRC: "Council notes the project's primary vehicle access route to the development footprint is now via Golden Hwy, Ringwood Rd, Wollar Rd. This does not affect roads under the control of MWRC. Section 1.3.6 Appendix A Updated Project Description indicates a peak construction force of 350, with 10% workers expected to be sourced locally (Merriwa, Mudgee, Gulgong, and Rylstone), with the majority of the construction workforce being accommodated within worker camps situated in Merriwa.

The Amendment Report also notes that an analysis of existing Construction and Manufacturing businesses within the study area indicated that Mid-Western Region LGA has the largest number of businesses with likely capability to service the Amended Project. Based on this information, assuming the potential for all local workers to come from the MWRC LGA, it may be anticipated that an additional 70 vehicle trips plus per day could be generated on 1.32km length of Ringwood Rd and 35 additional movements in AM/PM peak hour through the Wollar Rd/Ringwood Rd intersection. Ringwood Rd is an unsealed local road carrying low traffic volumes under existing conditions (<14 vehicle movements during peak hours). The formation width is 6m. Whilst the forecast traffic volumes on this road remain low during the construction period, Council requests the proponent either;

1. *Provide contribution to seal the 1.32km road or*
2. *Provide contribution towards increased maintenance of the unsealed road.*

Council also requests if any transport of construction workers is to and from the Mid-Western Region LGA, that the conditions include Council's approval of the transport plan, in addition to other associated Council prior to consent as part of the approval process."

Lightsource bp commit to undertaking pre and post dilapidation surveys along the 1.32 km stretch of Ringwood Road that sits within the Mid-Western Region Local Government Area (MWR LGA) to demonstrate commitment to the maintenance of this road.

Non-local worker Project traffic will not utilise the road network in the MWR LGA to access the Project site. If this approach changes and there is a proposal to include MWR LGA roads within the CTMP, the CTMP would be developed in consultation with and to the satisfaction of MWRC.

2.3 Hazards and Risk

DPHI (Industrial Assessment) team provided commentary on the Amended Project:

"…the Department requests the following information for the amended proposed development.

Inconsistencies
1. Given the inconsistencies within Appendix G clarify and confirm the information in the amended report to be consistent with the amended scope change.

Spacing of Batteries
2. Considering the Li-ion battery will be located outdoor and Section 2.3.2 of FM Global Datasheet 5-33 is the correct reference for outdoor battery, provide further justification for the spacing of batteries to minimise the risk of propagation between batteries.

3. Update the area requirements of the BESS based on the findings of Item 1 and Item 2 if required."

As part of the Amended Project, Lightsource bp is proposing three BESS options:

- A centralised BESS with a proposed capacity of 450 MWp/900 MWh
- A decentralised BESS with a proposed capacity of 580 MWp/1160 MWh
- A combined centralised and decentralised BESS with a total capacity of 1,030 MWp/2,060 MWh

The location of the centralised AC-coupled BESS and the distribution of the decentralised DC-coupled BESS battery stations is shown on Figure 3.6 of the Amendment Report 1. The conceptual layout of the centralised AC-coupled BESS is presented in **Figure 2.3.**

The proposed centralised AC-coupled BESS includes:

- 258 battery storage cabinets approximately 6 m long, 2.4 m wide and 2.9 m high per station.
- A manufacture's specified energy storage capacity of 3.686 MWh per battery cabinet.
- A total nominated aggregate operational energy storage capacity for approximately 258 battery storage cabinets of 900 MWh.
- Cabinets installed with a space between facing battery storage units of up to 4.5 m. It is noted that in accordance with FM Global's Property Loss Prevention *Data Sheet 5-33 Lithium-Ion Battery Energy Storage Systems* (2023) the recommended minimum separation distance between the sides of lithium iron phosphate batteries containing access panels, doors or deflagration vents would be separated by at least 1.5 m (5 ft).
- A hardstand area for the centralised AC-coupled BESS of approximately 339 m by 185 m to allow for a separation distance between combustible vegetation and battery storage units of at least 3 m (10 ft) in accordance with *NFPA 855 Clause 443.6*[1].
- Access roads running between the banks of batteries are provided within the centralised AC-coupled BESS area.
- An AC-coupled BESS compound with a footprint of approximately 6.2 ha. Based on a maximum 'faceplate' storage capacity of 950 MWh, the approximate stored energy density of the centralised AC-coupled BESS would be 15 kWh/m^2.

The conceptual layout of a decentralised DC-coupled BESS battery station showing separation distances of the battery units per power conditioning system (PCS) is presented in **Figure 2.4**. The proposed decentralised DC-coupled BESS includes:

- 70 battery stations with a maximum of 8 battery storage units approximately 6.0 m long, 2.4 metres wide and 2.9 m high per station.
- A manufacturer's specified energy storage capacity of 3.686 MWh per battery cabinet.
- A total nominated aggregate operational energy storage capacity for approximately 315 battery cabinets of 1,160 MWh.

[1] *National Fire Protection Agency, "Standard for the Installation of Stationary Energy Storage Systems," NFPA 855, 2023*

- Cabinets installed with a space between facing battery storage units of up to 4.5 m. It is noted that in accordance with FM Global's Property Loss Prevention *Data Sheet 5-33 Lithium-Ion Battery Energy Storage Systems* (2023) the recommended minimum separation distance between the sides of lithium iron phosphate batteries containing access panels, doors or deflagration vents would be separated by at least 1.5 m (5 ft).

- A hardstand area for each DC-coupled battery station of approximately 25 m by 35 m to allow for a separation distance between combustible vegetation and battery storage units of at least 3 m (10 ft) in accordance with *NFPA 855 Clause 443.6*.

- A buffer zone between each DC-coupled battery station and the solar panels approximately 5 m or greater.

- An access road running adjacent to each DC-coupled battery station.

- Each DC-coupled battery station compound would have a footprint of approximately 400 m^2. Based on a maximum 'faceplate' battery station capacity of 29.5 MWh capacity, the approximate stored energy density of the of a decentralised DC-coupled BESS battery station would be 34 kWh/m^2.

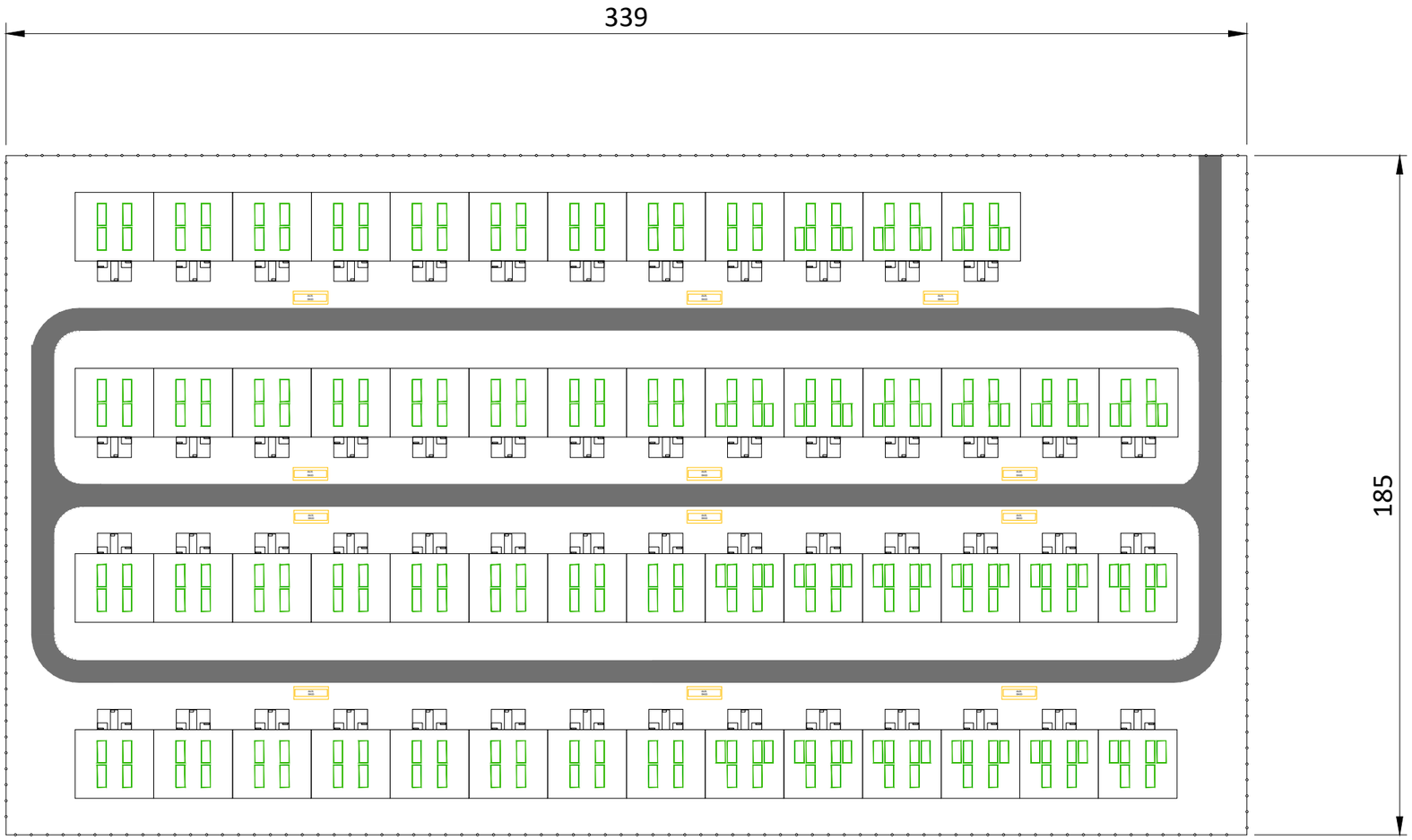
It is considered that there will be sufficient area within the centralised AC-coupled BESS and each of the DC-coupled battery station to enable adequate separation distances between adjacent battery cabinets and other sensitive equipment to achieve non-propagation of thermal incidents.

Figure 2.3 - Goulburn River AC Coupled BESS

LEYEND

	Hithium ESS Container 3.686MWh
	AC LV Auxiliary skid
	Power Conversion Station (PCS)

258 containers x 3.686MWh
54 PCS x 2 Inverters x 4.2MWac
12 Aux. AC LV Skids
453.6MW/901.0MWh system



METERS
0 25 50 75 100

A3 - (420 x 297)mm

Goulburn River AC Couple BESS			
FC			21.03.2024
DRAWN	CHECKED	APPROVED	DATE
Paper Size: A3	Scale: 1:1500@A3	Sheet: 1	
DRAWING NUMBER: TWS_02	STATUS: Preliminary		

lightsource bp
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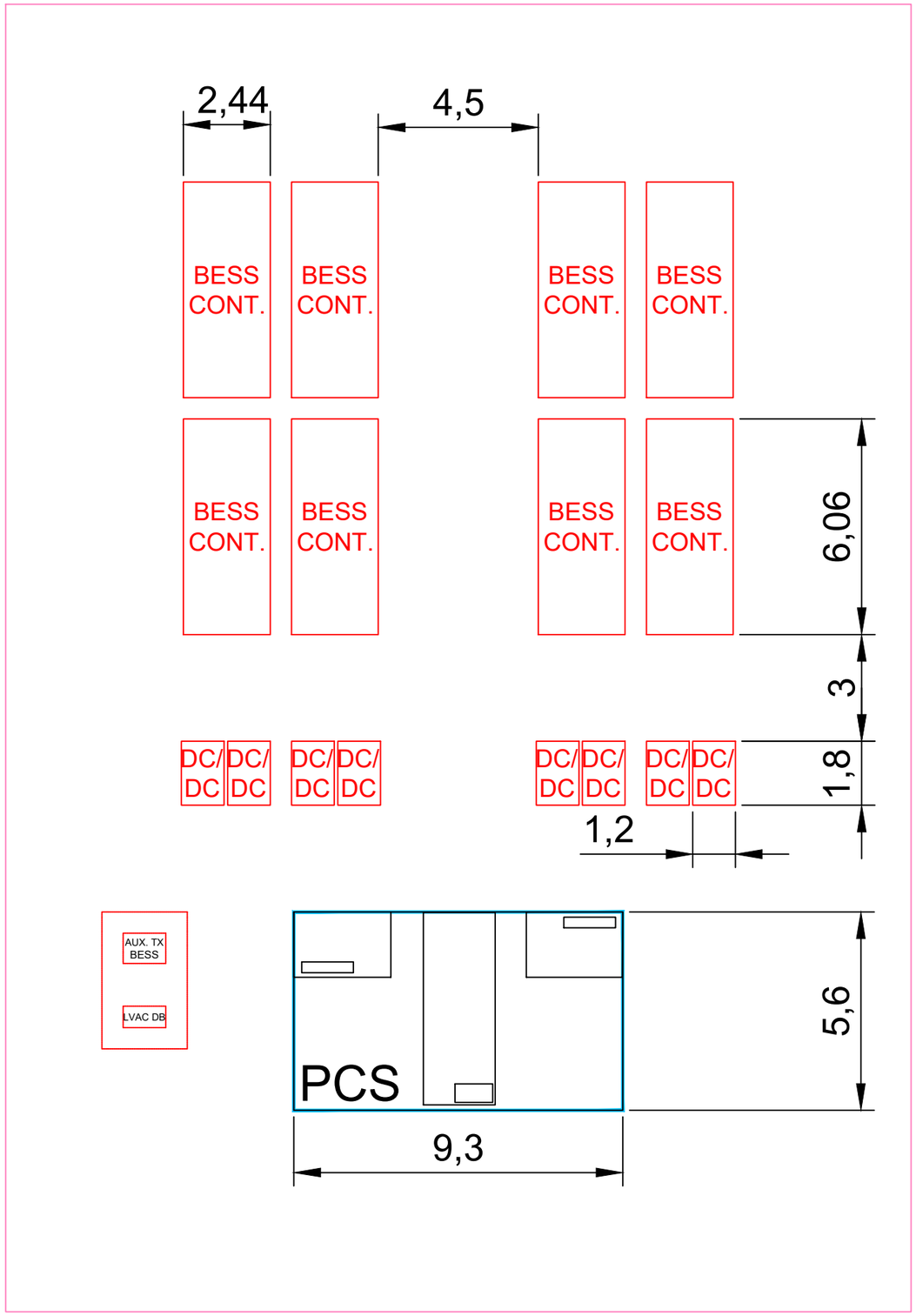
Figure 2.4 - AUS_Goulburn River_PCS + BESS LAYOUT_03 (Alt.4B)

ISO full bleed A3 (420.00 x 297.00 MM)



LEGEND

- BESS SoW
- Aux. LV power for BESS (BESS SoW)
- Setback

Revisions:

Rev	Date	Comments	Dwn	Chkd
1-4B	19.03.24	Concept layout PCS with BESS DC coupled	FC	-

DRAWN	CHECKED	APPROVED	DATE
FC			19.03.24

PROJECT NAME & ADDRESS:
Goulbuirn River Solar Farm
Goulburn River, Merriwa NSW 2329
Lat: -38.28 S
Long: 150.10 E

NOTES:
1. Concept arrangement for information

Paper Size:	Scale:	Sheet:
##	n.t.s.	01

PROJECT: Goulburn River

DRAWING TITLE: AUS_GOU_BESS_Layout_03 - PCS & BESS (Alt.4B)

DRAWING NUMBER:	STATUS:
GOU_TWS_03 (Alt.4B)	Preliminary

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2.4 Heritage

Heritage NSW provided the following commentary on the Amended Project:

> *"The responses provided by Lightsource bp Development Services Australia Pty Ltd and Umwelt (Australia) Pty Ltd and the Addendum ACHAR have adequately addressed comments provided by Heritage NSW on Aboriginal cultural heritage (ACH) matters related to the SSD. Heritage NSW supports the updated Recommendations (Section 8 of the Addendum ACHAR) for the Amended Project. With respect to ACH, however, Heritage NSW does make note of the following:*
>
> - *It is understood that a Project update letter was sent to Registered Aboriginal Parties (RAPs) on the 29 August 2023. This update letter indicates that the Addendum ACHAR would be sent to RAPs following preparation of the draft. Please provide evidence that the Addendum ACHAR was provided to RAPs for review and comment.*
> - *The updated Mitigation and Management Measures presented in Appendix B of the RtS Report require further updates to ensure consistency with the updated recommendations in the Addendum ACHAR and Amendment Report relating to ACH including:*
>   - *The total number of Aboriginal sites to be salvaged from within the Development Footprint must be revised from eight to seven to reflect avoidance of Aboriginal site Redlynch Creek IF1 (AHIMS 37-1-1027).*
>   - *The new recommendation relating to further recording and investigation of the grinding groove site (Killoe Creek GG1; AHIMS 37-1-1033) prior to construction activities must be added."*

Evidence of consultation with and provision of the Addendum ACHAR to the RAPs is included as **Appendix B** to this letter.

It is noted that both of the recommendations above were presented in pages C-3 and C-4 of Appendix C of the Amendment Report 1 Part A (Umwelt, 2023b), which was submitted to DPHI after the RtS report (Umwelt, 2023a). These measures superseded the RtS report and associated mitigation measures, and it is confirmed that the recommendations presented above by HNSW have been appropriately documented.

2.5 Water

NSW DCCEEW Water provided the following commentary on the Amended Project:

"The DCCEEW Water group has reviewed the Amendment and Response to Submissions reports and provides the following recommendation:

Post approval
Works within waterfront land need to be in accordance with the Guidelines for Controlled Activities on Waterfront Land.

Explanation
Insufficient information has been provided to confirm if the proposed project is in accordance with the Guidelines for Controlled Activities on Waterfront Land. The area in the north-east around Redlynch Creek should have a setback from second and third order watercourses. The area is the south-western corner around the tributaries of Rocky Creek should also have setbacks for the mapped third order and east-west running second order watercourses. The difficultly confirming this may be based on map scale but these setbacks must be provided if they have not already been provided."

The Amended Aquatic Assessment prepared to support the Amendment Report 1 (Umwelt, 2023b) notes that works would be undertaken within waterfront lands within the Development Footprint, including at Redlynch Creek and the unnamed tributary of Rocky Creek. Where a watercourse does not exhibit the features of a defined channel with bed and banks, the watercourse is not waterfront land for the purposes of the *Water Management Act 2000*.

Indicative watercourse setbacks are illustrated within figures presented throughout the Goulburn River Solar Farm EIS (Umwelt, 2023c). Lightsource bp confirm that waterfront land will be electronically mapped for accuracy and that watercourse setbacks will be derived in accordance with the Guidelines for Controlled Activities on Waterfront Land. This information would be ground-truthed prior to construction of the Project and clearly presented within the Construction Environmental Management Plan (CEMP), and any relevant sub-plans i.e. a Soil and Water Management Plan (SWMP).

Works within waterfront land would occur throughout construction of access roads, watercourse crossings and trenching to lay cables. Construction works will avoid waterfront land as much as feasibly possible, and any work undertaken within waterfront land would be done so in accordance with the Guidelines for Controlled Activities on Waterfront Land. This will include stabilisation of beds and banks of established watercourses with. This measure would also be presented in the CEMP, SWMP and Biodiversity Management Plan.

MWRC provided the following comment in relation to construction and potable water use for the Project:

"Council notes water for construction would be sourced from commercial suppliers in the nearby region (via water trucks), and farm dams located within the Project Area. The associated water demand for the project would likely be in the order of 11.26 megalitres (ML) for the 27-month construction period.

Construction Water - At this point in time, the Proponent should not depend on Mid-Western Regional Council water sources (directly or through third parties) for construction activities, as the capacity to supply this does not exist. Council is willing to discuss this further with the LSbp to investigate alternative opportunities for construction water sources if required.

Potable Water - Council advises it does not currently have the capacity to support a potable water requirement. Potable water will be required to be sourced from alternate sources and cannot be sourced from local water carters accessing Council's licenced potable supply. The Proponent may require purchasing a water license to access additional water for this project."

Lightsource bp acknowledge the construction and potable water constraints within the MWR LGA and note that Council water cannot be accessed through any third-party resource that may use Council water sources. As outlined in Appendix K of the Amendment Report 1, water sources would be determined in consultation with suppliers and landholders. Where further licenses are needed to access water from these sources or licence amendments are required, these will be secured by Lightsource bp prior to the water being used.

2.6 Waste

MWRC provided the following comment in relation to construction waste generation for the Project:

"Council notes the Waste Management Plan will be developed in consultation with the Upper Hunter Shire Council and surrounding LGAs including Mid-Western Regional Council.

In this regard, Council wishes to advise that none of its waste facilities are appropriate or capable of handling the disposal of landfill waste generated by the project. The Mudgee Waste Facility has limited capacity to accommodate enormous quantities of landfill material likely to be generated by the project, as the existing Waste Cell is almost exhausted. All of Council's other waste facilities are waste transfer stations (including Kandos) accepting residential waste only, which is then transported to Mudgee waste facility. They are not suitable to accept waste from this project. Please note any contract with a third-party waste company does not mean that materials collected can automatically be taken to a Mid-Western Region facility."

Lightsource bp acknowledge that the current waste management services within the MWR LGA are unable to accept additional Project-related wastes. It is noted that the Goulburn River Solar Farm EIS identified numerous locations outside of the MWR LGA where Project-related wastes (that cannot be reused or recycled) could be disposed of.

Lightsource bp commits to continue liaising with UHSC and Muswellbrook Shire Council during detailed design and throughout the preparation of the Waste Management Plan, to confirm the quantity and type of wastes requiring disposal at a licenced facility.

2.6.1 Sewer

MWRC provided the following comment in relation to construction waste generation for the Project:

> *"Council notes there is no sewer access in the Project Area. Therefore, construction amenity facilities would be pumped out via tanker and delivered to the nearest sewage treatment facility, or as agreed with Upper Hunter Shire Council during construction. Council advice is that Gulgong, Rylstone, or Kandos Sewage Treatment Plant's (STP) do not have any facilities to receive septage or sewage collected/tankered from sites not serviced by the town sewage collection system. In the Mid-Western Region, Mudgee STP is the only site that can receive such tankered waste. Mudgee STP has an existing septage disposal facility designed to receive up to 20KL/day of tankered sewage/septage. This facility has been designed to receive septage from Council's rural domestic customers. Mudgee STP has no capacity to accommodate additional loading of sewage at this point in time.*
>
> *As such any capacity made available to this commercial project will need to be via consideration of STP upgrades. Council is willing to discuss this further with the Proponent to investigate opportunities for sewage disposal. If STP upgrades are not carried out, Council requires the Proponent to have suitable sewage treatment and treated effluent application facilities onsite without the need for sewage transfer to Council facilities."*

Lightsource bp acknowledge that the sewer facilities within MWR LGA cannot service the needs of the Project. Construction amenity facilities would be pumped out via tanker and delivered to a sewage treatment facility, to be agreed with UHSC during construction. Additionally, as noted in the Goulburn River Solar Farm EIS, it is likely that a septic system would be installed for the operational amenities, which would be constructed and managed in accordance with the UHSC Liquid Trade Waste Regulation Policy 2016.

2.7 Other Issues

Table 2.2 below provides a response to other features raised in agency submissions.

Table 2.2 Response to other features raised by agencies

Feature	Agency Comment	Proponent Response
MWRC		
General comments	Council's comments on the Amendment Report Appendices. 1. Council would like to clarify that Mudgee, Gulgong, Rylstone, Kandos, and Wollar are in the MWR LGA. 2. Table 2.4 Key Township Overview notes Wollar and Kandos in Muswellbrook LGA (Rylstone is not noted in the overview). 3. Table 2.6 Key Township Housing Overview has Kandos in Muswellbrook LGA. 4. Table 2.7 Community Facilities and Services - Police Stations - Dunedoo is not in the MWR LGA, the Kandos, Gulgong and Rylstone police stations are not staffed full time. 5. Key Transport Infrastructure - Mudgee does not have a train station.	Lightsource bp acknowledges all comments provided by MWRC and notes that MWRC is correct. The clarifications made by MWRC supersede the information presented in the relevant sections of the Amendment Report 1 appendices.

Feature	Agency Comment	Proponent Response
	6. 1.3.6 Construction workforce notes Mudgee, Gulgong, and Rylstone, not Kandos for local workforce, but Kandos has been referred to often in the report, not Rylstone.	
UHSC		
Planning agreement	We confirm that Council is continuing to work with LSbp regarding the preparation of a planning agreement. We anticipate the planning agreement will be placed on public exhibition in the coming months.	Noted.
Bushfire	In relation to bushfire impacts, the applicant's response adequately addresses our concerns. However, should the application be approved, we recommend the imposition of a condition of consent requiring the provision of a dedicated water supply for bushfire protection in accordance with the requirements of the NSW Rural Fire Service.	Noted, Lightsource bp support this condition being consented.
Rehabilitation	Whilst the applicant is committed to the decommissioning and rehabilitation of the Project in accordance with the Decommissioning and Rehabilitation Management Framework (Appendix 21 of the EIS), Council is concerned that the solar farm could be abandoned at the end of the asset's useful life, leaving property owners to decommission and rehabilitate the site. The applicant should be required to provide some form of security (e.g. bank guarantee) to ensure the solar farm is decommissioned and rehabilitated following the cessation of operations. We note that the draft Private Agreement Guideline prepared by DPE and currently on public exhibition as part of the State government's Draft Energy Policy Framework, recommends that host agreements between a project developer and a landowner includes the provision of security by the developer.	Lightsource bp confirm that they are the owner of the land and commit to undertaking decommissioning and rehabilitation in line with the conditions of consent. This is considered sufficient in addressing UHSC's comment, as discussed in the virtual meeting with UHSC on 16 February 2024.

3.0 Conclusion

We trust this information adequately satisfies DPHI (and agency) requirements. Please do not hesitate to contact the undersigned, or Lightsource bp directly via email (beth.kramer@lightsourcebp.com or stephen.archer@lightsourcebp.com), should you require clarification or further information.

Yours sincerely

Thomas Buchan
Environmental Consultant

E | tbuchan@umwelt.com.au
M| 0401 452 790

References

Umwelt, 2023a. Goulburn River Solar Farm Response to Submissions Report. December 2023

Umwelt, 2023b. Goulburn River Solar Farm Amendment Report Part A. December 2023

Umwelt, 2023c. Goulburn River Solar Farm Environmental Impact Statement. May 2023

Umwelt, 2024a. Goulburn River Solar Farm Amendment Report Part B. January 2024

Umwelt, 2024b. Goulburn River Solar Farm Public Road and Culvert Upgrade Works Biodiversity Development Assessment Report. January 2024.

Appendix A – Traffic Memo

Memo Title	Golden Highway and Ringwood Road Turn Warrants Assessment
Document Number	TEJ0305-MEM-0003
Recipient	Umwelt
Prepared by	Richard Banzon, Dmitry Shirokov
Revision	Final Rev B
Date	05/04/2024

1. Introduction

This memorandum outlines the turn warrants assessment carried out and documented in the Amended Traffic and Transport Impact Assessment (TTIA) for the Goulburn River Solar Farm Response to Submissions (RtS). The turn warrants assessment informed the development of the strategic design of the Golden Highway / Ringwood Road intersection upgrade proposed as part of the Goulburn River Solar Farm (the Project). All Project construction vehicles would travel through this intersection as it provides primary access to the site between the arterial and local road network.

Transport for NSW (TfNSW) have provided comments on the Amended TTIA which included the following:

The existing Basic Right (BAR) turn treatment on Golden Highway is upgraded to a Channelised Right (Short) (CHR(s)) turn treatment. This is necessary given turn warrant treatments provided in Austroads Guide to Traffic Management Part 6 and the additional traffic that will pass through the intersection (eastbound) by virtue of the proposed TMP left out only movement onto Golden Highway and U-turn facility on Barnett Street.

This memorandum also provides justification on why a CHR(s) treatment is not required at the intersection to meet the turn warrants and hence was not included in the design of the intersection upgrade.

Following a meeting with DPE and TfNSW, this memorandum has been updated to include the following:

- Revised turn warrants assessment with a lower background traffic growth rate (1.6% per annum)
- Additional turn warrants assessment for a period outside of the road network AM peak hour
- A swept path assessment of the existing BAR.

2. Existing Intersection Volumes

Intersection turning movement volumes were collected at the Golden Highway / Ringwood Road intersection on Thursday, 31 March 2022, from 6:00am to 10:00am and 3:00pm to 7:00pm. On the surveyed day, the intersection experienced a morning peak hour from 7:15am to 8:15am and an evening peak hour from 3:00pm to 4:00pm. These peak hour intersection volumes are shown in Figure 2-1.

A review of the Golden Highway eastbound right turn volume into Ringwood Road showed a maximum hourly volume of 5 vehicles during the survey period.

Traffic volumes on the Golden Highway east of Ringwood Road were also collected as part of speed surveys carried out in October 2023. A review of the 2023 volumes on the Golden Highway from the speed surveys for the same morning and evening peak hours showed a similar volume compared to the 2022 intersection counts.

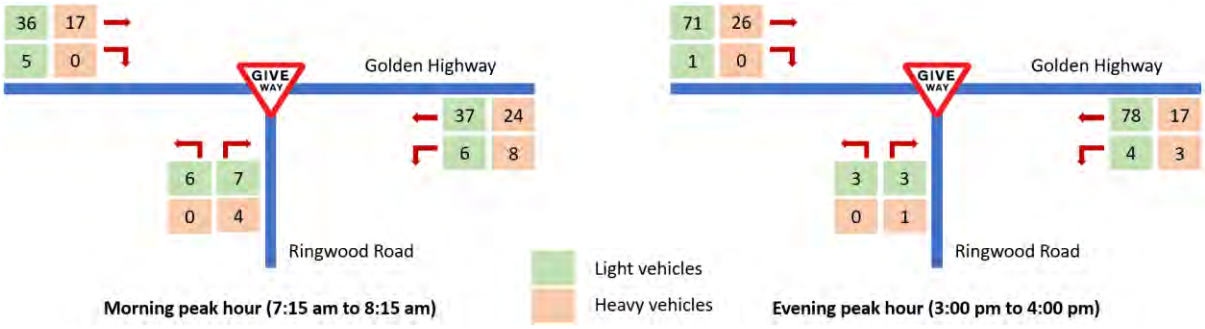


Figure 2-1: Peak hour traffic volumes at the Golden Highway / Ringwood Road intersection

3. Future Intersection Volumes

The peak construction year assessed in the EIS was 2025. The construction turn warrants assessment included Project construction volumes (see Figure 3-1), a two per cent per year background traffic growth rate (based on *Golden Highway Corridor Strategy*, (TfNSW 2016)) and cumulative volumes generated by other nearby projects (see Figure 3-1).

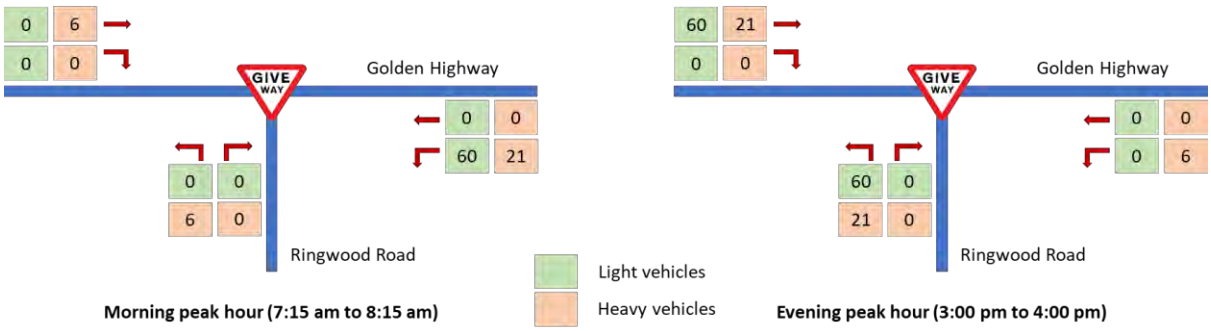


Figure 3-1: Project construction peak hour traffic volumes at the Golden Highway / Ringwood Road intersection

Table 3-1: 2025 peak hour volumes from other projects on the Golden Highway

Project name	Light vehicles	Heavy vehicles	Assumptions
Stubbo Solar Farm	N/A	6	• Light vehicle routes do not overlap with Project
Liverpool Range Wind Farm	10	26	• Derived from peak daily volumes • 16 per cent of daily volume to occur during peak hours, as per Austroads Guide to Road Traffic Management Part 6 • One third of daily light vehicle trips to/from Merriwa via Golden Highway, as outlined in planning documents
Valley of the Winds Wind Farm	N/A	4	• Light vehicle routes do not overlap with Project
Tallawang Solar Farm	75	15	• A quarter of light vehicle trips to/from Merriwa via Golden Highway, as outlined in planning documents • 10 per cent of daily heavy vehicle volume to occur during peak hours, as outlined in planning documents
Birriwa Solar Farm	N/A	14	• Light vehicle routes do not overlap with Project
Spicers Creek Wind Farm	N/A	27	• Light vehicle routes do not overlap with Project
Bowdens Silver Project	N/A	5	• Light vehicle routes do not overlap with Project • Heavy vehicles derived from peak daily volumes • 16 per cent of daily volume to occur during peak hours, as per Austroads Guide to Road Traffic Management Part 6
Cumulative total	**85***	**97****	

*85 inbound trips during the morning peak hour and 85 outbound trips during the evening peak hour

**97 inbound and 97 outbound trips during the morning peak hour and evening peak hour

4. Turn Warrants Assessment

The turn warrants assessment caried out was based on the *Guide to Road Traffic Management Part 6: Intersections, Interchanges and Crossings Management* (Austroads, 2020) as shown in Figure 4-1 and Figure 4-2.

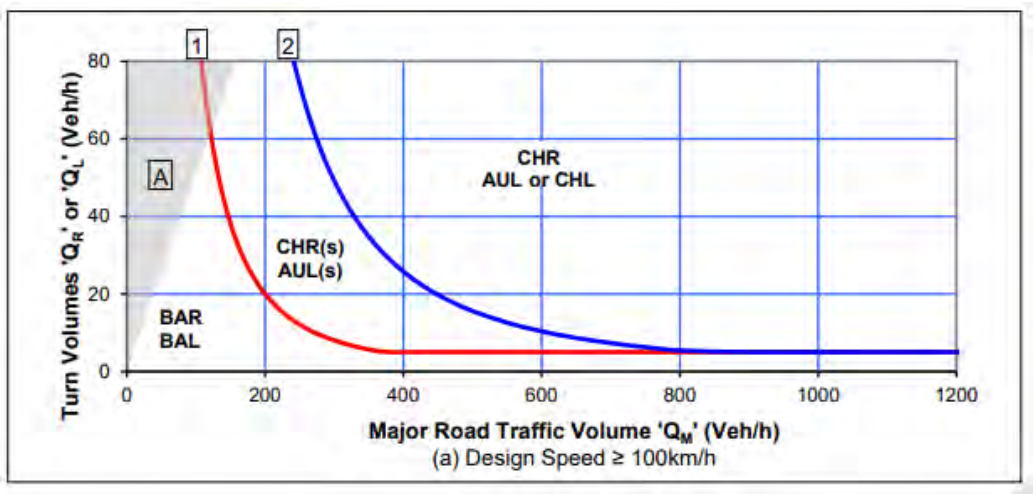
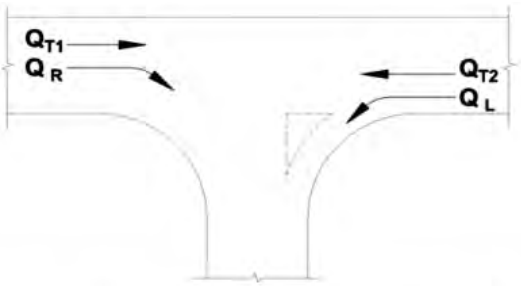


Figure 4-1: Warrants for turn treatments on the major road at unsignalised intersections



Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= $Q_{T1} + Q_{T2} + Q_L$
		Yes	= $Q_{T1} + Q_{T2}$
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 50% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x $Q_{T1} + Q_{T2} + Q_L$
		Yes	= 33% x $Q_{T1} + Q_{T2}$
	Left	Yes or no	= 33% x Q_{T2}

Figure 4-2: Calculation of major road traffic volume

Approach traffic volumes at the Golden Highway / Ringwood Road intersection in 2025 with and without construction traffic are shown in Table 4-1 (Project only) and Table 4-2 (cumulative construction). The approach traffic volumes include Project construction heavy vehicles travelling through the intersection three times (left-in, left-out and eastbound through), due to the left turn only arrangement to be imposed on Project construction vehicles.

Table 4-1: Peak hour traffic volumes for turn treatments assessment (Project only)

Movement	2025 base		2025 construction (Project only)	
	Morning	Evening	Morning	Evening
Major road traffic volume (Q_M) for left turn	64	101	64	101
Major road traffic volume (Q_M) for right turn	145	211	232	298
Left turn volume (Q_L)	14	7	95	13
Right turn volume (Q_R)	5	1	5	1

Table 4-2: Peak hour traffic volumes for turn treatments assessment (cumulative)

Movement	2025 cumulative base		2025 cumulative construction	
	Morning	Evening	Morning	Evening
Major road traffic volume (Q_M) for left turn	246	198	246	198
Major road traffic volume (Q_M) for right turn	424	490	511	577
Left turn volume (Q_L)	14	7	95	13
Right turn volume (Q_R)	5	1	5	1

The turn warrants assessment for the Project only and cumulative construction scenarios are shown in Table 4-3 and Table 4-4, respectively.

Table 4-3: Turn warrants assessment (Project only)

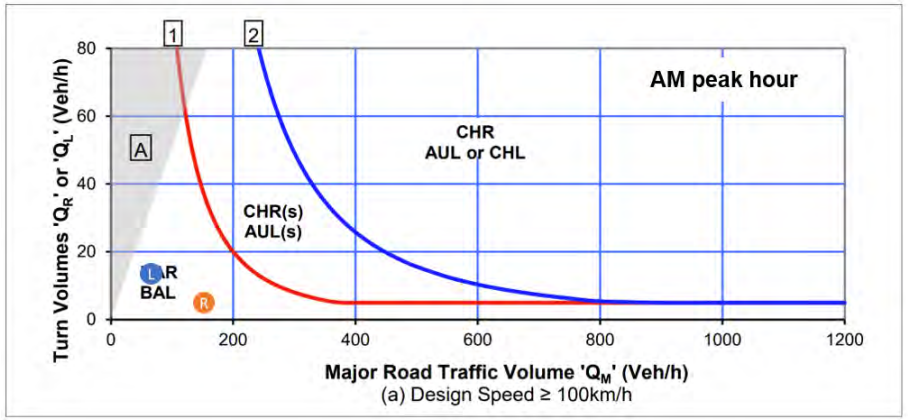
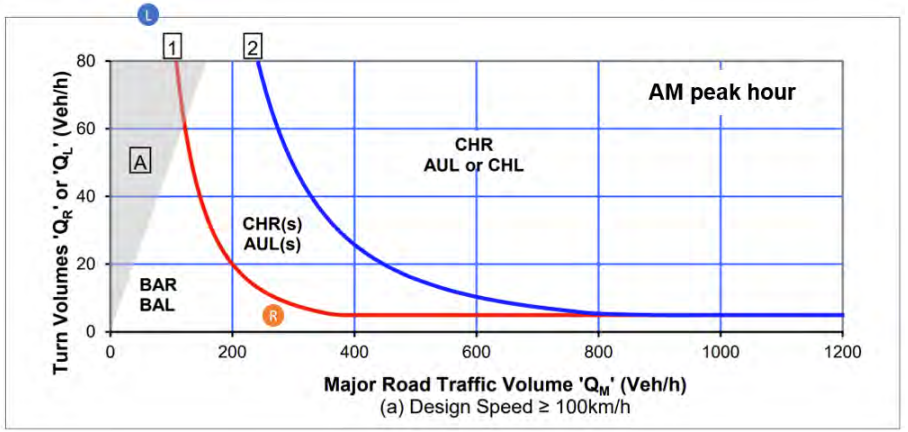
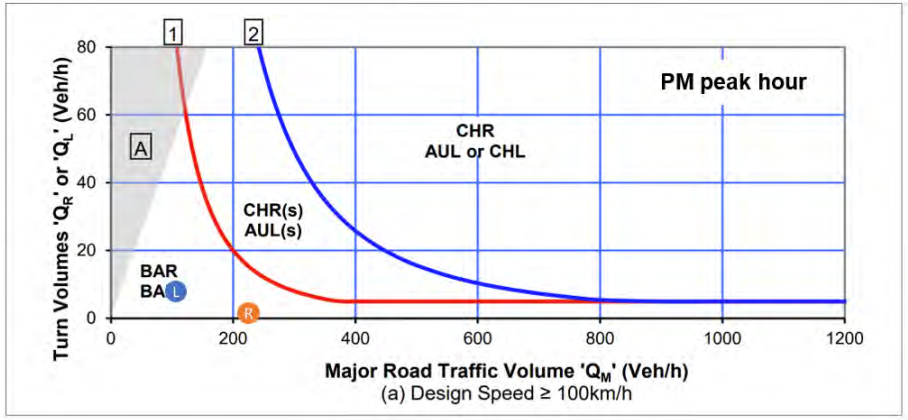
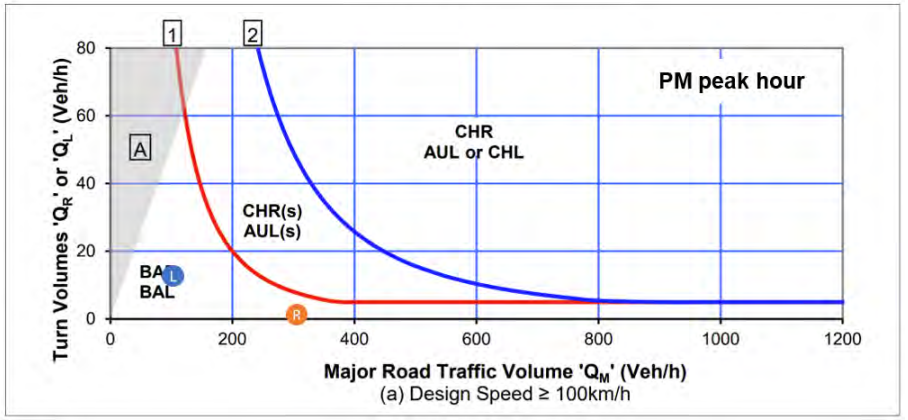
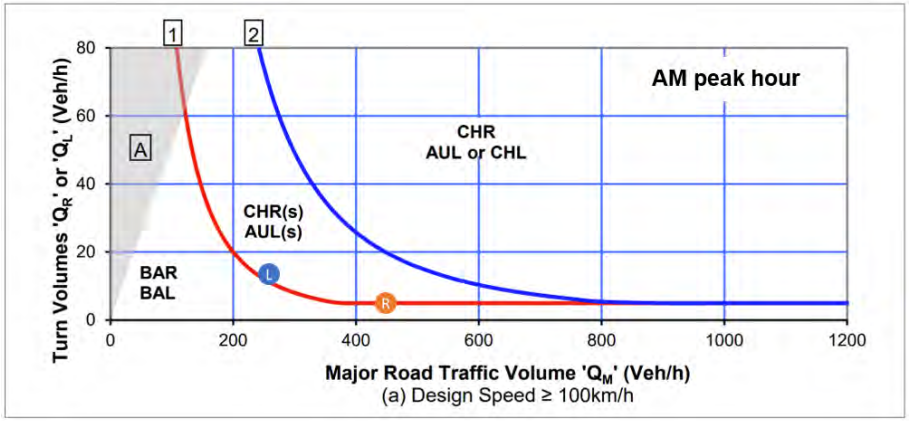
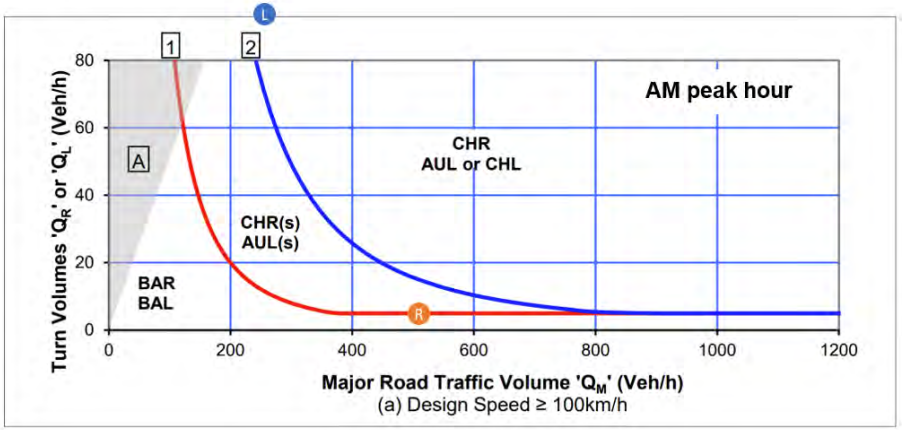
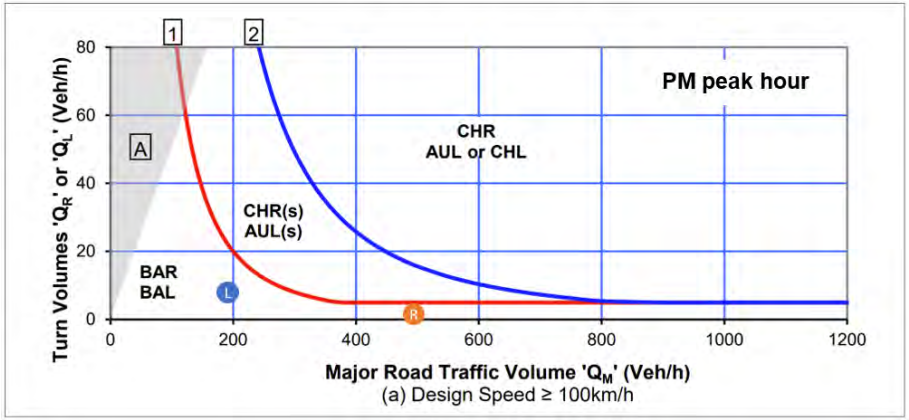
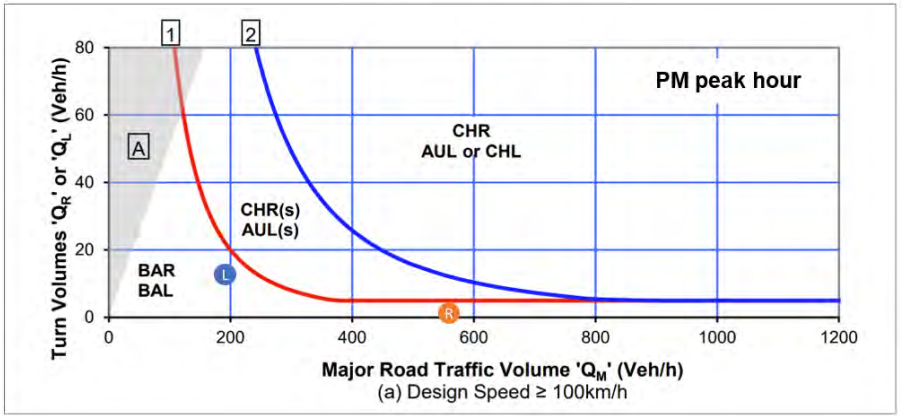
2025 base	2025 construction (Project only)
	
	

Table 4-4: Turn warrants assessment (cumulative construction)

2025 cumulative base	2025 cumulative construction
	
	

As shown in Table 4-3, with Project only construction vehicles, at minimum the intersection would need a BAR and BAL to accommodate the proposed traffic volumes.

As shown in Table 4-4, with cumulative construction vehicles, the Golden Highway left turn is marginally above the threshold for a full AUL, and the Golden Highway right turn is on the threshold of a BAR or CHR (short) lane.

As stated in the Amended TTIA, the turn warrants assessment represents a worst-case scenario and the cumulative volumes would likely be lower. Hence the strategic design developed for the intersection includes an AUL(s) and a BAR as shown in Appendix A.

4.1. BAR vs CHR

Based on the turn warrants assessment outlined above, a CHR would not be required at the intersection. This conclusion is further supported by the following:

- With Project only construction vehicles, the turn warrants assessment for the right turn is well within the threshold of a BAR.
- The turn warrants assessment with cumulative construction vehicle volumes represents a worst case scenario and hence traffic volumes would likely be lower.
- The turn warrants assessment includes Project construction heavy vehicles travelling through the intersection three times within the hour (left-in, left-out and eastbound through).
- The right turn in and out of Ringwood Road would be banned for Project construction vehicles and enforced under a TMP to be developed post-approval.
- An increase in through traffic (Golden Highway eastbound through and westbound through), pushes the right turn treatment horizontally in the turn warrants graph, and hence would always remain on the threshold of a BAR vs CHR, unless the right turn volume is increased (which Project construction vehicles would not be performing).
- A review of the Golden Highway eastbound right turn volume into Ringwood Road during the survey period showed a maximum hourly volume of 5 vehicles, which was used in the turn warrants assessment.
- A comparison of the surveyed traffic volumes on the Golden Highway collected in March 2022 vs October 2023 showed negligible increase in traffic volume.

5. Revised Turn Warrants Assessment

Following an online meeting held on 21 March 2024 attended by Turnbull, Umwelt, Lightsource, TfNSW and DPE, a revised assessment using a reduced background growth rate of 1.6% instead of 2% per annum was requested by TfNSW to determine whether the warrant for a BAR was clearly met. Applying the lower background growth rate had minimal impact on the outcome of the turn warrants assessment as shown below.

Approach traffic volumes at the Golden Highway / Ringwood Road intersection in 2025 under the reduced background growth factor of 1.6% per year with and without construction traffic are shown in Table 4-1 (Project only) and Table 4-2 (cumulative construction).

Table 5-1: Peak hour traffic volumes for revised turn treatments assessment (Project only)

Movement	2025 base		2025 construction (Project only)	
	Morning	Evening	Morning	Evening
Major road traffic volume (Q_M) for left turn	64	100 (-1)	64	100 (-1)
Major road traffic volume (Q_M) for right turn	144 (-1)	208 (-3)	231 (-1)	295 (-3)
Left turn volume (Q_L)	14	7	95	13
Right turn volume (Q_R)	5	1	5	1

*Note: Numbers in brackets represent the change in volume due to the 1.6% growth rate

Table 5-2: Peak hour traffic volumes for revised turn treatments assessment (cumulative)

Movement	2025 cumulative base		2025 cumulative construction	
	Morning	Evening	Morning	Evening
Major road traffic volume (Q_M) for left turn	246	197 (-1)	246	197 (-1)
Major road traffic volume (Q_M) for right turn	423 (-1)	487 (-3)	510 (-1)	574 (-3)
Left turn volume (Q_L)	14	7	95	13
Right turn volume (Q_R)	5	1	5	1

*Note: Numbers in brackets represent the change in volume due to the 1.6% growth rate

The revised turn warrants assessment for the Project only and cumulative construction scenarios are shown in Table 5-3 and Table 5-4, respectively.

Table 5-3: Revised turn warrants assessment (Project only)

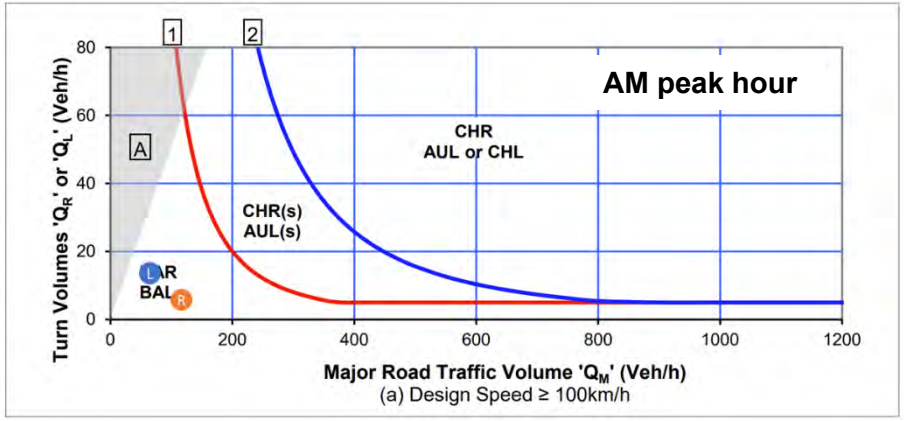
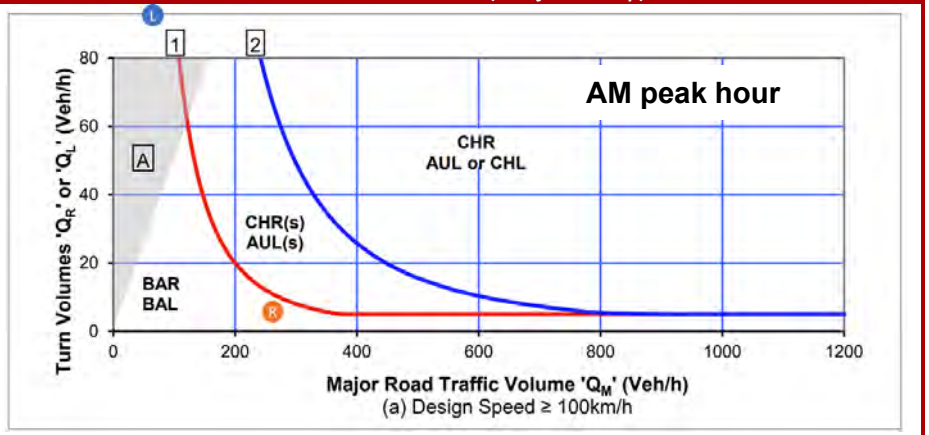
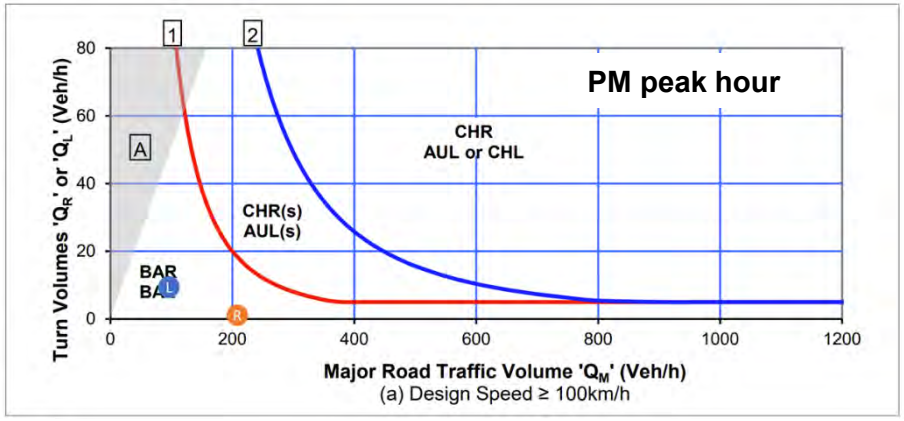
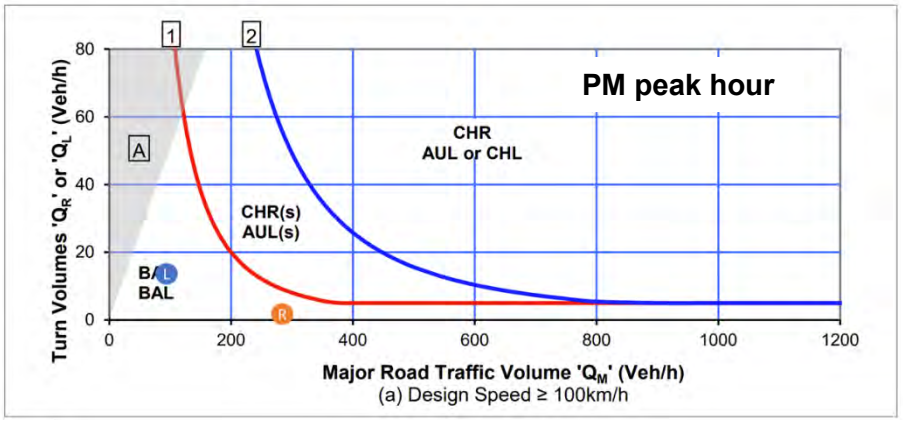
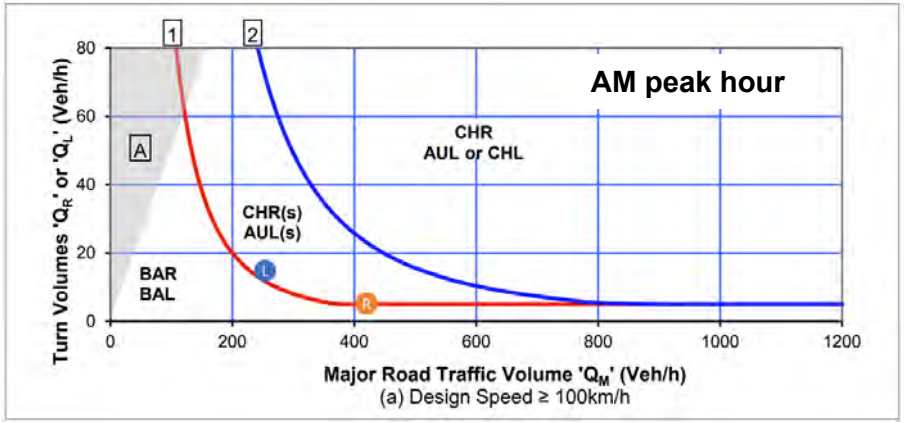
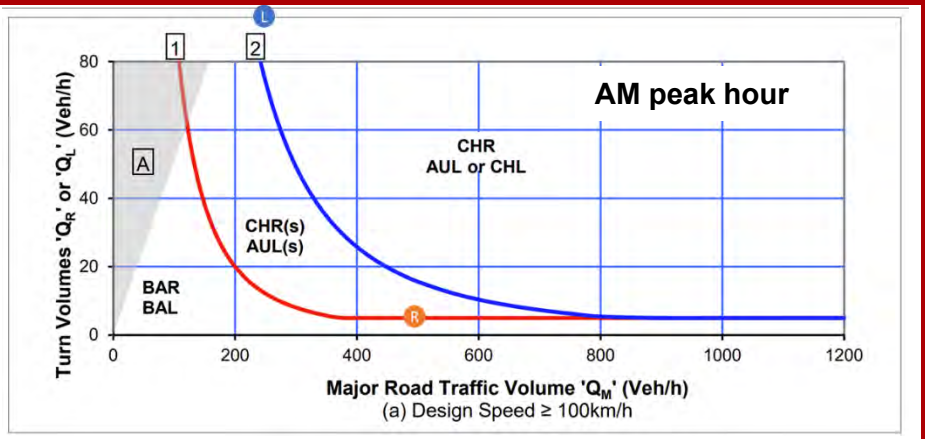
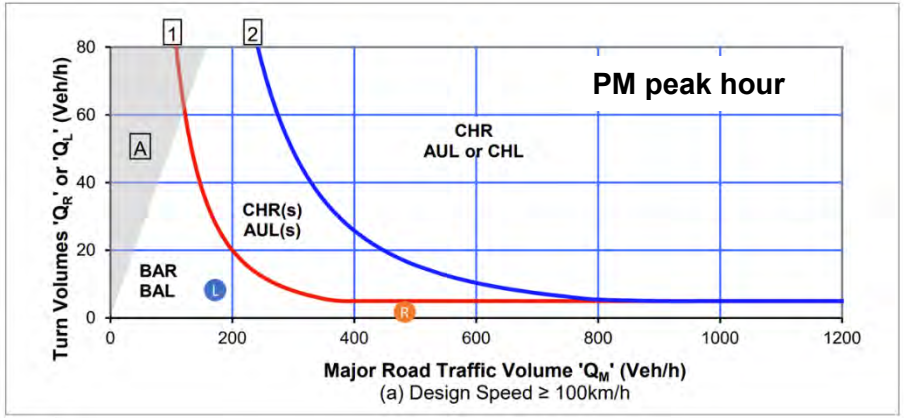
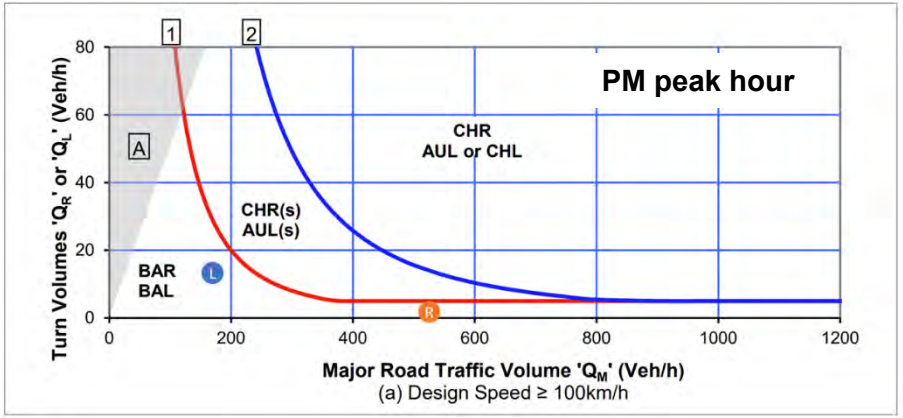
2025 base	2025 construction (Project only)
	
	

Table 5-4: Revised turn warrants assessment (cumulative construction)

2025 cumulative base	2025 cumulative construction
	
	

As shown in Table 5-3 and Table 5-4, the revised assessment for the right turn with a reduced background traffic growth rate shows that warrant for a BAR vs CHR is still on the threshold as there is a minimal change to the revised volumes.

Investigation of the threshold value was determined to be 5 vehicles. The right turn volume assessed in the construction scenarios is 5 vehicles, confirming that the BAR vs CHR warrant is “on the line” with and without the project (under the cumulative construction scenario).

6. Additional Turn Warrants Assessment

An additional turn warrants assessment was undertaken for a period outside of the road network peak hour. The additional assessment includes the lower background traffic growth rate used in Section 5.

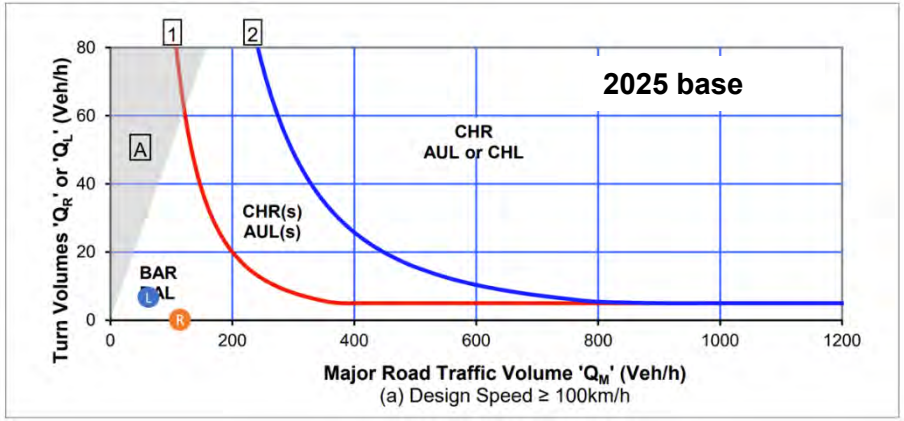
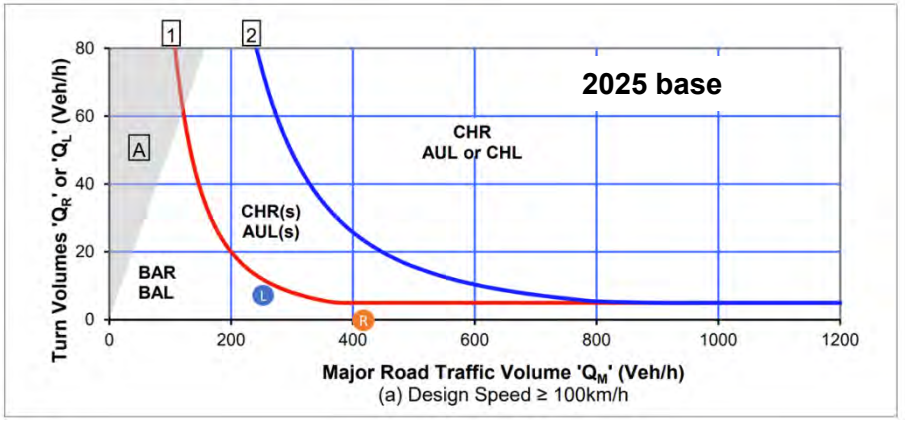
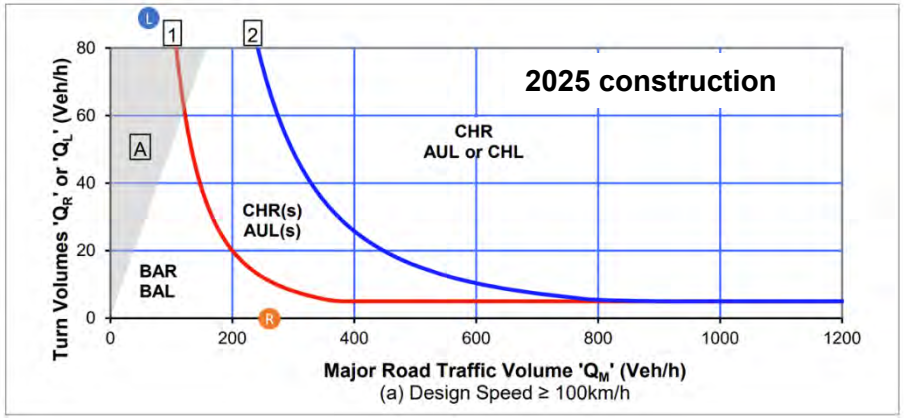
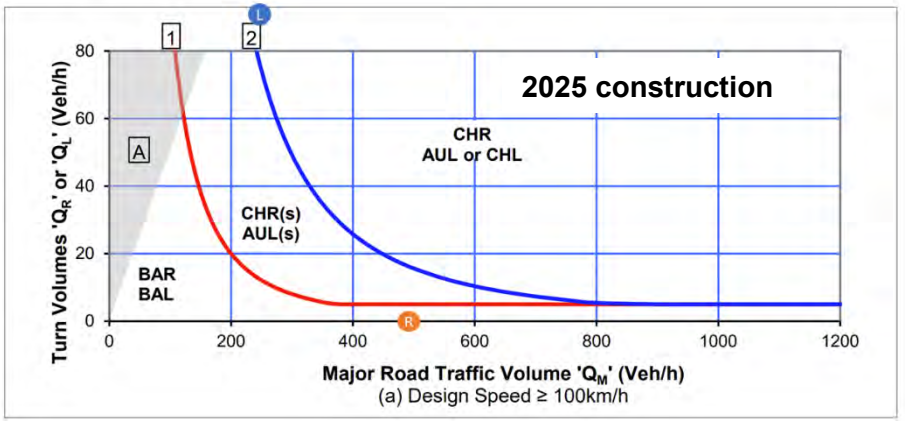
Approach traffic volumes at the Golden Highway / Ringwood Road intersection in 2025 based on intersection volumes from 8:30am to 9:30am (non-peak hour) and under the reduced background growth factor of 1.6% per year with and without construction traffic is shown in Table 6-1.

Table 6-1: 8:30am to 9:30am traffic volumes for additional turn treatments assessment

Movement	Project only		Cumulative	
	2025 base	2025 construction	2025 base	2025 construction
Major road traffic volume (Q_M) for left turn	62	62	244	244
Major road traffic volume (Q_M) for right turn	139	226	418	505
Left turn volume (Q_L)	6	87	6	87
Right turn volume (Q_R)	0	0	0	0

The additional turn warrants assessment is shown in Table 6-2.

Table 6-2: Additional turn warrants assessment (non-peak hour)

Project only	Cumulative
	
	

As shown in Table 6-2, the additional assessment for the right turn with a reduced background traffic growth rate and non-peak hour volumes from 8:30am to 9:30am shows that warrant for a CHR is clearly not met, and the existing BAR treatment would be appropriate.

7. Existing BAR Turn Path Assessment

A turn path assessment has been undertaken of the existing BAR to ensure that the Goulburn River Solar Farm design vehicle can utilise the existing facility.

The following assumptions have been utilised:

- A 19m prime mover and semi-trailer is waiting to turn right into Ringwood Road (arterial to collector check vehicle based on AGRD Part 4).
- The existing steel barrier and end terminal protrude approximately 200mm into the road from the edge of seal.
- The Goulburn River Solar Farm design vehicle is a 19m prime mover and semi-trailer.

A design speed of 100 km/h has been applied for the Goulburn River Solar Farm design vehicle. This is supported by a speed survey undertaken for this project for the eastbound approach of the intersection with Ringwood Road (undertaken between 31 October 2023 to the 6 November 2023 by Geocounts). There are two existing 75 km/h advisory signs prior to the intersection and a motorist is likely to slow down when having to utilise a BAR facility; hence the design speed adopted is considered conservative.

The Goulburn River Solar Farm design vehicle can utilise the existing BAR facility to bypass a 19m prime mover and semi-trailer. It is noted that the design vehicle would be within the shy line of the barrier and end terminal. For this specific situation (high-speed manoeuvre approaching a horizontal curve and steep downhill grade), the existing barrier and end terminal is to be relocated outside the shy line.

This is to be undertaken in the next design gate. Appropriate design criteria are to be utilised in accordance with Austroads Guide to Road Design Part 6 (criteria will be subject to Contract execution date for detailed design). Also, the proposed barriers and end terminals are to be approved in accordance with TfNSW Accepted Road Safety Barrier Systems and Devices.

The turn path assessment is included in Appendix B.

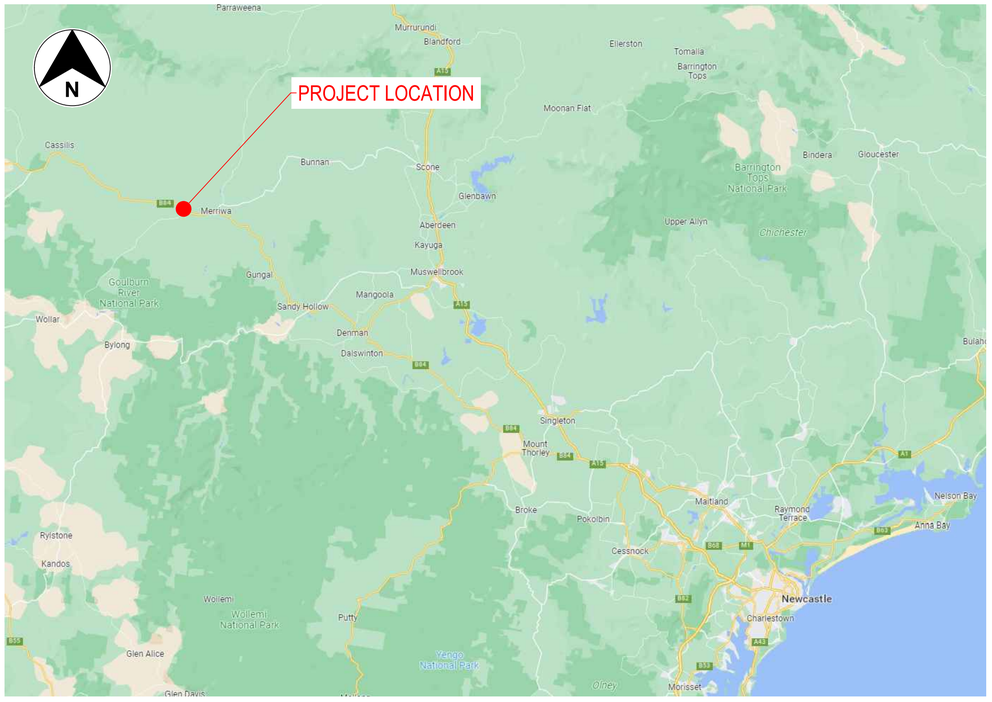
Appendix A Strategic Intersection Design

GOULBURN RIVER SOLAR FARM

RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION

ROAD UPGRADE

STRATEGIC DESIGN



LOCALITY PLAN
NOT TO SCALE

DRAWING INDEX

SHEET No.	SHEET TYPE	SHEET DETAILS	No. OF SHEETS	ISSUE
01-GN-0001	ROAD ALIGNMENT	COVER SHEET AND DRAWING INDEX	1 OF 1	A
01-RD-0101	ROAD ALIGNMENT	PLAN	1 OF 3	A
01-RD-0102	ROAD ALIGNMENT	PLAN	2 OF 3	A
01-RD-0103	ROAD ALIGNMENT	PLAN	3 OF 3	A
01-RD-0201	ROAD ALIGNMENT	TYPICAL CROSS SECTION	1 OF 1	A

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED
50mm ON A3 SIZE ORIGINAL
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CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) HEIGHT DATUM: AHD

PLOT DATE / TIME: 27 October 2023 04:47:49 PM PLOT BY: PakWaHo

TITLE	NAME	DATE
DRAWN	A.REIS	27.10.23
DRG CHECK	B.EVANS	27.10.23
DESIGN	P.PHAM	27.10.23
DESIGN CHECK	D.SHIROKOV	27.10.23
DESIGN MNGR	D.SHIROKOV	27.10.23
PROJECT MNGR	R.BANZON	27.10.23

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT

DRAWING TITLE
GOULBURN RIVER SOLAR FARM, EIS
RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION
ROAD ALIGNMENT
COVER SHEET AND DRAWING INDEX

A1
SHEET 1 OF 1

DRAWING NUMBER: 0305-DRG-01-RD-0001

ISSUE STATUS: STRATEGIC DESIGN
SHEET No.: 01-RD-0001
ISSUE: A

X:\0305-06-GE-A1.tmf

LEGEND

GENERAL

- DESIGN
- CADASTRAL
- SURVEY
- SAFETY BARRIER

ROAD GEOMETRY

- CONTROL LINE AND CHAINAGE (50)
- MCXX — CONTROL LINE LABEL
- C1 — LINE MARKING LABEL
- EXISTING SIGN

PAVEMENT AND KERBS

- NEW PAVEMENT

NOTES

1. DESIGN IS UNDERTAKEN IN 2D.
2. SURVEY SHOWN HAS BEEN PROVIDED BY UMWELT (11/09/2023).
3. BOUNDARIES HAVE BEEN SOURCED FROM SIX MAPS "Clip 'n' Snip".
4. PAVEMENT DESIGN AND JOINTING IS EXCLUDED.
5. PROPOSED BARRIER LOCATION IS SHOWN INDICITIVELY ONLY.
6. EXISTING GUIDE POSTS ALONG BARRIER EXTENTS ARE TO BE REMOVED.

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

50mm ON A3 SIZE ORIGINAL

DRAWING FILE LOCATION / NAME
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X:0305-01-RD-RINGWOOD-BARNETT
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REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	27.10.23	STRATEGIC DESIGN	-	RB

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CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020)
HEIGHT DATUM: AHD

PLOT DATE / TIME: 27 October 2023 04:48:16 PM
PLOT BY: PakWaHo

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DRG CHECK	B.EVANS	27.10.23
DESIGN	P.PHAM	27.10.23
DESIGN CHECK	D.SHIROKOV	27.10.23
DESIGN MNGR	D.SHIROKOV	27.10.23
PROJECT MNGR	R.BANZON	27.10.23

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT

DRAWING TITLE
GOULBURN RIVER SOLAR FARM, EIS
RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION
ROAD ALIGNMENT
PLAN

A1
SHEET 1 OF 3

DRAWING NUMBER: 0305-DRG-01-RD-0101

ISSUE STATUS: STRATEGIC DESIGN
SHEET No.: 01-RD-0101
ISSUE: A

LEGEND

GENERAL

- DESIGN
- CADASTRAL
- SURVEY
- SAFETY BARRIER

ROAD GEOMETRY

- CONTROL LINE AND CHAINAGE (50)
- MCXX — CONTROL LINE LABEL
- C1 — LINE MARKING LABEL
- EXISTING SIGN

PAVEMENT AND KERBS

- NEW PAVEMENT

NOTES

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NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

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X:0305-01-RD-HATCH
X:0305-01-RD-SURVEY

REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
A	27.10.23	STRATEGIC DESIGN	-	RB

SCALES ON A1 SIZE DRAWING
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SCALE 1:500m

CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) HEIGHT DATUM: AHD

PLOT DATE / TIME: 27 October 2023 04:48:45 PM PLOT BY: PakWaHo

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DRG CHECK	B.EVANS	27.10.23
DESIGN	P.PHAM	27.10.23
DESIGN CHECK	D.SHIROKOV	27.10.23
DESIGN MNGR	D.SHIROKOV	27.10.23
PROJECT MNGR	R.BANZON	27.10.23

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT

DRAWING TITLE
GOULBURN RIVER SOLAR FARM, EIS
RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION
ROAD ALIGNMENT
PLAN

A1
SHEET 2 OF 3

DRAWING NUMBER 0305-DRG-01-RD-0102

ISSUE STATUS: STRATEGIC DESIGN
SHEET No.: 01-RD-0102
ISSUE: A

LEGEND

GENERAL
- DESIGN
- CADASTRAL
- SURVEY
- SAFETY BARRIER

ROAD GEOMETRY
- CONTROL LINE AND CHAINAGE (50)
- MCXX — CONTROL LINE LABEL
- C1 — LINE MARKING LABEL
- EXISTING SIGN

PAVEMENT AND KERBS
- NEW PAVEMENT

NOTES

1. DESIGN IS UNDERTAKEN IN 2D.
2. SURVEY SHOWN HAS BEEN PROVIDED BY UMWELT (11/09/2023).
3. BOUNDARIES HAVE BEEN SOURCED FROM SIX MAPS "Clip 'n' Snip".
4. PAVEMENT DESIGN AND JOINTING IS EXCLUDED.
5. PROPOSED BARRIER LOCATION IS SHOWN INDICITIVELY ONLY.
6. EXISTING GUIDE POSTS ALONG BARRIER EXTENTS ARE TO BE REMOVED.

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

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EXTERNAL REFERENCE FILES	REV	DATE	AMENDMENT / REVISION DESCRIPTION	WVR No.	APPROVAL
	A	27.10.23	STRATEGIC DESIGN	-	RB

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CO-ORDINATE SYSTEM: MGA ZONE 56 (GDA2020) — HEIGHT DATUM: AHD

PLOT DATE / TIME: 27 October 2023 04:49:10 PM — PLOT BY: PakWaHo

TITLE	NAME	DATE
DRAWN	A.REIS	27.10.23
DRG CHECK	B.EVANS	27.10.23
DESIGN	P.PHAM	27.10.23
DESIGN CHECK	D.SHIROKOV	27.10.23
DESIGN MNGR	D.SHIROKOV	27.10.23
PROJECT MNGR	R.BANZON	27.10.23

DRAWINGS / DESIGN PREPARED BY — DESIGNER: turnbull

DRAWINGS / DESIGN PREPARED FOR — CLIENT

DRAWING TITLE
GOULBURN RIVER SOLAR FARM, EIS
RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION
ROAD ALIGNMENT
PLAN

A1

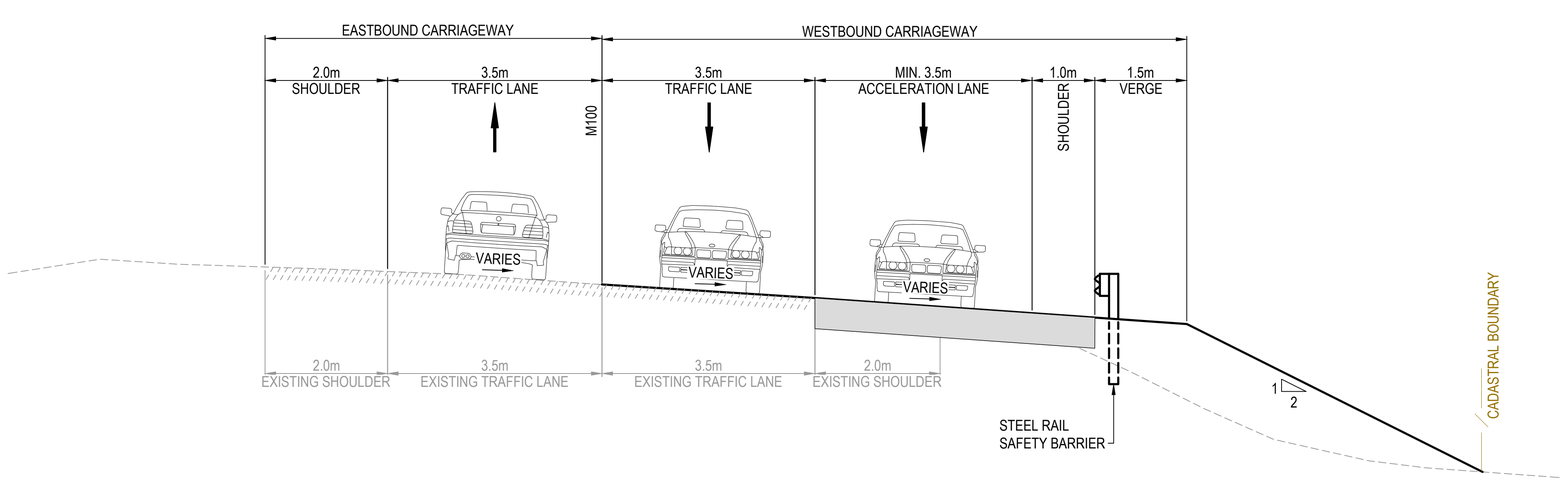
SHEET 3 OF 3

DRAWING NUMBER: 0305-DRG-01-RD-0103

ISSUE STATUS: STRATEGIC DESIGN — SHEET No.: 01-RD-0103 — ISSUE: A

LEGEND

- DESIGN SURFACE
- EXISTING SURFACE
- PROPOSED PAVEMENT



SECTION 1 / RD-0102
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GOLDEN HIGHWAY

NOTE

1. PROPOSED PAVEMENT SHOWN IS INDICATIVE ONLY. PAVEMENT DESIGN AND JOINTING IS EXCLUDED FROM SCOPE OF WORKS.
2. CADASTRAL BOUNDARY SOURCED FROM SIX MAPS "Clip 'n' SNIP".
3. GRADES OF PROPOSED ACCELERATION LANE AND SHOULDER TO MATCH EXISTING CONDITIONS.
4. PROPOSED BARRIER LOCATION IS SHOWN INDICATIVELY ONLY

NOT FOR CONSTRUCTION

THIS DRAWING MAY BE PREPARED IN COLOUR AND MAY BE INCOMPLETE IF COPIED

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SCALE 1:50m

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HEIGHT DATUM: AHD

PLOT DATE / TIME: 27 October 2023 04:49:13 PM
PLOT BY: PakWaHo

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DRG CHECK	B.EVANS	27.10.23
DESIGN	P.PHAM	27.10.23
DESIGN CHECK	D.SHIROKOV	27.10.23
DESIGN MNGR	D.SHIROKOV	27.10.23
PROJECT MNGR	R.BANZON	27.10.23

DRAWINGS / DESIGN PREPARED BY
DESIGNER
turnbull

DRAWINGS / DESIGN PREPARED FOR
CLIENT

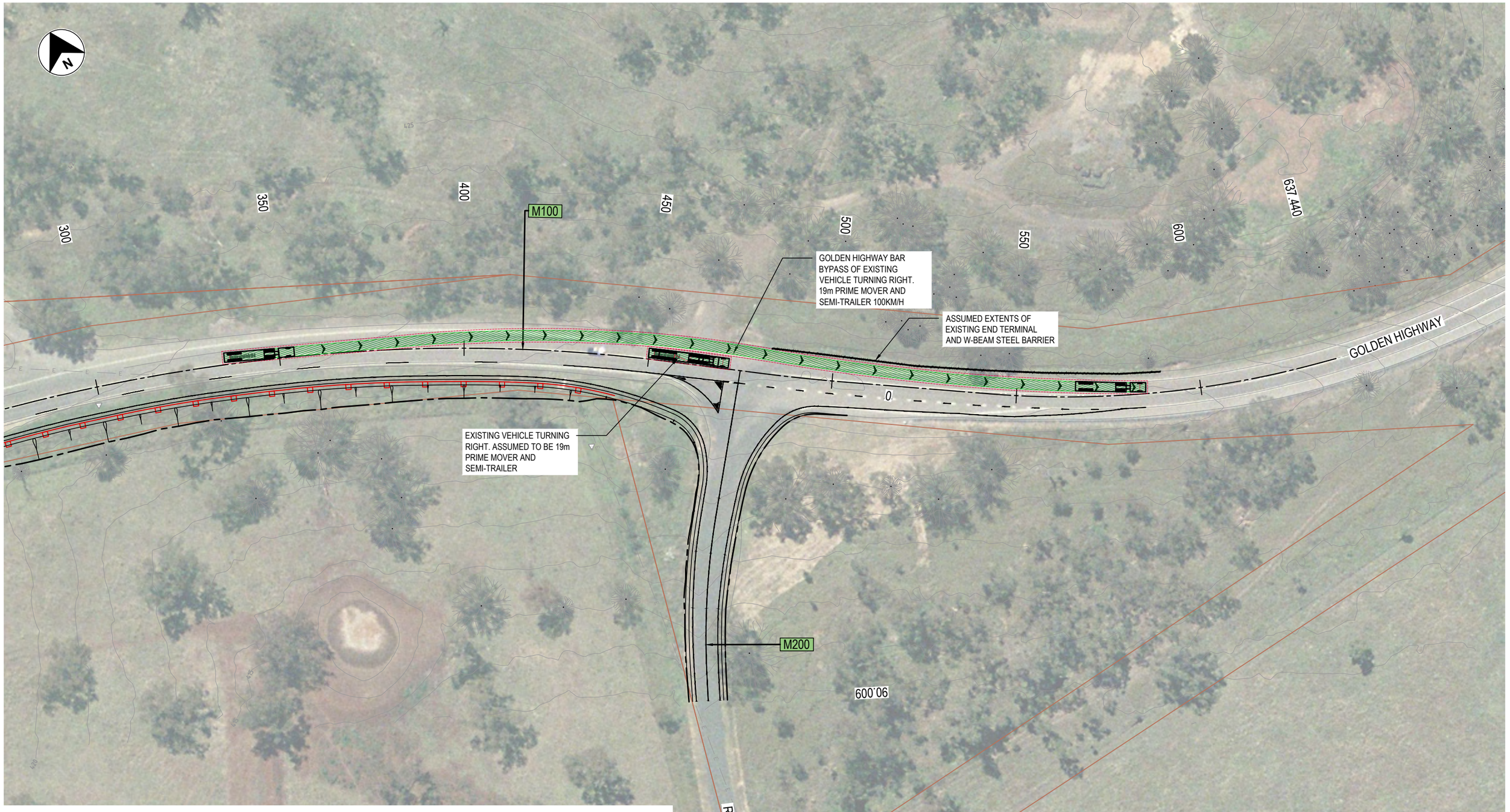
DRAWING TITLE
GOULBURN RIVER SOLAR FARM, EIS
RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION
ROAD ALIGNMENT
TYPICAL CROSS SECTION

A1
SHEET 1 OF 1

DRAWING NUMBER: 0305-DRG-01-RD-0201

ISSUE STATUS: STRATEGIC DESIGN
SHEET No.: 01-RD-0201
ISSUE: A

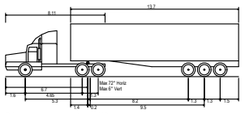
Appendix B Existing BAR Turn Path Assessment



NOTES

1. NO ASSESSMENT HAS BEEN UNDERTAKEN FOR EXISTING PAVEMENT.
2. TURN PATHS PRESENTED IS THE INTENDED OPERATIONS OF TRAFFIC ASSOCIATED WITH GOULBURN SOLAR FARM. ONLY THE DISPLAYED MOVEMENTS WILL BE PERMITTED.
3. SURVEY SHOWN HAS BEEN PROVIDED BY UMWELT (11/09/2023).
4. BOUNDARIES HAVE BEEN SOURCED FROM SIX MAPS "Clip 'n' Snip".

VEHICLE TURN PATH PROFILE



Prime mover and semi-trailer (19 m)

Overall Length	19.000m
Overall Width	2.500m
Overall Body Height	4.300m
Min Body Ground Clearance	0.540m
Track Width	2.500m
Lock-to-lock time	6.00s
Curb to Curb Turning Radius	12.500m

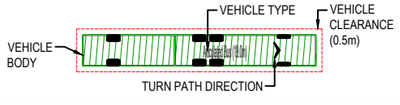
GENERAL

- DESIGN
- CADASTRAL
- SURVEY
- SAFETY BARRIER

ROAD GEOMETRY

- 20 — CONTROL LINE AND CHAINAGE
- MCXX — CONTROL LINE LABEL

VEHICLE TURN PATH LEGEND



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SCALE 1:1000m

FOR INFORMATION ONLY

GOULBURN RIVER SOLAR FARM
RINGWOOD ROAD AND GOLDEN HIGHWAY INTERSECTION
SWEPT PATHS
SHEET 2 OF 4
27/10/2023

turnbull

0305-INF-RD-SWEPT-PATH-RINGWOOD BAR

Appendix B – Evidence of RAP Consultation

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:07 PM
To: Carolyn .H
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:50 PM
To: MARILYN CARROLL
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:49 PM
To: lilly carroll
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:55 PM
To: NTSCORP Notifications
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:06 PM
To: Paulette Ryan
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:00 PM
To: Tania Matthews
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:08 PM
To: Junburra Aboriginal Consultancy Services
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:06 PM
To: Shaun Carroll
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:05 PM
To: Ryan Johnson - Murra Bidgee Mullangari Aboriginal Corporation
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:52 PM
To: Rose Nean
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:54 PM
To: Ungooroo Aboriginal Corporation
Cc: notificaitons@ntscorp.com.au
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:52 PM
To: Walhallow Local Aboriginal Land Council
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 1:01 PM
To: CEO Wanaruah LALC
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

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Regards, Catherine

Catherine Burrowes
OzArk Environment & Heritage
Office Manager
(02) 6882 0118

Thomas Buchan

From: Catherine Burrowes
Sent: Tuesday, 6 February 2024 12:51 PM
To: WIDESCOPE Indigenous Group
Subject: Addendum ACHAR - Goulburn River Solar Farm
Attachments: Amendment ACHAR cover letter.docx; FINAL_Addendum_ACHAR_Goulburn River Solar Farm_2023.pdf

Hello members,

Please find attached Addendum ACHAR for the **Aboriginal Cultural Heritage Assessment Report for the Goulburn River Solar Farm**

Regards, Catherine

Catherine Burrowes
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