36°29'39.9"S
146°07'12.1"E

Winton Battery Energy Storage System (BESS): 6 Bowers Road, Winton, VIC

Traffic Impact Assessment

18 November 2025
Prepared for NGH Consulting

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Impact

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Contents

Tables

Figures

Appendices

1 IMPACT® Snap Shot

Development Proposition

Location	36°29'39.9"S 146°07'12.1"E	6 Bowers Road, Winton
Use	Battery Energy Storage System (BESS) - 120 MW / 480 MWh Capacity	
Access	Access to the site is afforded from Bowers Road and Lee Road for all construction and staff movements	
Car Parking	A detailed car park design has yet to be determined, however it is assumed that: — During construction, vehicles will be parked either at designated laydown areas, storage locations, or where construction activities are occurring. — During operations, operational and maintenance staff vehicles will be accommodated on-site within a vehicle parking area located adjacent to the site office.	

Traffic Assessment

Access	
Access Design	Development plans are still in the preliminary stages. Notwithstanding, swept path analyses show that the Site Access will be able to cater for 26 metre B-double vehicles into and out of the site. An assessment of the ability of over size, over mass (OSOM) vehicles to access the site will need to be undertaken as part of the NHVR application process to confirm if any temporary traffic management measures will be required for the haulage of any over-sized deliveries.
Sight Distances	Assessment of the available sight distances has been undertaken based on aerial imagery and photographs provided by the project team. We are satisfied that sight lines in accordance with / exceeding the minimum are available.
Turn Warrants	If traffic was permanent, each site access would warrant the provision of a basic right turn (BAR) to cater for movements into the site. Given movements are temporary (primarily during construction), sight lines are appropriate and existing traffic along the external road network is minimal, we are satisfied that vehicles could use the existing road pavement & shoulder to facilitate passing of turning vehicles where required.
Traffic Impact	
Construction Timing	We understand that the proposed Winton BESS is to commence mid-2028 over a 12-month period. The Winton Energy Reserve 1 Facility is scheduled to commence in 2026 over a 12-18-month period.
Construction Traffic	Up to 52 vehicles per hour are expected during peak construction activities, if staff primarily drive to the site (fewer movements would be expected throughout the course of a day). The Winton Energy Reserve 1 Facility is situated west of the proposal and traffic volumes obtained from WSP indicate that construction traffic will likely generate up to 104 peak hour through movements along Bowers Road.

	Conservatively assuming that both Winton BESS and Winton Energy Reserve 1 Facility peak construction activities coincide (unlikely), 156 peak hour movements could be observed along Bowers Road. These peak daily movements are significant in the context of the existing road network, however, given most of these movements are related to staff travelling to / from construction sites (which would be tidal), it is expected that this is manageable. These movements are not permanent and will only be for a short-term. We do note however that the traffic generated by the site will have an increased impact on the road pavement causing more frequent maintenance / repair work required.
Operational Traffic	It is estimated the site will have up to four (4) daily vehicle movements associated with routine maintenance during operations. There will also be, on occasion some additional movements associated with more thorough maintenance. This level of traffic will be negligible and have no discernible impact on the operation of the surrounding road network.
Traffic Management Plan	It is recommended that a detailed Traffic Management Plan (TMP) be prepared once the project design is complete and prior to commencement of the project construction to confirm the requirements, particularly for sight distances and for mitigation / management works.

Conclusion

— There are no traffic and transport grounds that should prohibit the issue of a permit

2 Introduction

2.1 Engagement

IMPACT® have been engaged by NGH Consulting on behalf of Avenis Energy to undertake a Traffic Impact Assessment for the proposed Winton Battery Storage System (BESS) located in Winton, Victoria.

The following assessment has been prepared to accompany the Engineering Impact Statement (EIS) and subsequent town planning submission.

3 Winton BESS - Proposal

IMPACT® have been advised that the project will consist of the installation of a BESS facility with a capacity to store up to 120 MW / 480 MWh of renewable energy.

We understand that the site will connect into a new proposed heavy-voltage power line located along the proposed access road which will connect to the existing Glenrowan Substation.

Construction is expected to begin mid-2028 and take approximately 12 months to complete.

Access to this site will be accommodated via two new crossovers to Bowers Road and Lee Road respectively. The site and proposed access arrangements is indicatively illustrated in Figure 1.

Figure 1 **Proposed Winton BESS**

4 Site Context

4.1 Location

The proposed Winton Battery Energy Storage System (BESS) development is located on the south east corner of the Bowers Road / Lee Road intersection in Winton, Victoria and is located approximately 13 kilometres north-east of Benalla and 25 kilometres south-west of Wangaratta, as indicatively illustrated in Figure 2.

Figure 2 **Location of Subject Site**

4.2 Existing Road Network

4.2.1 Bowers Road

Classified as a local road. Aligned in a north-south direction between Lee Road to the north and the Hume Freeway to the south.

Along the site frontage, Bowers Road comprises an approximate 4 metre road pavement (plus 1-2 metre wide unsealed gravel shoulders) that provides two-way traffic flow. Its typical cross-section is illustrated in Figure 3.

Figure 3 **View of Bowers Road facing south adjacent the subject site**

4.2.2 Hume Freeway

Classified as Freeway and aligned in an east-west direction.

In the vicinity of the site, Hume Freeway provides two trafficable lanes on each of the two (2) carriageway. On the northern carriageway, a dedicated left-turn lane is provided to access Bowers Road, whilst the central median between the carriageways, features dedicated auxiliary right-turning lanes. Its typical cross-section is illustrated in Figure 4.

Figure 4 Hume Freeway facing east

It is understood that as part of a nearby development approval, an acceleration lane is to be constructed for vehicles exiting Bowers Road onto the Highway. It is expected that these works will be done prior to construction commencing on this site.

4.2.3 Lee Road

Classified as a local road. Aligned in an east-west direction between Gould Road to the east and terminating at the Hume Freeway road reserve to the south-west.

In the vicinity of the site, Lee Road comprises an approximate 5 metre road pavement (plus 2 metre unsealed gravel shoulders) that provides for two-way traffic. Its typical cross-section is illustrated in Figure 4.

Figure 5 View of Lee Road facing west

4.2.4 Existing Crash Statistics

A review of the reported casualty accident history for the roads and intersections for the last five (5) years from 2019 to 2024, in the vicinity of the subject site has been sourced from the Department of Planning & Transport (DTP) Crash Database is depicted in Figure 6.

Figure 6 Crash Statistics in the Vicinity of the Subject Site (Source: DTP Crash & Casualty Statistics)

The data revealed that there were no recorded crashes along Bowers Road or Lee Road.

There was one (1) crash along Hume Freeway, with the data showing this as being of a collision with a parked vehicle, and was considered an 'other' injury type.

This data does not show any trends with crashes, and therefore does it indicate that there are any problems with the road design in this area, based on existing vehicle movement.

4.3 DTP Road Network Limits

The DTP General Mass Limits (GML) and Concessional Mass Limits (CML) network in the locality of the development site is reproduced as Figure 7.

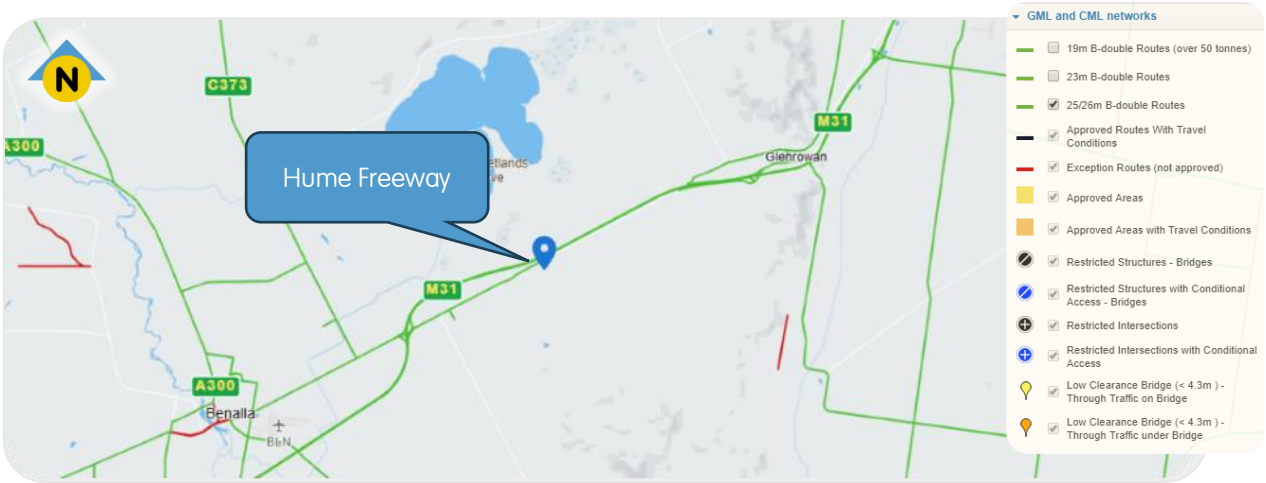
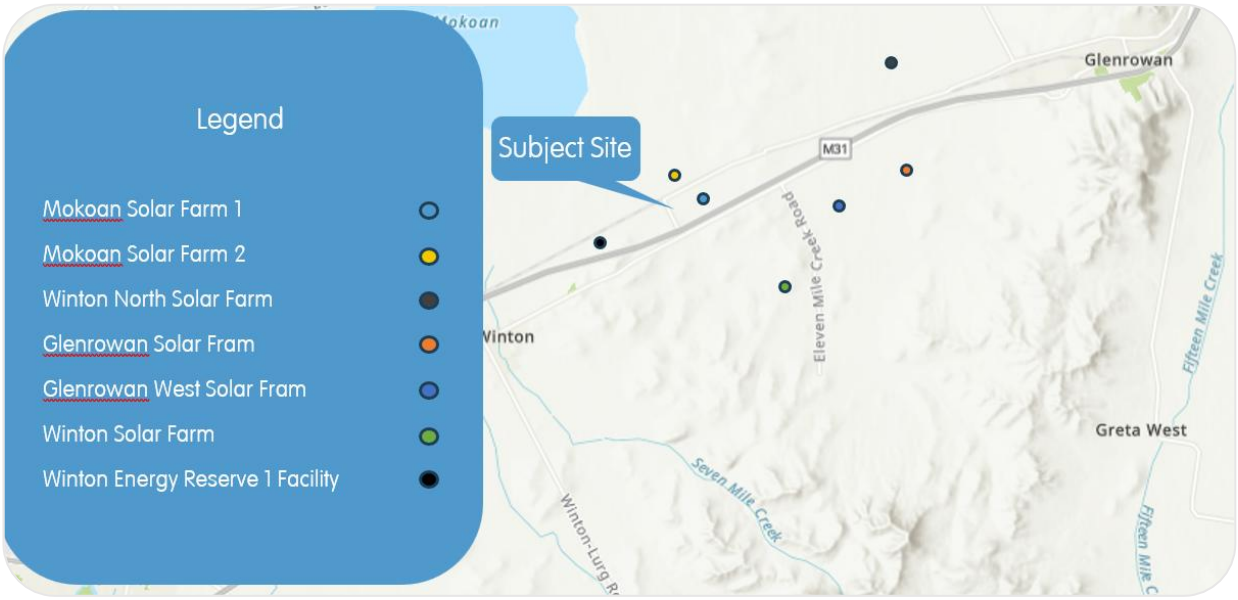


Figure 7 DTP Pre-approved B-Double & Higher Mass Limit (HML) Network

The DTP network plans confirm that the Hume Freeway route to the site is pre-approved for HML and B-double vehicles, neither Bowers Road or Lee Road are pre-approved for haulage.

4.4 Other Neighbouring Projects

Other neighbouring sites both exiting and approved are depicted below. Construction traffic however for the approved projects are not expected to coincide with the subject site's development in contrast to Winton Energy Reserve Facility 1.



The status for each development which is considered most relevant (i.e. located to the north of Hume Freeway) is listed below:

Figure 8 Surrounding Projects

- Mokoan Solar Farm 1: 30 MW Solar Farm - Under Construction
- Mokoan Solar Farm 2: 45 MW Solar Farm - Under Construction
- Winton North Solar Farm: 100 MW Solar Farm - Approved (Construction to Commence Shortly 2025/2026)
- Winton Energy Reserve 1 Facility: Gas Plant & BESS - Approved with Construction Expected to Commence 2026.

We note that each of these developments are proposed to (or are using) Bowers Road and Lee Road to facilitate movement of construction traffic (suitability of these roads for construction traffic is therefore considered to be approved).

Based on the foregoing, we expect that any construction related activities for the Mokoan Solar Farm (1 or 2) - which are already under construction, and the Winton North Solar Farm (for which construction will shortly commence) will have concluded before development at the subject site commences.

Given Winton Energy Reserve 1 Facility is not expected to commence until 2026 (and last for 18 months), there is some chance that activities from this project will overlap with the proposal (which is expected to commence in mid 2028).

4.5 Winton Energy Reserve 1 Facility: Gas Plant & BESS

The Winton Energy Reserve 1 Facility is situated at 386 Lee Road, Winton, immediately west of the proposed BESS site.

Notably, Winton Energy Reserve 1 Facility project will utilise Bowers Road / Lee Road to facilitate movement to/from the subject site for staff and delivery vehicles.

Construction timing is expected to take approximately 12-18 months to complete and we understand that the project is currently approved and is expected to commence in 2026.

Figure 9 shows the concept layout plan of the proposed Winton Energy Reserve 1 Facility site.

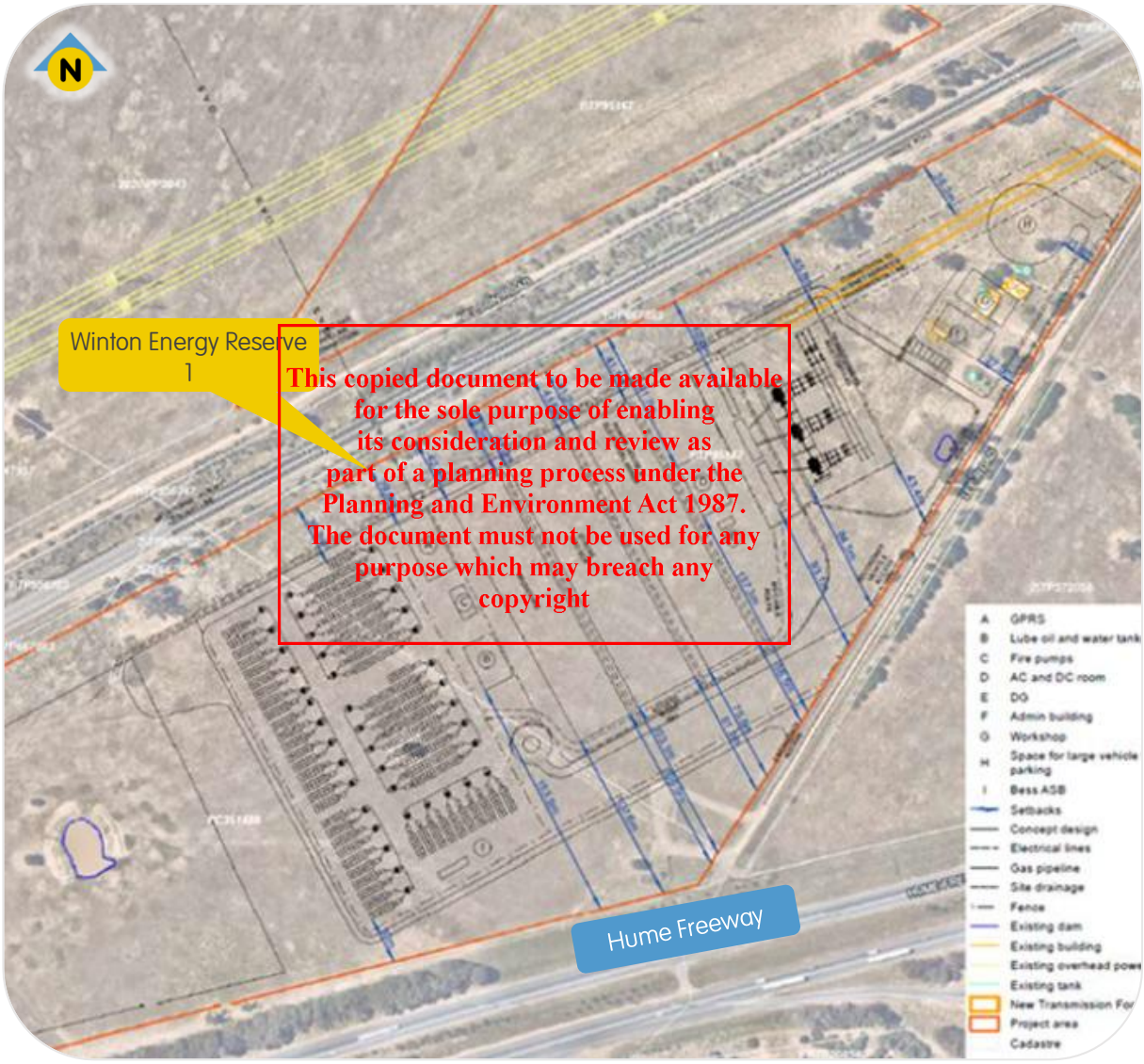


Figure 9 Concept Layout Plan (Source: WSP)

Based on information available for this development, during peak construction activities, this project is expected to generate in the order of 230 daily vehicle movements and up to 104 during the project 'commuter' peak (i.e. when staff arrive and / or depart from the site).

5 Traffic Generation

5.1 Traffic Generation

5.1.1 General

The access road network will typically limit internal construction traffic to internal access roads, with only deliveries and staff movements to and from the site required to travel across the external road network.

External traffic generated by the site will generally be split into three (3) broad categories:

- General light vehicle traffic generated by staff travelling to/from the subject site;
- Over Dimensional (OD) vehicles used for the delivery of the large substation components; and
- Other heavy vehicles (HV) which are used for the delivery of BESS components, construction equipment and construction material.

5.1.2 Adopted BESS Delivery Timeframes

IMPACT® are advised that the Winton BESS construction and delivery will occur across an approximate 12-month period, mid-2028.

Following the full construction phase, the Commissioning Stage and Operations Stage will commence however it is expected that traffic volumes will be limited.

5.1.3 Construction Related Vehicle Movements

5.1.3.1 Winton BESS Construction Traffic

IMPACT® have been advised that during the peak construction periods, up to 90 staff on-site can be expected on-site.

Table 1 and Table 2 show the daily and hourly traffic movements anticipated as part of the works (advised by the project team).

Table 1 Peak Daily Construction Traffic Volumes

Construction Period	Two-way Trips		Anticipated Peak Daily Construction Traffic
	Light Vehicles (per day)	Heavy Vehicles (per day)	
12 months	80	86	166

Table 2 Peak Hour Construction Traffic Volumes (during peak construction)

Construction Period	Light Vehicles (per hour)	Heavy Vehicles (per hour)	OSOM Movements (per hour)	Anticipated Peak Hour Construction Traffic
12 months	40	12	0	52

It is noted that the project will also require a total of three (3) OSOM movements. It is expected that only one OSOM movement would ever be transported to the site at a time, and that it wouldn't align with the peak hour construction traffic.

The assumptions above consider that most workers will travel to and from the site via light vehicles with an average occupancy of 2-2.25 persons per car. It is noted that a reduction in vehicle movements can be achieved by transporting workers to and from site via shuttle bus movements with greater occupancy per car.

5.1.3.2 Winton Energy Reserve 1 Facility Traffic Generation

As above, we understand that Winton Energy Reserve 1 facility is in the early stages of development, with construction slated to commence in 2026 and last for 12-18 months.

WSP have prepared a traffic assessment for that project which showed the following anticipated traffic volumes during construction activities:

Table 3 Winton Energy Reserve 1 Facility Peak Daily Construction Traffic Volumes

Construction Period	Light Vehicles (per day)	Heavy Vehicles (per day)	Daily Movements (One-way)	OD Movements (One off)	Anticipated Peak Daily Construction Traffic
12-18 months	200	30	115	0	230

Table 4 Winton Energy Reserve 1 Facility Peak Hour Construction Traffic Volumes

Construction Period	Light Vehicles (per hour)	Heavy Vehicles (per hour)	OSOM Movements (per hour)	Anticipated Peak Hour Construction Traffic
12-18 months	100	4	0	104

It is noted that these movements would utilise Bowers Road (between Hume Freeway and Lee Road) and then turn left onto Lee Road.

5.1.4 Cumulative Traffic Impacts

Whilst unlikely to occur, to conservatively assess the possible impacts on the road network, the following assessment has been prepared assuming that peak construction activities from each of these projects occur at the same time.

Table 5 and Table 6 shows the cumulative traffic volumes as a result.

Table 5 Cumulative Peak Daily Traffic

Construction Period	Two-way Trips		Anticipated Peak Daily Construction Traffic
	Light Vehicles (per day)	Heavy Vehicles (per day)	
12 months	280	116	396

Table 6 Cumulative Peak Hour Traffic

Light Vehicles (per hour)	Heavy Vehicles (per hour)	OSOM Movements (per hour)	Anticipated Peak Hour Construction Traffic
140	16	0	164

Note: This peak movement is associated with when staff arrive or leave from each development site. Outside of this period - the average hourly movements will be circa 16 movements per hour associated with heavy vehicle deliveries.

5.1.5 Operation and Maintenance Traffic

For the majority of the time, the BESS facility is expected to operate with limited staff and generate minimal traffic movements.

Accordingly, apart from the initial construction phase, the proposal is anticipated to have a negligible impact upon traffic on the local road network. Details of likely traffic generation during the operation are estimated as follows:

- Daily routine maintenance to be carried out by two (2) people. It is assumed that the daily traffic generation will not exceed two vehicle movements per day to the local road network, with all other movements being internal to the site.
- Occasional maintenance will occur when components of the development need to be replaced, such as replacing BESS unit components. This is expected to occur only very occasionally, and will have no discernible impact on the external road network.
- Visitors to the site such as office based staff and courier deliveries etc.

The operation and maintenance traffic when compared to the construction traffic is expected to be minimal at most.

6 Traffic Impact Assessment

6.1 Vehicle Access Routes

As above, traffic generated by the site will generally be split into three (3) broad categories:

- General light vehicle traffic generated by staff travelling to/from the subject site;
- Heavy vehicles (HV) which are used for the delivery of BESS components, construction equipment and construction material; and
- Over Dimensional (OD) vehicles used for the delivery of the large substation components.,

The following set sout our initial assumptions in relation to the direction of travel for each of these vehicle categories:

6.1.1 General Traffic (Staff)

Generally, traffic to / from the site will typically be comprised of staff and courier movements.

They will generally be comprised of light vehicles, likely utes, cars and vans.

As noted above, there is scope to utilise further car pooling or shuttle services to reduce the overall number of these movements if required.

It is expected that most staff will reside within either Benalla or Wangaratta for the length of construction and generally seek to travel to / from the site via Hume Freeway and Bowers Road / Lee Road.

6.1.2 Heavy Vehicle Deliveries (General)

Heavy vehicles will form a vast majority of the delivery vehicles that travel to / from the subject site, generally for the purposes of:

- Gravel, Aggregate and Concrete Deliveries
  - For the construction of hardstand areas and access tracks.
- Water Deliveries
  - For dust settling.
- Battery Energy Storage System (BESS) components.
  - Components likely imported into (or constructed from within) Melbourne.

Generally speaking, it is expected that these deliveries would also leverage the major highways to get to the local area and then travel to the site via Hume Freeway, Bowers Road and Lee Road (if applicable).

6.1.3 Oversized Overmass (OSOM) Vehicle Deliveries

IMPACT® are advised that the BESS Transformer components will be transported to site via OSOM vehicles of up to 53.5m in length and will originate from Melbourne (Glen Waverley).

It is to be noted that this current assessment takes into consideration vehicle sizes of up to 26m in length (B-doubles) and does not cater for the assessment of OSOM vehicle deliveries.

Ultimately, this assessment will need to be undertaken as part of the NHVR application process to confirm if / what temporary traffic management measures will be required for the transport of these longer and heavier OSOM vehicles (given other projects occurring in the area, it is not expected that this access should be an issue).

6.2 Road Network Limits

As highlighted above, Hume Freeway which will serve as the main access corridor to the subject site is pre-approved for the haulage of both Higher Mass and B-double vehicles.

Neither Bowers Road nor Lee Road are part of the pre-approved network. It is noted however that each of these roads are currently being utilised as part of the road network for other construction projects, and it is therfefore assumed that access along this path will not present an issue for the proposal.

6.2.1 Recommendations - Road Network Limits

Based on the foregoing, we note / recommend the following:

- Heavy Vehicle Deliveries (General)
  - Approaching to the site along the Hume Freeway is considered appropriate given the route is pre-approved.
  - A permit will be required for the use of Bowers Road (and Lee Road) for these vehicles.
    - Given other projects utilise this route already, it is not expected that this would present a problem / approval risk.
    - Given the median break in the Freeway, there is a chance that a restriction would be put in place for vehicles that turn right into Bowers Road from Hume (see further below).
- Over-Size, Over-Mass (OSOM) Vehicles
  - As above, a specific permit approval will be required for the delivery of each OSOM vehicle.
    - This permit process should be explored and more detail on the type of vehicle and components to be known.

6.3 Sight Distance Assessment

To ensure that vehicles are able to safely move into and out of the subject land during construction, a desktop sight distance assessment (with supplementary images provided by the project team) has been undertaken for:

- Site Access / Lee Road; and
- Site Access / Bowers Road.

Note: As part of an established road network (and an intersection that is already used for numerous other construction projects) with no repeat incidents (Section 4.2.4) it is assumed that the Hume Freeway / Bowers Road intersection (and other intersections further afield) sight lines are appropriate.

6.3.1 Sight Distance Requirements

AustRoads Guide to Road Design - Part 4A: Unsignalised Intersections[1] sets out the sight distance requirements for unsignalised intersections, including:

- Approach Sight Distance;
- Safe Intersection Sight Distances (SISD); and
- Minimum Gap Sight Distance.

The guide recommends that Safe Intersection Sight Distance (SISD) is the minimum distance that should be provided on the Major Road at any intersection.

SISD is measured as shown in Figure 10.

[1] AustRoads Guide to Road Design Part 4a: Unsignalised and Signalised Intersections, AustRoads 2017 Edition)

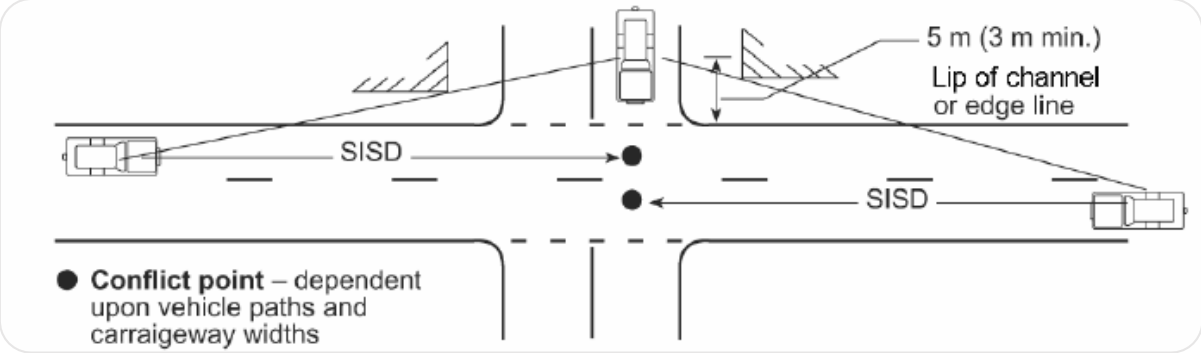


Figure 10 Guide to Measuring SISD for Unsignalised Intersections

The Austroads Guide provides SISD values for commuter vehicles at varying design speeds.

For a speed limit of 100km/hr (design speed of 110km/hr) which applies to Bowers Road and Lee Road and a reaction time of 2.5 seconds, Austroads stipulates an SISD of at least 300m should be provided.

6.3.2 Assessed Site Access Sight Distance

The site contemplates two (2) site access locations one off Bowers Road and the other from Lee Road, located west and northeast of the subject site respectively.

A review of street view and photographic imagery provided by the project team shows that each of these roads are generally straight, flat with vegetation set back sufficiently to ensure that sight lines are not restricted.

Noting the above, a sight distance of at least 300 metres was considered to be achieved from each site access.

The sight distances available is illustrated in Figure 11 and Figure 12.

Figure 11 Sight Distance Assessment - Proposed Bowers Road Site Access

Figure 12 Sight Distance Assessment - Proposed Lee Road Site Access

Based on the foregoing, we are satisfied that the available sight lines at each of these key locations are in accordance with the relevant design standards and are therefore not considered to present a safety risk.

6.4 Turning Lane Assessment

In addition to the above, reference has been made to AustRoads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings[2] (AGTM Part 6).

This document provides guidance on the warranting of various turn treatments at unsignalised intersections, based on turning volumes versus through traffic volumes.

These warrants provide guidance on where a full-length deceleration lane must be used and where a shorter lane, designated Auxiliary Left Turn Lane (AUL) and Channelised Right Turn (CHR), may be acceptable based on traffic volumes.

The warrants apply to turning movements from the major road only, with the applicable traffic flows being peak hour flows.

Note: The above applies to new intersections and does not apply to existing intersections or access points. Notwithstanding, this has been referenced for information purposes.

For the purposes of this turning lane assessment, we make the following assumptions / notes (based on the previous traffic generation estimates):

- Up to 83 inbound vehicles are expected to travel to the site during peak construction activities.
  - Of these, 40 are expected to be attributed to general traffic (staff), with the remaining (43) associated with heavy vehicles.
  - It has been assumed that all staff plus 12 heavy vehicles will arrive during one single hour in the morning 'commuter' peak.
- All movements will arrive / depart from one direction (i.e. to the Hume Freeway).
  - For a conservative assessment, two separate scenarios are considered where all traffic enters via the Bowers Road access, or all traffic enters via the Lee Road access.

[2] AustRoads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings, AustRoads 2017 Edition)

- Qm (or major road traffic volume) is calculated using the method outlined in Figure 2.27 of the AGTM Part 6.
  - Hume Freeway 1250 vehicles / hour (600 eastbound per hour)
    - Based on historical traffic volumes provided by VicRoads.
  - Bowers Road 110 vehicles / hour
    - Assumes minimal existing movements (5) plus 105 from Winton Energy Reserve.
  - Lee Road 5 vehicles per hour.
    - Nominally assumes minimal existing movements per hour.

6.4.1 Turning Warrants - Hume Freeway / Bowers Road

As above, staff vehicles travelling to the subject site (and also Winton Energy Reserve) are likely to be distributed evenly between left-in (Benalla) and right-in (Wangaratta).

The following provides an illustration of these movements (164 peak movements across both projects) in the context of Hume Freeway (110 km/hr speed limit).

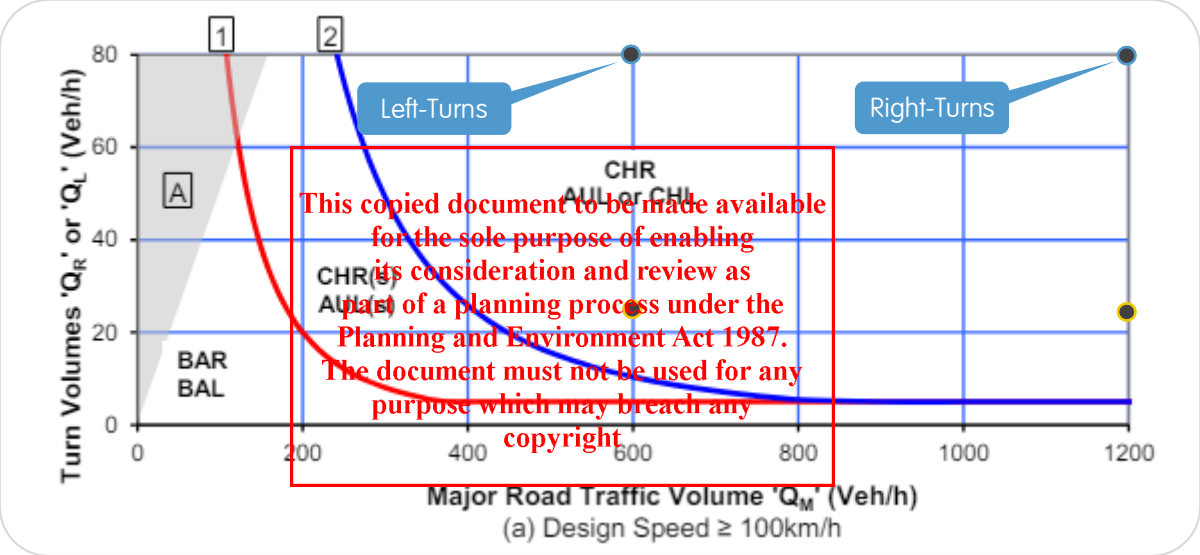


Figure 13 Warrants for Turn Treatments at Unsignalised Intersections - Hume Fwy / Bowers Road

6.4.1.1 Recommendations

Based on the foregoing assessment, during the construction of these two projects (assuming peak construction activities overlap) this intersection would require the delivery of dedicated right and left turn lanes for vehicles that enter into Bowers Road from the Freeway.

This intersection has currently been constructed with both (each including considerable storage / declaration length to allow for vehicles to slow down from 110 km/hr); a median break and storage is also provided for vehicles turning right across the Freeway.

We are satisfied that this infrastructure is appropriate to allow for vehicles moving in to Bowers Road from the Freeway (in line with past and ongoing construction activities that occur).

Note: The blue circles in the above figure represents worst case outcome where the Winton BESS and Winton Energy Reserve peak at the same time. This is unlike to happen in practice, and volumes closer to the yellow.

6.4.2 Turning Warrants - Bowers Road / Site Access

As above, it is conservatively assumed that all vehicles will travel along Bowers Road and turn right into the subject site.

The following figure provides an illustration of these movements in the context of Bowers Road (100km/hr speed limit). It assumes that peak traffic generated by Winton Energy Reserve (104 peak movements) is travelling along Bowers Road, in addition to the assumed existing movements (5 vehicles); the yellow circle represents site traffic compared to existing movements along Bowers Road only (i.e. not including Winton Energy Reserve).

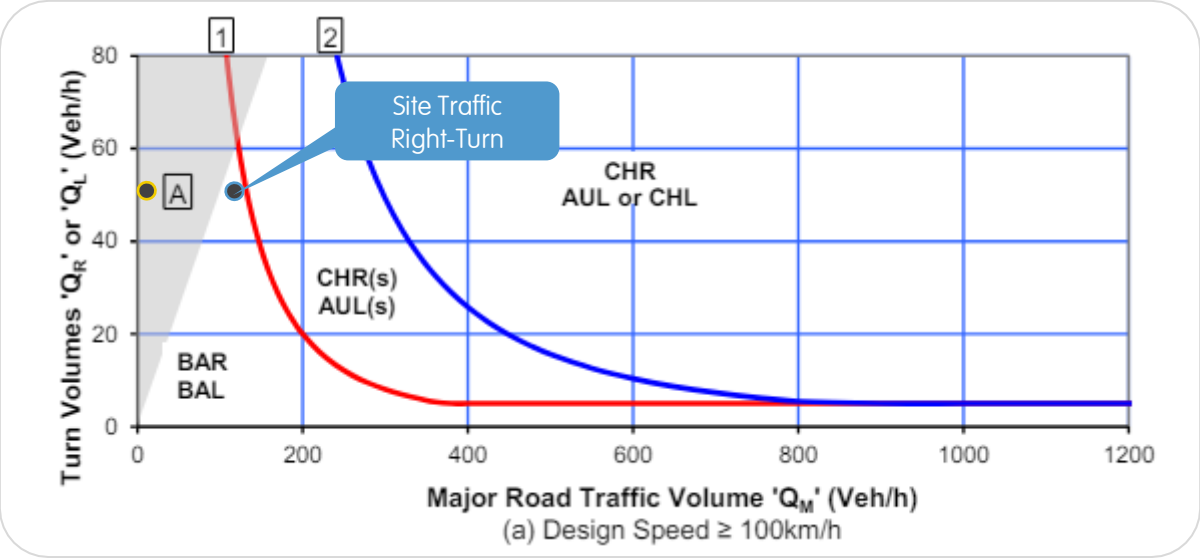


Figure 14 Warrants for Turn Treatments at Unsignalised Intersections - Bowers Rd / Site Access

Based on the foregoing, we note that these movements would trigger a requirement to provide a Basic Right-Turn Treatment (BAR) for vehicles entering the site.

6.4.2.1 Recommendations

The above notwithstanding, given that ample sight lines are available and that external traffic along Bowers Road (when construction for the Winton Energy Reserve has concluded) will be low, we are satisfied that construction traffic can safely enter the subject site without additional width for a turn treatment.

Notably, through traffic can utilise the full width of Bowers Road (including the unsealed shoulder) to pass a car that is waiting to turn into the site should the need arise.

This outcome is also considered applicable / suitable in the scenario which includes Winton Energy Reserve Traffic (although unlikely to occur given proposed construction timeframes) noting these peak period movements would be primarily tidal and therefore unlikely to encounter southbound traffic along Bowers Road.

Further, supplementary 'trucks crossing' signs or similar could be used to provide advanced warning to motorists driving along this road that there will be construction traffic moving into and out of the site.

6.4.3 Turning Warrants - Lee Road / Site Access

As above, a second scenario is considered where all vehicles will travel along Lee Road and turn right into the subject site.

The following figure provides an illustration of these movements in the context of Lee Road (100km/hr speed limit). It assumes existing movements along this road is 5 vehicles per hour; Winton Energy Reserve is located to the west and therefore not relevant to this site access.

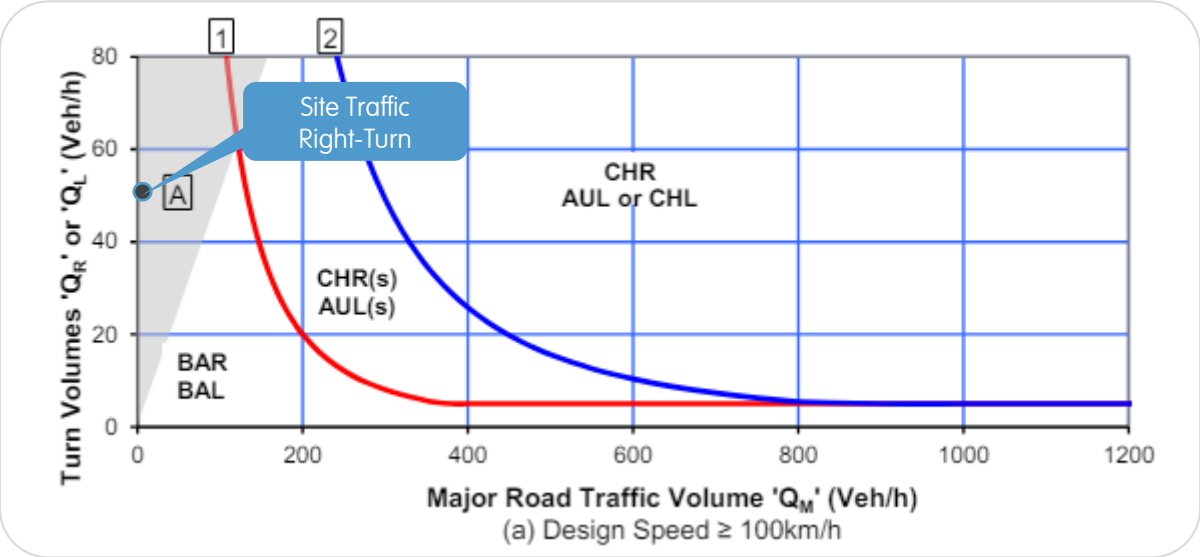


Figure 15 Warrants for Turn Treatments at Unsignalised Intersections - Lee Rd / Site Access

Based on the foregoing, we note that these movements would trigger a requirement to provide a Basic Right-Turn Treatment (BAR) for vehicles entering the site.

6.4.3.1 Recommendations

The above notwithstanding, given that ample sight lines are available and that external traffic along Lee Road will be low, we are satisfied that construction traffic can safely enter the subject site without additional width for a turn treatment.

Notably, through traffic can utilise the full width of Lee Road (including the unsealed shoulder) to pass a car that is waiting to turn into the site should the need arise.

Further, supplementary 'trucks crossing' signs or similar could be used to provide advanced warning to motorists driving along this road that there will be construction traffic moving into and out of the site.

6.5 Spatial Considerations

To confirm that construction vehicles will be able to access the subject site, a swept path assessment has been undertaken to demosntrate how vehicles can move into and out of the site from the arterial road network (Hume Freeway).

Specifically, swept path analysis has been prepared for a 26m B-double and 20m semi-trailer at the following locations:

- Hume Freeway / Bowers Road;
- Bowers Road / Site Access;
- Bowers Road / Lee Road; and
- Lee Road / Site Access.

The swept path assessment can be found attached as Appendix A.

6.5.1 Hume Freeway / Bowers Road

This intersection is currently utilised (or has been approved to be used) for construction traffic of various renewable energy projects in this area (Winton Solar Farm, Winton Energy Reserve etc).

As noted above, we understand that an upgrade to this intersection has been considered to help facilitate vehicle access into and out of Bowers Road - including the provision of an acceleration lane for vehicles that are exiting to the north.

Noting the intersection design will be changed - no detailed swept path analysis has been provided for this intersection.

We do note however that a review of the median break suggests that larger construction delivery vehicles will likely need to be restricted to left-out only (to prevent any overhang onto the through lanes of the Hume Freeway).

It is understood that this constraint / requirement applies to other construction projects that have been approved for this area - and that ultimately delivery vehicles would utilise nearby interchanges (Glenrowan to the north-east and Winton to the south-west) will help facilitate the turning of vehicles such that they are able to enter / exit Bowers Road via a left-turn movement.

6.5.2 Bowers Road / Site Access

Proposed site access has been designed to accommodate vehicles up to 26 metres in length.

Swept paths (prepared and attached as Appendix A) show inbound and outbound movement of B-double vehicles travelling into / out of the subject site.

As shown attached - an inbound construction vehicle is able to pass any construction traffic that is waiting to leave the subject site.

6.5.3 Lee Road / Site Access

Proposed site access has been designed to accommodate vehicles up to 26 metres in length.

Swept paths (prepared and attached as Appendix A) show inbound and outbound movement of B-double vehicles travelling into / out of the subject site.

As shown attached - an inbound construction vehicle is able to pass any construction traffic that is waiting to leave the subject site.

6.6 Road Capacity

The proposed development is projected to generate up to 166 additional movements per day and 52 additional movements per peak hour during peak construction activities.

The neighbouring Winton Energy Reserve 1 Facility is projected to generate in the order of 230 additional daily movements and 104 peak hour movements during the peak construction period.

Therefore, conservatively assuming that these each peak at the same time, Hume Freeway & Bowers Road can be expected to carry an additional 396 daily vehicles (and 156 during the peak period) and Lee Road 166 daily movements (and 52 during the peak period).

6.6.1 Hume Freeway

Hume Freeway is classified as a major arterial road and is designed to carry approximately 16,000 two-way daily vehicles movements per day.

During the peak construction periods (conservatively assuming they coincide), this road could be expected to carry up to 400 additional daily movements and 160 peak period movements.

This additional traffic can be comfortably accommodated by the Hume Freeway without any material impact on the operation or safety of this road.

Note: As above - there will likely be some restrictions made around the direction of travel / arrival for heavy vehicles to restrict right-in and right-out movements where possible.

6.6.2 Bowers Road

Similarly, assuming peak construction activities coincide Bowers Road (up to the site access) could be expected to cater to an additional 400 daily movements and 160 peak period movements.

With nothing to restrict sight lines and sufficient space within the existing road network (including road shoulders) to allow for vehicles to pass it is expected that Bowers Road can physically cater to this increased construction traffic for a short period of time.

It is noted however that the increased traffic (particularly where vehicles might be relying on road shoulders for passing movements) will likely increase the rate of deterioration of this road during construction activities (leading to increased maintenance / repair work being required).

Given this possible increased impact, we expect that an agreement would need to be established between Council and the proponent for the maintenance / repair works on this road.

6.6.3 Lee Road

During peak construction activities, Lee Road (relevant to the proposal) could be expected to carry an additional 166 daily movements and 52 peak period movements. With minimal existing traffic along this road, this level of additional traffic will be noticeable.

Given there is sufficient width available within this road (including road shoulders) to facilitate passing of vehicle traffic (and no major sight line impediments) we expect that this level of additional traffic can be accommodated by this road without any major upgrades required.

It is noted however that the increased traffic (particularly where vehicles might be relying on road shoulders for passing movements) will likely increase the rate of deterioration of this road during construction activities (leading to increased maintenance / repair work being required).

Given this possible increased impact, if the Lee Road access is to be used to cater to general construction movements (versus being for emergency only) we expect that an agreement would need to be established between Council and the proponent for the maintenance / repair works on this road.

6.6.4 Pavement Upgrades

As above, given each local roads along the proposed haulage route are sealed and provide sufficient width for passing of traffic (albeit using unsealed shoulder), we do not believe any permanent pavement upgrades will be required to physically cater to the construction traffic moving into / out of the subject site.

We do however recommend that each site access point be constructed to an 'all weather' standard to cater for construction traffic throughout the year.

6.6.5 General Road Maintenance During Construction

As above, the proposal will ultimately lead to a noticeable increase in vehicle movements during construction, and also possibly increased reliance on the unsealed road shoulder along Bowers / Lee Road.

This will likely lead to increased wear and tear on each of these roads during project construction. After construction concludes, minimal additional traffic movements are likely to be generated by the subject site.

Based on the foregoing, we recommend that the applicant liaise with Council with respect to the maintenance and repair of the relevant sections of road during the construction period.

It is expected that once the site is in operation (and generating minimal movements) maintenance / repair activities would be resumed by Council as appropriate.

Any maintenance and repair of the arterial road network will require the applicant to liaise with DTP and may require a contribution or fee based on haulage distance.

6.7 Other Impacts

6.7.1 Emergency Vehicle Access

Two separate access points are proposed for the subject site.

Whilst the access strategy has yet to be confirmed - it is noted that each of these access points will be able to cater for emergency vehicles.

Having a second access (off a different road)will ensure that an access point to / from the site is always available.

Further, we note that a back-up emergency route along Lee Road to the east/north would also be available for emergency vehicle access on any occasion where access via Hume Freeway cannot be achieved.

7 Traffic Management

7.1 Traffic Management - High Level

External

As above, the proposal isn't expected to have any material impact on the operation of the external road network.

Supplementary 'trucks crossing' signs could be provided along the Bowers Road and Lee Road's approach to the Site Access, to assist in alerting drivers as to the possibility of trucks entering / exiting the site.

Note: Any specific traffic management requirements for the Site Access construction will be outlined within a Traffic Management Plan for these works at a time closer to construction. Any specific traffic management device required to build the access point will be outlined and justified within this TMP.

Internal

We expect that a detailed list of internal traffic management strategies will be provided when the TMP is prepared for the subject site (see below).

Notwithstanding, we expect that such management devices will ultimately include (but not necessarily be limited to):

- A reduced speed limit on internal roads (20km/hr for example);
- Radio communications between construction vehicles at all times;
- Flashing lights on all construction vehicles;
- Induction and training procedures for all drivers and staff; and
- Warning signs to be provided at any 'critical' points within the site.

7.2 Traffic Management Plan

Subject to the appointment of a supplier / construction contractor and other considerations, aspects of the Winton BESS facility (the project) may be subject to review.

In addition, construction / work programs for the project will not be fully resolved until closer to the project commencement. As such, subject to commencement timeframes, there is potential for changes to the existing road conditions and BESS haulage assumptions as considered within this report.

Based on the foregoing, and our experience with similar projects, we expect that a detailed Traffic Management Plan (TMP) will need to be prepared prior to the commencement of the project to confirm any mitigation measures and management works required at that time.

The TMP is likely a condition of any Development Consent issued for the BESS and would be developed in consultation with the Council, DTP, and any other relevant stakeholders to provide a more accurate indication of traffic impacts and generally identify responsibilities for road maintenance and upgrades throughout the construction period.

In general, the TMP should include:

- Confirmation of the BESS construction timeframe and work stages;
- Confirmation of expected traffic volumes generated by the BESS facility for all work stages
- Identification of all HV and OD vehicle haulage routes for all work stages;
- A mechanism to review identified haulage route road conditions prior to the commencement of works;
- Mechanisms/agreements (if deemed necessary) to maintain haulage route roads and road infrastructure, including local public roads used by site traffic, during construction works and to reinstate roads to at least pre-construction conditions;
- Qualify any requirement for specific work stage construction traffic management plans;
- Qualify and identify any relevant mechanisms for OD vehicle permits and traffic management requirements; and
- Confirm on-site the adequacy of available sight distances along the Bowers Road and Lee Road from each respective Site Access point.

Please note that this is not an exhaustive list, and that the final TMP requirements would be as per those outlined in the Development Consent.

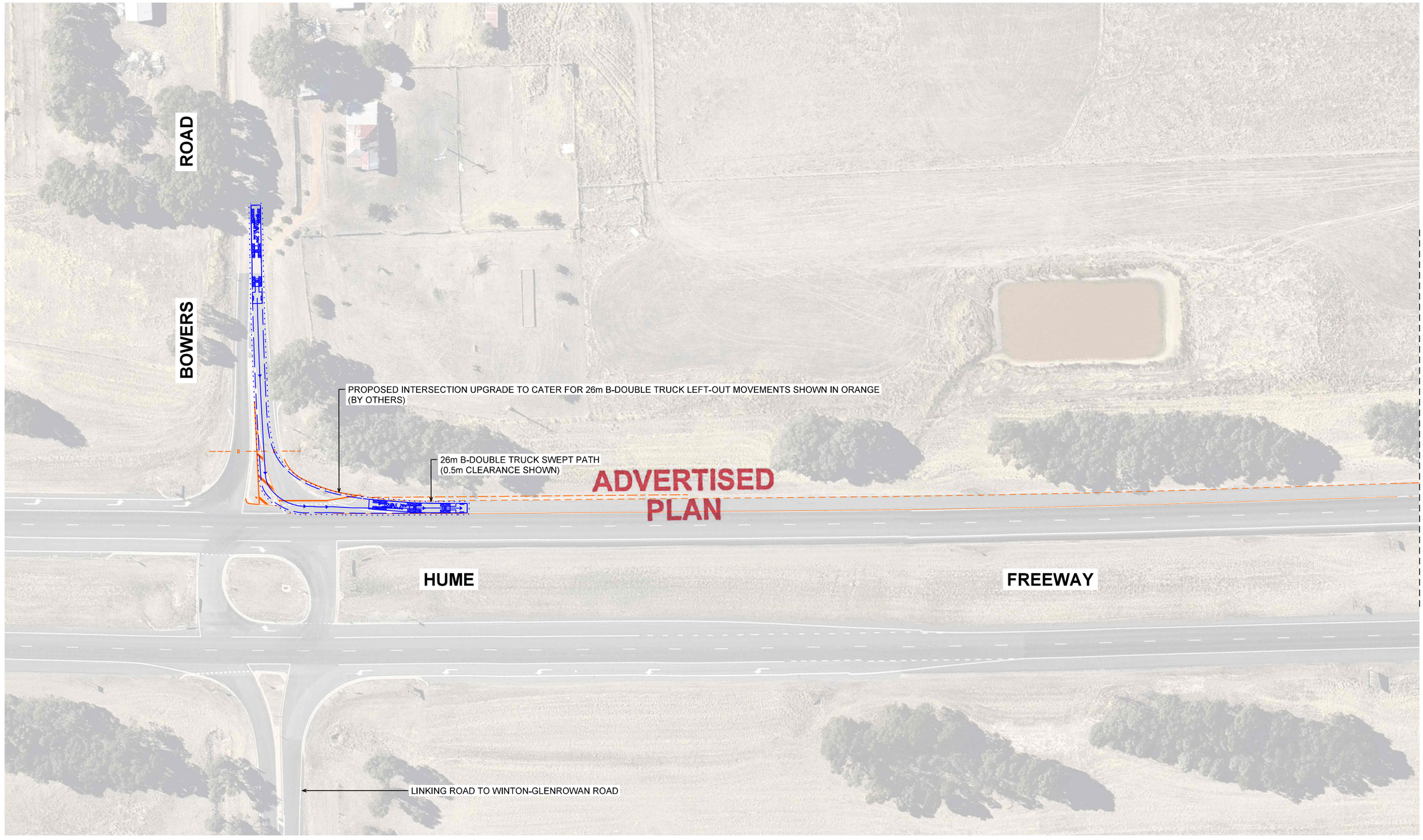
Note:

In addition to the above aspects, we understand / note that the Traffic Management Plan will also be required to include detail on the traffic management / access requirements for movements to/from the Glenrowan Terminal Station.

Specifically, a small number of movements will need to be arranged and managed to facilitate the connection between the subject land and the Glenrowan Terminal Station.

APPENDIX A
Swept Path Analysis

Design Vehicle - 26m B-double



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Client
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Date 2025-03-20
Drawn / Approved CB / WD

Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
EXISTING INTERSECTION UPGRADE
FOR INFORMATION ONLY
WORKS BY OTHERS

Status
PRELIMINARY

Drawing Number
IMP2410021 - DRG-01-01

Revision
A

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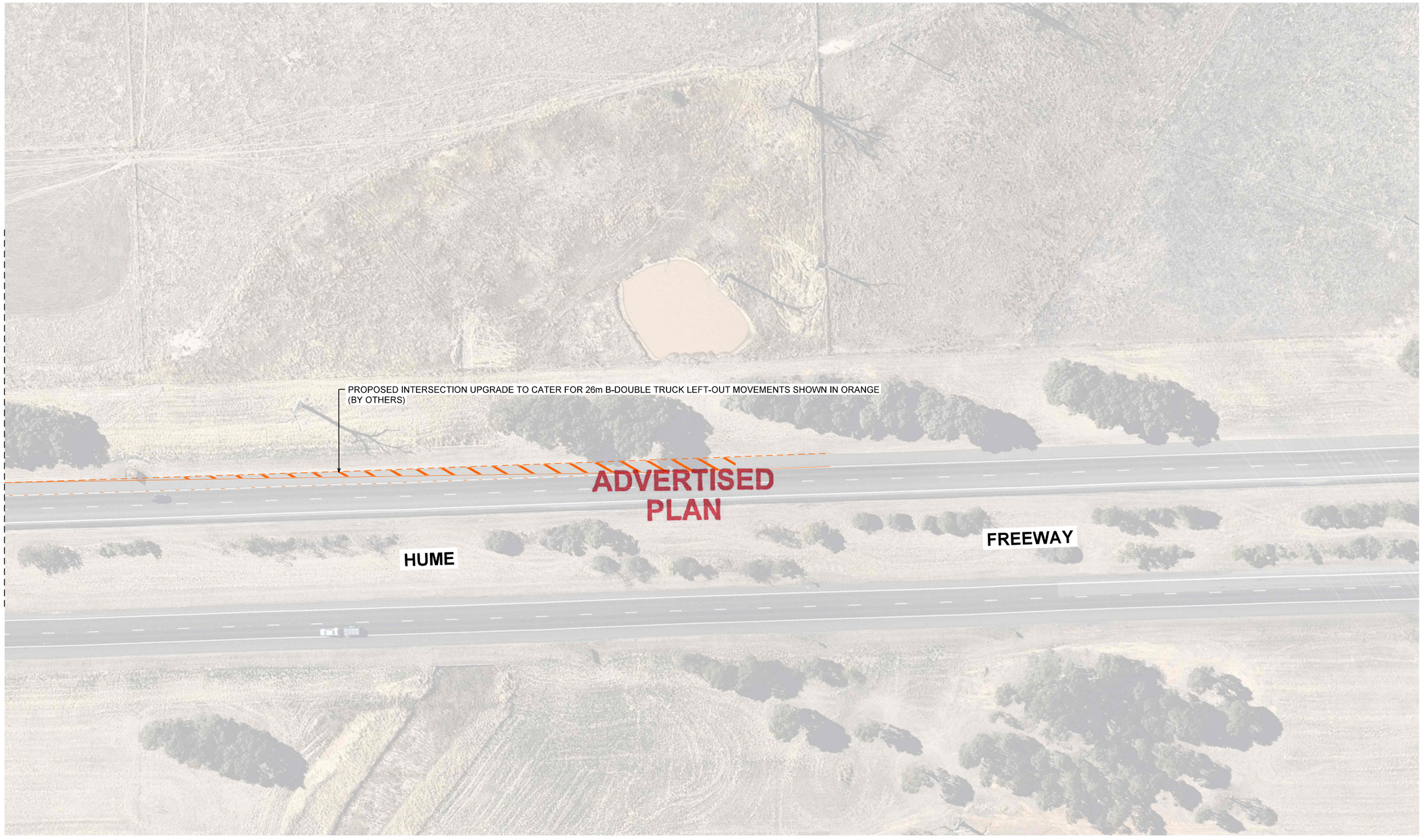

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Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
EXISTING INTERSECTION UPGRADE
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Status
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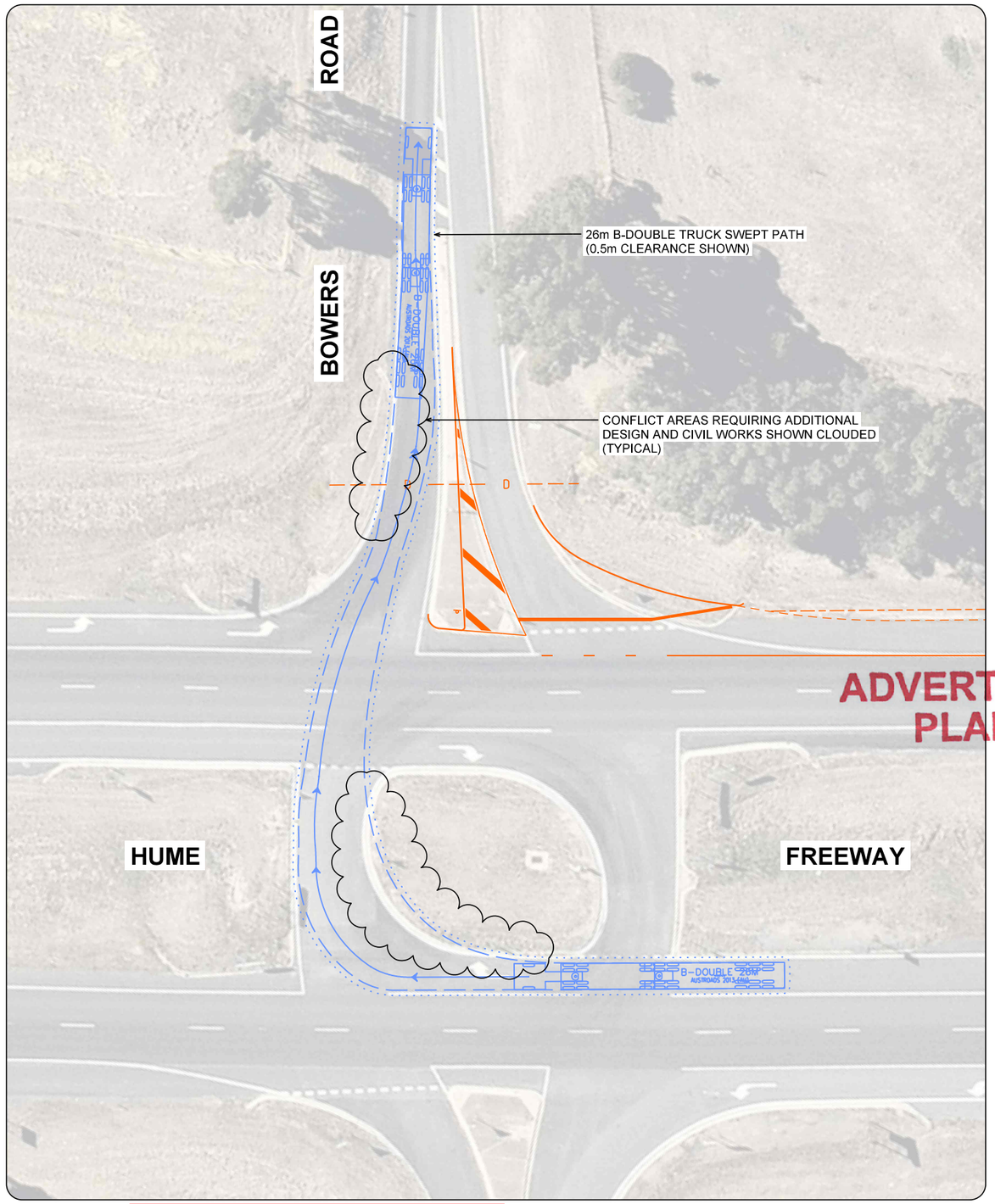

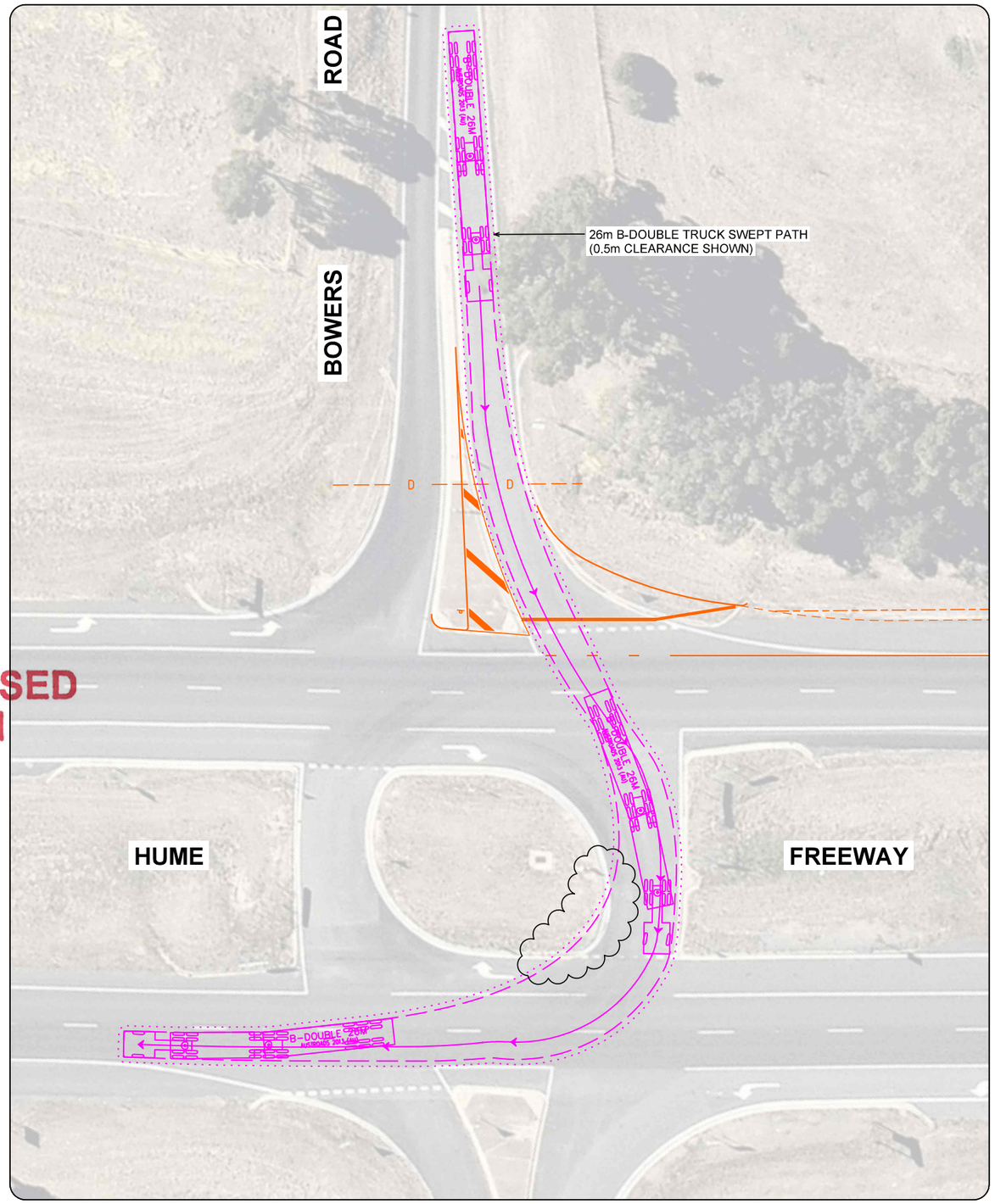

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Date 2025-03-20
Drawn / Approved CB / WD

Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
EXISTING INTERSECTION UPGRADE
FOR INFORMATION ONLY
WORKS BY OTHERS

Status
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Revision
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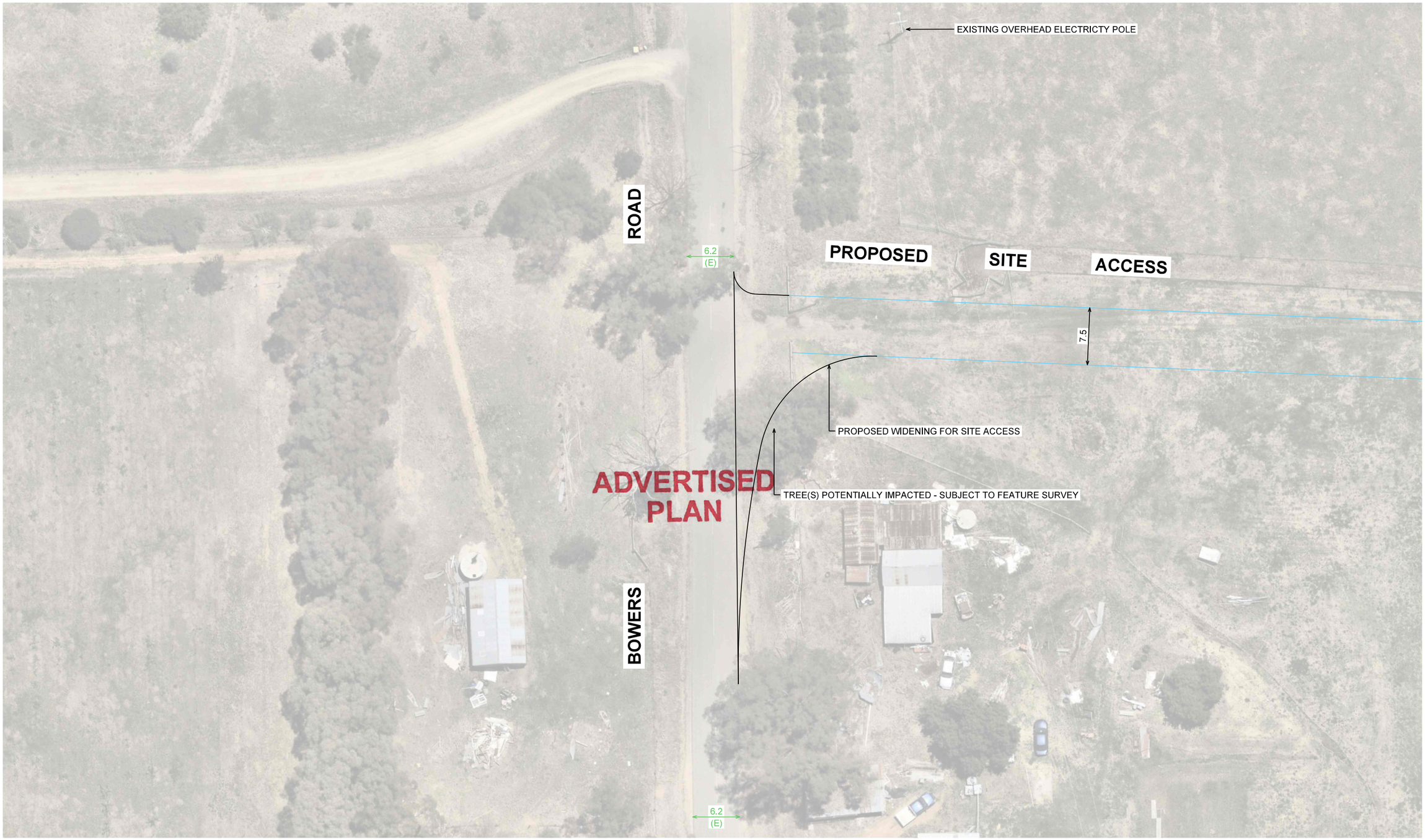

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Date **2025-03-20**
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Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
PROPOSED SITE ACCESS UPGRADES
CONCEPT LAYOUT PLAN
SINGLE VEHICLE ACCESS OPTION

Status
PRELIMINARY

Drawing Number
IMP2410021 - DRG-02-01

Revision
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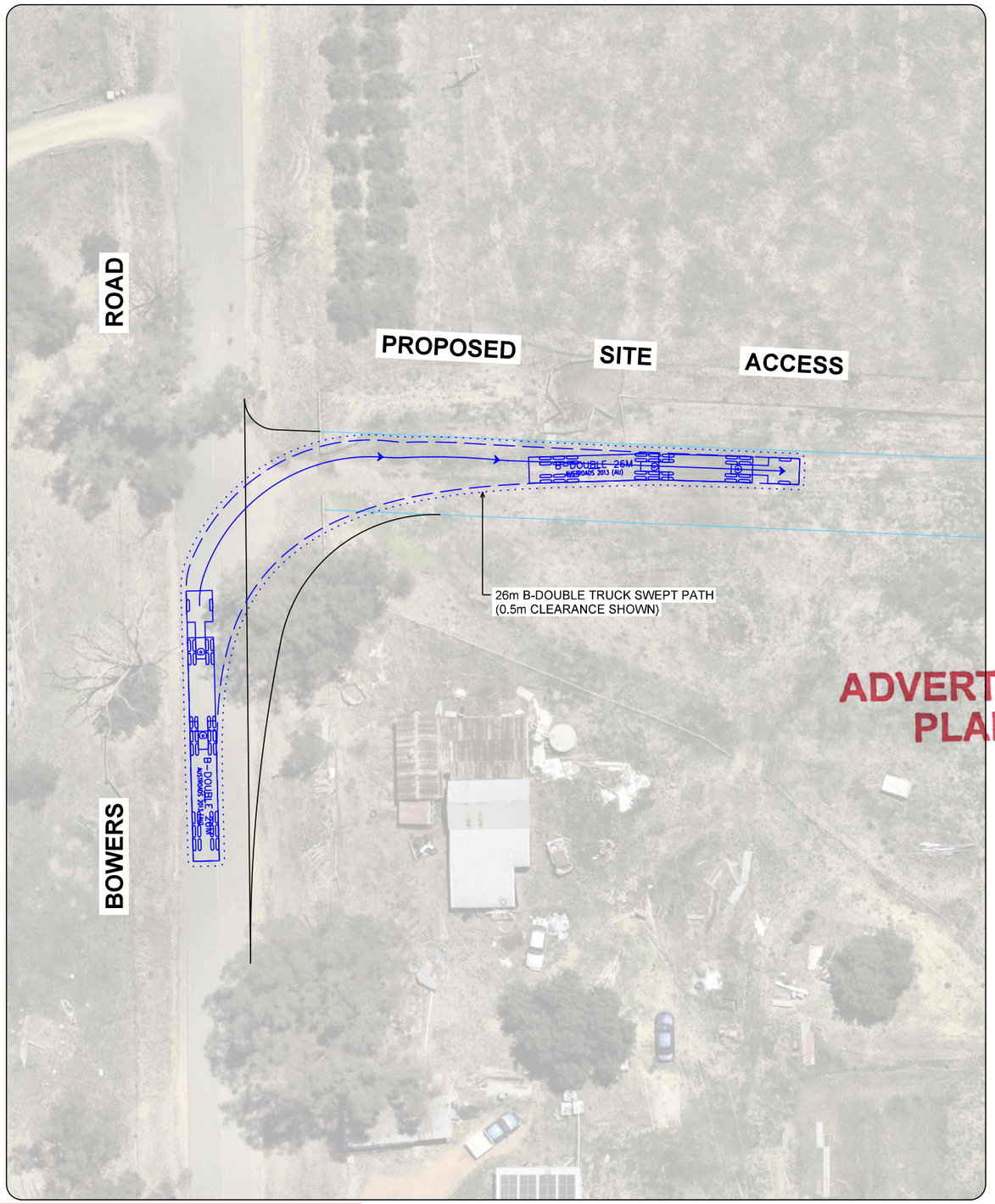

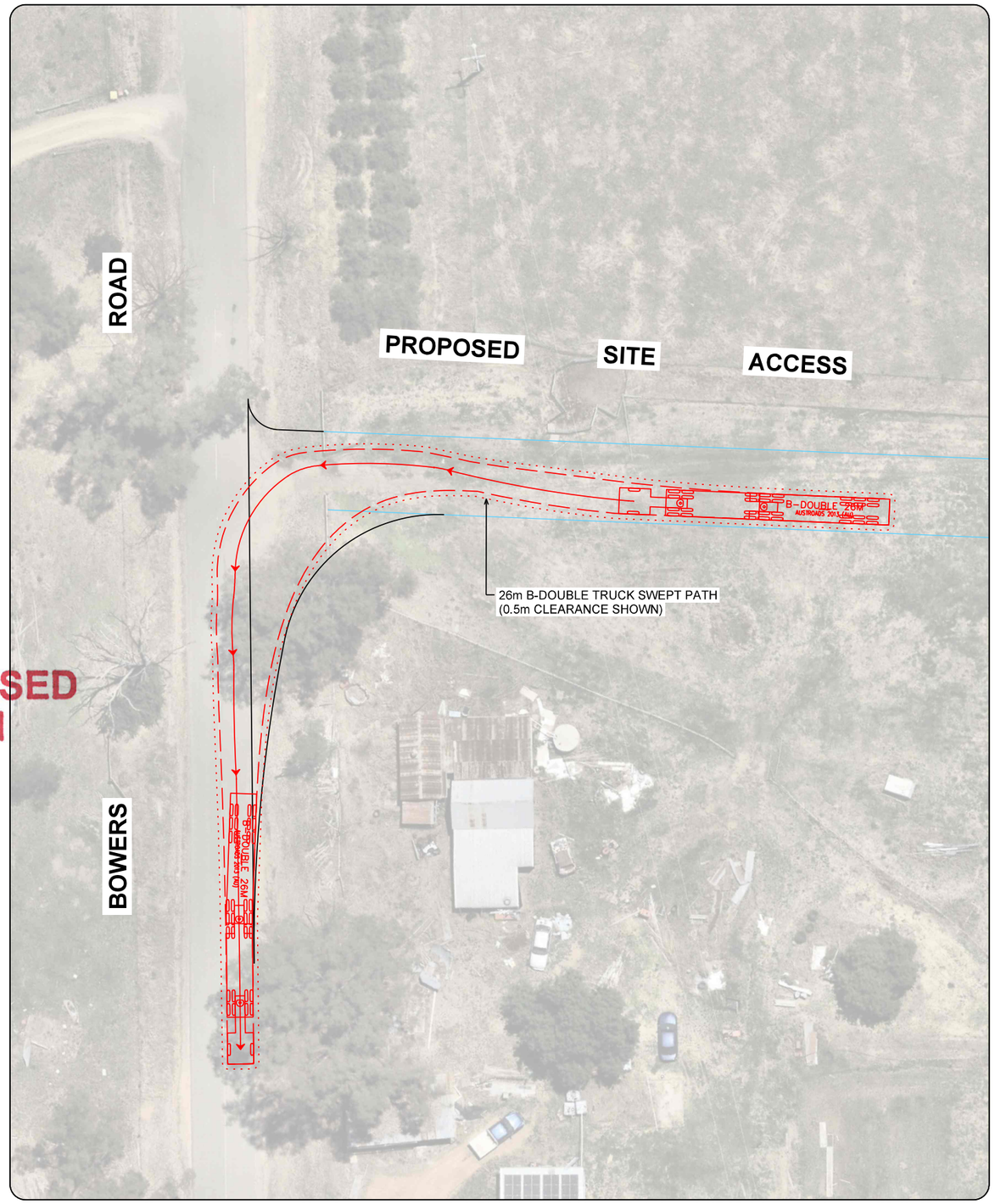

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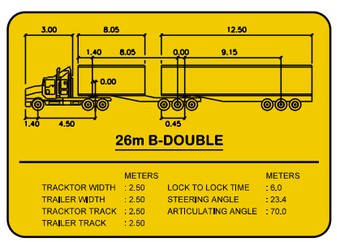

26m B-DOUBLE

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TRAILER WIDTH	: 2.50	STEERING ANGLE	: 23.4
TRACKTOR TRACK	: 2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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Client
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Drawn / Approved **CB / WD**

Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
PROPOSED SITE ACCESS UPGRADES
SWEPT PATH ANALYSIS
26m B-DOUBLE TRUCK

Status
PRELIMINARY

Drawing Number
IMP2410021 - DRG-02-02

Revision
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Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
PROPOSED SITE ACCESS UPGRADES
CONCEPT LAYOUT PLAN
SINGLE VEHICLE ACCESS OPTION

Status
PRELIMINARY

Drawing Number
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Revision
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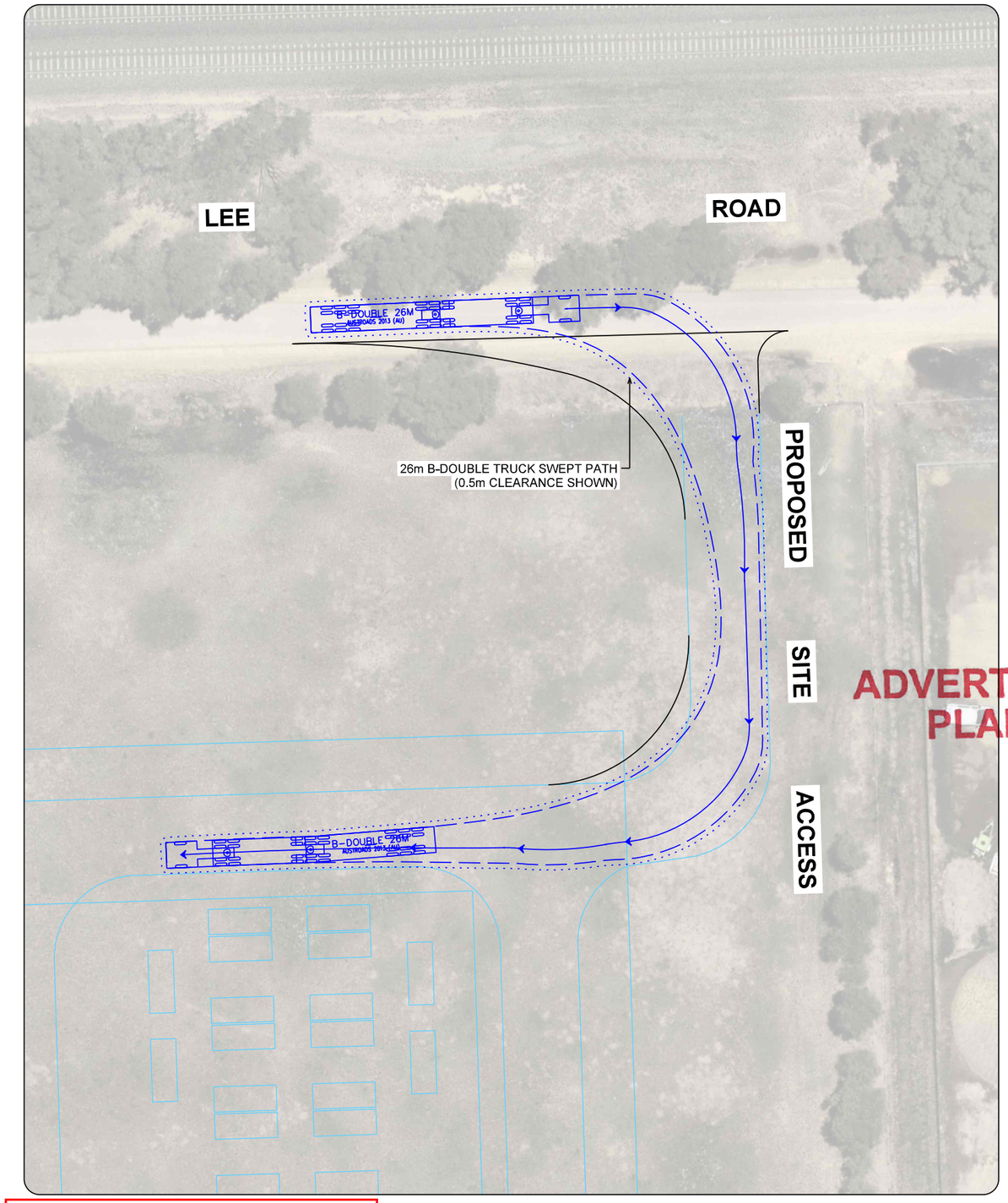

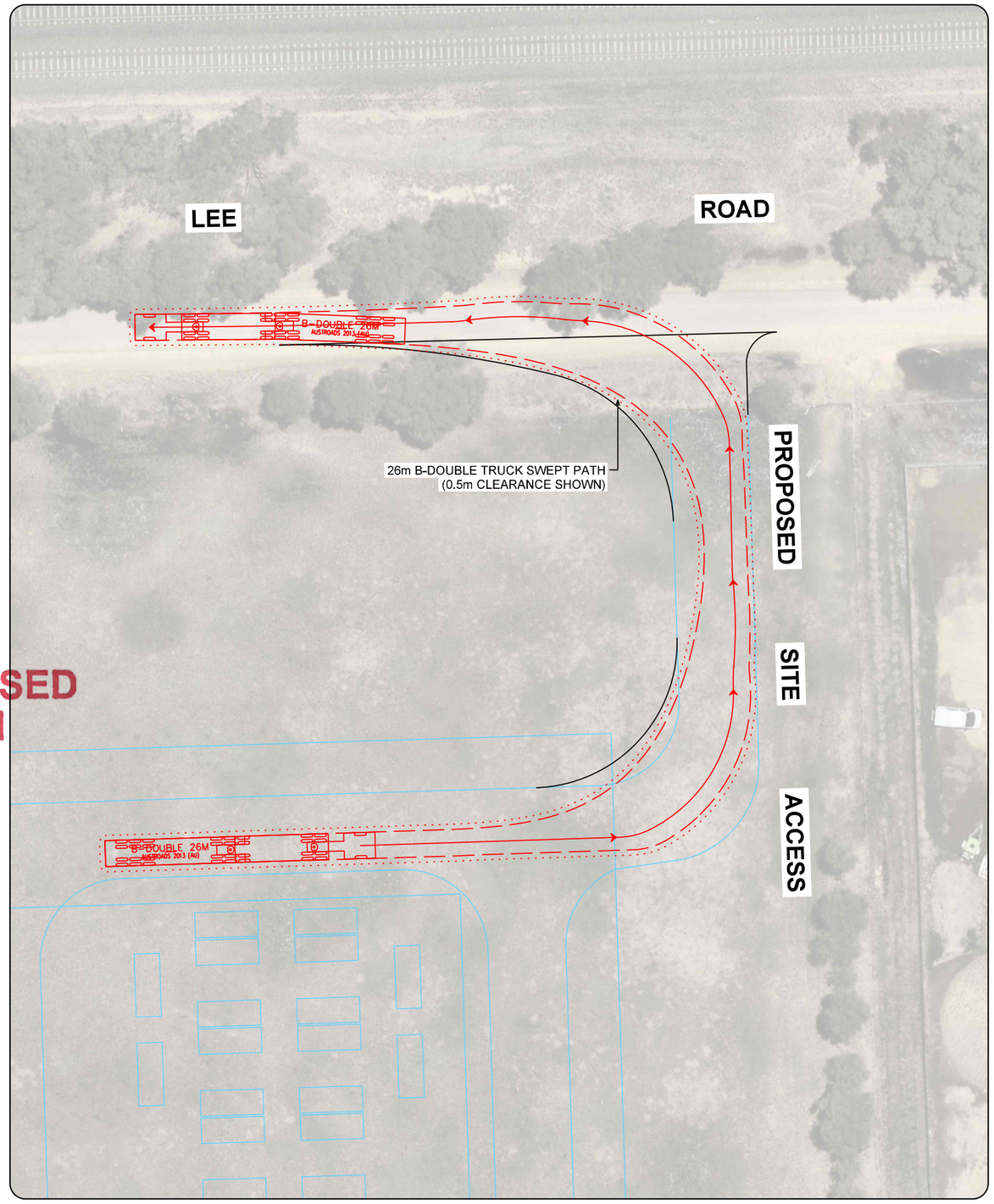

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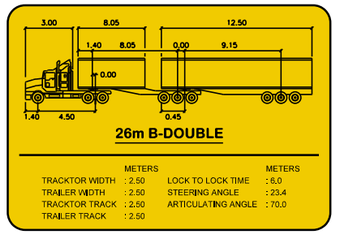

26m B-DOUBLE

	METERS		METERS
TRACKTOR WIDTH	: 2.50	LOCK TO LOCK TIME	: 6.0
TRAILER WIDTH	: 2.50	STEERING ANGLE	: 23.4
TRACKTOR TRACK	: 2.50	ARTICULATING ANGLE	: 70.0
TRAILER TRACK	: 2.50		

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Date **2025-03-20**
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Project
PROPOSED B.E.S.S. SOLAR ENERGY SITE
6 BOWERS ROAD, WINTON
CITY OF BENALLA

Title
PROPOSED SITE ACCESS UPGRADES
SWEPT PATH ANALYSIS
26m B-DOUBLE TRUCK

Status
PRELIMINARY

Drawing Number
IMP2410021 - DRG-02-04

Revision
A

APPENDIX B
Terminal Substation Connection Strategy

High Level Construction Traffic Management

37°50'12"S 144°58'33"E

CONSULTANT ADVICE NOTICE

To:	Gerry McGrath	From:	Will Drew
Company	**NGH Consulting**	Company:	**IMPACT®**
Email	Gerry.McGrath@fyfe.com.au	Email:	will@impactaustralia.com.au
CC			
PROJECT:	Winton BESS - Glenrowan Substation	Reference:	IMP2410021CAN02
Subject	Terminal Substation Connection - Traffic Management Strategy		

Preamble

An application has been lodged to develop the subject site (located within the land at 6 Bowers Road) for the purposes of a 120 MW / 480 MWh Battery Energy Storage System (BESS) project (Winton BESS).

IMPACT® were previously engaged to prepare a Traffic Impact Assessment addressing the traffic impacts during both construction and operation of the project.

Following the initial submission and application, several authorities have reviewed the application and requested pieces of additional information.

Specifically, relevant to traffic Department of Transport & Planning (DTP) have requested that additional information be provided in relation to the future construction and traffic management strategy to link the project in to the Glenrowan Terminal Station (i.e. connect the BESS project into the power grid).

Whilst the construction traffic management strategy is typically deferred until more information is known about future construction activities, the following advice notice / CAN has been prepared to try and address the comments raised by DTP, and is based on information available at the time of writing this advice notice.

Project / Construction Activity Description

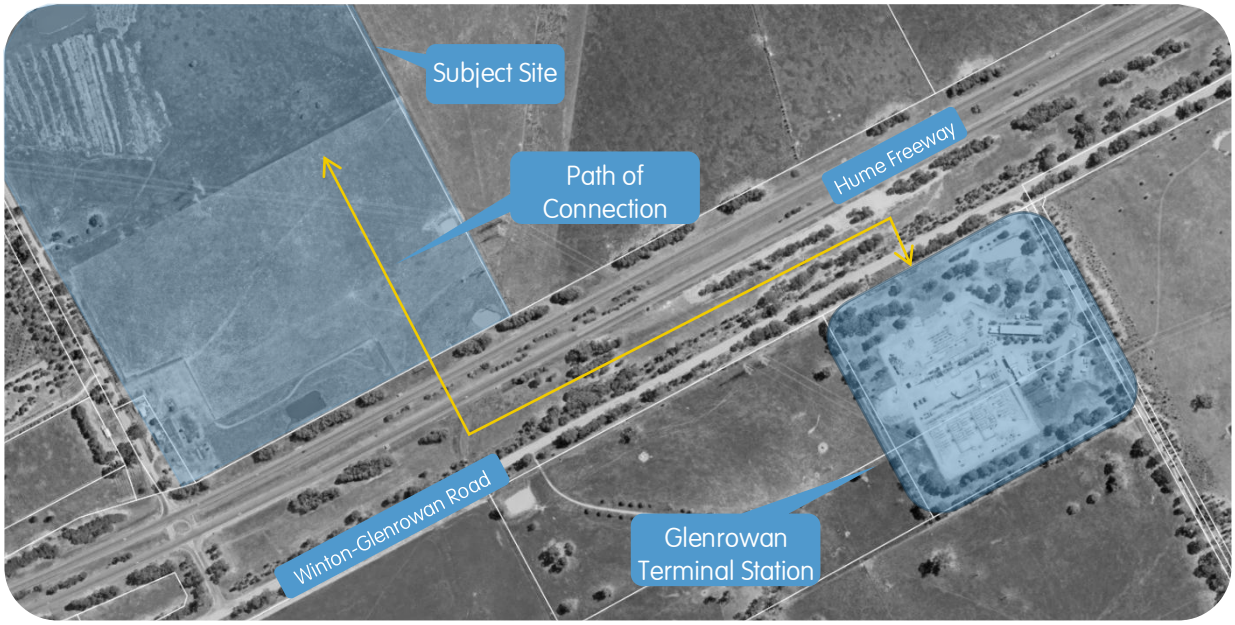
As above, the proposal intends to deliver a BESS project, which is located on the northern side of the Hume Freeway in Winton, Victoria.

Ultimately, this project will connect into the 'grid' via the existing Glenrowan Terminal Substation which is located on the southern side of Hume Freeway.

It is understood that connection to the terminal station will ultimately be facilitated by bore holes beneath the freeway and Winton-Glenrowan Road.

The following figure provides an illustration of the subject site, terminal station, and possible connection path between the two.

37°50'12"S 144°58'33"E



Anticipated Vehicle Movements

Whilst construction activities are yet to be confirmed / locked in, **IMPACT®** have been advised that the following vehicle movements might be required during the boring activities / substation connection works:

- Cable Works / Trenching*
  - Light Vehicles 8 vehicles per day.
  - Heavy Vehicles 6 vehicles per day.
- Installation of Cabling into the Bay**
  - Light Vehicles 12 vehicles per day.
  - Heavy Vehicles 18 vehicles per day.

*The cable works / trenching component will be undertaken from within the Road Reserve and subject site areas. Access to the road reserve area will be facilitated via Winton-Glenrowan Road, and we understand that boring activities themselves will occur with a significant setback from the road carriageway itself.

**It is understood that the Installation / Cabling works will be undertaken from within the existing substation area itself (with access facilitated via Glenwest Lane).

37°50'12"S 144°58'33"E

Construction Traffic Management Details / Strategy

As above, access to the boring zone is expected to be facilitated by:

- The subject site to the north.
- Winton-Glenrowan Road to the south.

Boring activities will be undertaken within the freeway road reservation,

Any work zones undertaken within the Freeway road reservation areas will be installed outside of the 'no go' zones of the existing wire rope barrier which extends along the Hume Freeway Road carriageway.

As far as traffic management devices and approvals required to complete these works, we note that:

- Appropriate traffic management devices and practices will be required to facilitate vehicle access to the work area along Winton-Glenrowan Road and possibly Glenwest Lane (for the installation component).
  - These roads fall under Council jurisdiction, with appropriate permits sought from Council for these works.
  - No access will be sought directly from Hume Freeway itself for any of these activities.
- Working within a road reserve (WWRR) permits will be required for boring setup and boring activities within the road reserve area.
- No traffic control devices are expected to be required on a DTP Road, and hence no Memorandum of Authorisation (MoA) from DTP is expected to be required at this stage.

Based on the foregoing, we are comfortable that the proposed / possible future connection strategy (outlined above) will not have any detrimental impact on operation or safety of Hume Freeway, and should not prohibit the issue of a permit for the development of the Winton BESS project.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