

Traffic Impact Assessment Report

120 Houghton Road, Yanco, NSW

Project Number 230136

Final 5 Report 19/02/2025

Client ACEnergy Pty Ltd

Document control record

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Executive summary

ACEnergy Pty Ltd engaged Trafficworks to undertake a traffic impact assessment (TIA) for the proposed development of a Battery Energy Storage System (BESS) at **120 Houghton Road, Yanco, NSW** within Leeton Shire Council. (council).

The Yanco BESS includes constructing, operating, and commissioning a BESS with an estimated capacity of approximately 250 MW / 1,100 MWh and associated infrastructure, including transmission and connection works.

This report includes a response to Transport for NSW's (TfNSW) submissions and the Planning Secretary's Environmental Assessment Requirements (SEARs) dated February 2024. The report has also been updated to respond to the comments of the Department of Planning, Housing and Infrastructure (DPHI).

The table below summarises the development site, the proposed development, and our conclusions and recommendations.

Address	120 Houghton Road, Yanco
Zoning	RU1: Primary Production
Proposed development	Battery Energy Storage System (BESS)
Road network	Houghton Road (local road) Irrigation Way (state road)
Traffic generation	Construction phase (per day): — light vehicles = 50 vpd — heavy vehicle = 28 vpd Operation phase (per day): — light vehicles = 10 vpd
Car parking	Construction phase: 25 spaces Operation phase: 5 spaces
Conclusion	We conclude that subject to the implementation of our recommendations, no traffic engineering reasons would prevent the development from proceeding. — the peak hour traffic generation is likely to occur during the construction phase of the development, where the peak hour volumes are expected to be: — 25 light vehicles — 1 heavy vehicle.

-
- the construction phase is expected to take 8 months
 - during the development's operation phase, the peak hour volumes are expected to be up to 5 light vehicles
 - the development site will generate a peak car parking demand of 25 spaces during construction and 5 spaces post-opening
 - the updated development site plan has a designated parking area that can accommodate 25 vehicles during the development's construction phase
 - the sight lines along:
 - Houghton Road at the intersection with Hulme Road are satisfactory
 - Irrigation Way at the intersection with Houghton Road is satisfactory
 - the proposed security gate's setback from the edge of Hulme Road will accommodate the storage of a light vehicle clear of the traffic lane
-

Recommendations

It is recommended that:

- **Recommendation 1:** implement a traffic management plan to ensure consultation with council is maintained concerning the operation of the Yanco Sportsground.
 - **Recommendation 2:** Irrigation Way and Houghton Road's intersection should be upgraded per the prepared Strategic Design plans
 - **Recommendation 3:** Install signage and line marking north of the railway line to advise drivers not to store between the railway lines.
 - **Recommendation 4:** implement a traffic management plan to ensure all staff are instructed not to store across the railway lines.
 - **Recommendation 5:** the intersection of Houghton Road, Hulme Road and the development site access should be upgraded in accordance with the prepared Strategic Design plan.
 - **Recommendation 6:** implement a traffic management plan to ensure no heavy vehicles arrive and depart simultaneously along Houghton Road.
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Referenced documents

References used in the preparation of this report include the following:

- Austroads Guide to Road Design
 - Part 4: Intersections and Crossings (AGRD4)

- Part 4A – Unsignalised and Signalised Intersections (AGRD4A)
- Austroads Guide to Traffic Management
 - Part 6 – Intersections, Interchanges and Crossings Management (AGTM6)
- Australian Standards:
 - AS 2890.1-2004 Parking facilities - Off-street car parking
- RTA Guide to Traffic Generating Developments, Version 2.2, October 2002.
- Transport for New South Wales (TfNSW)
 - Centre for Road Safety development
 - Traffic Volume Viewer
- Leeton Shire Council
 - Local Environment Plan 2014 (LEP)
 - Development Control Plan 2022 (DCP)
 - Engineering Guidelines 2022/23

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1 Introduction

ACEnergy Pty Ltd engaged Trafficworks to undertake a traffic impact assessment (TIA) for the proposed development of a proposed Battery Energy Storage System at **120 Houghton Road, Yanco, NSW** within Leeton Shire Council. (council).

The Yanco BESS includes constructing, operating, and commissioning a BESS with an estimated capacity of approximately 250 MW / 1,100 MWh and associated infrastructure, including transmission and connection works.

This report includes a response to Transport for NSW's (TfNSW) submissions and the Planning Secretary's Environmental Assessment Requirements (SEARs) dated February 2024. The report has also been updated to respond to the comments of the Department of Planning, Housing and Infrastructure (DPHI).

For the details about:

- existing site conditions – see section 2
- description of the proposed development – see section 3.1
- traffic impact of the proposed development – see section 3
- car parking assessment of the proposed development – see section 4
- assessment of the access to the proposed development – see section 5
- our conclusions and recommendations – see section 6.

2 Existing conditions

2.1 Development site

The development site is:

- located at 120 Houghton Road in Yanco
- located within Lot 516 of DP751745 and part of Lot 521 of DP751745
- currently occupied by farmland.

Vehicular access to the development site is available from the existing access point to Hulme Road, connecting to Houghton Road at the northeast corner.

Figure 1 shows the development site's location, surrounded by farmland and rural properties.



Figure 1: Location plan (reproduced from Nearmap)

The development site is located adjacent to an electrical transmission and distribution facility and a sewage treatment plant to the east of Hulme Road (SP2: Infrastructure), as per the Leeton Shire Council's (council) Local Environmental Plan 2014 (LEP). Further to the east, along Houghton Road, near Irrigation Way (a state arterial road), is a GrainCorp facility adjacent to an active railway line.

Figure 2 shows the zoning for the development site and surrounding area.

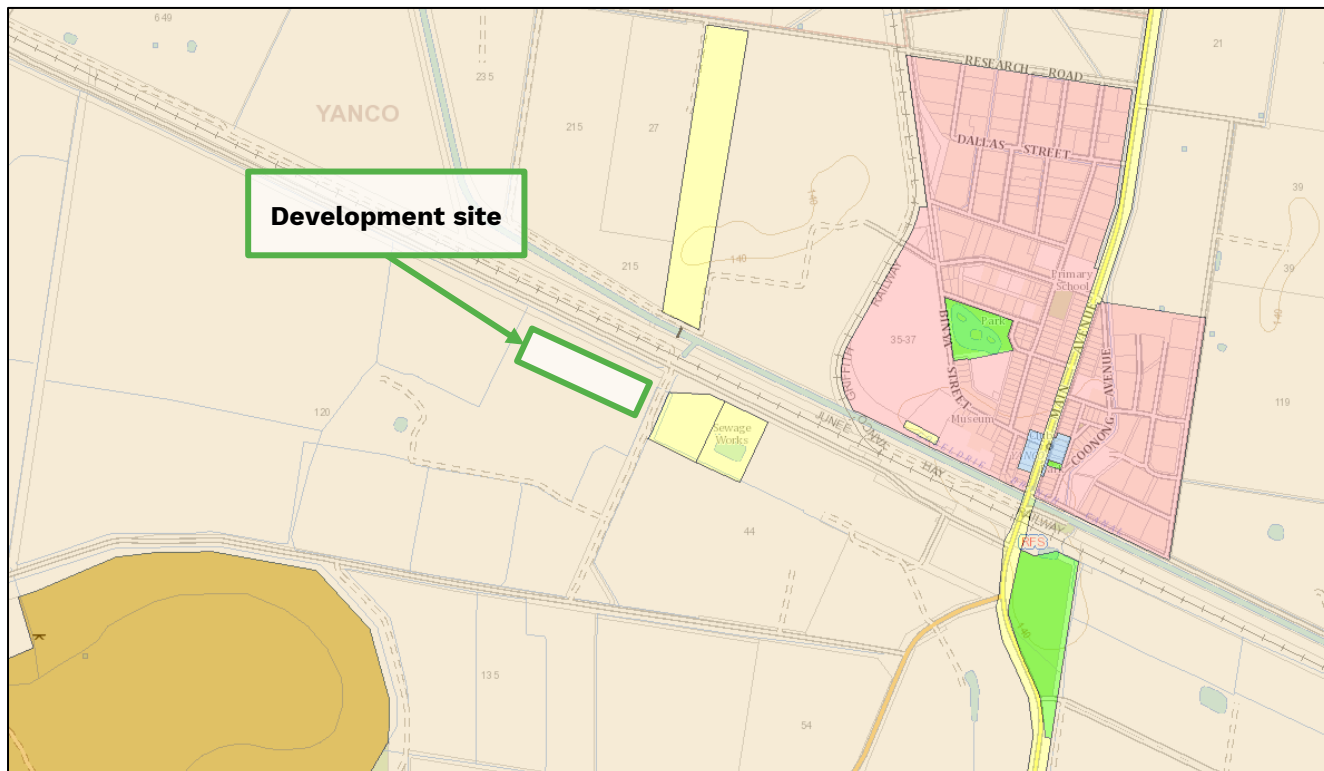


Figure 2: Zoning plan (reproduced from NSW ePlanning Spatial Viewer)

2.2 Road network

The road network includes:

- Irrigation Way (Euroley Road)
- Houghton Road
- Hulme Road.

2.2.1 Irrigation Way (MR80 - Euroley Road)

Table 1 describes the features of this road.

Table 1: Irrigation Way features

Feature	Description
Road type	Classified state arterial road managed by Transport for New South Wales (TfNSW)
Access	Provides access between Narrandera at the southeastern end to Griffith at the northwestern end
Road reservation	— 60 m wide
Carriageway	— 7.6 m wide
Cross section	— two-way undivided road (2 x 3.5 m traffic lanes) — rural open swale drains to each side
Other features	— Railway level crossings north of Houghton Road — Services include one passenger train in each direction per day — During the grain season, GrainCorp may load up 8 trains (at most one per day)
Speed limit	— 60 km/h

Figure 3 and Figure 4 provide further information about the road.



Figure 3: Irrigation Way looking northeast towards the intersection with Houghton Road on the left



Figure 4: Irrigation Way looking southwest towards the intersection with Houghton Road on the right

2.2.2 Houghton Road

Table 2 describes the features of this road.

Table 2: Houghton Road features

Feature	Description
Road type	Local road managed by council
Access	Provides access between Whitton at the northwestern end to Euroley Road / Irrigation Way in Yanco at the southeastern end
Road reservation	60 m wide
Carriageway	9.5 m wide unsealed road formation for the majority of the subject length, including at the intersection with Hulme Road 5.5 m wide sealed road for 600 m from Irrigation Way, past the GrainCorp facility
Cross-section	— two-lane, two-way undivided road — rural open swale drains to each side
Speed limit	100 km/h (assumed default rural limit) A solitary 60 km/h sign is located about 100 m from the intersection with Irrigation Way (northwestern approach) Due to the unsealed road condition/environment, the operating speed is estimated to be 60 to 70 km/h along the subject length.

Figure 5 shows an extract of the land ownership for Houghton Road. Figure 6 and Figure 7 provide further information about the road.

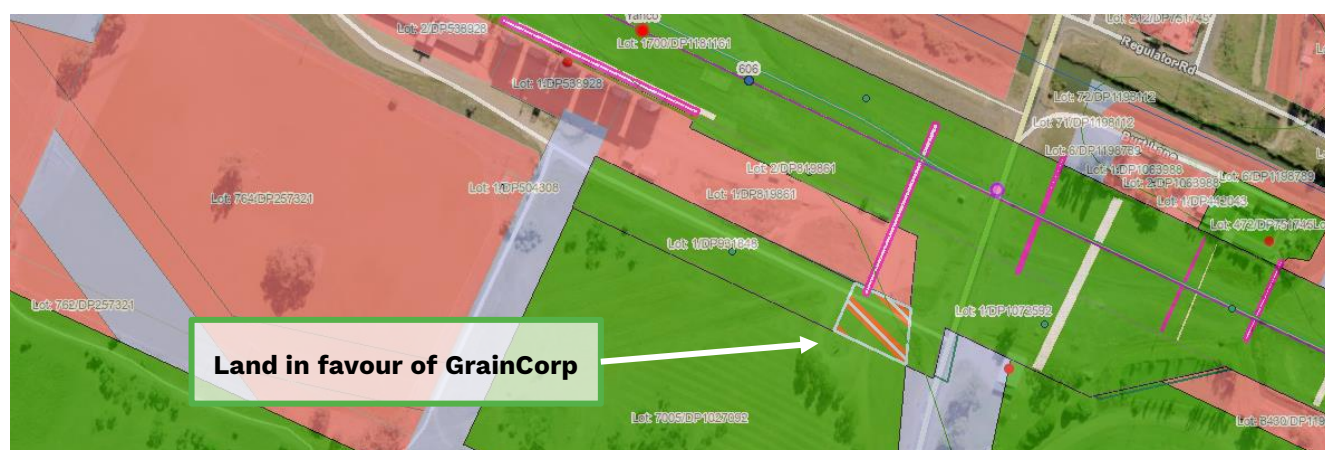


Figure 5: Extract of land ownerships along Houghton Road

The eastern end of Houghton Road runs through land within Lot 1 DP931848 and Lot 1 DP1072592, which are owned by Transport Asset Holdings (TAHE) and managed by UGL Regional Linx on their behalf.

The road alignment passes through these private landholdings and is the subject of a right of access (orange hatch in Figure 5) in favour of GrainCorp land to the north, i.e. Lot 1 DP819861.



Figure 6: Houghton Road looking southeast past the GrainCorp facility on the left



Figure 7: Houghton Road looking southeast towards the intersection with Hulme Road on the right

2.2.3 Hulme Road

Table 3 describes the features of this road.

Table 3: Hulme Road features

Feature	Description
Road type	Local road managed by council
Access	Provides access between Houghton Road at the northeastern end to River Road at the southwestern end
Road reservation	40 m wide
Carriageway	3.0 m wide unsealed road formation
Cross section	— single-lane, two-way, undivided road — rural open swale drains to each side
Speed limit	100 km/h (assumed default rural limit) Due to the unsealed road condition /environment, the operating speed is estimated to be 40 to 50 km/h along the subject length.

Figure 8 and Figure 9 provide further information about the road.



Figure 8: Hulme Road looking southwest from the intersection with Houghton Road, the existing farm gate access to the land where the development site will be located is on the right



Figure 9: Hulme Road looking northeast towards the intersection with Houghton Road, the development site access on the left

2.3 Traffic volumes

2.3.1 Irrigation Way / Houghton Road intersection

Following the RFI from TfNSW, traffic surveys were undertaken at the intersection of Irrigation Way and Houghton Road during the following day and times:

- Thursday, 6 am to 9 am
- Thursday, 3 pm to 6 pm

The results of the surveys determined that the peak hours during the two periods are as follows:

- Thursday, 7 am to 8 am
- Thursday, 4 pm to 5 pm

A summary of the peak-hour surveys is shown in Figure 10 and Figure 11.

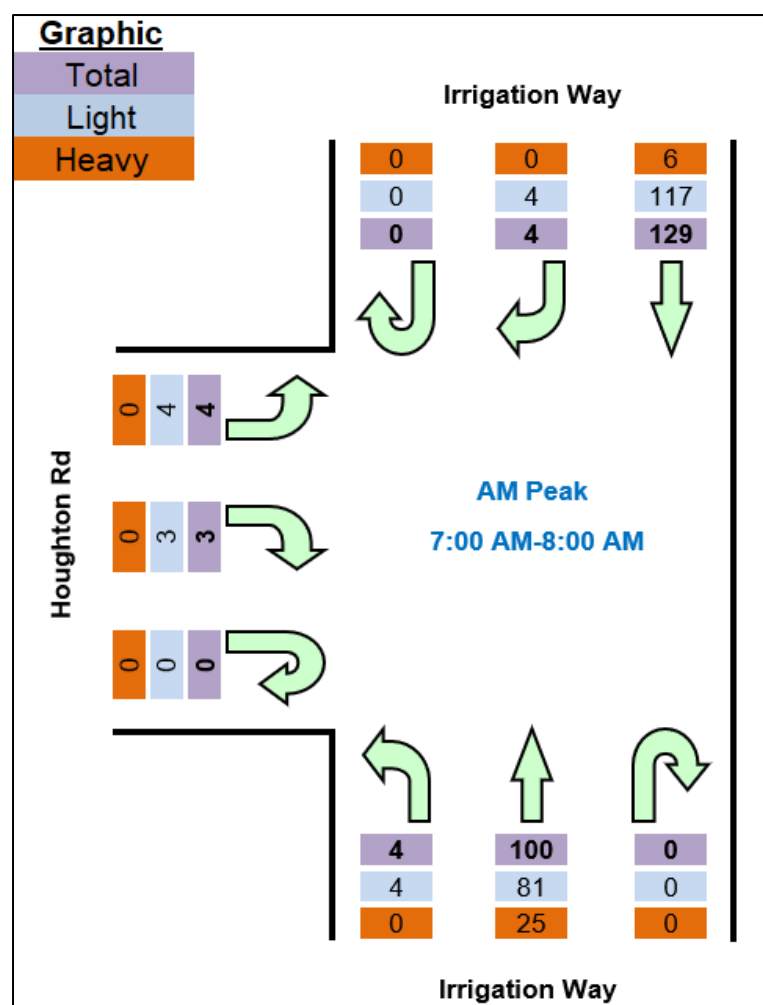


Figure 10: Traffic volumes at the Irrigation Way / Houghton Road intersection on Thursday, 9 May 2024 (AM Peak)

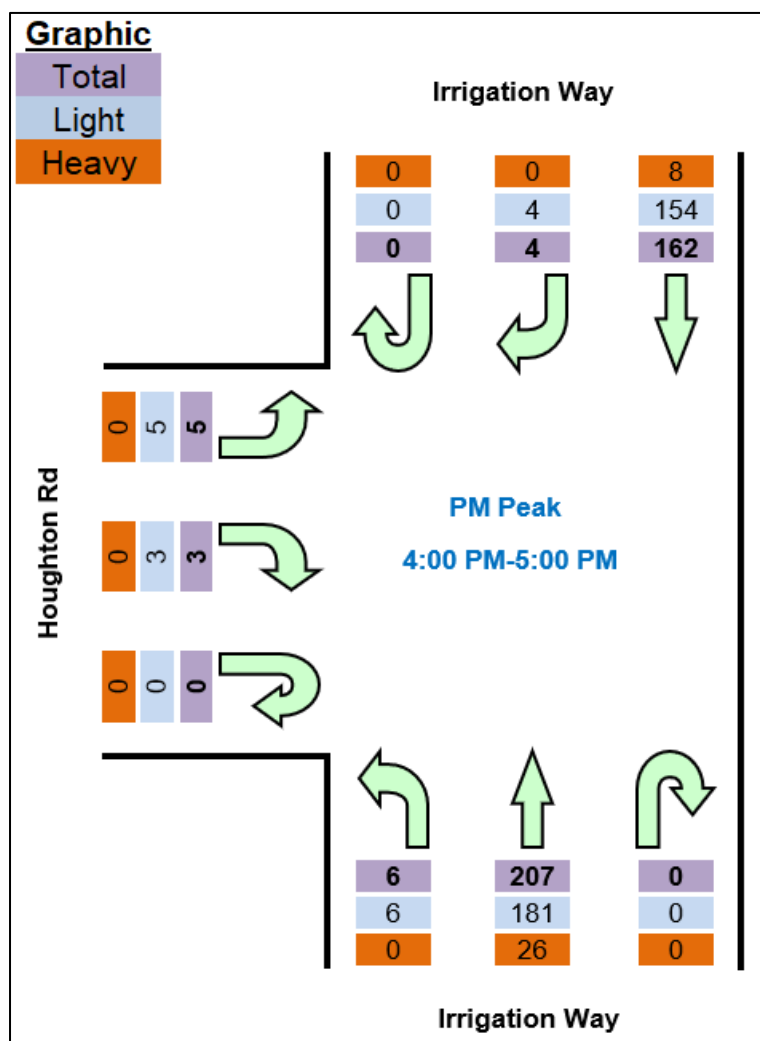


Figure 11: Traffic volumes at the Irrigation Way / Houghton Road intersection on Thursday, 9 May 2024 (PM peak)
Full details can be found in Appendix 1 – Traffic Survey Results.

2.3.2 Hulme Road

No traffic volume data is available for Hulme Road. As a result, the average daily traffic volume has been estimated. The road services 2 dwellings and farmland, estimated to have no more than 20 vpd, equating to a peak hour two-way volume of 2 vph.

2.4 Crash history

The TfNSW Centre for Road Safety website details all injury crashes throughout New South Wales and reports that no casualty crashes have occurred on the roads near the development site in the last five years (2018 - 2022).

Based on this, we conclude that no trend requires immediate investigation.

3 Traffic assessment of the proposed development

3.1 The proposal

The extract of the aerial layout plans (in Figure 12 and reproduced in Appendix 2 – Development Plan), shows the development includes a 250 MW / 1,100 MWh (4-hour storage) facility consisting of:

- BESS lithium-ion battery units, resembling 20ft containers
- MVPS (Medium Voltage Power Station) resembling 40ft containers
- hardstand/storage area
- connection to a 132 kV Transgrid transmission line.

Vehicular access to the proposed development will be via a new access driveway from the northeast via Hulme Road and Houghton Road, connecting to the arterial road network at Yanco (Irrigation Way).

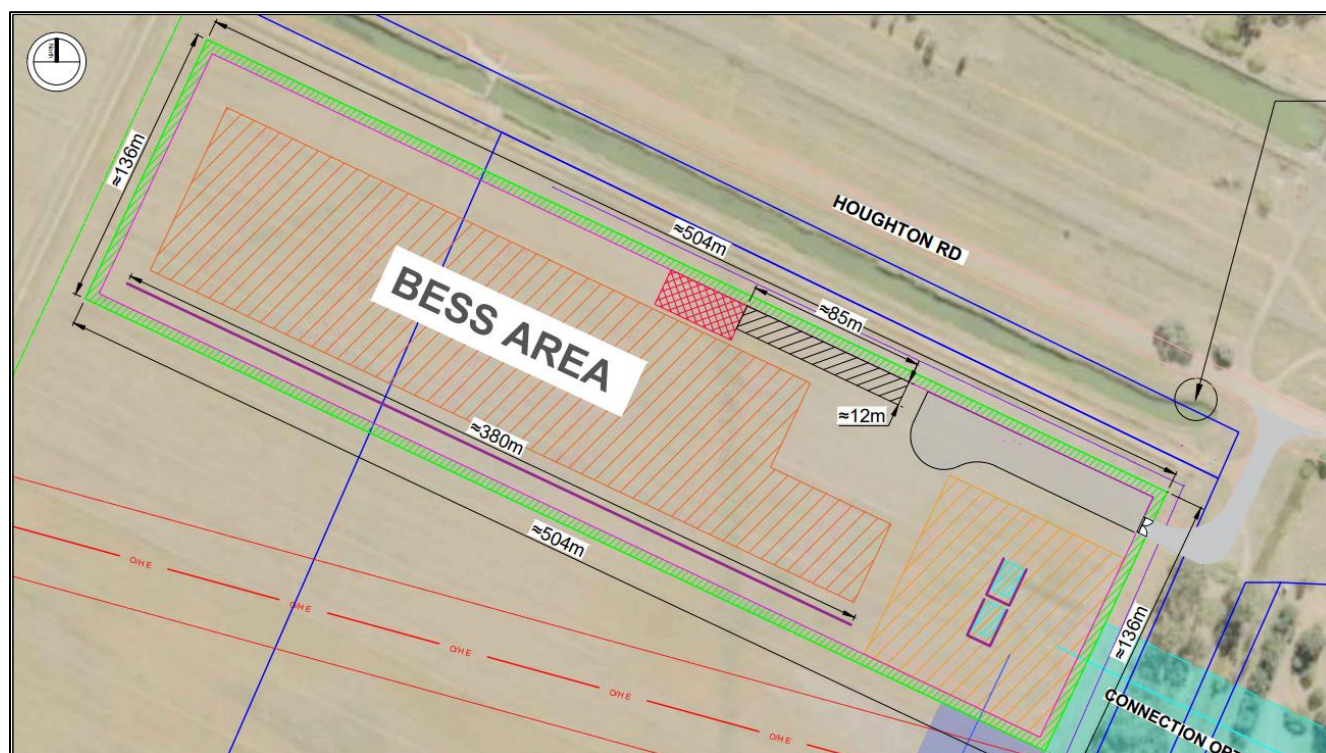


Figure 12: Extract of the development plan

3.1.1 Construction

On-site construction for the proposed BESS is limited mainly to assembly and connecting components with the typical battery energy storage system shipping containers.

The typical construction delivery schedule for this BESS is shown in Table 4.

Table 4: Construction delivery schedule

Time period	Site Works
Months 1 to 2	drainage, road and fencing works installation of concrete footings
Months 3 to 6	cable installation delivery of battery shipping containers and MVPS installation of battery shipping containers and inverter station
Months 6 to 7	electrical installation and cable termination electrical testing
Month 8	commissioning / demobilisation

There is an 8-month construction phase before full operation, with the indicative commencement date of late 2025 (November/December). The peak periods for construction traffic are likely to commence in February/March of 2026.

The proposed work hours during the construction phase are as follows:

- Monday to Friday 7:00 am – 6:00 pm
- Saturday 8:00 am – 1:00 pm
- Sundays and Public Holidays No construction work.

3.1.2 Light vehicle access to the development site

Light vehicles will arrive from Yanco/Leeton/Griffith to the north (approximately 75%) and Narrandera from the south (approximately 25%). Shuttle buses will be provided to reduce traffic vehicle movements during the project's construction phase.

The client has advised that four 22-seat shuttle buses will be included with the construction work vehicles (like utes) to transport staff to and from the subject site. The staff movements will be serviced by the shuttle buses as follows:

- 2x for Yanco
- 1x for Griffith
- 1x for Narrandera.

A code of conduct will be included with the traffic management plan for the construction period to promote safe behaviour when commuting to the worksite.

3.1.3 Heavy vehicle access to the development site

All heavy vehicle traffic from the port in Sydney, hauling the equipment (MVPS, BESS, Cables, etc.) will arrive/depart the development site as follows:

- Arrivals: access from the Hume Highway (M31) via the Sturt Highway (A20) through Wagga Wagga to Narrandera, to Irrigation Way towards Yanco, left onto Houghton Road, left onto Hulme Road, and then into the development site.
- Departures: will follow the same route as arrivals, but in reverse.

The proposed heavy vehicle route is already used by heavy vehicles (including 19 m semi-trailers) and is approved to carry larger vehicles, including 26 m B-doubles. Only the last 800 m on an unsealed section of local road is not currently B-Double approved. Many deliveries will be via rigid 12.5 m single-unit trucks with the largest vehicle being 19.0 m articulated trucks. At this stage of the project's planning, the client does not know the percentage split of the delivery vehicle types.

The only exception will be for the grid transformers, which will be transported via an oversized-overmass (OSOM) delivery undertaken by a specialist haulage contractor, with approvals from the National Heavy Vehicle Regulator (NHVR).

The above heavy vehicle movements relate to the project's construction phase. During the operational phase, no heavy vehicle movements will occur, with access via light vehicles only (like utes). Only in rare circumstances, like replacing malfunctioning equipment that could not be repaired on-site, would a heavy vehicle be required to access the subject site post-construction.

Figure 13 indicates the routes for all heavy vehicles arriving and departing the development site.

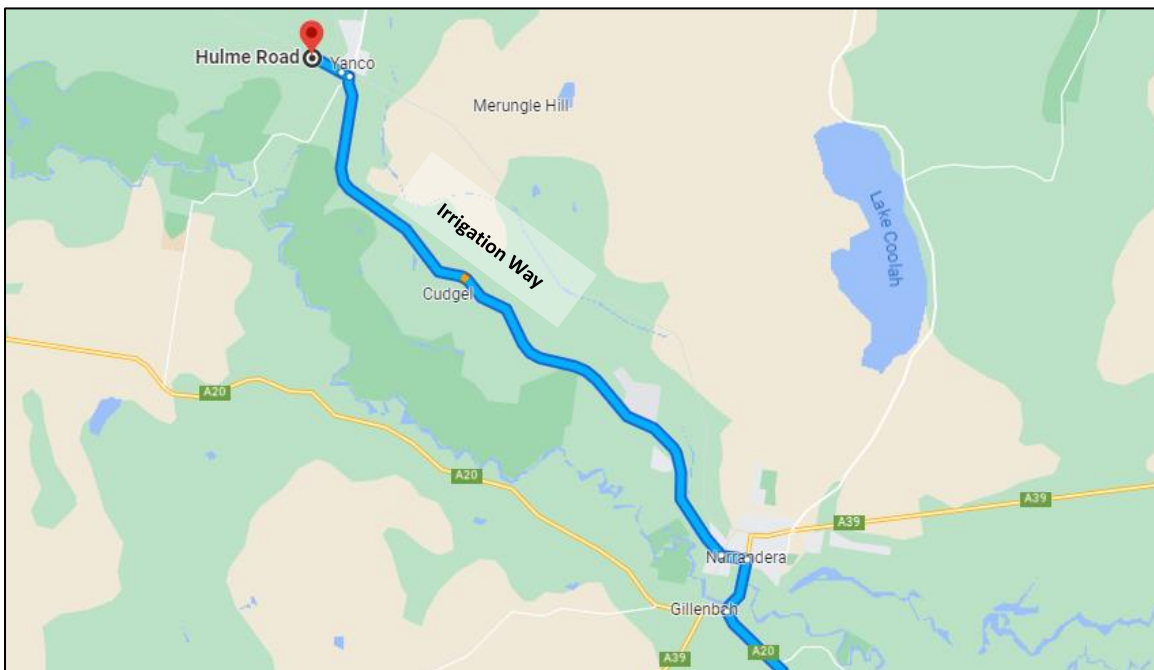


Figure 13: Indicative route for heavy vehicle arrivals/departures from the port in Sydney (source: Google Maps)

The balance of the deliveries to the development site, including materials for site preparation and set up (aggregate, concrete, fencing, etc), will arrive from the north and south along Irrigation Way.

The heavy vehicles are expected to arrive from Yanco/Leeton/Griffith to the north (approx. 30%) and Narrandera from the south (approx. 70%).

3.1.4 OSOM vehicles

Others completed the OSOM route assessment, refer to Appendix 5 – OSOM Route Assessment Report. Further information has been provided by the client as follows:

Load - HV transformers

- Equipment quantity: 2
- Vehicle quantity:
 - 16x 19 m semi-trailers for dismantled components per transformer
 - OSOM: 2x Combination Prime mover and platform trailer
 - 8x pilot vehicles
 - 4x Police escort vehicles
- Movements: one-off
- Timeline: Week 26 of construction

Load – switch rooms/control room

- Specification: 3.5W x 16L x 3.6H. Weight 60t.
- Drawings: N/A
- Equipment qty: 2 switch rooms, 1 control room, 1 O & M room
- Vehicle quantity:
 - OSOM: 4x prime mover and platform trailer
 - 8x pilot vehicles
- Movements: one-off
- Timeline: Week 26 of construction

Cranes:

- Specification: 220t lifting capacity.
- Equipment quantity: 2. One for the BESS area and one for the HV asset

- Vehicle quantity:
 - 8 x semi-trailers for components
 - OSOM: 2 x Combination Prime Mover and platform trailer. (OSOM for delivering crane base and semi-trailers for dismantled parts. Assemble crane on site)
 - 4 x pilot vehicles
- Movements: one-off and stay on site for 10 weeks
- Timeline: Week 18-27 of construction

A maximum of 8 OSOM vehicles, requiring pilots/escorts, will arrive at the subject site throughout construction. The OSOM route assessment report confirms that no height restrictions will prohibit the delivery of any loads to the subject site.

3.1.5 Operation / decommissioning

The proposed use is based on a forty-year lease. If the lease is not renewed after this period, the facility's operator will be obliged to decommission the facility, remove all installations, and remediate the development site back to its pre-existing state.

Upon approval of this application, the responsible authority may require a decommissioning and rehabilitation plan to be submitted for endorsement.

3.1.6 Accommodation needs of the development

Accommodation for workers throughout the 8-month construction phase is expected to be in Yanco / Leeton to the north and Narrandera to the south. Others will prepare the Social Impact Assessment Report and analyse the workers' accommodation.

3.2 Traffic generation

Typically, traffic generation for new developments is estimated using the rates provided in the RTA Guide to Traffic Generating Developments — Version 2.2A 2002 (the RTA Guide). However, the RTA Guide does not include traffic generation rates for BESS facilities.

Therefore, the traffic generation to/from the proposed development was estimated empirically. Traffic generation analysis was undertaken for the development's construction and operational phases to establish the likely peak traffic generation.

3.2.1 Construction phase traffic volumes

Based on the information provided by the client, the peak light vehicle traffic generation will likely occur during months 3 to 6 of the construction phase. Up to 25 construction staff vehicles per day (including the shuttle buses) will access the development site, resulting in a total daily traffic generation of 50 vpd (25 vpd arriving and 25 vpd departing at the end of the shift).

Assuming the construction work will be undertaken during regular working hours, 25 vehicles will be expected to access the development site during peak hours (at the start of the morning shift).

Assessment of the heavy vehicles accessing the development site during the construction phase revealed that peak traffic generation would likely occur during months 3 and later during months 5 to 6. This period includes the delivery of battery shipping containers when up to 14 heavy vehicles will access the development site daily. Therefore, this would result in a total daily traffic generation of 28 vpd (14 vpd arriving and 14 vpd departing). It is unlikely that more than 4 heavy vehicles will arrive within the same hour as deliveries will be managed by the project team (i.e. delivery schedule).

Assuming the construction work will be undertaken during regular working hours, heavy vehicles are anticipated to access the development site outside the commuter peak hours for the surrounding road network. However, conservatively, for this assessment, it has been assumed that a single heavy vehicle will access the development site during the AM (arriving) and PM (departing) peak hours.

3.2.2 Operational phase traffic volumes

The proposed BESS will require on-site surveillance and monitoring of the facility. The compound contains critical infrastructure that requires a high degree of security. Once potential issues are identified, on-site staff can act directly.

Up to 5 light vehicles will attend the development site daily during the operational phase for general maintenance. Therefore, this would result in a total daily traffic generation of 10 vpd (5 vpd arriving and 5 vpd departing) for the project's operational phase.

3.2.3 Peak traffic generation

Assessment of the likely traffic generation volumes during the development's construction and operational phases revealed that the development site's peak traffic generation would occur during the construction phase. Therefore, the assessment was undertaken to determine the traffic implications during this phase.

3.3 Traffic distribution assumptions

Based on the surrounding road network, it has been assumed that:

- For light vehicles the distribution reflects the 3 towns in the north and the one town in the south based on the amount of labour available in the respective towns:
 - 75% will access the development site to/from the north (Yanco/Leeton/Griffith), entering Houghton Road via a right turn from Irrigation Way
 - 25% will access the development site to/from the south (Narrandera), entering Houghton Road via a left turn from Irrigation Way.

- For heavy vehicles the distribution was based on the number of steel and concrete suppliers available in the 4 nearby towns:
 - 30% will access the development site to/from the north (Yanco/Leeton), entering Houghton Road via a right turn from Irrigation Way
 - 70% will access the development site to/from the south (Narrandera), entering Houghton Road via a left turn from Irrigation Way.

It has been assumed that during the AM peak of the construction phase, 100% of the light/heavy vehicles will enter the development site, and 0% will leave it. Similarly, during the PM peak of the construction phase, 0% of the light/heavy vehicles will enter the development site, and 100% will leave it.

3.4 Anticipated traffic volumes

Given that the proposed BESS will have peak traffic generation during the construction phase, the anticipated development traffic volumes for 2026 (when the facility is under construction) are summarised in Figure 14.

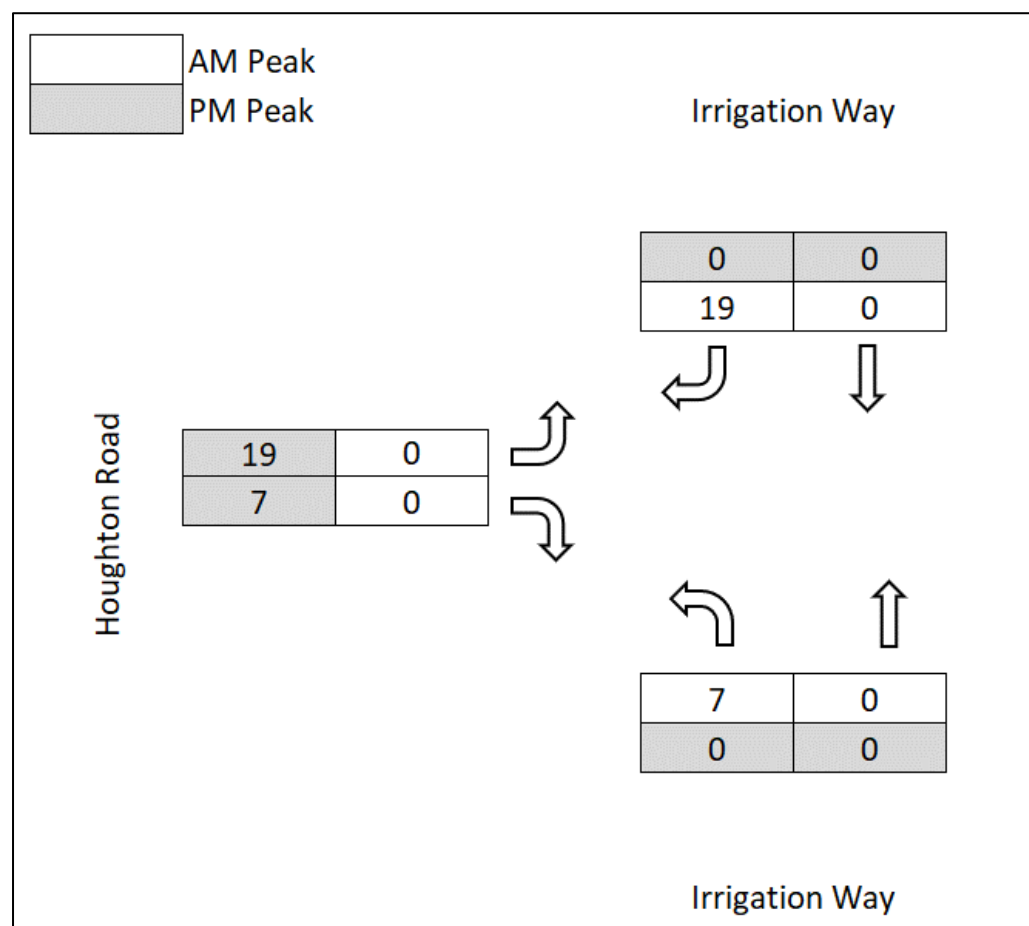


Figure 14: Anticipated traffic volumes for development

3.5 Nearby traffic impacts

3.5.1 Yanco solar energy facility

A 60 MW solar energy facility has been proposed on approximately 152 ha of land 10 km south of Leeton. Construction will commence in July 2025, 4-5 months before the Yanco BESS project.

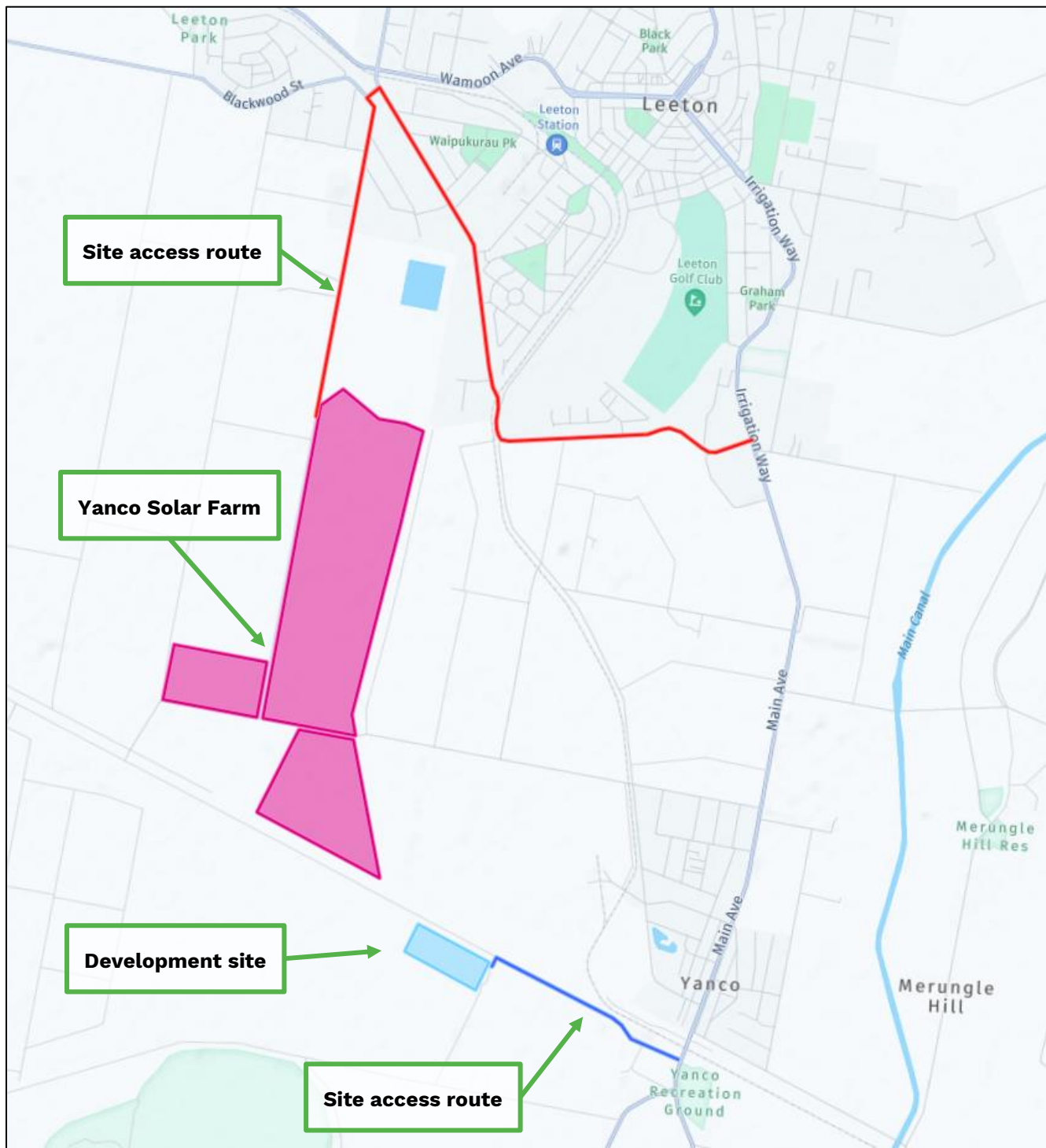


Figure 15: Location of nearby construction projects

According to information provided to our client about the proposed Yanco solar energy facility:

- all site traffic will access Irrigation Way at the intersection with McQuillan Road (also refer to Figure 5)
- a maximum of 90 movements per day would be generated during peak operations for the construction phase (10 movements per hour, 5 in and 5 out)
- of the traffic, 10 light vehicles will enter and exit the site during the commuter peak periods (10 movements in during the AM peak and 10 movements out during the PM peak)

The construction traffic for the two solar energy projects will not occupy the same local road access routes (overlap), with the only impacts being the additional through volumes along Irrigation Way.

To provide a more conservative analysis, it is assumed that the peak operations for the construction phase will coincide with the staff movements during the commuter peaks.

On this basis, the traffic volumes through the intersection of Houghton Road and Irrigation Way have been shown in Figure 16.

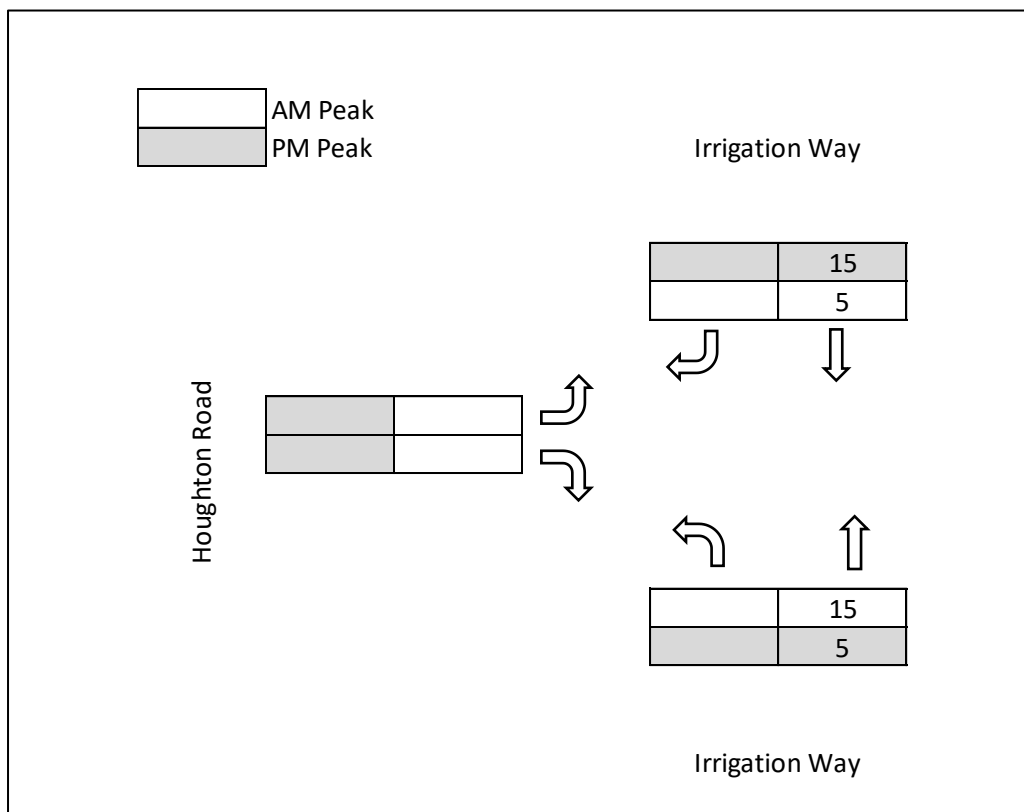


Figure 16: Yanco solar farm impacts

Irrigation Way has peak hour volumes in the AM and PM peak of about 240 vph and 380 vph, respectively. The impacts of the two projects will result in minor increases in the AM and PM traffic on Irrigation Way, as follows:

- Irrigation Way / Houghton Road¹
 - AM = $14/240 = 5.8\%$
 - PM = $14/380 = 3.7\%$
- Irrigation Way / McQuillan Road
 - AM = $19/240 = 7.9\%$
 - PM = $19/380 = 5.0\%$

This would equate to a negligible increase in traffic on Irrigation Way at the intersections with Houghton Road and McQuillan Road during the concurrent construction of the two solar energy facilities however these volumes will be included in the SIDRA assessments undertaken later in the report.

3.5.2 GrainCorp Silo

There is currently a silo located on the northwest corner of Irrigation Way and Houghton Road that is operated by GrainCorp. Through discussions with GrainCorp, we have identified the following key information about the operation of the site:

- the site receives approximately 10,000 tonnes of grain between November and December and another 10,000 tonnes between March and September
- each of these periods will see a total of 200 trucks with the following breakdown
 - 30% semi-trailers
 - 60% B-doubles
 - 10% road trains (up to 36 m long)
- operates approximately 60 days a year during daylight hours
- up to 40 trucks per day will access the site
- days will be non-consecutive and heavily weather dependent
- on-site staffing is minimal with 3 staff at any one time

¹ Assuming 100% of HVs travel to/from the south and 50% of LVs travel to/from the south

- if overflow queuing of trucks outside of the site occurs (approximately 10 times a year) the trucks will wait on the 'Big Compass' site on the south side of Houghton Road

Based on the above, the peak traffic generated by the site has been conservatively estimated to be 20 vehicle trips during the peak hour (10 vehicles in and 10 vehicles out in the same hour). These vehicles have then been matched to the existing directional splits observed from the surveys at Houghton Road and Irrigation Way to produce the silo volumes as shown in Figure 17.

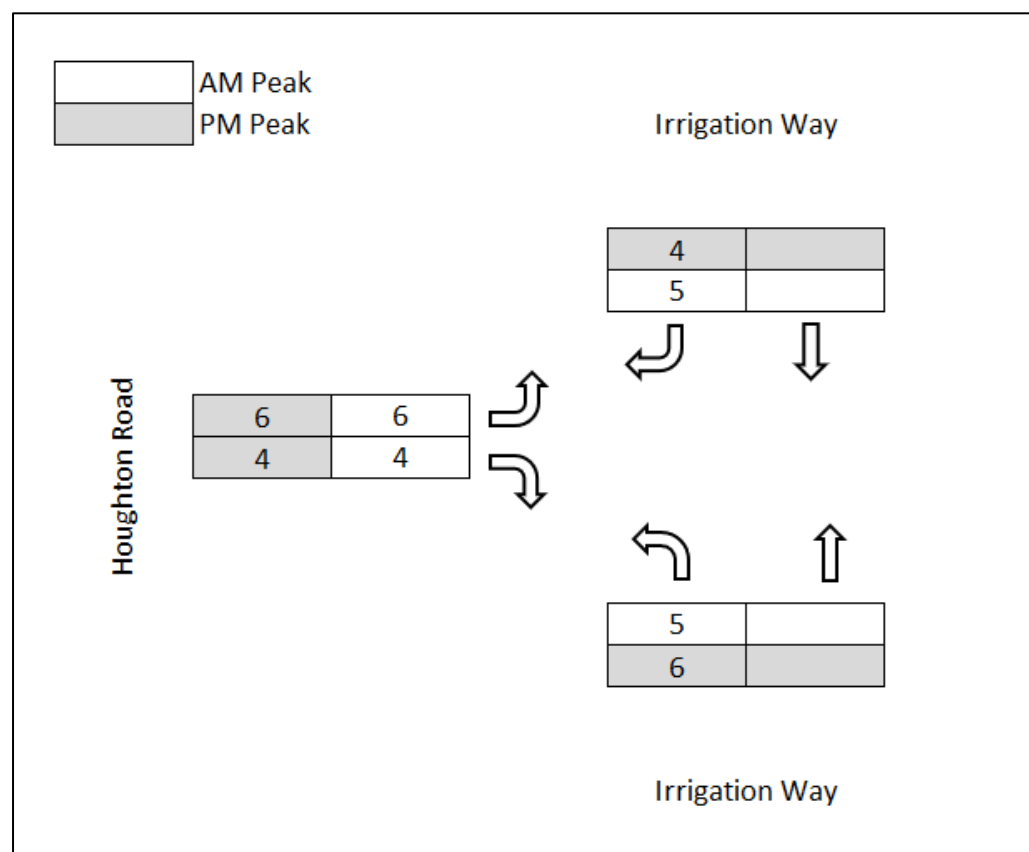


Figure 17: GrainCorp Silo Peak Volumes

3.5.3 Yanco Sportsground

Consultation has been undertaken with Leeton Shire Council about the operation of the Yanco Sportsground site with a summary as follows:

- the primary use of the site will be between 8-10 rugby league games on Sundays
- infrequent use during weekdays, typically afternoon and nights with traffic being insignificant during these periods.

Given the proposed construction works are not scheduled to occur on Sundays there is anticipated to be minimal interaction between the sportsground and the construction activities.

The traffic management plan for the construction period will contain measures to ensure that consultation is maintained with council associated with the operation of the Yanco Sportsground.

Recommendation 1: implement a traffic management plan to ensure consultation with council is maintained concerning the operation of the Yanco Sportsground.

4 Car parking assessment of the proposed development

4.1 Planning scheme car parking assessment

The RTA Guide provides car parking rates for new developments. However, the parking requirement for BESS facilities is unavailable. Therefore, an empirical assessment was undertaken to estimate the demand for car parking for the proposed development.

Section 3.2.1 outlined that:

- up to 25 light vehicles are anticipated to access the development site per day during construction of the development

Section 3.2.2 outlined that:

- up to 5 light vehicles are anticipated to access the development site daily during operation for facility monitoring and maintenance.

The proposed site plan indicates a hardstand and a formal on-site car parking area to accommodate 25 light vehicles, including the shuttle buses.

5 Access to the development site

5.1 Site access – intersection SISD requirement

The visibility criterion normally applied to intersections is Safe Intersection Sight Distance (SISD) Figure 18 shows the SISD, which:

- is nominated in the Austroads Guide to Road Design, Part 4A (AGRD4) as the minimum distance that should be provided on a major road at any intersection (refer to Section 3.2.2 in AGRD4A)
- provides sufficient distance for the driver of a vehicle on the major road:
 - to observe a vehicle from the minor access approach moving into a collision situation, e.g., in the worst case, stalling across the traffic lanes
 - to decelerate to a stop before reaching the collision point.

The minimum SISD criterion, specified in Table 3.2 of AGRD4A, requires clear visibility for a desirable minimum distance of 151 m, relating to the general reaction time RT of 2 seconds and a design speed of 70 km/h (Design speed = 85th percentile speed or posted speed + 10 km/h).

This applies to the intersections of Houghton Road with Hulme Road and Irrigation Way.

SISD for trucks should also be considered. Design speed for trucks is typically the posted speed limit. Using the SISD criterion specified in section 3.2.2 of the AGRD4A with a 3-second observation time, the SISD for trucks is 142 m for 60 km/h.

The SISD criterion for light and heavy vehicles is satisfied with clear sight lines over 151 m available:

- to the east and west from Hulme Road and the intersection with Houghton Road
- to the north and south from Houghton Road at the intersection with Irrigation Way.

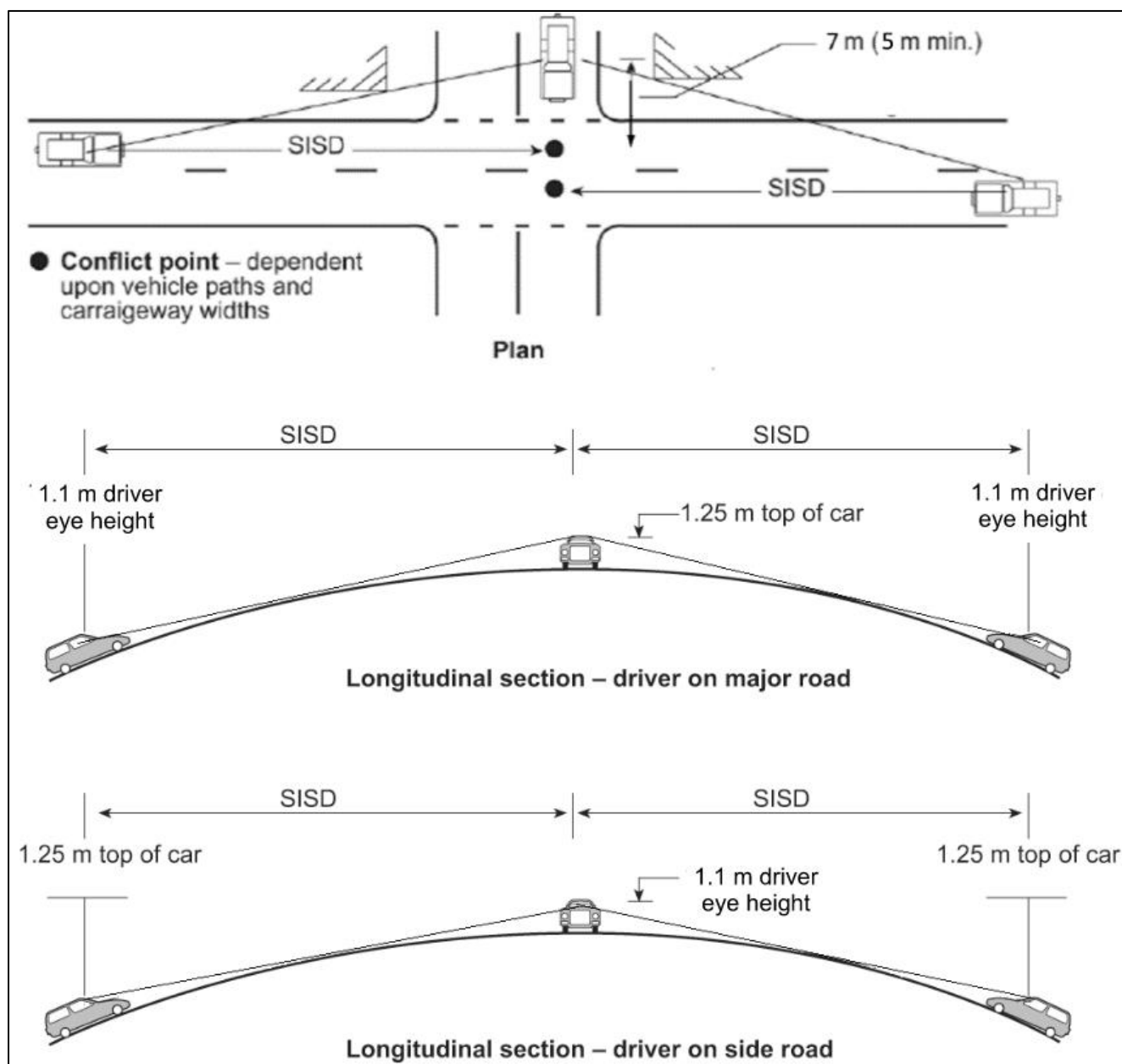


Figure 18: Safe Intersection Sight Distance (SISD) (Source: Figure 3.2 from AGRD4)

5.2 Existing road network impact

We use SIDRA software to analyse the intersections and determine anticipated intersection operations for the proposed development. Typically, the main characteristics used to assess intersection operation are the following:

- degree of saturation (DOS)
- 95th percentile queue lengths
- average delay.

Table 5 explains the intersection operating characteristics.

Table 5: Definitions of intersection operation characteristics

Degree of Saturation (DOS)			Operation
Sign control	Roundabout	Traffic signals	
< 0.6	< 0.6	< 0.6	Excellent operating conditions, minimal delays
0.6 - 0.699	0.6 - 0.699	0.6 - 0.699	Very good operating conditions, minimal delays
0.7 - 0.799	0.7 - 0.849	0.7 - 0.899	Good operating conditions, delays and queuing increasing
0.8 - 0.899	0.85 - 0.949	0.9 - 0.949	Fair operating conditions, delays and queues growing. Any interruption to flow such as minor incidents causes increasing delays
0.9 - 1.0	0.95 - 1.0	0.95 - 1.0	Poor operating conditions, flows starting to breakdown and queues and delays increase rapidly.
> 1.0	> 1.0	> 1.0	Very poor operating conditions with queues and delays increasing rapidly. Once queues develop it takes a significant time for queues to dissipate resulting in long delays to traffic movements

The DOS of an intersection is the ratio between the arrival (demand) flow and the intersection capacity during a given flow period. A degree of saturation of 1.0 is the theoretical capacity of an intersection, achievable if all parameters are optimal. Inefficiencies in driver behaviour and specific site conditions (including sight lines, gap acceptances, and follow-up headways) make this unrealistic in practice.

An intersection's practical degree of saturation (or practical capacity) is a more realistic measure of what can be achieved before it becomes oversaturated, traffic flows break down, and queues and delays increase rapidly.

Austroads Guide to Traffic Management Part 3 (AGTM3) specifies the following target DOS (practical degree of saturation / practical capacity) for different intersection types:

- 0.90 for traffic signals
- 0.85 for roundabouts
- 0.80 for unsignalised intersections.

5.2.1 Intersection analysis

The existing volumes were forecast for 2026 conditions (when the proposed works are likely to take place as follows:

- 1% p.a. increase in the local roads
- 3% p.a. increase in the arterial road

In addition, the traffic volumes for the proposed Yanco solar farm as well as the peak harvest volumes for the GrainCorp silo (discussed in Section 3.5 of this report) have been superimposed on the forecast 2026 volumes with the proposed construction traffic.

The traffic volumes for the 2026 conditions during construction activities are shown in Figure 19.

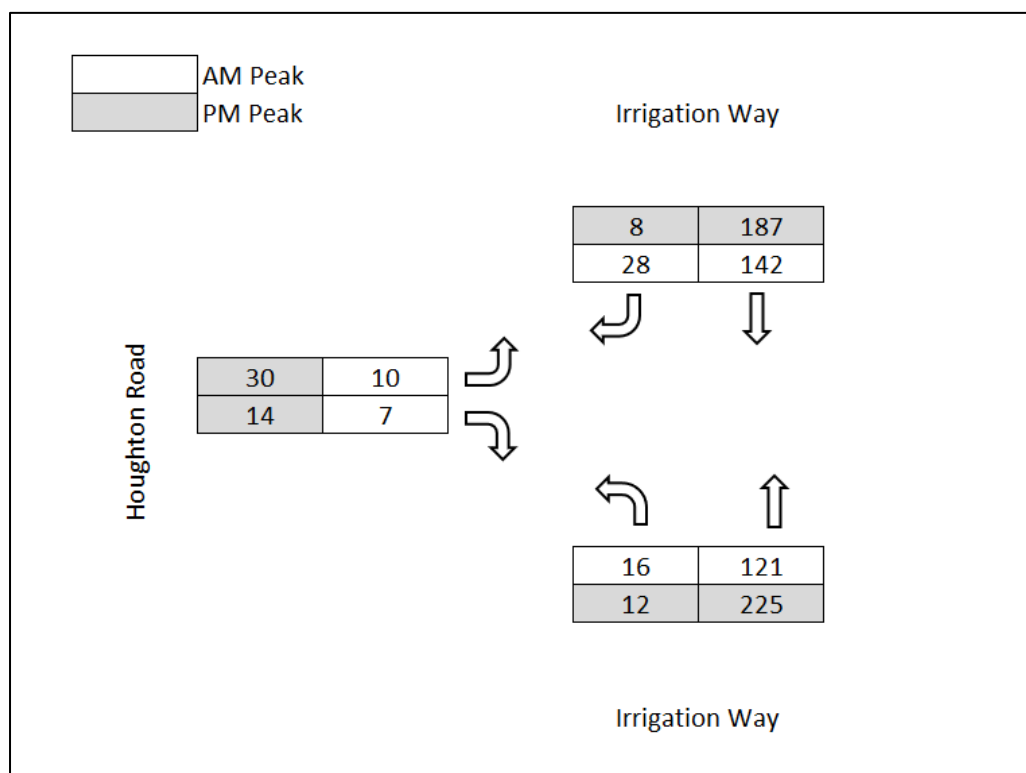


Figure 19: Construction (2026) turning movements

Table 6 provides a summary of the SIDRA assessment. For full SIDRA results, see Appendix 3 – SIDRA Outputs.

Table 6: SIDRA outputs – construction traffic conditions at Houghton Road and Irrigation Way

Movements	DOS		95% queue (m)		Average delay (sec)	
	AM	PM	AM	PM	AM	PM
Irrigation Way (south approach)	0.088	0.141	0.0	0.0	0.8	0.3
Irrigation Way (north approach)	0.116	0.113	2.8	0.7	1.6	0.4
Houghton Road (west approach)	0.021	0.068	0.7	2.9	7.5	9.1

SIDRA analysis reveals that the intersection of Houghton Road and Irrigation Way will operate well under capacity with minimal queuing and delays during construction.

5.3 Turn provisions impact

The traffic turning from major roads into minor roads should not delay through traffic.

Generally, turn treatments from major roads into minor roads at sign-controlled intersections are provided to ensure the intersection's safe and efficient operation.

Figure 19 shows the anticipated traffic generated from the proposed development.

Figure 20 shows the formulas used to determine the major road volume (Q_M).

The results were then applied to Figure 3.26, Austroads Guide to Traffic Management Part 6 (AGTM6), to determine the turning warrants for the intersections.

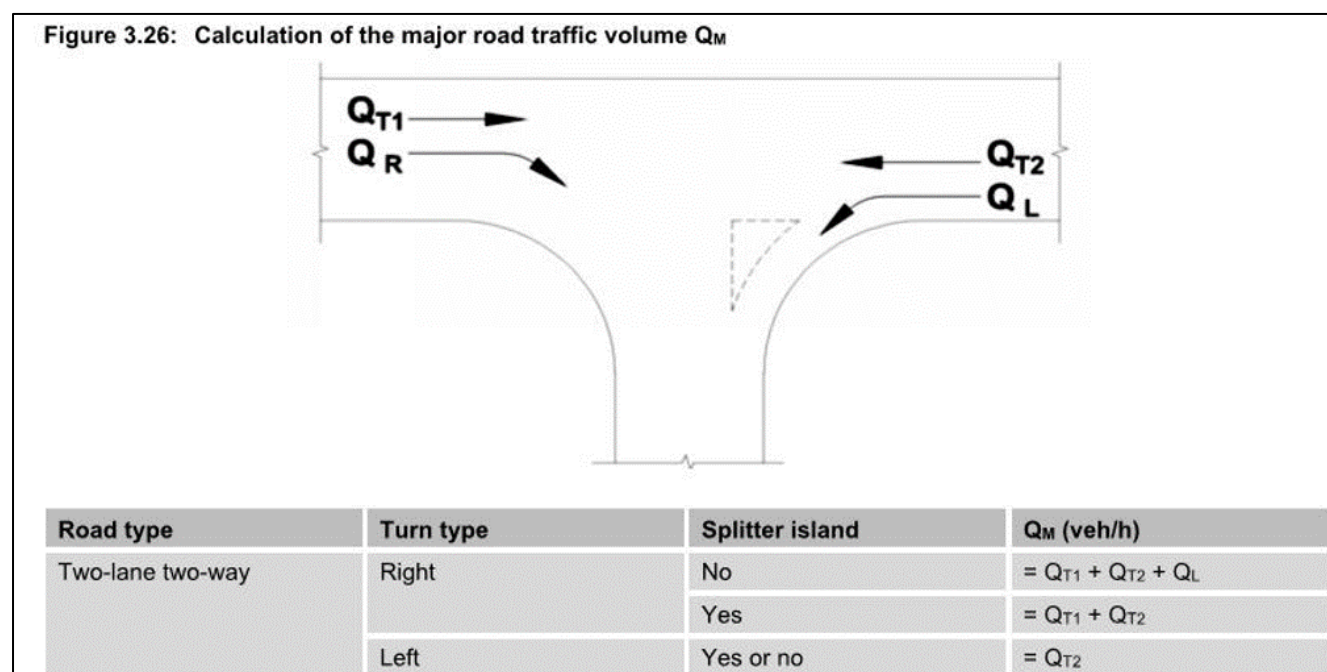


Figure 20: Formulas used to determine major road traffic (Source: Figure 3.26 from AGTM6)

5.3.1 Anticipated conditions for Irrigation Way / Houghton Road intersection

To determine anticipated conditions at the intersection, traffic volumes from Section 3.2 were used to determine the warrants shown in Table 7 and were applied in Figure 20.

Table 7: Turn lane warrants on Irrigation Way at Houghton Road intersection – anticipated conditions

Road	Peak period	Left turn Q_L (vph)	Right turn Q_R (vph)	Through Q_T (vph)	Q_M	Q_M
					Left turn	Right turn
Houghton Road	AM	16	28	Q_{T1}	142	121
				Q_{T2}	121	
	PM	12	8	Q_{T1}	187	225
				Q_{T2}	225	

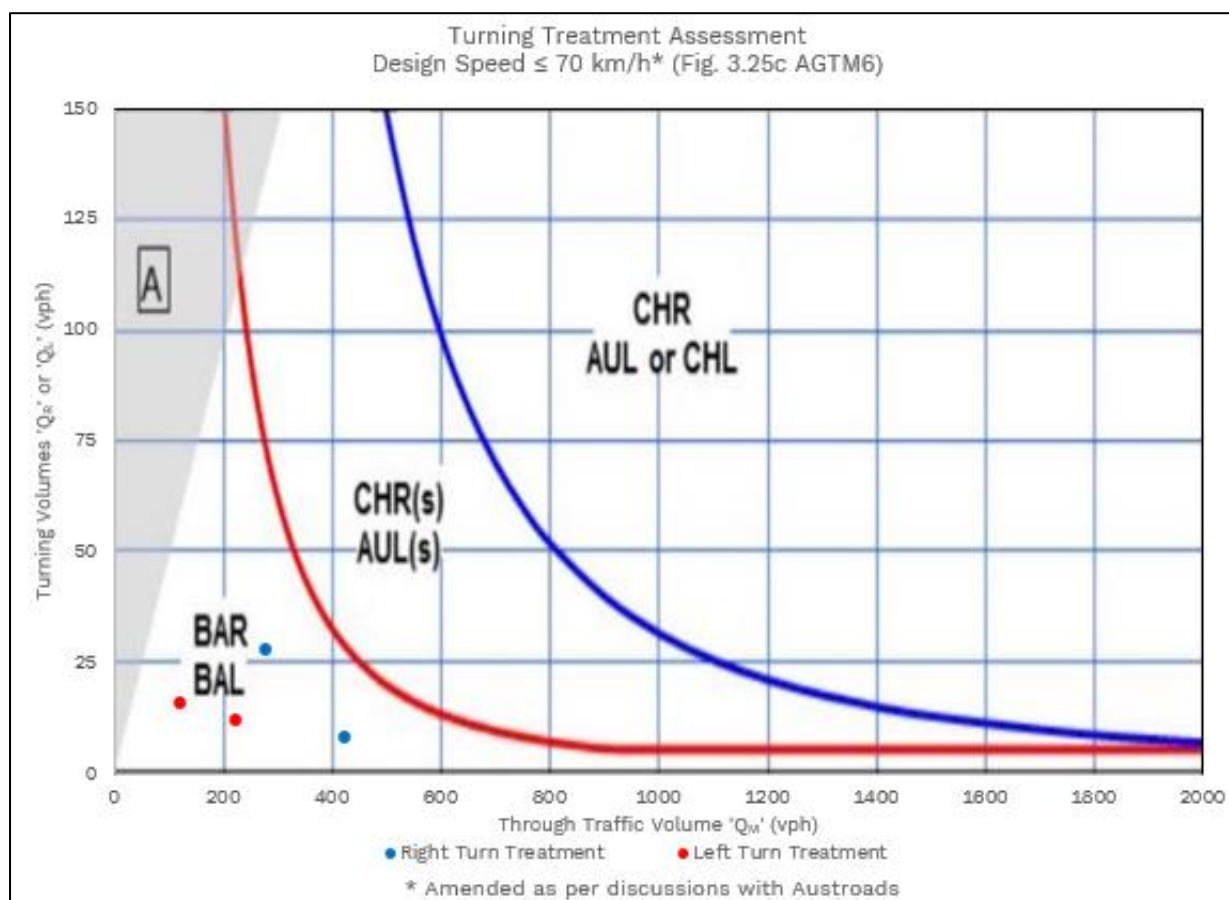


Figure 21: Graph used to determine the turn treatments Irrigation Way at the Houghton Road intersection – anticipated construction peak conditions

Based on the data gathered and reported in this section, our key observations are that:

- a right turn from Irrigation Way into Houghton Road is likely to meet warrants for a BAR treatment in the morning and afternoon peak periods
- a left turn from Irrigation Way into Houghton Road will likely meet warrants for a BAL treatment in the morning and afternoon peak periods.

Given the low traffic volumes and the warrants in the bottom corner of the graph, turn lanes are not considered to be required.

5.3.2 Sensitivity assessment for Irrigation Way / Houghton Road intersection

The traffic distributions for the development traffic were assumed based on a high-level review of the nearby residential centres (to house workers during the construction phase) and where the raw materials and equipment will be arriving from / departing to.

To ensure the turn provision assessment for the anticipated conditions is robust, a sensitivity assessment for the development traffic was conducted, considering the following scenarios:

- 100 % of the development traffic arrives/departs to and from the north
 - i.e. turn right in / left out at the Irrigation Way intersection
- 100 % of the development traffic arrives/departs to and from the south
 - i.e. turn left in / right out at the Irrigation Way intersection

100 % development traffic (to/from the north)

To determine anticipated conditions at the intersection for all traffic to/from the north, traffic volumes from Section 3.2 were used to determine the warrants shown in Table 8 and were applied in Figure 19

Table 8: Turn lane warrants on Irrigation Way at Houghton Road intersection – 100 % development traffic (north)

Road	Peak period	Left turn Q _L (vph)	Right turn Q _R (vph)	Through Q _T (vph)	Q _M	Q _M
					Left turn	Right turn
Houghton Road	AM	9	35	Q _{T1}	142	121
				Q _{T2}	121	
	PM	12	8	Q _{T1}	187	225
				Q _{T2}	225	

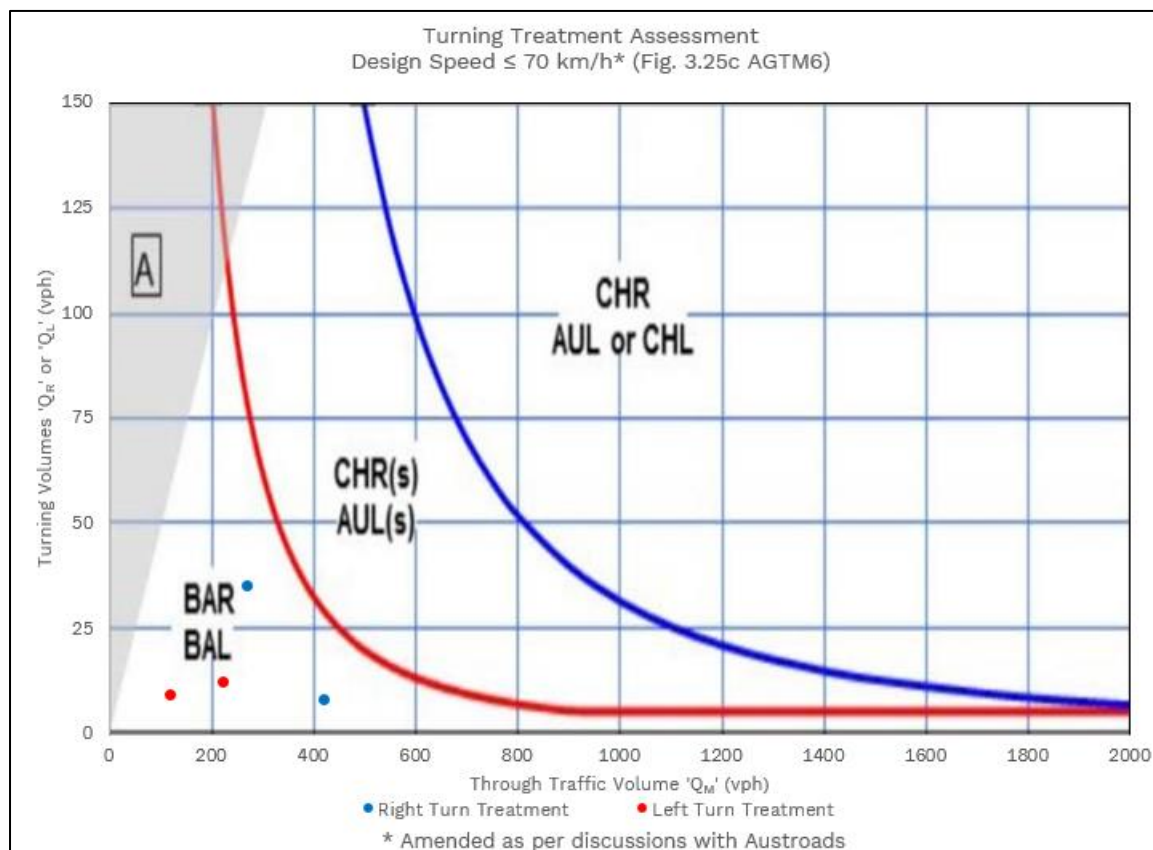


Figure 22: Graph used to determine the turn treatments Irrigation Way at the Houghton Road intersection – 100% development traffic (north)

100 % development traffic (to/from the south)

To determine anticipated conditions at the intersection for all traffic to/from the south, traffic volumes from Section 3.2 were used to determine the warrants shown in Table 9 and were applied in Figure 23

Table 9: Turn lane warrants on Irrigation Way at Houghton Road intersection – 100 % development traffic (south)

Road	Peak period	Left turn Q_L (vph)	Right turn Q_R (vph)	Through Q_T (vph)	Q_M	Q_M
					Left turn	Right turn
Houghton Road	AM	35	9	Q_{T1} 142	121	298
				Q_{T2} 121		
	PM	12	8	Q_{T1} 187	225	424
				Q_{T2} 225		

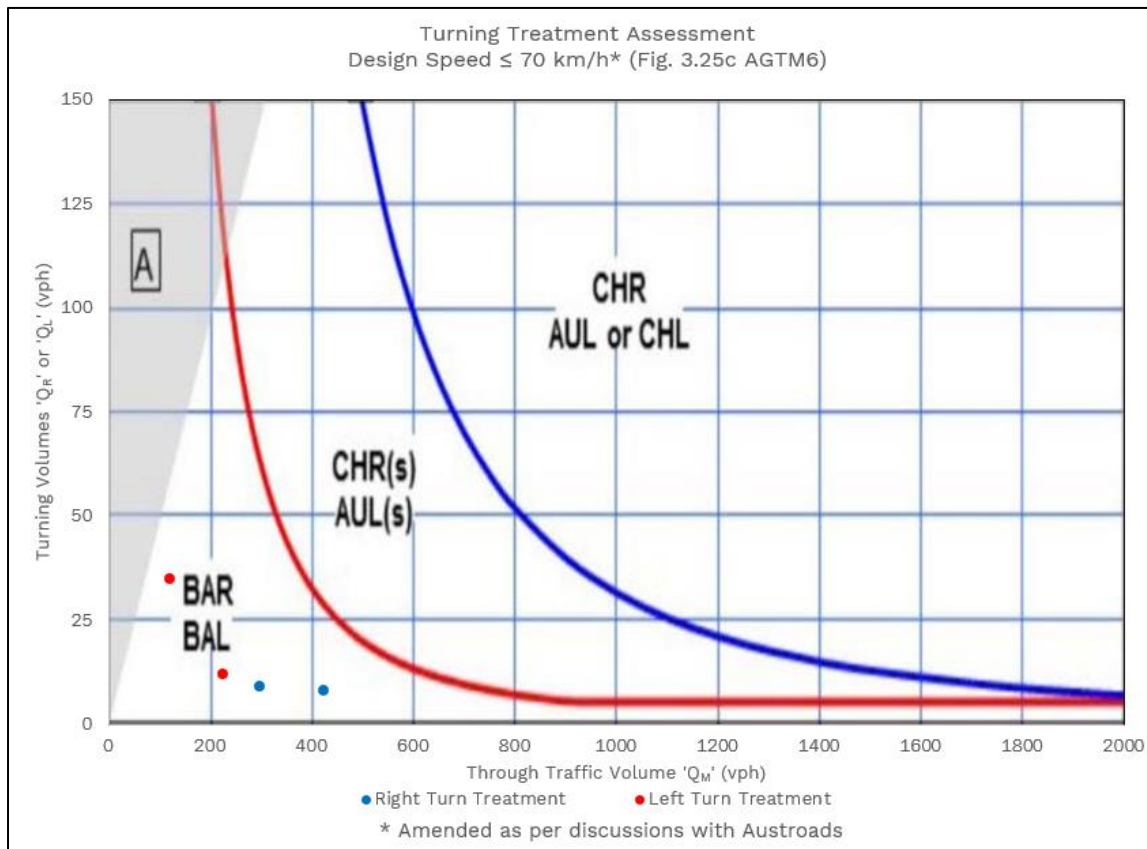


Figure 23: Graph used to determine the turn treatments Irrigation Way at the Houghton Road intersection – 100% development traffic (south)

Based on the data gathered and reported for the sensitivity analysis, our key observations are that the turn lane warrants do not change even if 100% of the development traffic is to/from the north or the south.

Based on previous discussions the client held with representatives of TfNSW about this and other similar projects, whilst the turn lane assessment indicates the warrants are in the corner quadrant of the graph, TfNSW is of the view that there is no lesser treatment than BAR/BAL, and this should be provided at the intersection of Irrigation Way and Houghton Road.

Strategic design plans were prepared for the intersection of Irrigation Way and Houghton Road to accommodate the heavy vehicles accessing the site, refer to A4.1 – Strategic Design – Houghton Road / Irrigation Way for more details.

Recommendation 2: The intersection of Irrigation Way and Houghton Road should be upgraded to provide BAR and BAL treatments per the Strategic Design plans included in A4.1.

TfNSW has concerns there is a risk of vehicles 'short-stacking' between the two rail lines along Irrigation Way. The SIDRA assessments demonstrate that the risk of queuing along the north approach of Irrigation Way to the intersection is minimal. However additional

signage and line marking could be installed prior to the railway line to advise drivers not to store between the tracks.

Recommendation 3: Install signage and line marking north of the railway line to advise drivers not to store between the railway lines.

Recommendation 4: implement a traffic management plan to ensure all staff are instructed not to store across the railway lines.

5.3.3 Houghton Road / Hulme Road / Site access intersection

A strategic design plan has been prepared for the intersection of Houghton Road, Hulme Road and the development site access to accommodate the heavy vehicles accessing the site, refer to A4.2 – Strategic Design – Development Access / Hulme Road / Houghton Road for more details.

Recommendation 5: the intersection of Houghton Road, Hulme Road and the development site access should be upgraded in accordance with the prepared Strategic Design plan.

5.3.4 Unsealed roads

During the construction phase of the development, heavy vehicles will be using Houghton Road and a short length of Hulme Road to access the development site. Based on previous similar projects, the council is expected to request that Houghton Road and Hulme Road's suitability to accommodate the heavy vehicle traffic generated during the construction phase be assessed as part of the pre-development application advice. As a result, a dilapidation report should be undertaken before and after the construction phase of the development.

During the development site inspection, several vehicles safely passed the Trafficworks vehicle on Houghton Road, and it is expected that a light vehicle and a heavy vehicle could pass safely.

Due to the low volumes of heavy vehicles generated by the development, it is unlikely that two heavy vehicles would need to pass one another on either Houghton Road or Hulme Road. However, a traffic management plan should be implemented for the development site operation to ensure no heavy vehicles arrive and depart simultaneously.

Recommendation 6: implement a traffic management plan to ensure no heavy vehicles arrive and depart simultaneously along Houghton Road.

5.4 Oversized-Overmass vehicle access

Swept path plans have been prepared for the intersections of:

- Irrigation Way and Houghton Road
- Houghton Road, Hulme Road and the development site access.

Please refer to A4.3 – Oversized-Overmass Vehicle Access more details.

5.5 Site security

The proposed development will include installing site security and restricting access to authorised vehicles only. This will involve providing security fencing and gates at the development's entrance.

It is very unlikely that a heavy vehicle will arrive at the development site when the security gate is locked/closed. Therefore, the security gate only needs to be set back a sufficient distance to allow a light vehicle to park clear of any traffic on Hulme Road.

6 Conclusions and recommendations

We conclude there are no traffic engineering reasons that would prevent the development from proceeding, as outlined below:

- the peak hour traffic generation is likely to occur during the construction phase of the development, where the peak hour volumes are expected to be:
 - 25 light vehicles
 - 1 heavy vehicle.
- the construction phase is expected to take 8 months
- during the development's operation phase, the peak hour volumes are expected to be up to 5 light vehicles
- the development site will generate a peak car parking demand of 25 spaces during construction and 5 spaces post-opening
- the sight lines along:
 - Houghton Road at the intersection with Hulme Road are satisfactory
 - Irrigation Way at the intersection with Houghton Road is satisfactory
- the proposed security gate's setback from the edge of Hulme Road will accommodate the storage of a light vehicle clear of the traffic lane

However, this TIA has identified several recommendations that need to be addressed:

- **Recommendation 1:** implement a traffic management plan to ensure consultation with council is maintained concerning the operation of the Yanco Sportsground.
- **Recommendation 2:** the intersection of Irrigation Way and Houghton Road should be upgraded to include BAR and BAL treatments per the prepared Strategic Design plans in A4.1.
- **Recommendation 3:** Install signage and line marking north of the railway line to advise drivers not to store between the railway lines.
- **Recommendation 4:** implement a traffic management plan to ensure all staff are instructed not to store across the railway lines.
- **Recommendation 5:** the intersection of Houghton Road, Hulme Road and the development site access should be upgraded in accordance with the prepared Strategic Design plan in A4.2.
- **Recommendation 6:** implement a traffic management plan to ensure no heavy vehicles arrive and depart simultaneously along Houghton Road.

Appendix 1 – Traffic Survey Results

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Euroley Rd and Irrigation Way, Yanco

GPS -34.608172, 146.408191

Date:	Thu 09/05/24
Weather:	Overcast
Suburban:	Yanco
Customer:	Trafficworks

North:	Irrigation Way
East:	N/A
South:	Irrigation Way
West:	Euroley Rd

Survey Period	AM: 6:00 AM-9:00 AM	PM: 3:00 PM-6:00 PM
Traffic Peak	AM: 7:00 AM-8:00 AM	PM: 4:00 PM-5:00 PM

All Vehicles

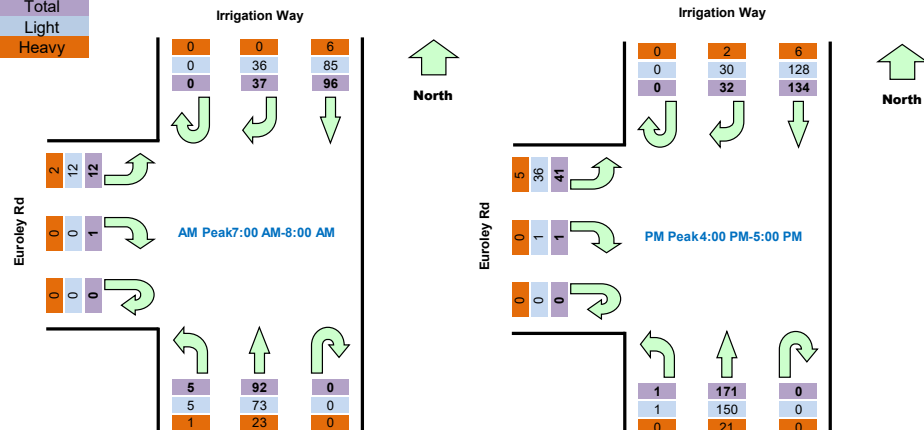
Time		North Approach Irrigation Way			South Approach Irrigation Way			West Approach Euroley Rd			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
6:00	6:15	0	3	14	0	7	0	0	1	2	175	
6:15	6:30	0	10	17	0	13	0	0	0	1	198	
6:30	6:45	0	11	20	0	25	0	0	0	2	212	
6:45	7:00	0	8	21	0	18	0	0	0	2	223	
7:00	7:15	0	7	19	0	20	1	0	1	2	243	
7:15	7:30	0	10	22	0	21	2	0	0	0	269	
7:30	7:45	0	14	31	0	19	1	0	0	4	298	
7:45	8:00	0	6	24	0	32	1	0	0	6	332	
8:00	8:15	0	12	37	0	21	3	0	0	3	357	Peak
8:15	8:30	0	10	34	0	28	3	0	0	9		
8:30	8:45	0	21	31	0	35	2	0	0	14		
8:45	9:00	0	7	29	0	42	0	0	0	16		
15:00	15:15	0	4	32	0	37	0	0	0	8	336	
15:15	15:30	0	4	32	0	39	0	0	0	8	348	
15:30	15:45	0	5	29	0	35	1	0	0	23	365	
15:45	16:00	0	6	29	0	34	0	0	1	9	364	
16:00	16:15	0	8	31	0	42	0	0	1	11	380	Peak
16:15	16:30	0	9	29	0	48	1	0	0	13	366	
16:30	16:45	0	7	33	0	45	0	0	0	7	358	
16:45	17:00	0	8	41	0	36	0	0	0	10	341	
17:00	17:15	0	4	32	0	31	1	0	0	11	305	
17:15	17:30	0	11	37	0	36	0	0	1	7		
17:30	17:45	0	7	28	0	33	0	0	1	6		
17:45	18:00	0	8	27	0	17	0	0	0	7		

Peak Time		North Approach Irrigation Way			South Approach Irrigation Way			West Approach Euroley Rd			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
7:00	8:00	0	37	96	0	92	5	0	1	12	243
16:00	17:00	0	32	134	0	171	1	0	1	41	380

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au



Intersection of Houghton Rd and Irrigation Way, Yanco

GPS -34.606560, 146.408497

Date:	Thu 09/05/24
Weather:	Overcast
Suburban:	Yanco
Customer:	Trafficworks

North:	Irrigation Way
East:	N/A
South:	Irrigation Way
West:	Houghton Rd

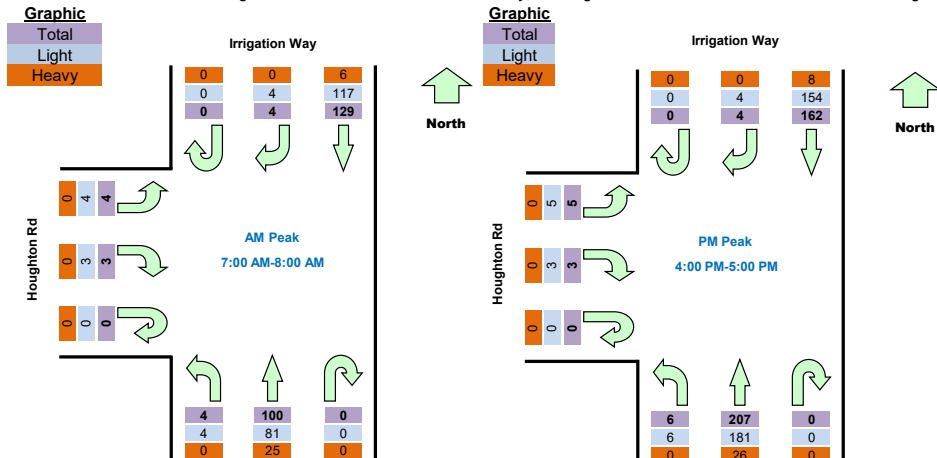
Survey Period	AM: 6:00 AM-9:00 AM	PM: 3:00 PM-6:00 PM
Traffic Peak	AM: 7:00 AM-8:00 AM	PM: 4:00 PM-5:00 PM

All Vehicles

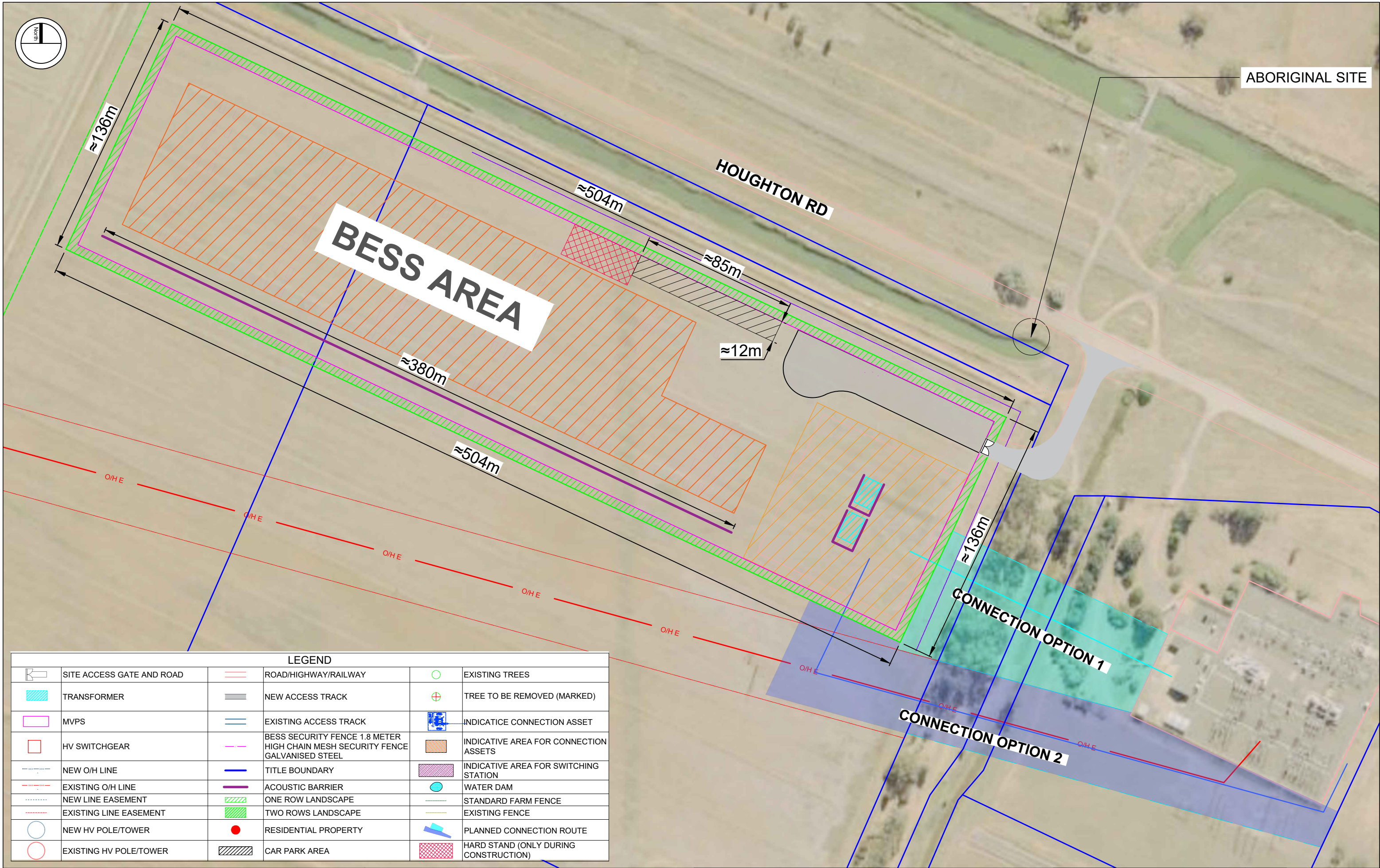
Time		North Approach Irrigation Way			South Approach Irrigation Way			West Approach Houghton Rd			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
6:00	6:15	0	0	17	0	7	2	0	0	0	181	
6:15	6:30	0	0	28	0	13	0	0	0	1	206	
6:30	6:45	0	4	31	0	25	1	0	0	1	221	
6:45	7:00	0	1	29	0	18	3	0	0	0	226	
7:00	7:15	0	2	25	0	23	0	0	0	1	244	
7:15	7:30	0	1	33	0	21	0	0	0	2	266	
7:30	7:45	0	0	42	0	21	1	0	2	1	289	
7:45	8:00	0	1	29	0	35	3	0	1	0	325	
8:00	8:15	0	0	47	0	23	1	0	2	0	352	Peak
8:15	8:30	0	0	43	0	34	2	0	0	1		
8:30	8:45	0	1	52	0	48	1	0	1	0		
8:45	9:00	0	0	36	0	58	1	0	1	0		
15:00	15:15	1	0	35	0	44	0	0	0	1	341	
15:15	15:30	0	0	34	0	42	3	0	2	0	354	
15:30	15:45	0	1	32	0	58	0	0	2	3	378	
15:45	16:00	0	2	35	0	44	0	0	0	2	371	
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16:45	17:00	0	0	49	0	46	0	0	1	3	356	
17:00	17:15	0	2	36	0	41	0	0	0	1	320	
17:15	17:30	0	4	48	0	44	1	0	0	3		
17:30	17:45	0	1	34	0	39	0	0	1	2		
17:45	18:00	0	1	33	0	26	0	0	2	1		

Peak Time		North Approach Irrigation Way			South Approach Irrigation Way			West Approach Houghton Rd			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
7:00	8:00	0	4	129	0	100	4	0	3	4	244
16:00	17:00	0	4	162	0	207	6	0	3	5	387

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.



Appendix 2 – Development Plan



LEGEND									
	SITE ACCESS GATE AND ROAD		ROAD/HIGHWAY/RAILWAY		EXISTING TREES		TREE TO BE REMOVED (MARKED)		INDICATIVE CONNECTION ASSET
	TRANSFORMER		NEW ACCESS TRACK		INDICATIVE AREA FOR CONNECTION ASSETS		INDICATIVE AREA FOR SWITCHING STATION		WATER DAM
	MVPS		EXISTING ACCESS TRACK		STANDARD FARM FENCE		EXISTING FENCE		PLANNED CONNECTION ROUTE
	HV SWITCHGEAR		BESS SECURITY FENCE 1.8 METER HIGH CHAIN MESH SECURITY FENCE GALVANISED STEEL		HARD STAND (ONLY DURING CONSTRUCTION)				
	NEW O/H LINE		TITLE BOUNDARY						
	EXISTING O/H LINE		ACOUSTIC BARRIER						
	NEW LINE EASEMENT		ONE ROW LANDSCAPE						
	EXISTING LINE EASEMENT		TWO ROWS LANDSCAPE						
	NEW HV POLE/TOWER		RESIDENTIAL PROPERTY						
	EXISTING HV POLE/TOWER		CAR PARK AREA						

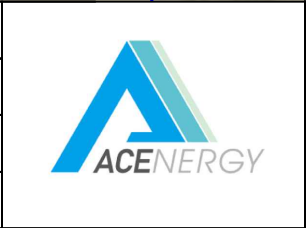
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A	CP	INITIAL ISSUE	07/03/2024	XZ	AJ
B	CP	ADDED ACOUSTIC BARRIER DETAILS	24/04/2024	XZ	AJ
C	CP	HIGH LEVEL PLAN LAYOUT	08/07/2024	XZ	AJ
D	CP	CAR PARK DETAILS AMENDED	01/11/2024	XZ	AJ

PROJECT DETAILS:	YANCO DISBUTION BESS 120 HOUGHTON ROAD, YANCO NSW 2703 -34.50097, 146.3939
CLIENT DETAILS:	ACENERGY PTY LTD
DRAWING TITLE:	AERIAL LAYOUT 1 OF 2

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DRAWING NR: G-1.0_023109		
DRAWN BY : XZ	APPROVED BY : AJ	PROJECT MGR : LZ
SCALE : AS INDICATED	ISSUE : CONCEPT PLAN	ISSUE DATE : 01/11/2024
SHEET SIZE: A3	PROJECT NO: 23109	REV. NO: D



Appendix 3 – SIDRA Outputs

SITE LAYOUT

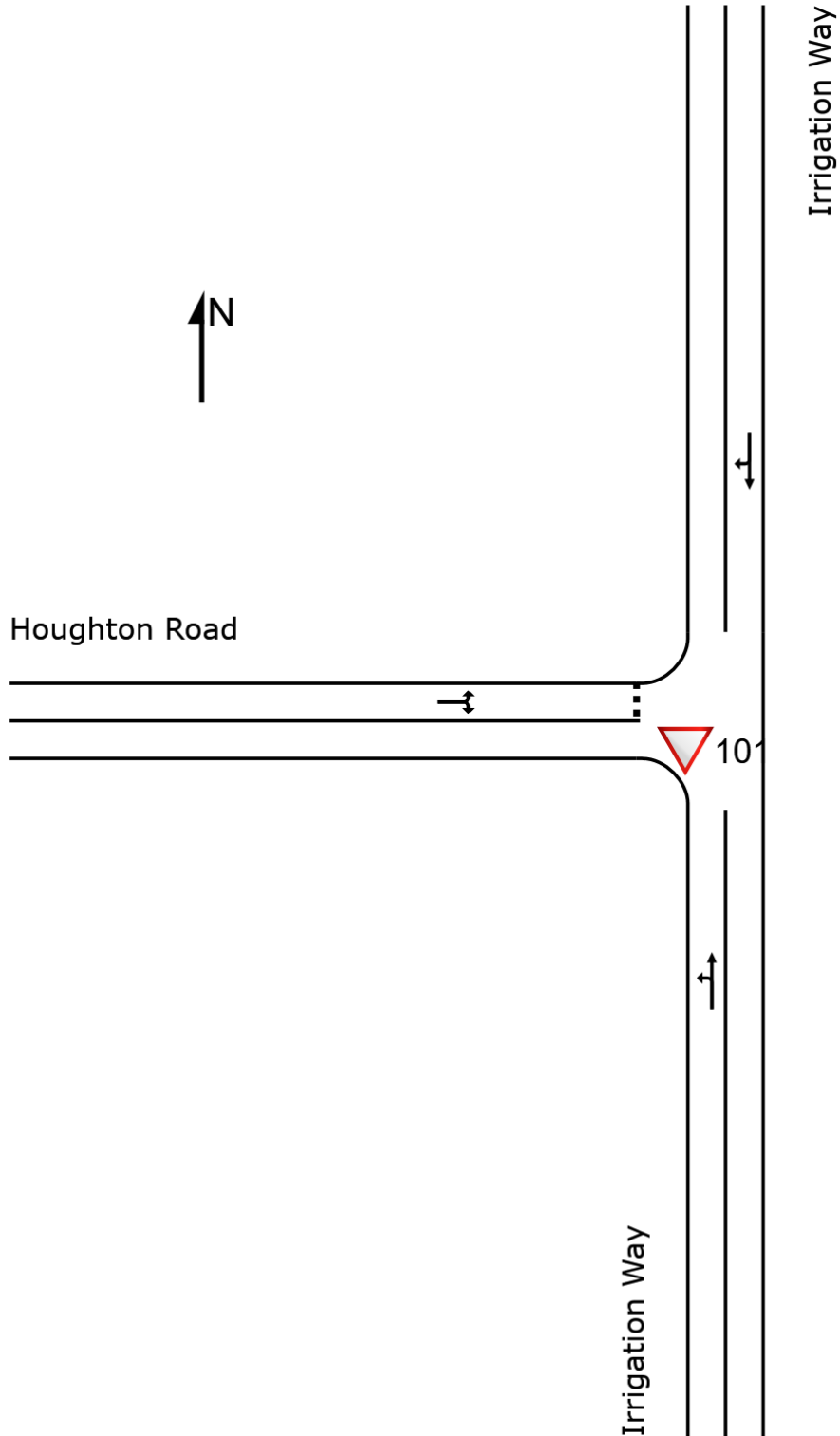
▽ Site: 101 [AM Peak (Site Folder: Post-Development (2026))]

New Site

Site Category: (None)

Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101 [AM Peak (Site Folder: Post-Development (2026))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] m				
			veh/h	%	veh/h	%	v/c	sec							km/h
South: Irrigation Way															
1	L2	All MCs	17	62.5	17	62.5	0.088	6.3	LOS A	0.0	0.0	0.00	0.07	0.00	54.2
2	T1	All MCs	127	22.3	127	22.3	0.088	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.6
Approach			144	27.0	144	27.0	0.088	0.8	NA	0.0	0.0	0.00	0.07	0.00	58.9
North: Irrigation Way															
8	T1	All MCs	149	4.2	149	4.2	0.116	0.4	LOS A	0.3	2.8	0.16	0.17	0.16	59.1
9	R2	All MCs	29	85.7	29	85.7	0.116	7.6	LOS A	0.3	2.8	0.16	0.17	0.16	52.3
Approach			179	17.6	179	17.6	0.116	1.6	NA	0.3	2.8	0.16	0.17	0.16	57.9
West: Houghton Road															
10	L2	All MCs	11	50.0	11	50.0	0.021	6.8	LOS A	0.1	0.7	0.31	0.57	0.31	49.9
12	R2	All MCs	7	57.1	7	57.1	0.021	8.5	LOS A	0.1	0.7	0.31	0.57	0.31	49.3
Approach			18	52.9	18	52.9	0.021	7.5	LOS A	0.1	0.7	0.31	0.57	0.31	49.7
All Vehicles			341	23.5	341	23.5	0.116	1.5	NA	0.3	2.8	0.10	0.15	0.10	57.8

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

LANE SUMMARY

Site: 101 [AM Peak (Site Folder: Post-Development (2026))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%											
South: Irrigation Way															
Lane 1	144	27.0	144	27.0	1641	0.088	100	0.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	144	27.0	144	27.0		0.088		0.8	NA	0.0	0.0				
North: Irrigation Way															
Lane 1	179	17.6	179	17.6	1542	0.116	100	1.6	LOS A	0.3	2.8	Full	500	0.0	0.0
Approach	179	17.6	179	17.6		0.116		1.6	NA	0.3	2.8				
West: Houghton Road															
Lane 1	18	52.9	18	52.9	867	0.021	100	7.5	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	18	52.9	18	52.9		0.021		7.5	LOS A	0.1	0.7				
All Vehicles	341	23.5	341	23.5		0.116		1.5	NA	0.3	2.8				

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

Approach Lane Flows (veh/h)										
South: Irrigation Way										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From S					Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	W	N			veh/h	v/c	%	%	%	Lane No.
Lane 1	17	127	144	27.0	1641	0.088	100	NA	NA	
Approach	17	127	144	27.0		0.088				
North: Irrigation Way										
Mov.	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N					Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	S	W			veh/h	v/c	%	%	%	Lane No.
Lane 1	149	29	179	17.6	1542	0.116	100	NA	NA	
Approach	149	29	179	17.6		0.116				
West: Houghton Road										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W					Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	N	S			veh/h	v/c	%	%	%	Lane No.
Lane 1	11	7	18	52.9	867	0.021	100	NA	NA	

Approach	11	7	18	52.9	0.021
Total %HV Deg.Satn (v/c)					
All Vehicles	341	23.5		0.116	

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Irrigation Way				
Lane 1	0.0	0.0	0.0	0.0
North: Irrigation Way				
Lane 1	0.0	0.0	0.0	0.0
West: Houghton Road				
Lane 1	0.0	0.0	0.0	0.0

MOVEMENT SUMMARY

Site: 101 [PM Peak (Site Folder: Post-Development (2026))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%				[Veh. veh	Dist] m				
South: Irrigation Way															
1	L2	All MCs	13	50.0	13	50.0	0.141	6.1	LOS A	0.0	0.0	0.00	0.03	0.00	54.9
2	T1	All MCs	237	12.4	237	12.4	0.141	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.8
Approach			249	14.3	249	14.3	0.141	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.5
North: Irrigation Way															
8	T1	All MCs	197	4.3	197	4.3	0.113	0.1	LOS A	0.1	0.7	0.05	0.06	0.05	59.7
9	R2	All MCs	8	50.0	8	50.0	0.113	7.6	LOS A	0.1	0.7	0.05	0.06	0.05	54.3
Approach			205	6.2	205	6.2	0.113	0.4	NA	0.1	0.7	0.05	0.06	0.05	59.4
West: Houghton Road															
10	L2	All MCs	32	83.3	32	83.3	0.068	8.3	LOS A	0.2	2.9	0.43	0.65	0.43	47.9
12	R2	All MCs	15	78.6	15	78.6	0.068	10.8	LOS B	0.2	2.9	0.43	0.65	0.43	47.7
Approach			46	81.8	46	81.8	0.068	9.1	LOS A	0.2	2.9	0.43	0.65	0.43	47.8
All Vehicles			501	17.2	501	17.2	0.141	1.2	NA	0.2	2.9	0.06	0.10	0.06	58.2

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

LANE SUMMARY

Site: 101 [PM Peak (Site Folder: Post-Development (2026))]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance															
	Demand Flows		Arrival Flows		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% Back Of Queue		Lane Config	Lane Length	Cap. Prob.	
	[Total	HV]	[Total	HV]						Veh	Dist]			Adj.	Block.
	veh/h	%	veh/h	%											
South: Irrigation Way															
Lane 1	249	14.3	249	14.3	1776	0.141	100	0.3	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	249	14.3	249	14.3		0.141		0.3	NA	0.0	0.0				
North: Irrigation Way															
Lane 1	205	6.2	205	6.2	1809	0.113	100	0.4	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	205	6.2	205	6.2		0.113		0.4	NA	0.1	0.7				
West: Houghton Road															
Lane 1	46	81.8	46	81.8	681	0.068	100	9.1	LOS A	0.2	2.9	Full	500	0.0	0.0
Approach	46	81.8	46	81.8		0.068		9.1	LOS A	0.2	2.9				
All Vehicles	501	17.2	501	17.2		0.141		1.2	NA	0.2	2.9				

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

Approach Lane Flows (veh/h)										
South: Irrigation Way										
Mov.	L2	T1	Total	%HV		Deg.	Lane	Prob.	Ov.	
From S					Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	W	N			veh/h	v/c	%	%	%	Lane No.
Lane 1	13	237	249	14.3	1776	0.141	100	NA	NA	
Approach	13	237	249	14.3		0.141				
North: Irrigation Way										
Mov.	T1	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From N					Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	S	W			veh/h	v/c	%	%	%	Lane No.
Lane 1	197	8	205	6.2	1809	0.113	100	NA	NA	
Approach	197	8	205	6.2		0.113				
West: Houghton Road										
Mov.	L2	R2	Total	%HV		Deg.	Lane	Prob.	Ov.	
From W					Cap.	Satn	Util.	SL	Ov.	Ov.
To Exit:	N	S			veh/h	v/c	%	%	%	Lane No.
Lane 1	32	15	46	81.8	681	0.068	100	NA	NA	

Approach	32	15	46	81.8	0.068
Total %HV Deg.Satn (v/c)					
All Vehicles	501	17.2		0.141	

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

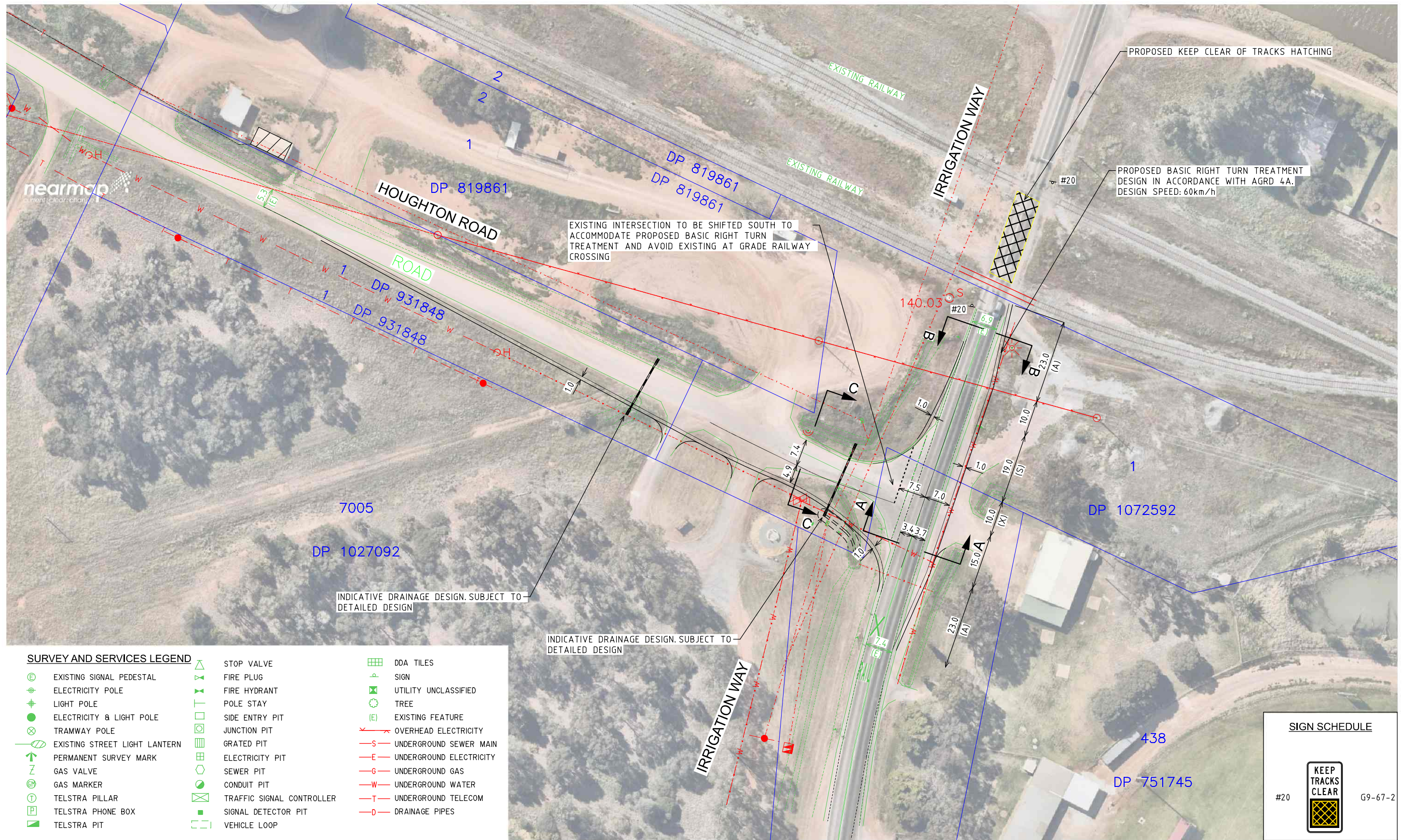
Merge Analysis											
	Exit Lane Number	Short Lane Length m	Percent Opng in Lane % veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.											

Variable Demand Analysis				
	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Irrigation Way				
Lane 1	0.0	0.0	0.0	0.0
North: Irrigation Way				
Lane 1	0.0	0.0	0.0	0.0
West: Houghton Road				
Lane 1	0.0	0.0	0.0	0.0

Appendix 4 – Intersection Designs

A4.1 – Strategic Design – Houghton Road / Irrigation Way

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SURVEY AND SERVICES LEGEND

	EXISTING SIGNAL PEDESTAL		STOP VALVE		DDA TILES
	ELECTRICITY POLE		FIRE PLUG		SIGN
	LIGHT POLE		FIRE HYDRANT		UTILITY UNCLASSIFIED
	ELECTRICITY & LIGHT POLE		POLE STAY		TREE
	TRAMWAY POLE		SIDE ENTRY PIT		EXISTING FEATURE
	EXISTING STREET LIGHT LANTERN		JUNCTION PIT		OVERHEAD ELECTRICITY
	PERMANENT SURVEY MARK		GRATED PIT		UNDERGROUND SEWER MAIN
	GAS VALVE		ELECTRICITY PIT		UNDERGROUND ELECTRICITY
	GAS MARKER		SEWER PIT		UNDERGROUND GAS
	TELSTRA PILLAR		CONDUIT PIT		UNDERGROUND WATER
	TELSTRA PHONE BOX		TRAFFIC SIGNAL CONTROLLER		UNDERGROUND TELECOM
	TELSTRA PIT		SIGNAL DETECTOR PIT		DRAINAGE PIPES
			VEHICLE LOOP		

SIGN SCHEDULE



G9-67-2

Drawing Record

ISSUE	DRAWN	APP'D	DATE	AMENDMENT
P7	GL	KK	19.02.25	MINOR AMENDMENTS INCORPORATED

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THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

PRELIMINARY PLAN
FOR DISCUSSION PURPOSES ONLY
SUBJECT TO CHANGE WITHOUT NOTIFICATION
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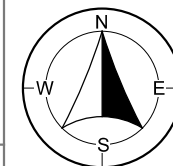
Notes & Legend

1. AERIAL IMAGE FROM NEARMAP UNDER LICENSE AGREEMENT WITH TRAFFICWORKS PTY LTD.
2. ALL DIMENSIONS ARE TO FACE OF KERB UNLESS SHOWN OTHERWISE.
3. CONSIDERATION SHOULD BE GIVEN TO REPLACING THE EXISTING RIGID POLE ON THE EAST SIDE WITH A SLIP BASE VARIANT.

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SCALE OF METRES
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**Intersection of Irrigation Way
and Houghton Road**
Leeton Shire Council

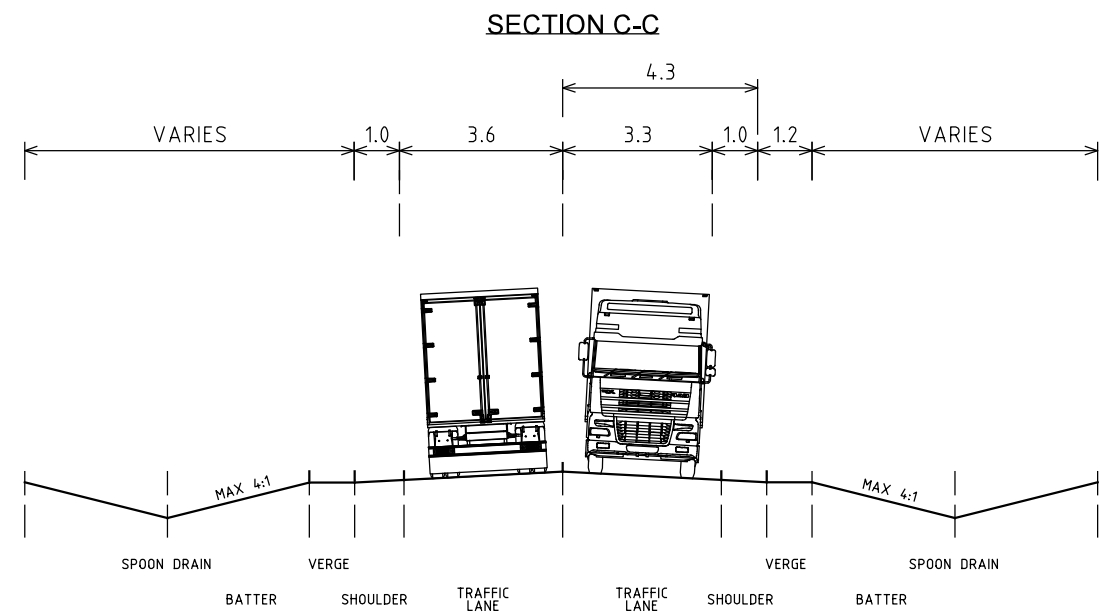
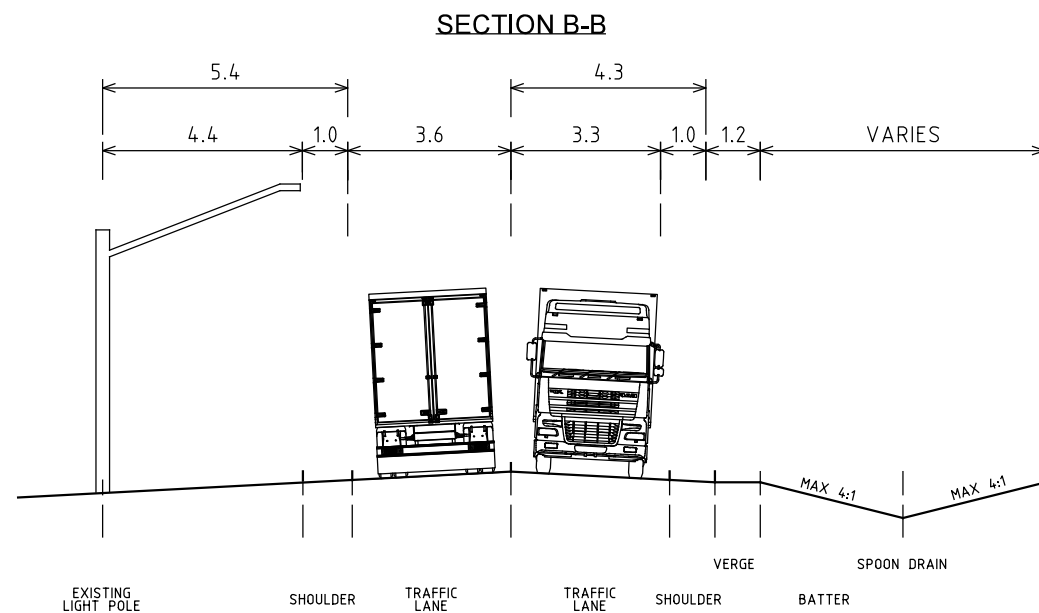
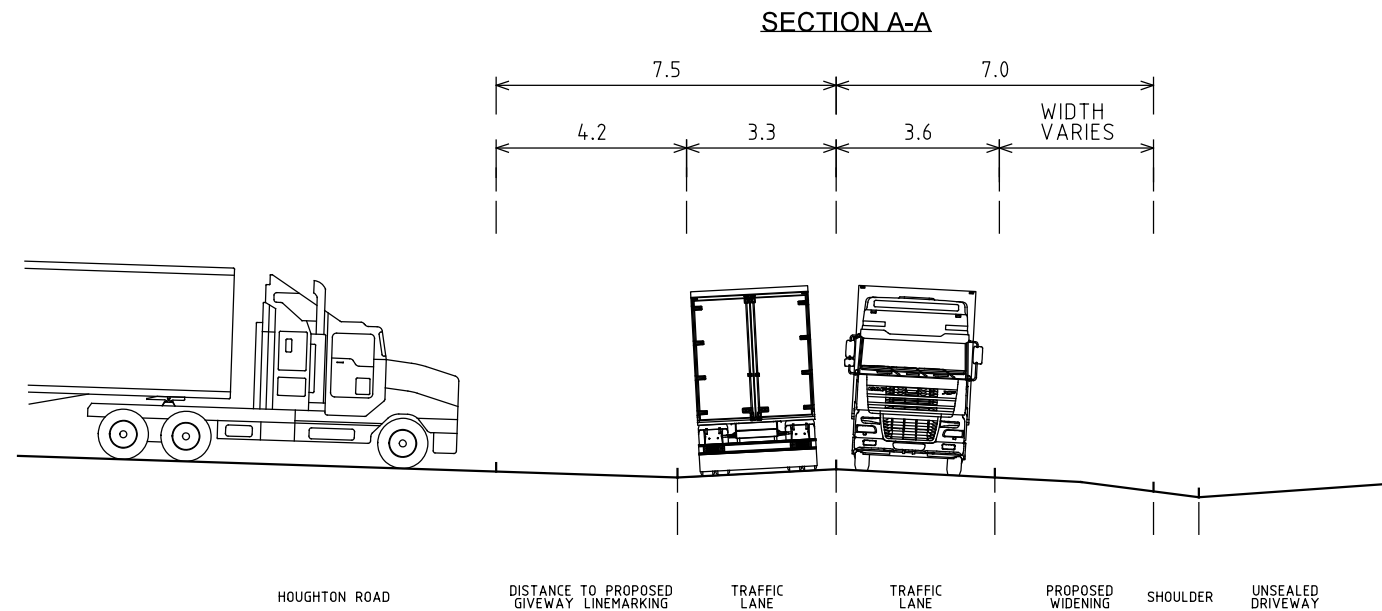
Two Dimensional Stratetgic Plan

SHEET NO.
01

DRAWING NO.
230136-CTP-01

ISSUE
P7

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SCALE OF METRES
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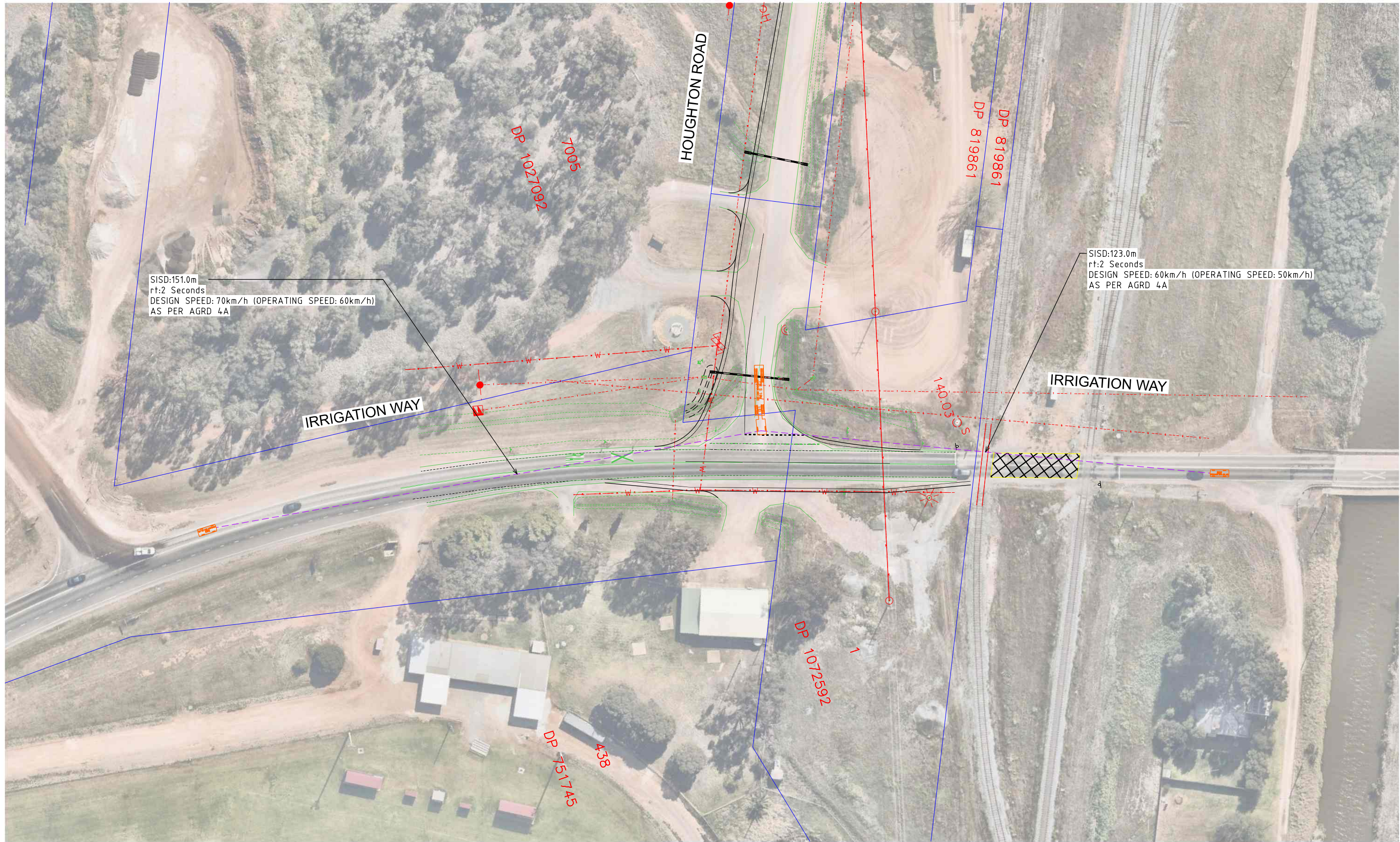
Intersection of Irrigation Way and Houghton Road

Leeton Shire Council

Typical Sections

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Drawing Record

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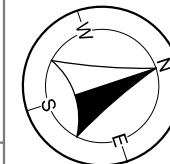
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1. AERIAL IMAGE FROM NEARMAP UNDER LICENSE AGREEMENT WITH TRAFFICWORKS PTY LTD.
2. ALL DIMENSIONS ARE TO FACE OF KERB UNLESS SHOWN OTHERWISE.
3. CONSIDERATION SHOULD BE GIVEN TO REPLACING THE EXISTING RIGID POLE ON THE EAST SIDE WITH A SLIP BASE VARIANT.

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SCALE OF METRES
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Intersection of Irrigation Way and Houghton Road

Leeton Shire Council

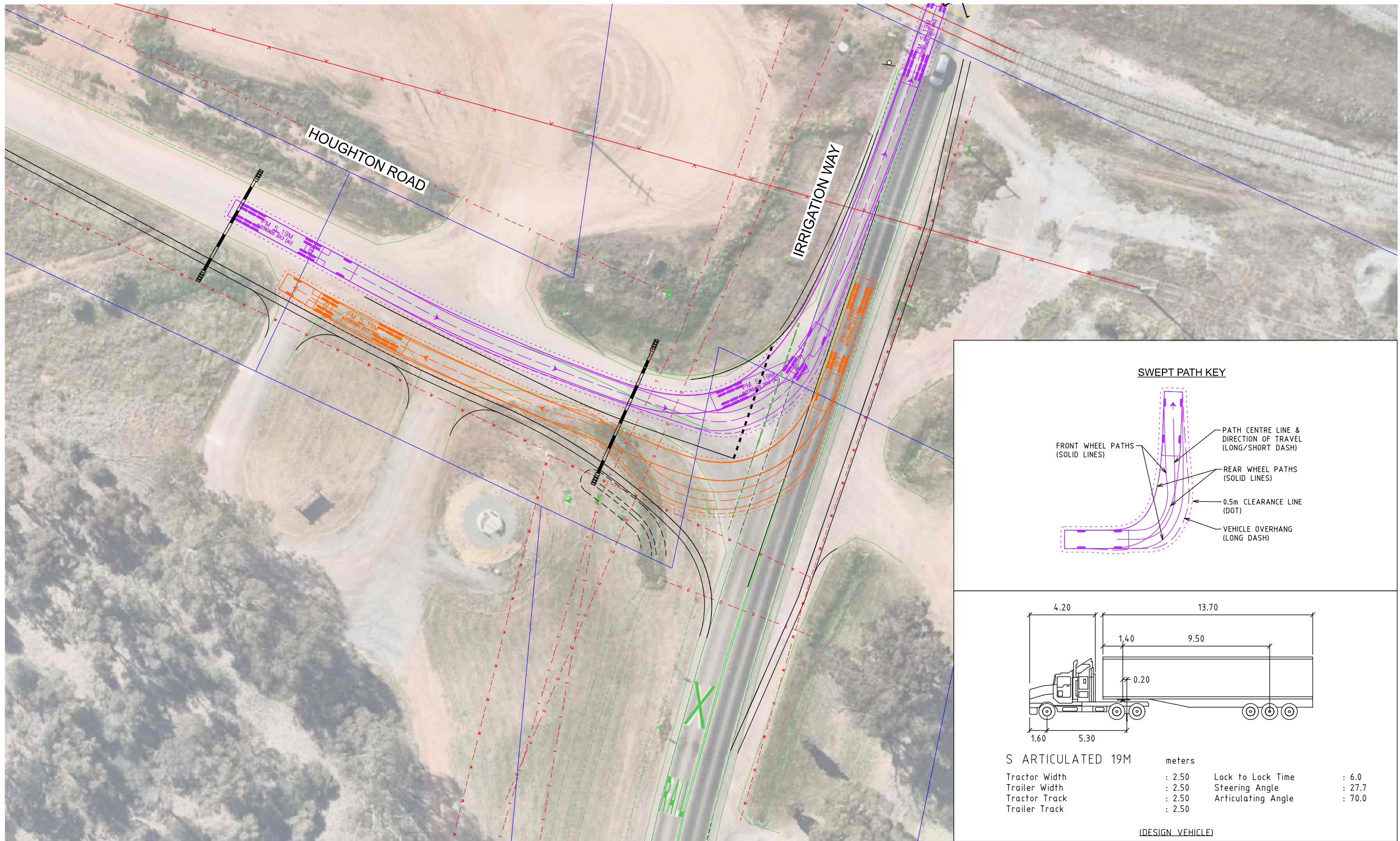
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03

DRAWING NO.
230136-CTP-03

ISSUE
P7

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GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

PRELIMINARY PLAN
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DATE OF ISSUE: 19/02/25

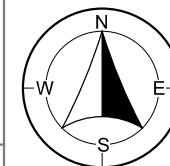
Notes & Legend

1. AERIAL IMAGE FROM NEARMAP UNDER LICENSE AGREEMENT WITH TRAFFICWORKS PTY LTD.
2. ALL DIMENSIONS ARE TO FACE OF KERB UNLESS SHOWN OTHERWISE.
3. CONSIDERATION SHOULD BE GIVEN TO REPLACING THE EXISTING RIGID POLE ON THE EAST SIDE WITH A SLIP BASE VARIANT.

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SCALE OF METRES
0 5 10

Intersection of Irrigation Way and Houghton Road

Leeton Shire Council

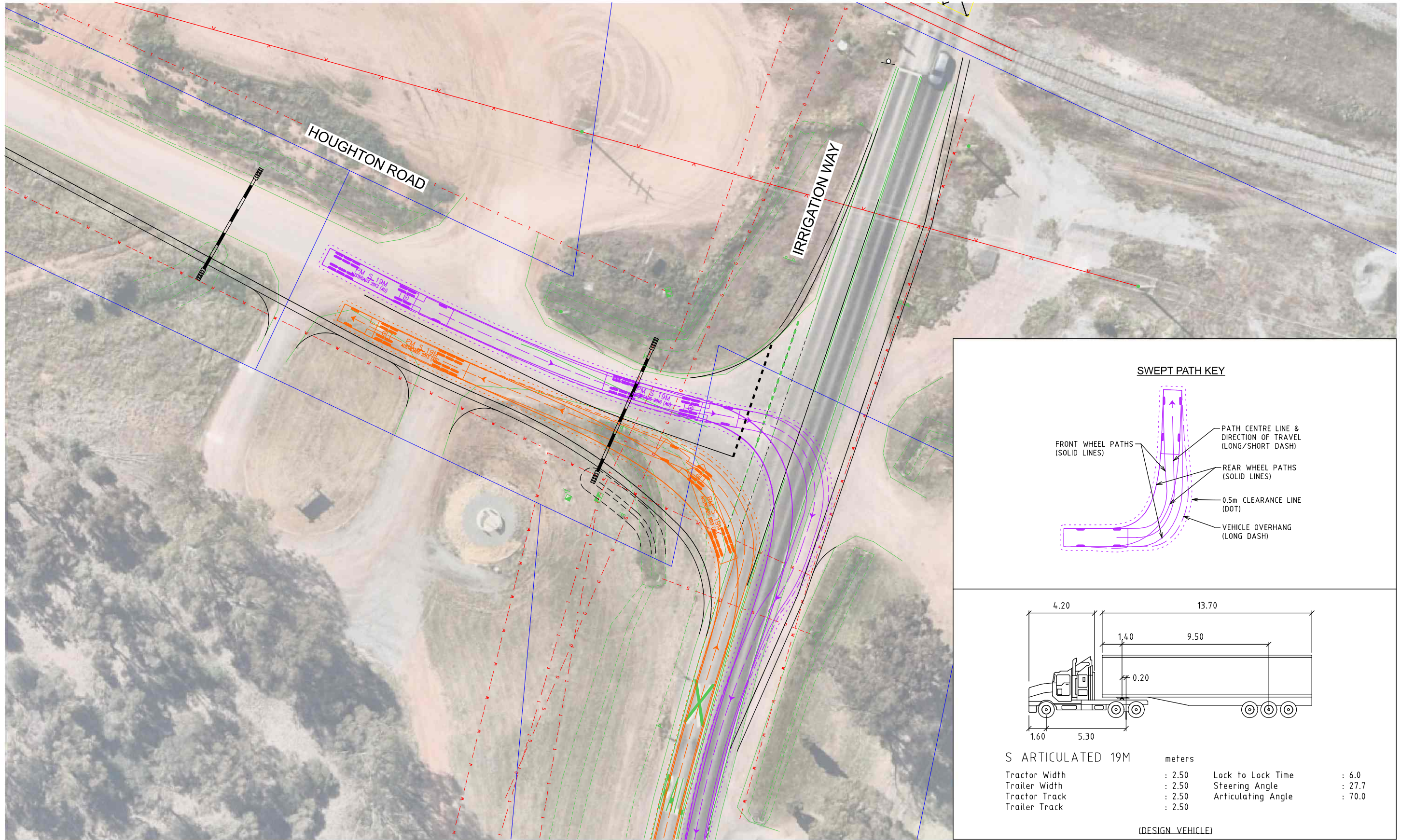
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ISSUE
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Drawing Record

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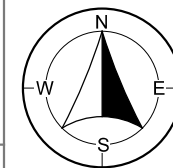
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SCALE OF METRES
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Intersection of Irrigation Way and Houghton Road

Leeton Shire Council

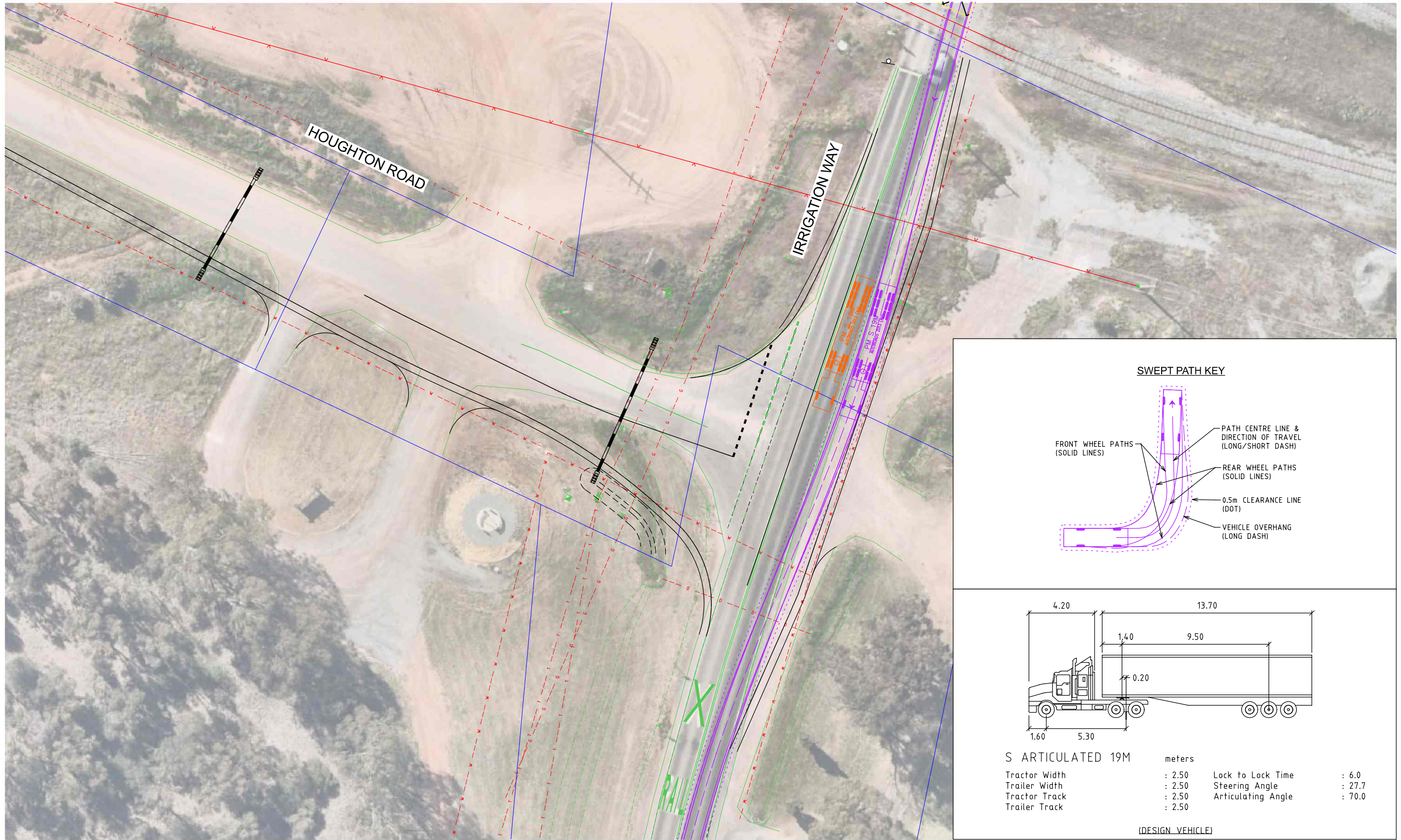
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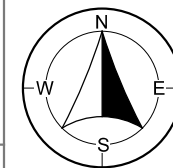
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SCALE OF METRES
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Intersection of Irrigation Way and Houghton Road

Leeton Shire Council

Swept Path Assessment

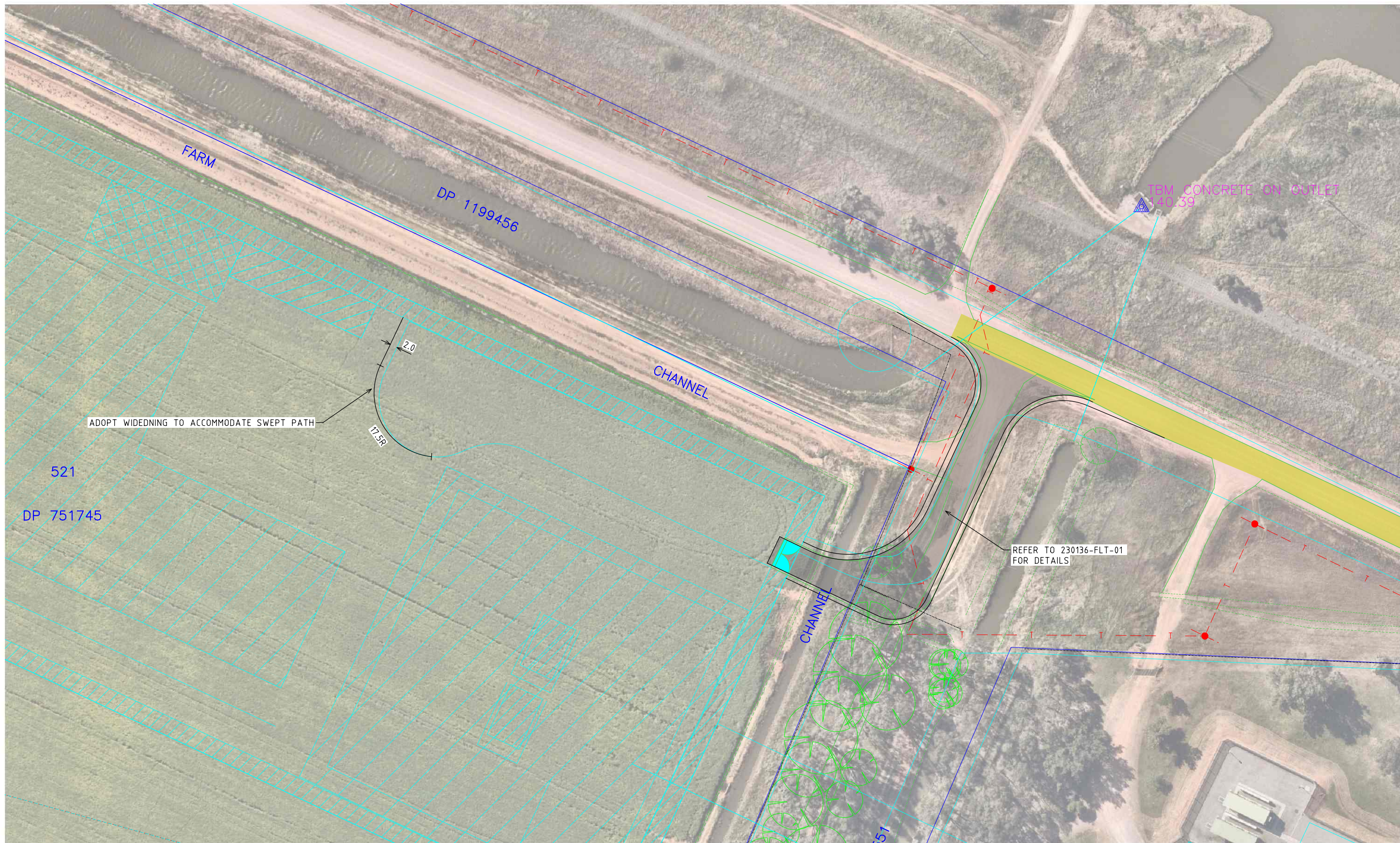
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A4.2 – Strategic Design – Development Access / Hulme Road / Houghton Road

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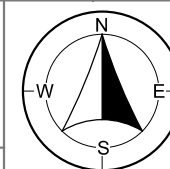
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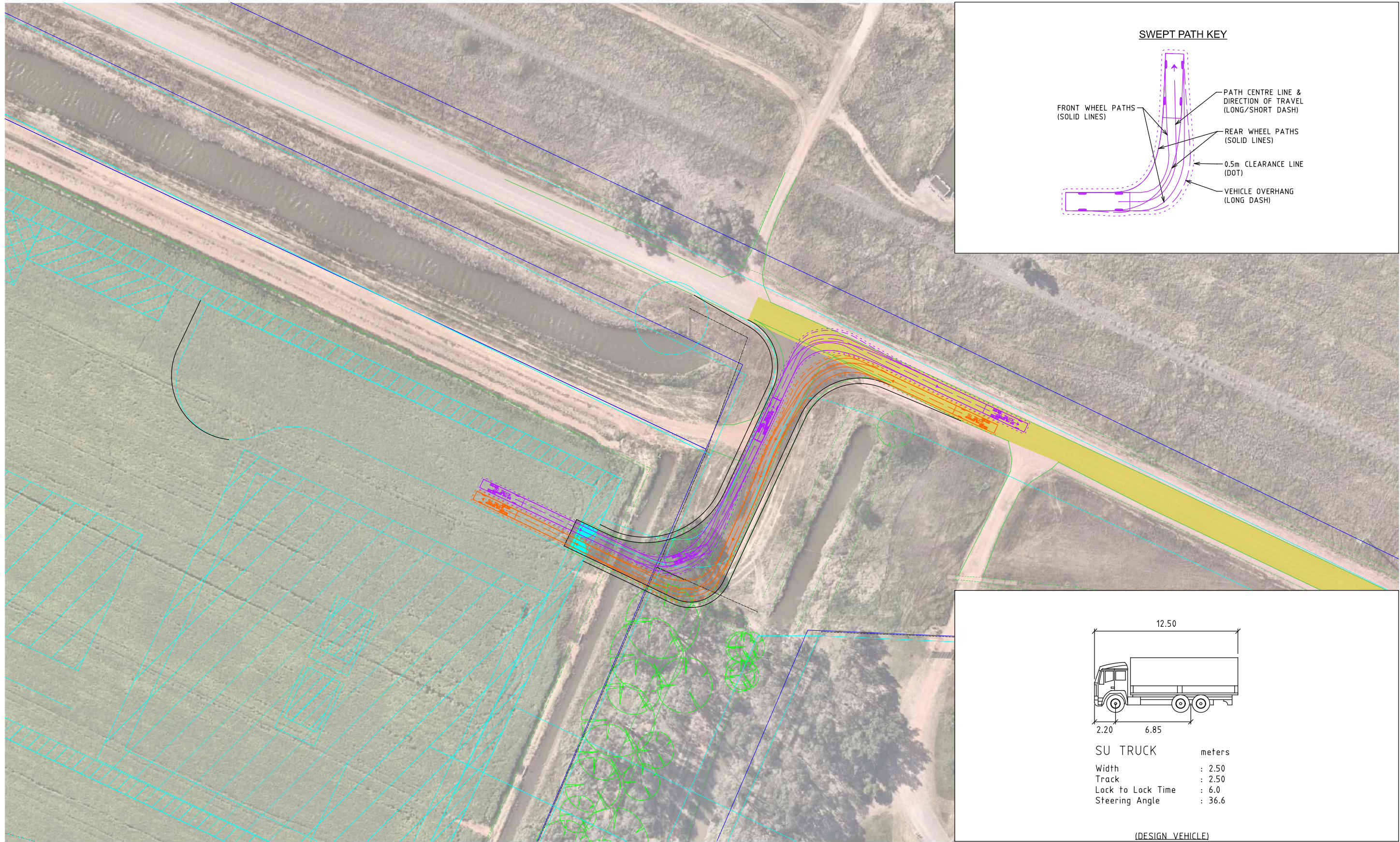
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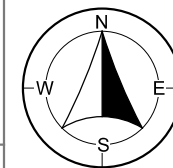
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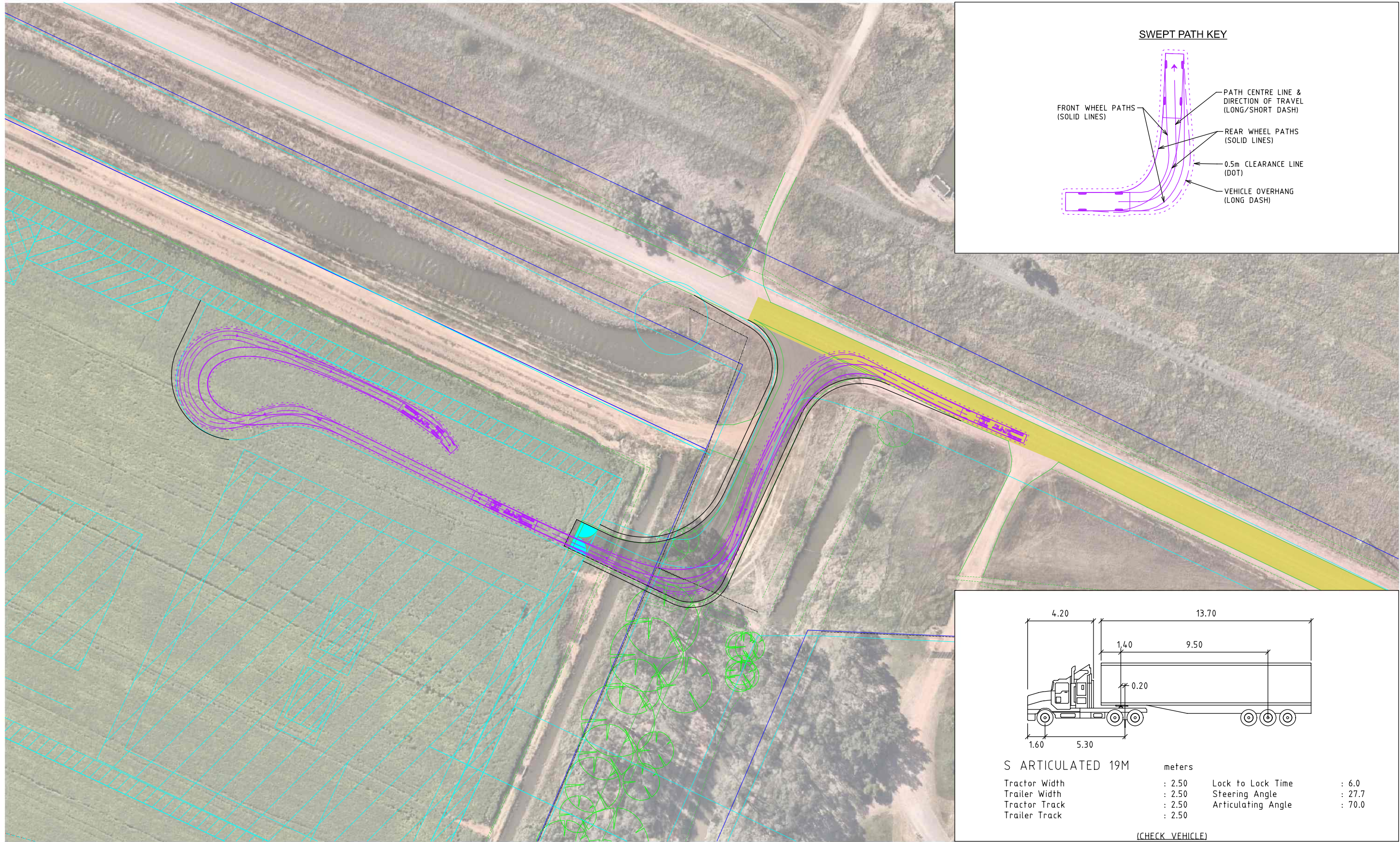
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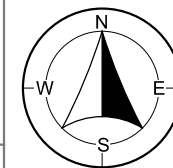
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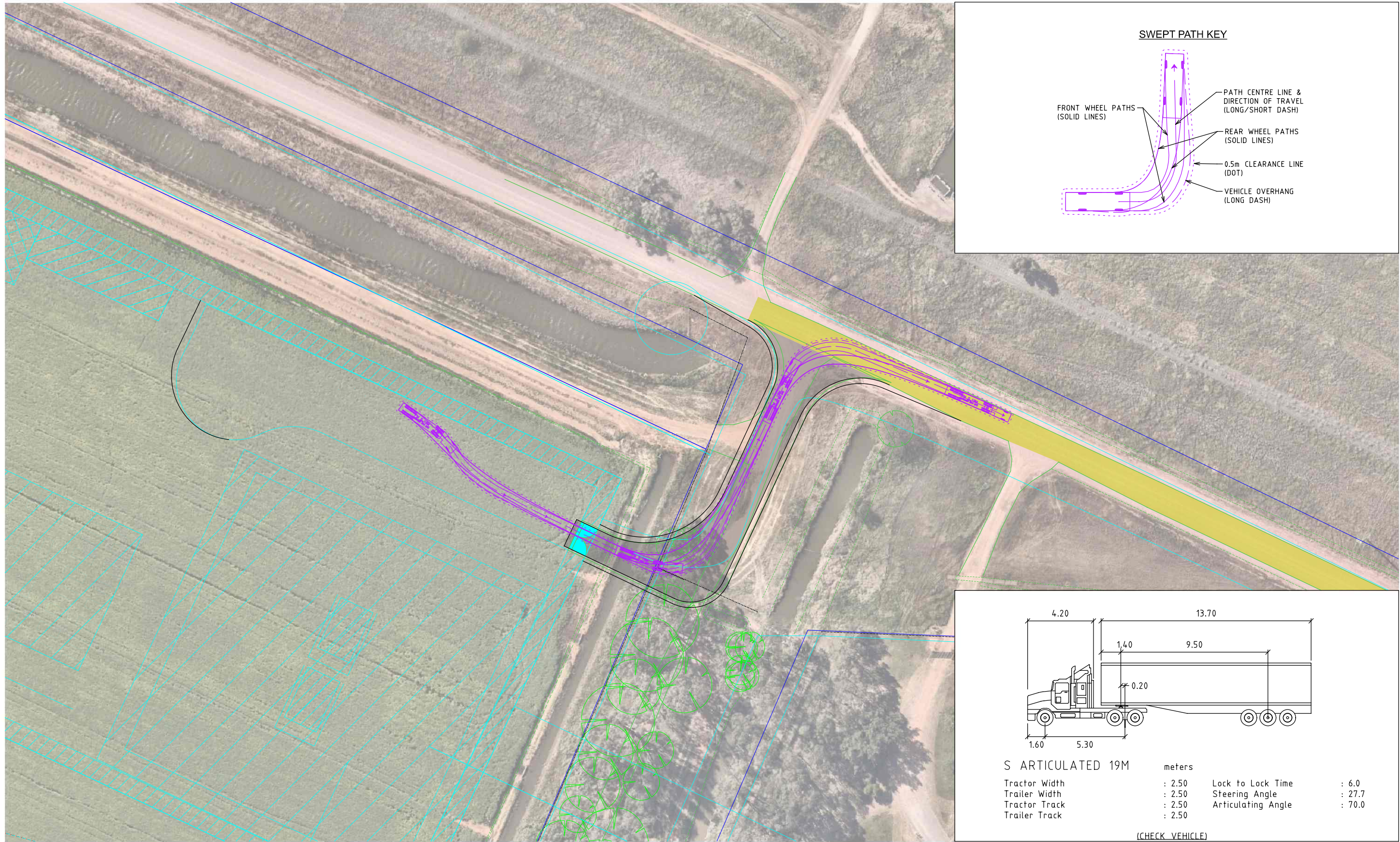
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Swept Path Assessment

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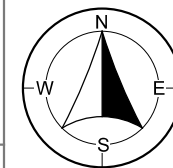
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Intersection of Houghton Road and Hulme Road
Leeton Shire Council

Swept Path Assessment

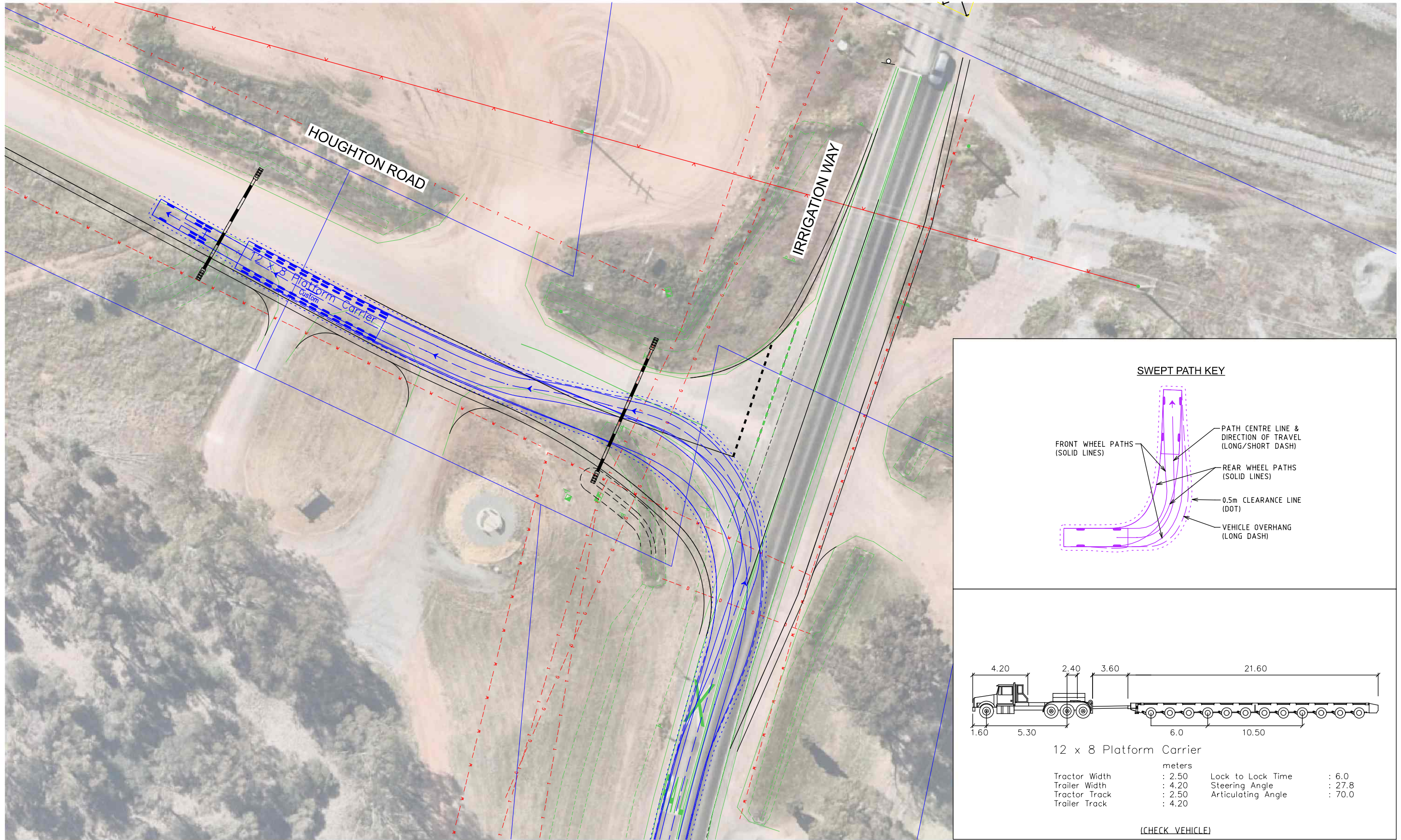
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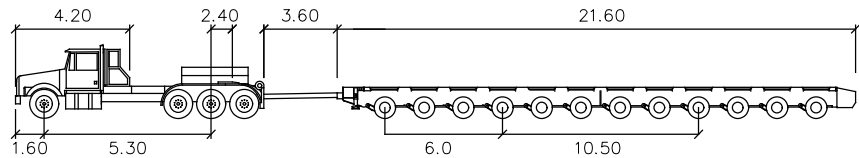
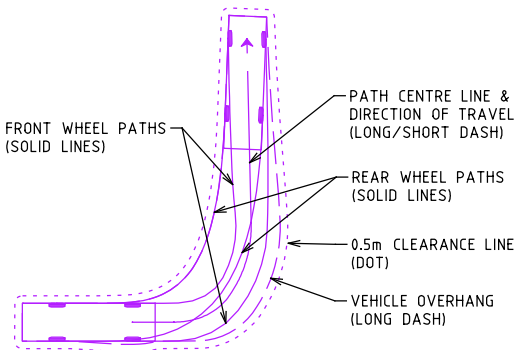
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A4.3 – Oversized-Overmass Vehicle Access

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SWEPT PATH KEY



12 x 8 Platform Carrier

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 4.20	Steering Angle	: 27.8
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 4.20		

(CHECK VEHICLE)

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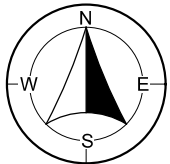
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SCALE OF METRES
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Intersection of Irrigation Way
and Houghton Road

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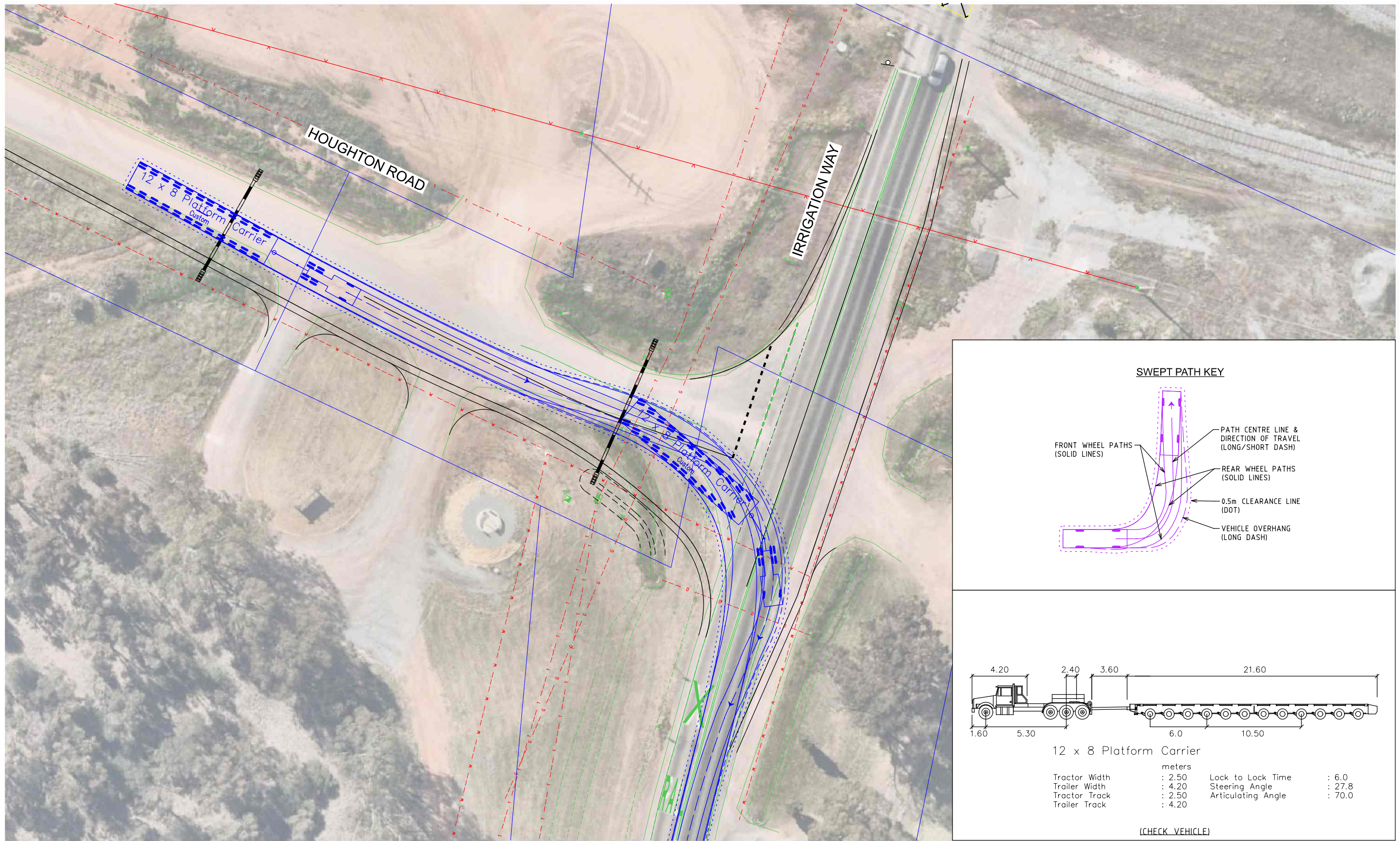
Swept Path Assessment
Oversize Vehicle

SHEET NO.
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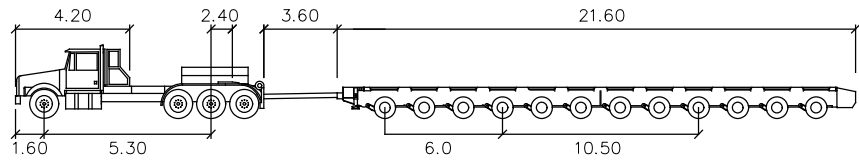
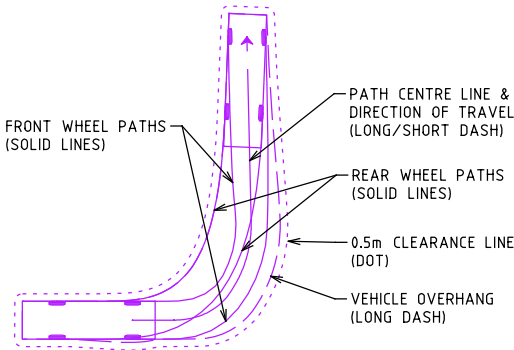
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SWEPT PATH KEY



12 x 8 Platform Carrier

	Tractor Width	: 2.50	Lock to Lock Time	: 6.0
	Trailer Width	: 4.20	Steering Angle	: 27.8
	Tractor Track	: 2.50	Articulating Angle	: 70.0
	Trailer Track	: 4.20		

(CHECK VEHICLE)

Drawing Record

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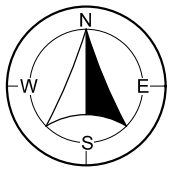
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SCALE OF METRES
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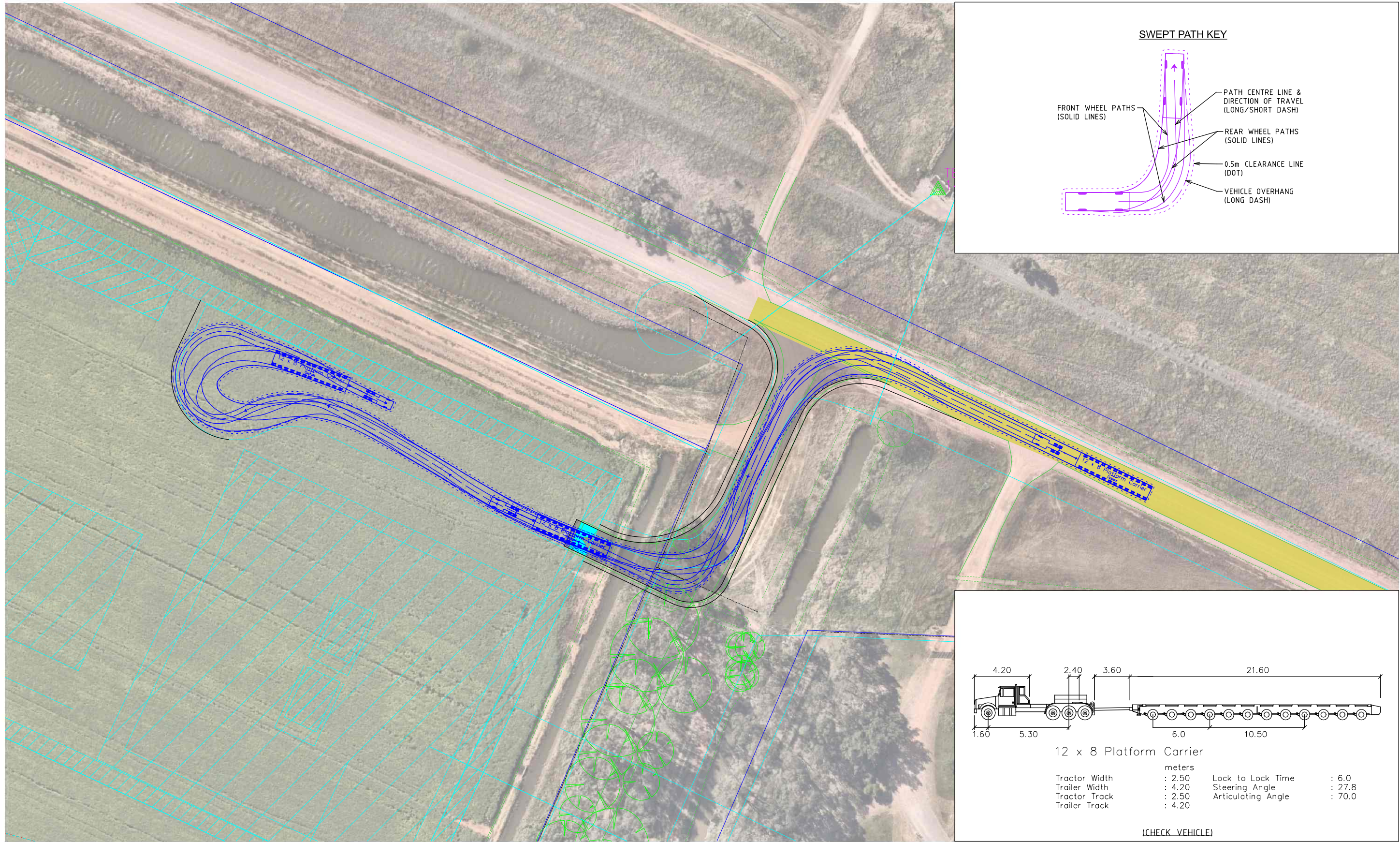
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Swept Path Assessment Oversize Vehicle

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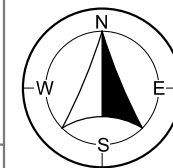
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SCALE OF METRES
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Leeton Shire Council

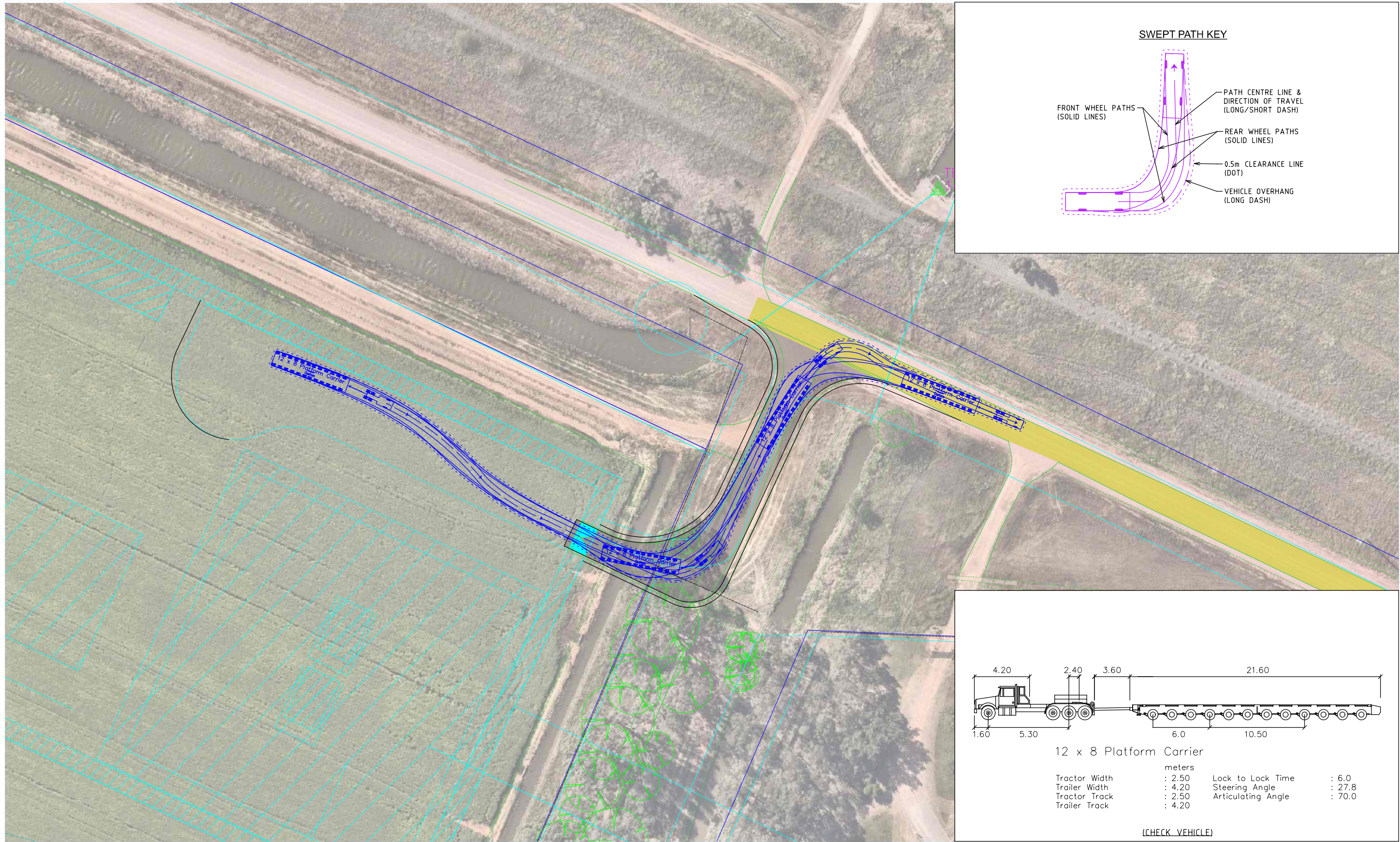
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Oversize Vehicle**

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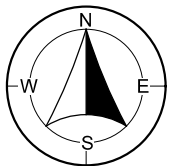
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SCALE OF METRES
0 5 10

Intersection of Houghton Road
and Hulme Road

Leeton Shire Council

Swept Path Assessment
Oversize Vehicle

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Appendix 5 – OSOM Route Assessment Report



ROUTE STUDY

CLIENT: ACENERGY

PROJECT: YANCO BIG BESS

PORT OF IMPORT: PORT KEMBLA

19/02/2025 REV 05.1

Rev	Date	Change	Responsible	Checked
00	28/11/23	Report Compiled	E Novak	✓
00	05/12/23	Report Completed	W Andrews	✓
01	12/03/24	Report Updated	E Novak	✓
01	13/03/24	Report Completed	W Andrews	✓
02	17/06/24	Report edited	W Andrews	✓
03	12/07/24	Site entrance updated	W Andrews	✓
04	07/02/25	Report updated	W Andrews	✓
05	14/02/25	Report updated	W Andrews	✓
05.1	11/2/25	Minor grammar updates	J Stokes	✓

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2.0	EVALUATION.....	4
3.0	PROJECT DATA.....	5
4.0	INDICATIVE TRANSPORT DRAWINGS	6
5.0	PORT OF IMPORT.....	8
6.0	SITE LOCATION & LAYOUT	9
7.0	TRANSPORT STUDY: PORT KEMBLA TO YANCO BIG BESS	11
8.0	PARKING LOCATIONS ON ROUTE.....	27
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1.0 Introduction

This document describes observations and previous experience on sections of this route and outlines the proposed Transport of transformer equipment from Port Kembla to the Yanco Big BESS.

The route study was undertaken on 28-11-23.

2.0 Evaluation

Assessment of the proposed routes was conducted by Rex J Andrews Engineered Transportation based on onsite route surveys as well as previous experience on sections of the identified routes and transporting transformers on various other projects similar to the one proposed for this project.

The assessment was conducted utilising the knowledge, experience and intellectual property of Rex J Andrews on purpose-built equipment and is not intended for use by other parties.

The assessment considered the key constraints encountered on the routes and an estimation of the amount of work required to make the route viable based on previous experience.

Table 1 shows the evaluation of each route and provides an overall ranking to give guidance on the most suitable route for the development from a transport perspective. The assessment was based on operational factors and equipment capability and does not consider external factors such as regulatory, landholder, environmental, cultural or any other external factors beyond the knowledge or control of Rex J Andrews.

1	No Work	Harbour	Road Modification	Road Furnishings	Vegetation	Site Entrance	Bridge Calculations	Overhead utilities	Overall Work Required
2	Some Work								
3	Moderate Amount of Work								
4	Large Amount of Work								
Route 1	All loads	1	1	1	1	3	2	1	2.0

Table 1 Route Evaluation

3.0 Project Data

Date of latest Route Assessment: 28/11/2023

Survey Undertaken By: (Rex J Andrews P/L)

Project Name: Yanco Big BESS

Location: Pt Kembla (NSW) to Yanco (NSW)

Proposed Load: 120MVA transformer (Bare transformer body without attachments
(for transportation) L*W*H = 7500*2750*3950mm. 136.4 tons)

Overall Transport Dimensions: L*W*H = 44900* 4300*4900. 228.5 tons

Transport Combination: 1x Prime mover and 12x8 platform trailer, with back up prime mover

Pilot Requirement: 3 x Pilots for the duration of the journey

Return Route: Use same route in reverse. GPS Link: <https://maps.app.goo.gl/cCozMn4EZyq21dz57>

Proposed Travel Times: 1 x trip, timing to be determined by client upon approval.

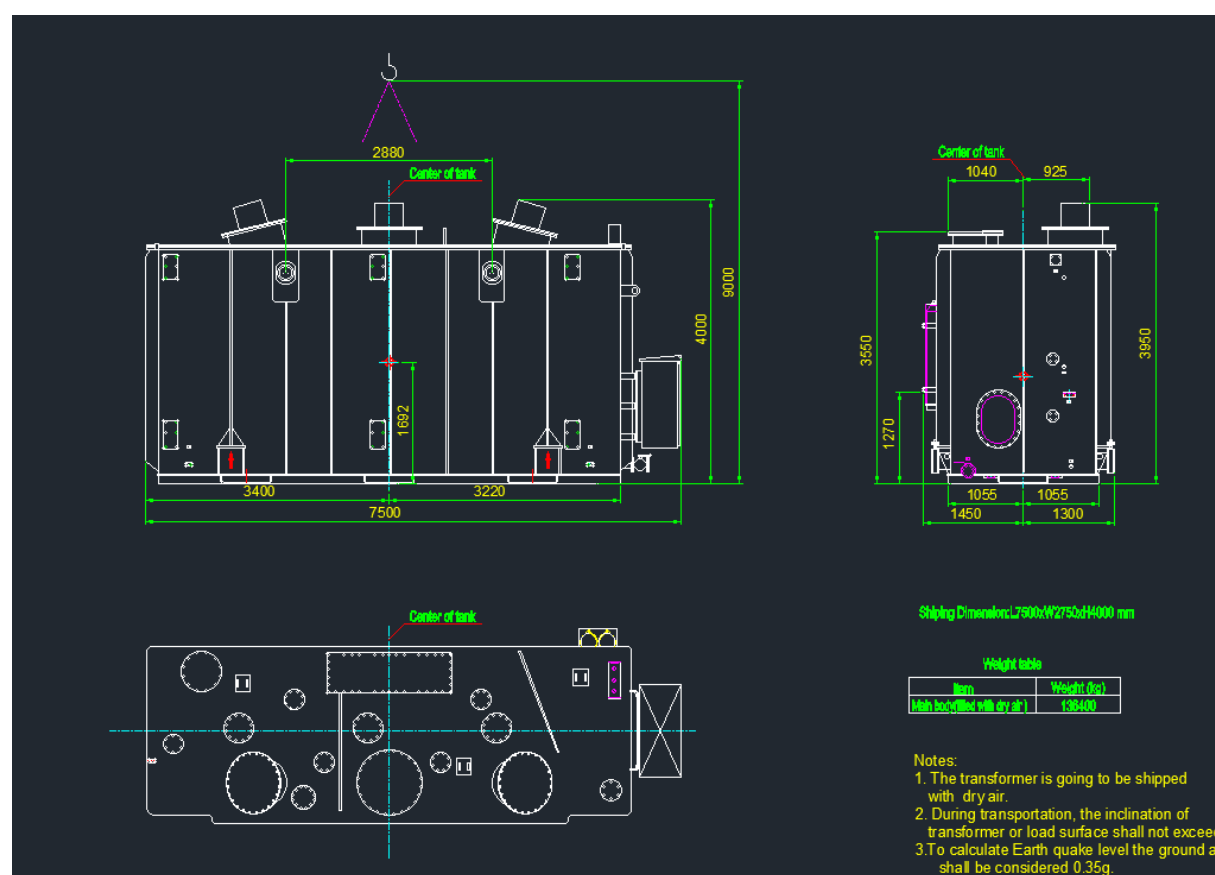


Figure 1 - Proposed Load

4.0 Indicative Transport Drawings

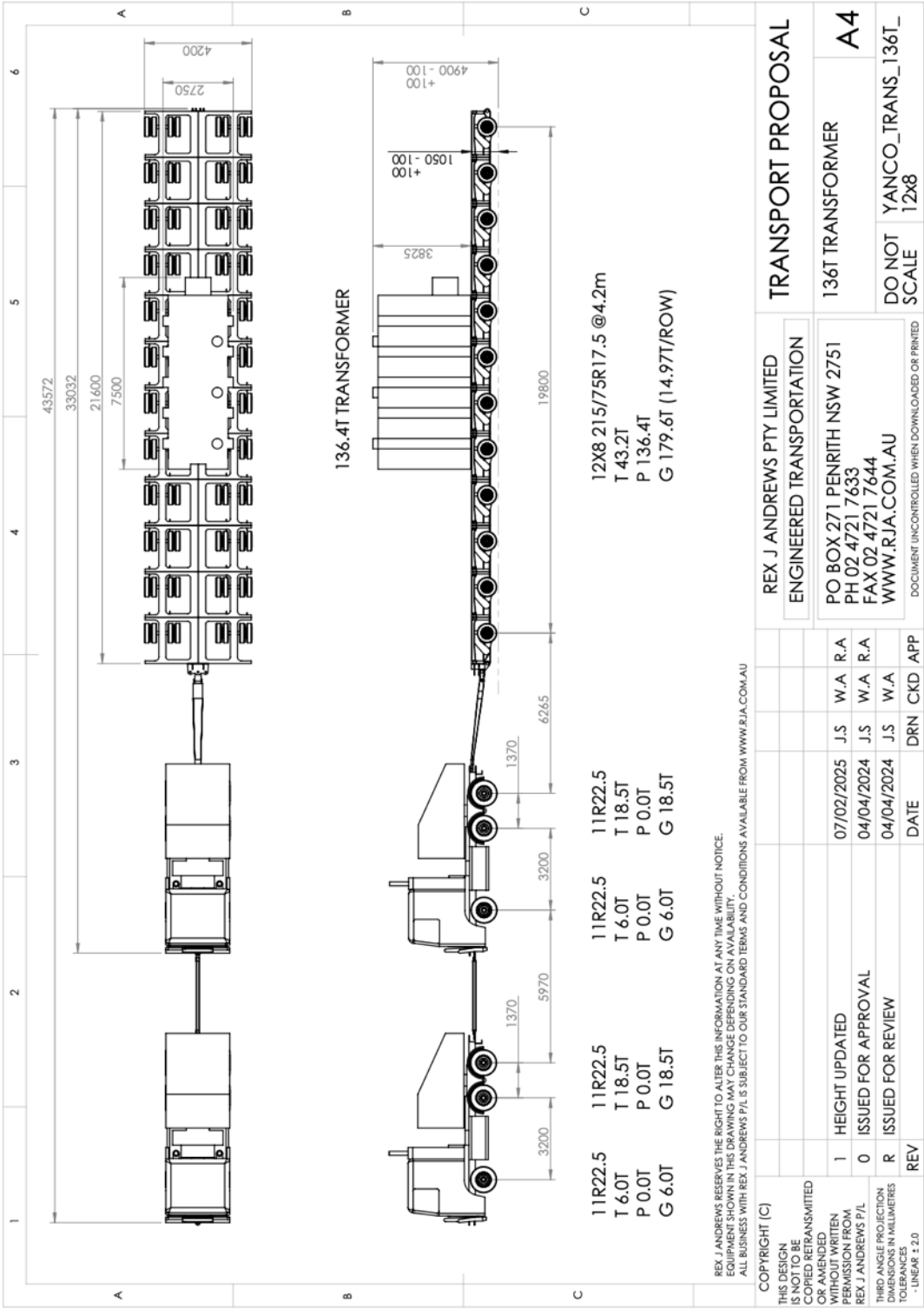


Figure 2 - 12x8 Platform trailer profile view

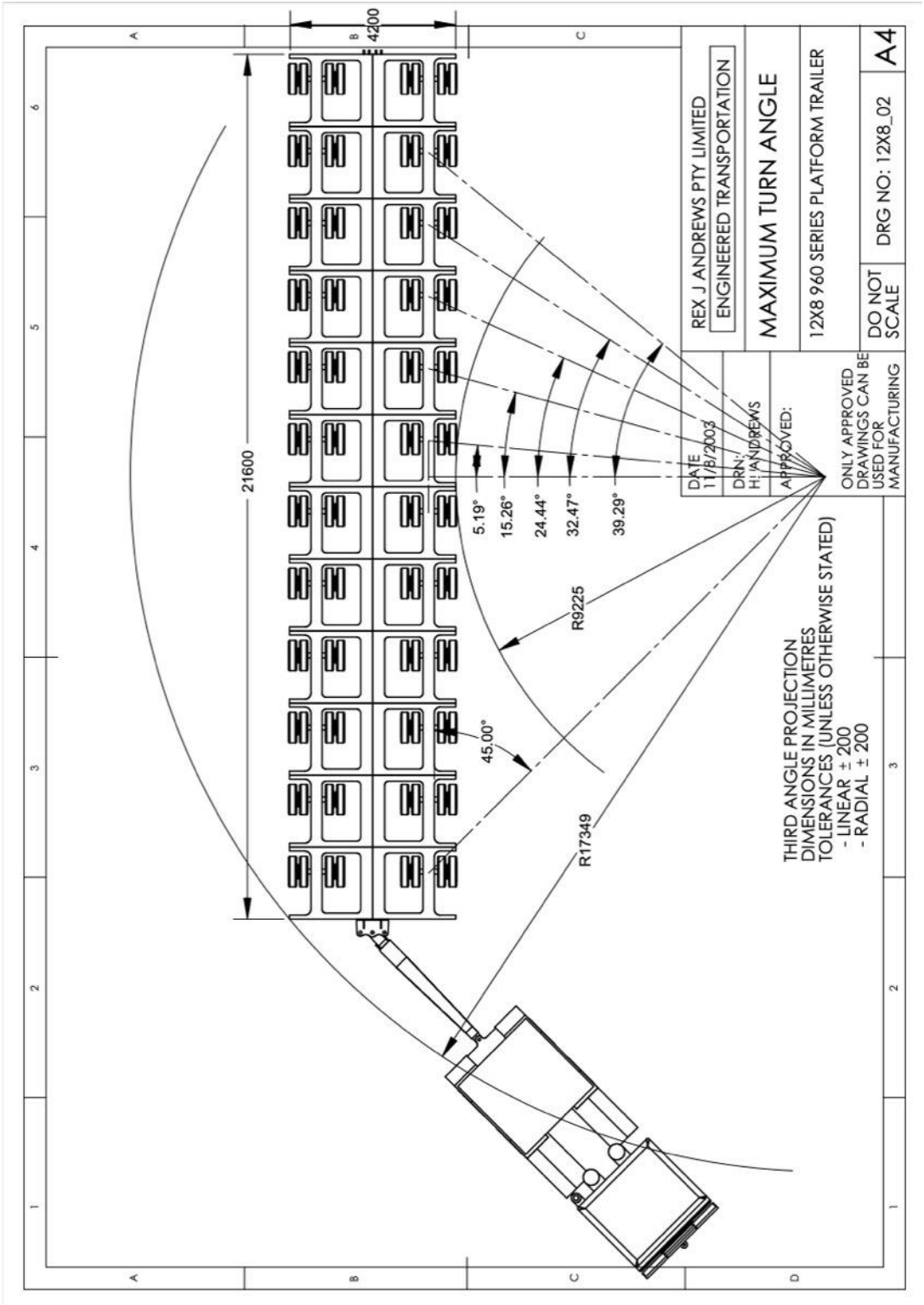


Figure 3 - 12x8 Platform trailer swept path

5.0 Port of Import

The transformer is to be imported from overseas and arrive via ship into Port Kembla. The ideal berth for these shipments is the AAT Terminal. This facility has a hardstand storage area of roughly 40,000 s/q meters, adjacent to the berth.

Access from the storage to the public roads is via a port operated road onto Tom Thumb Road.

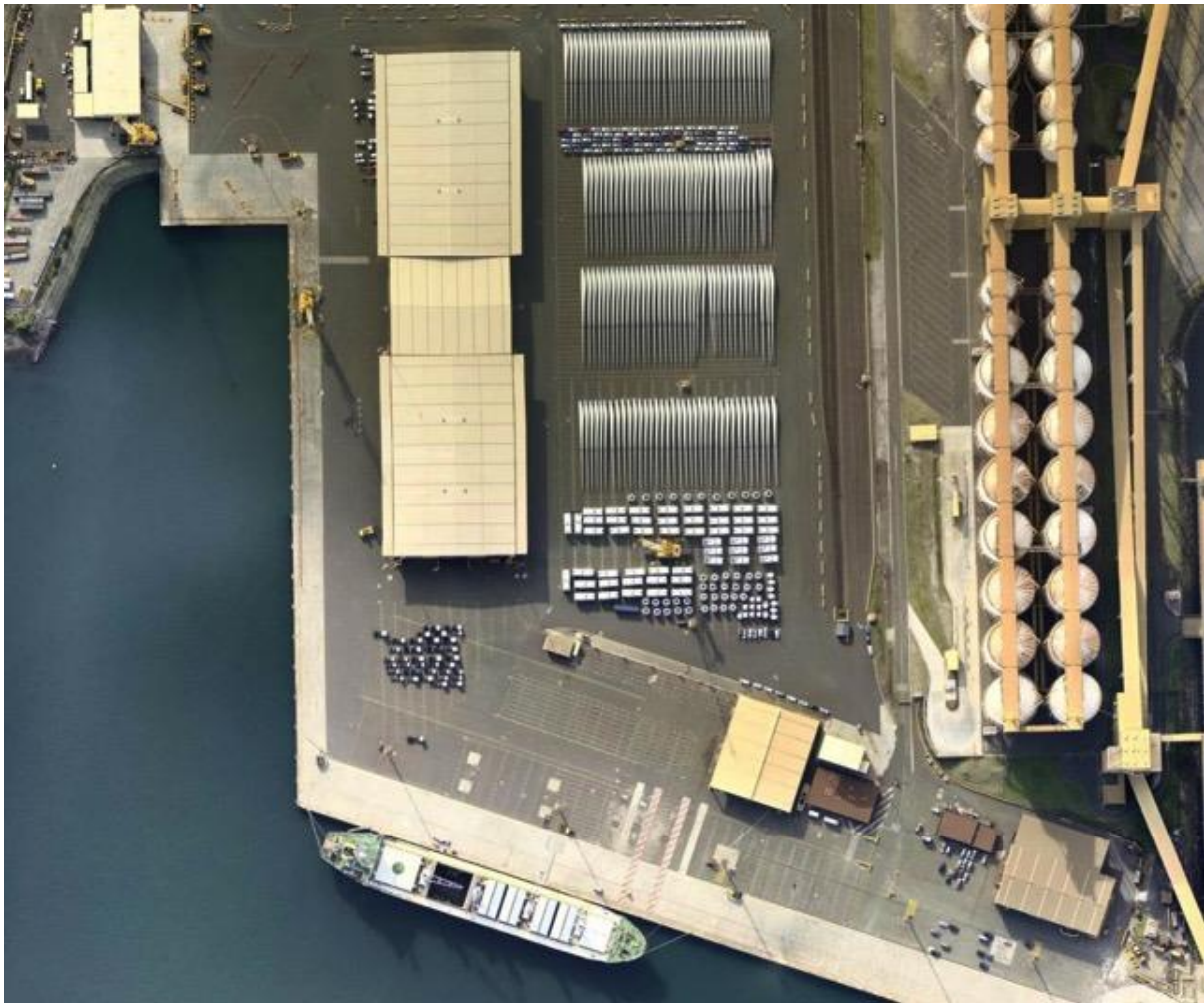


Figure 4 - Port Kembla AAT Terminal

6.0 Site Location & Layout

The proposed Yanco Battery Energy Storage System (BESS) is located approximately 270 kilometres west of Canberra and 500 kilometres from Sydney.

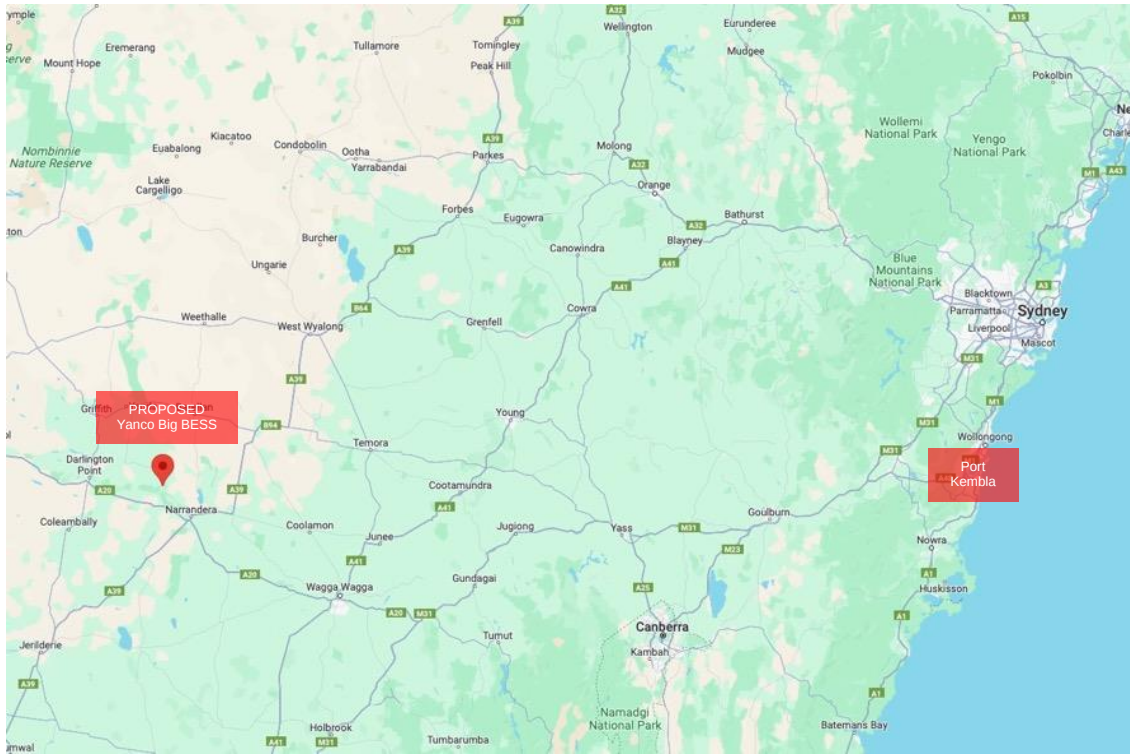


Figure 5 - Site Location

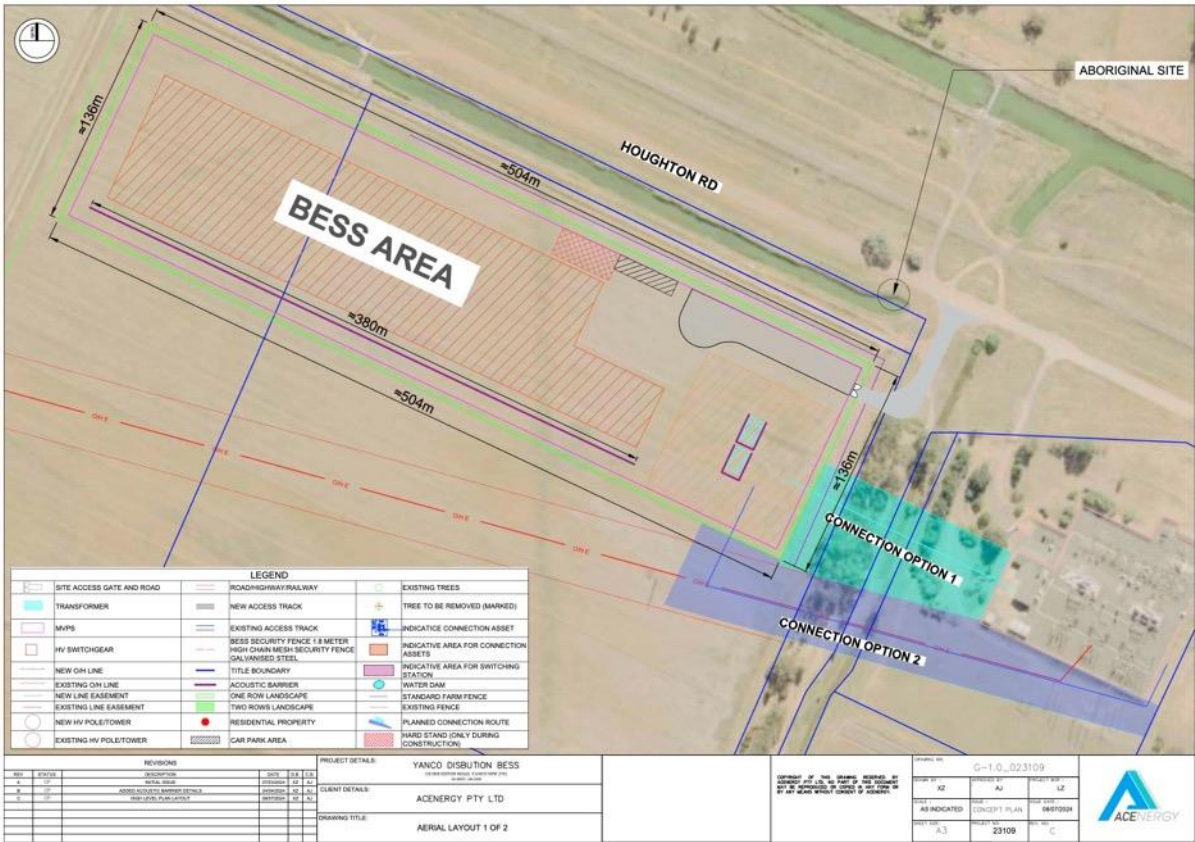


Figure 6 - Site Layout

7.0 Transport Study: Port Kembla to Yanco Big BESS

The study is based on the transformer entering Australia via the AAT Terminal at Port Kembla. The study shows the likely route for the transformer and the constraints that may be encountered on the route.

DISTANCE: 539 kilometres

GPS LINK: <https://maps.app.goo.gl/BMWadd8DiU4MfTbLA>

Route: Tom Thumb Road, Springhill Road, Masters Road, Princes Motorway, Mt Ousley Road, Picton-Wilton Road, Hume Highway, Sturt Hwy, Newell Hwy, Audley Street, Irrigation Way, Houghton Road, Hulme Road, Site Entry.

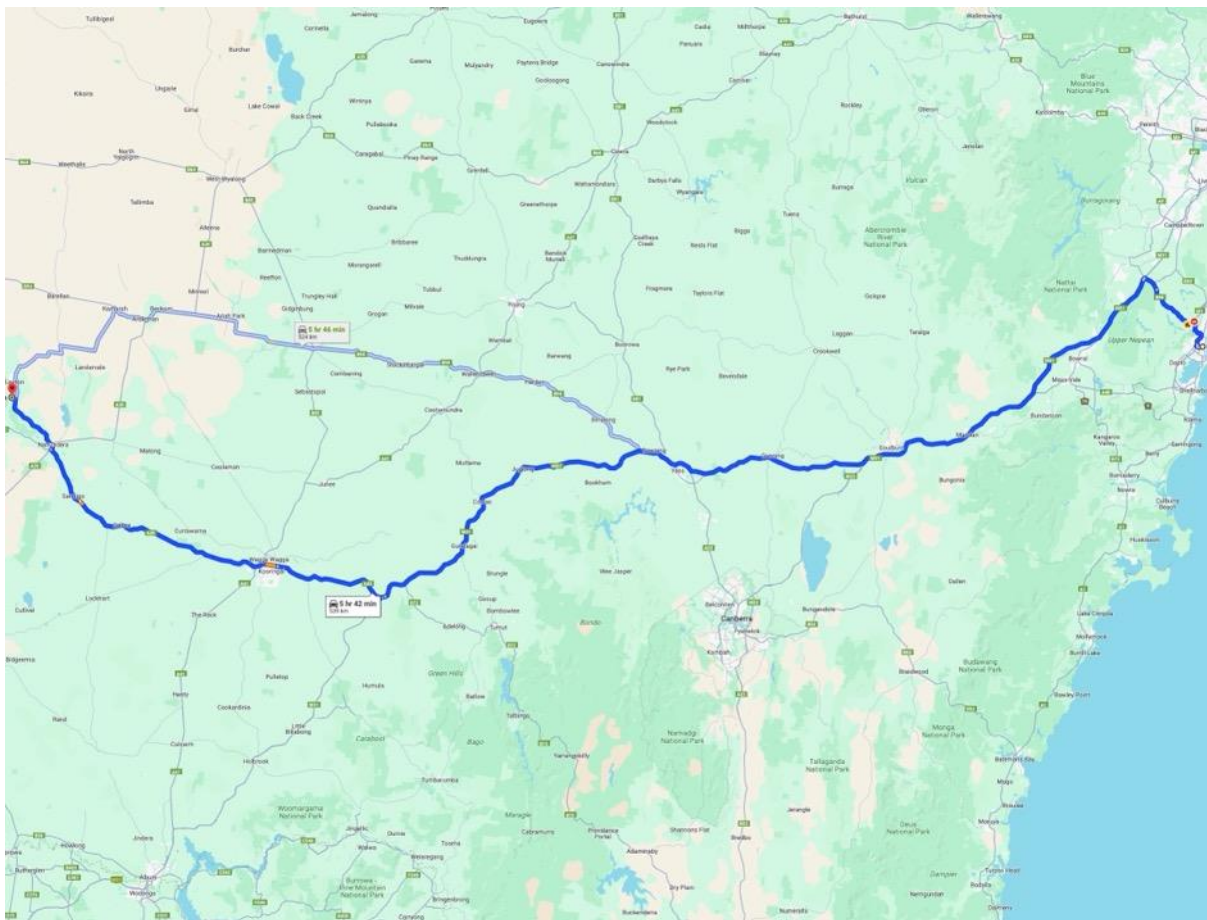


Figure 7 – Map of route

KEY	
MODIFICATIONS REQUIRED	
PINCH POINT	
EMERGENCY PARKING	

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
0.0	Port Kembla	Exit port onto Tom Thumb Road GPS link: https://goo.gl/maps/nXdxosvr1fQG6L2b9	Width: 5.5 metres	Travel directly ahead	No problems with this section of road
0.2	Port Kembla	Tom Thumb Road onto Springhill Road GPS link: https://goo.gl/maps/QB9L1BYNAUKJqoZ78	Length: 70.0 metres Width: 7.0 metres	Left hand turn	No problems with this section of road
1.4	Port Kembla	Springhill Road onto Masters Road GPS link: https://goo.gl/maps/pNxY2pLLej1KW4uh6	Length: 70.0 metres Width: 7.0 metres	Right hand turn	No problems with this section of road
2.6	Figtree	Masters Road onto Princes Motorway GPS link: https://goo.gl/maps/i57nvCKoETt8FYrs9	Length: 90.0 metres Width: 6.0 metres	Right hand sweeping bend	No problems with this section of road
2.7	Figtree	Princes Motorway under The Avenue GPS link: https://goo.gl/maps/gAGCrHkbgqMdnVNg6	Height clearances: Centre Lane: 5.4 mtrs	Travel directly ahead	Load is 4.9 metres in overall height. Load will have 500mm clearance under this structure.
6.4	Keiraville	Princes Motorway under Gipps Road GPS link: https://goo.gl/maps/VTqvHNfE25cpWxs7	Height clearances: Left Lane: 5.4 mtrs Centre Lane: 5.3 mtrs Right Lane: 5.3 mtrs	Travel directly ahead	Load is 4.9 metres in overall height. Load will have 400mm clearance under this structure.
6.5	Keiraville	Mount Ousley Road under the University Bridge GPS link: https://goo.gl/maps/S9kYztURpquEk3EQ7	Height clearances: Left Lane: 5.0 mtrs Centre Lane: 5.0 mtrs Right Lane: 4.9 mtrs	Travel directly ahead	Load is 4.9 metres in overall height. Load will need to lower the trailer to 4.8 metres in overall height in stay in the left-hand lane while travelling under this structure. Load will have 200mm clearance under this structure.
7.7	Mt Ousley	Princes Motorway GPS link: https://goo.gl/maps/9LCLZVycbbaom8rv8	Width: 8.0 metres	Travel directly ahead	No problems with this section of road
13.0	Mount Ousley	Mount Ousley Road onto Picton-Wilton Road GPS link: https://goo.gl/maps/8m1Er1RF785No29z5	Length: 70.0 metres Width: 6.0 metres	Left hand turn	No problems with this section of road
40.2	Wilton	Picton-Wilton Road onto the Hume Highway GPS link: https://goo.gl/maps/ZQKvS4wJ1ygWH3Ab7	Length: 70.0 metres Width: 7.0 metres	Left Hand Turn	No problems with this section of road

ROUTE STUDY

YANCO BIG BESS

KM index	Location	Section of road	Critical Measurement	Procedure	Notes
103.0	Sutton Forest	Hume Highway GPS link: https://maps.app.goo.gl/9cqNHN1KzNZeqNrU8	150.0 long x 10.0 wide	Merge to left	Sutton Forest Rest Area. Large parking bay suitable for this load
283.0	Berremangra	Hume Highway GPS link: https://maps.app.goo.gl/3sXQh6P1MN8Vv3549	180.0 long x 10.0 wide	Merge to left	Reddy Creek Rest Area. Large parking bay suitable for this load
343.0	South Gundagai	Hume Highway GPS link: https://maps.app.goo.gl/i8MFF3RWZdzzr4Ee7	150 long x 12.0 wide	Merge to left	Big Ben Creek Rest Area. Large parking bay suitable for this load
372.0	Tarcutta	Hume Hwy onto Sturt Hwy GPS Link: https://goo.gl/maps/ruqNDSw5vanJDd4x5	Length: 200 metres Width: 5.5 metres	Left Hand Merge	No problems with this section of road.
373.0	Tarcutta	Sturt Highway GPS link: https://maps.app.goo.gl/kypeAP1x2iqBjd8F8	140.0 long x 14.0 wide	Merge to left	Hume HWY Exit Stopping Bay. Large parking bay suitable for this load
412.0	Wagga Wagga	Sturt Hwy Roundabout 1 GPS Link: https://goo.gl/maps/7VDWUyW8KnUhCEdd7	Length: 50 metres Width: 8.0 metres	Travel directly ahead	No problems with this section of road
415.0	Wagga Wagga	Sturt Hwy Roundabout 2 GPS Link: https://goo.gl/maps/VeavHs6e4AjLaqqDA	Length: 50 metres Width: 8.0 metres	Travel directly ahead	No problems with this section of road
416.4	Wagga Wagga	Sturt Hwy Roundabout 3 GPS Link: https://goo.gl/maps/dBte59BvHyvcGSr5	Length: 50 metres Width: 8.0 metres	Travel directly ahead	No problems with this section of road
416.9	Wagga Wagga	Sturt Hwy under rail overpass GPS Link: https://goo.gl/maps/JPKJBAYzJuMAiHuz8	Height clearances: Left lane: 5.5 metres Right lane: 5.4 metres	Travel under rail overpass	Load is 4.9 metres in overall height. Load will have 500mm clearance under this structure.
419.0	Wagga Wagga	Sturt Hwy Roundabout 4 GPS Link: https://goo.gl/maps/fx388veUAjbykiyPA	Length: 50 metres Width: 8.0 metres	Travel directly ahead	No problems with this section of road
480.0	Galore	Sturt Highway GPS Link: https://maps.app.goo.gl/VUULuiYiDvMSJmd57	110.0 long x 15.0 wide	Merge to left	Kywong Rest Area. Large parking bay suitable for this load
513.0	Gillenhah	Sturt Hwy onto Newell Hwy GPS Link: https://maps.app.goo.gl/a2xKJNueVCyr5X917	Width: 6.0 metres	Travel directly ahead	No problems with this section of road
515.1	Narrandera	Newell Hwy onto Audley St GPS Link: https://maps.app.goo.gl/TT6RUBBG71MC5Bdw6	Length: 70.0 metres Width: 7.0 metres	Left hand turn	Loads to cross to incorrect side of Newell Hwy and turn into incorrect side of Audley St.
515.9	Narrandera	Audley St onto Irrigation Way GPS Link: https://maps.app.goo.gl/fNwNnEsYPKpgPteo7	Width: 4.5 metres	Travel directly ahead	No problems with this section of road
537.0	Yanco	Irrigation Way onto Houghton Rd GPS Link: https://maps.app.goo.gl/6uJnKCitAZdDWZAb7	Length: 35.0 metres Width: 6.0 metres	Left hand turn	No problems with this section of road
539.0	Yanco	Houghton Rd onto Hulme Rd/Site Entry GPS Link: https://maps.app.goo.gl/3uKZ20FJjemoH2T7	Length: 30.0 metres Width: 10.0 metres	Left hand turn followed by right hand turn	Hardstand to be installed and roadways made suitable for proposed loads. Gates and fences to be wide enough for trailer to maneuver into site.

0.2 Km's: Tom Thumb Road onto Springhill Road

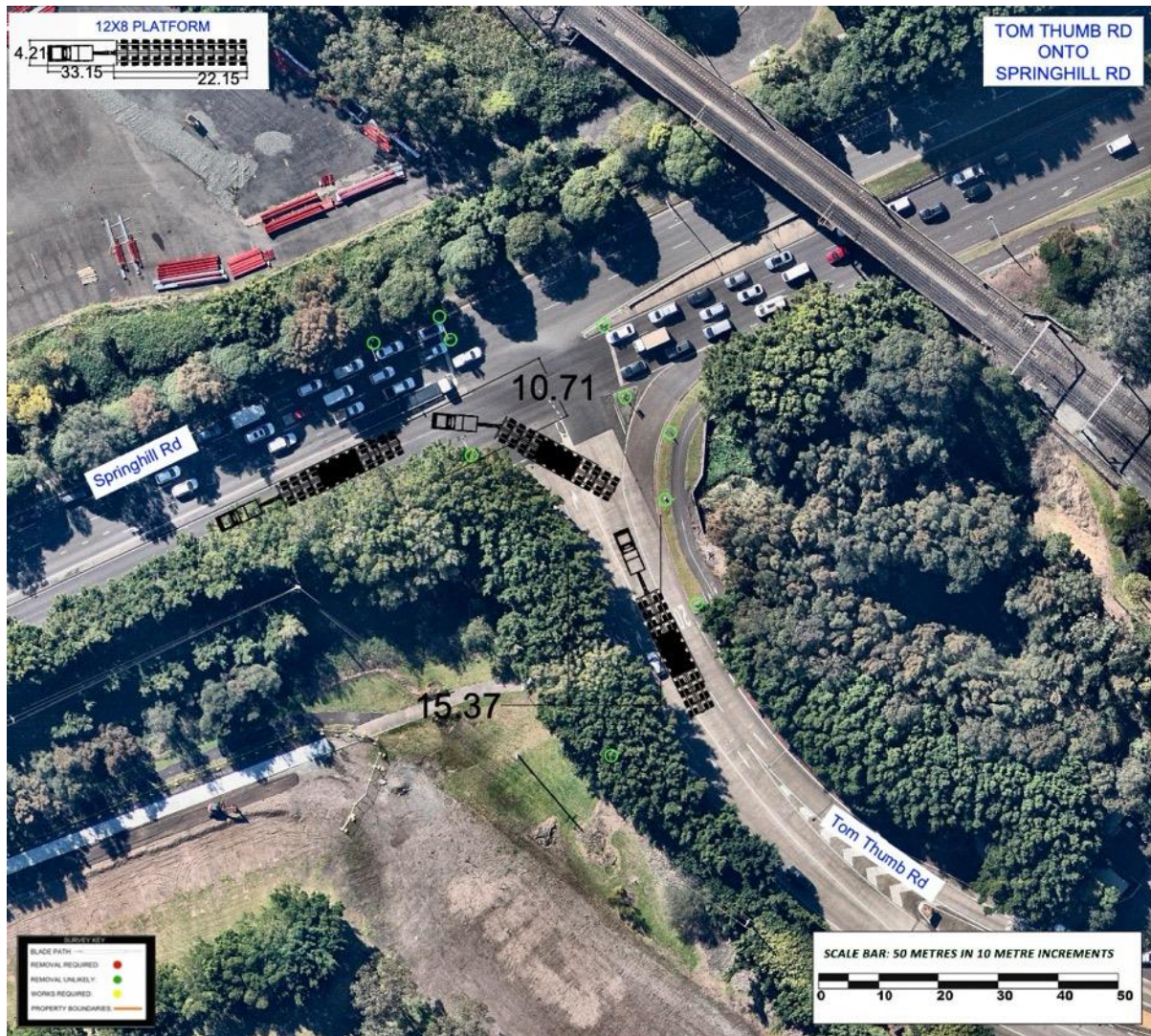


Figure 8 - Tom Thumb Road onto Springhill Road

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/QB9L1BYNAUKJgoZ78>

PROCEDURE: Left hand turn from Tom Thumb Road onto Springhill Road.

ROAD MODIFICATIONS: Nil.

1.4 Km's: Springhill Road onto Masters Road

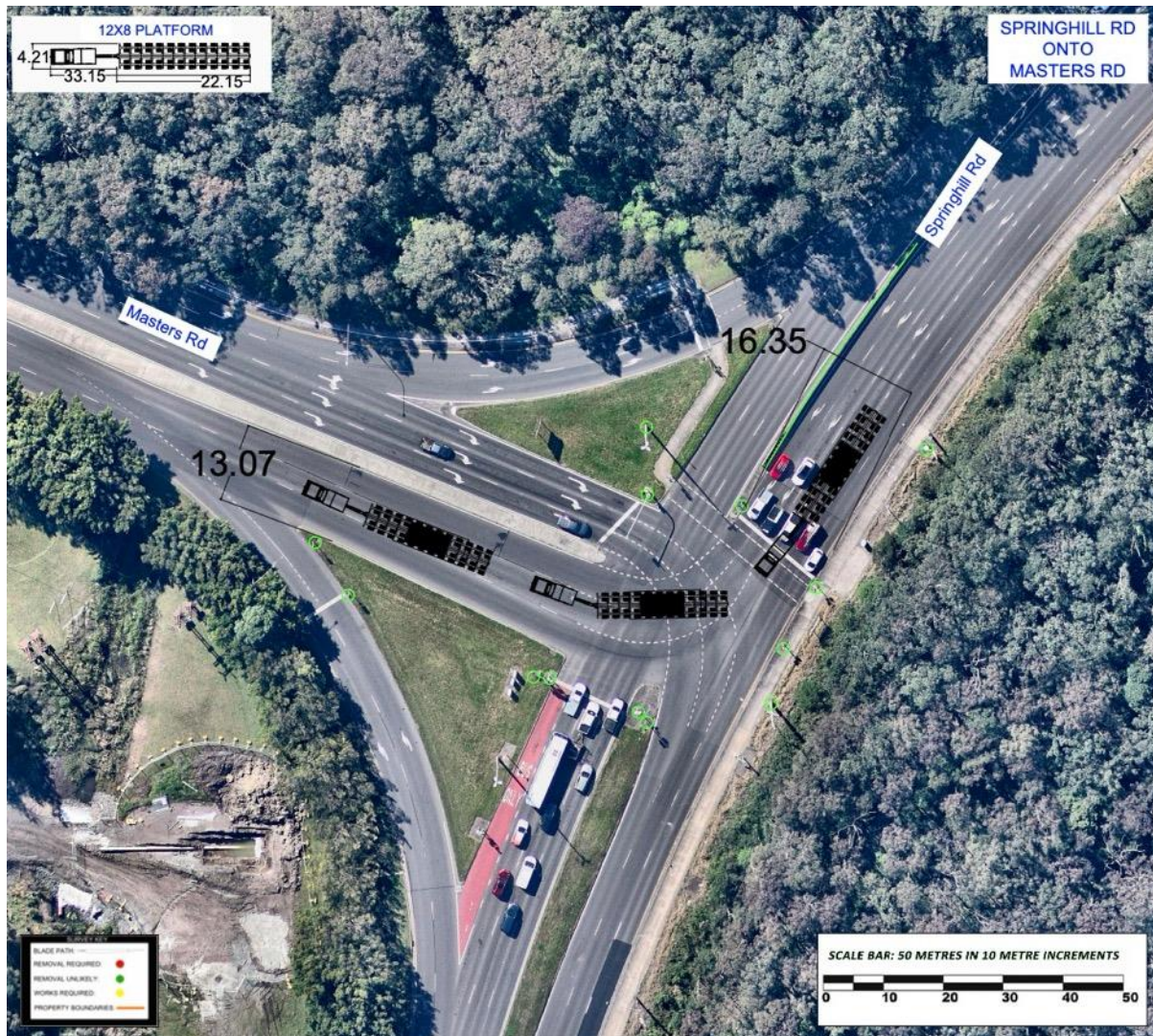


Figure 9 - Springhill Road onto Masters Road

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/pNxY2pLLej1KW4uh6>

PROCEDURE: Right hand turn from Springhill Road onto Masters Road.

ROAD MODIFICATIONS: Nil.

6.5 Km's: University Overbridge on the Princes Motorway at Wollongong



Figure 10 - University Overbridge on the Princes Motorway for loads under 4.8 metres in overall height

High Load Detour Route

VIA: Southern Freeway, Memorial Drive, Princes Highway, Mount Ousley Road.

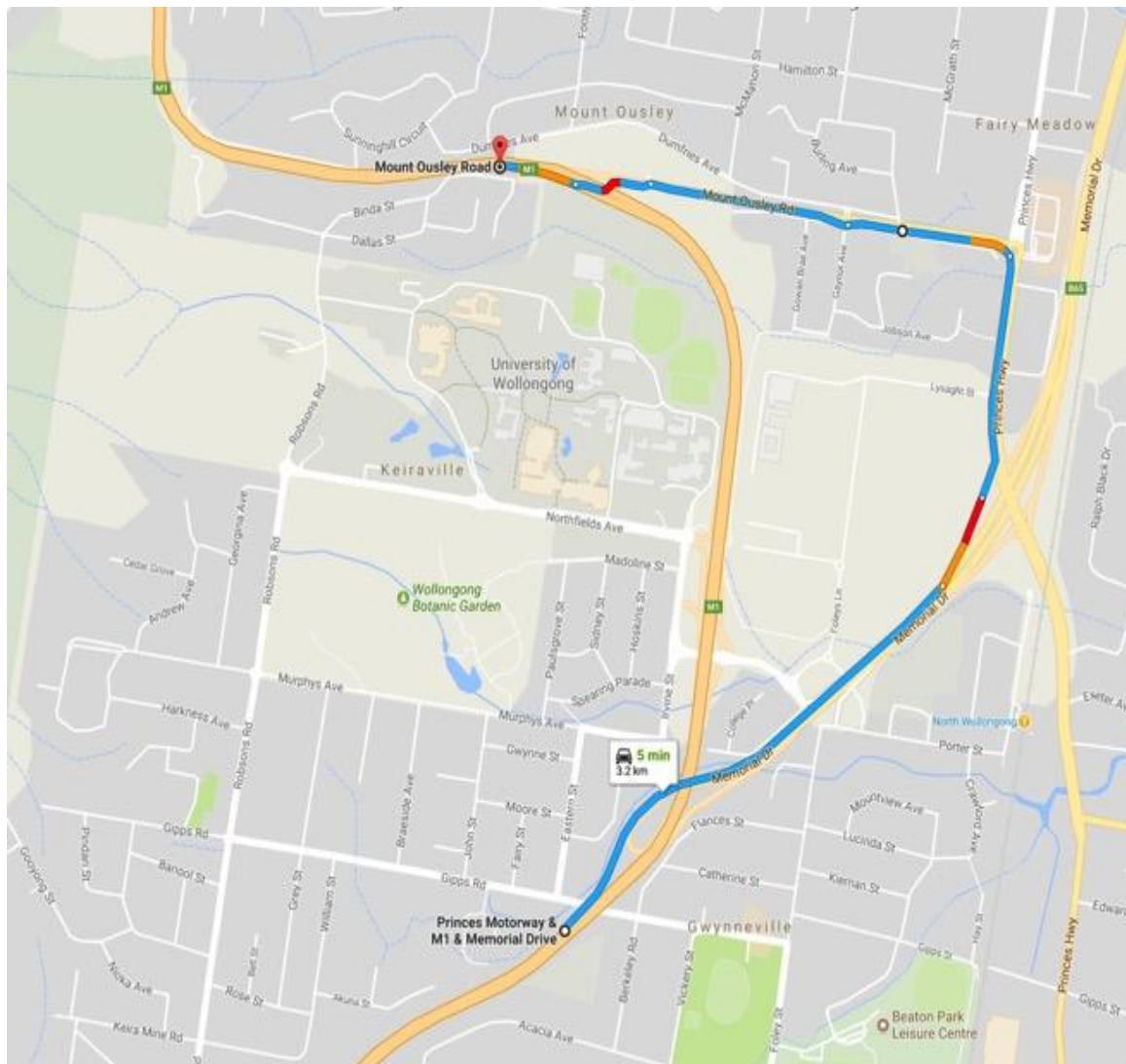


Figure 11 - High Load Detour Route for loads exceeding 4.8 metres in overall height

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/S9kYztURpquEk3EQ7>

PROCEDURE: Travel under the university bridge over the centre of the left hand fog line.

NOTES: If loads cannot lower to 4.8 metres in overall height, then they will need to use the High load detour via Memorial Drive, Princess Highway and Mt Ousley Road. To use the High load detour the loads must NOT exceed 5.2 metres in overall height.

ROAD MODIFICATIONS: Nil.

13.1 Km's: Mt Ousley Road onto Picton-Wilton Road



Figure 12 - Mt Ousley Road onto Picton-Wilton Road

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/8m1Er1RF785No29z5>

PROCEDURE: Left hand turn from Mt Ousley Road onto Picton-Wilton Road.

ROAD MODIFICATIONS: Nil.

40.2 Km's: Picton-Wilton Road onto the Hume Highway

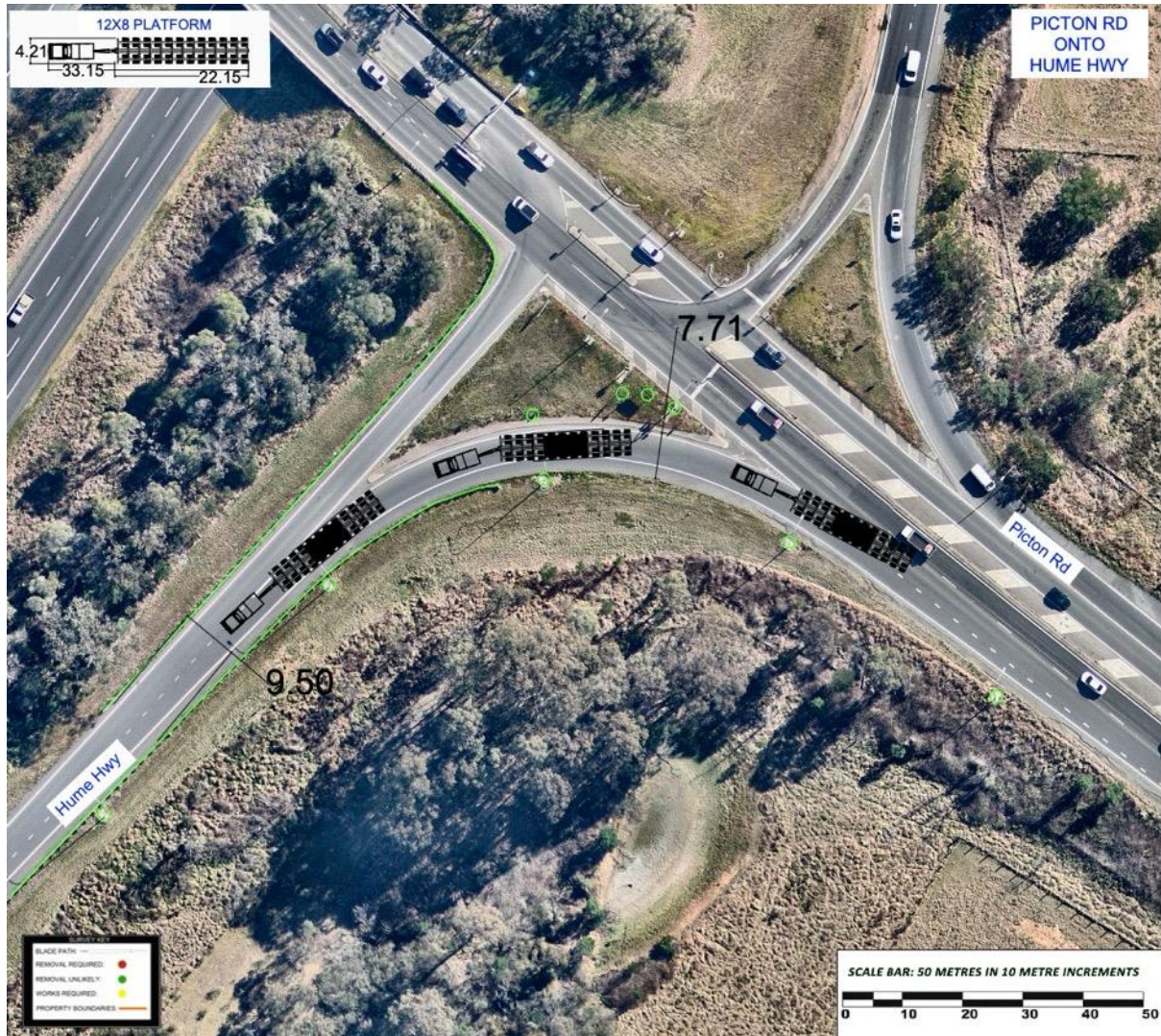


Figure 13 - Picton-Wilton Road onto the Hume Highway

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/ZQKvS4wJ1ygWH3Ab7>

PROCEDURE: Right hand turn from Picton-Wilton Road onto the Hume Highway.

ROAD MODIFICATIONS: Nil.

412.0 Km's: Sturt Highway Roundabout 1



Figure 14 - Sturt Hwy Roundabout 1

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/7VDWUyW8KnUhCEdd7>

PROCEDURE: Travel directly ahead. Suitable clearance on this section of road.

ROAD MODIFICATIONS: Nil.

415.0 Km's: Sturt Highway Roundabout 2

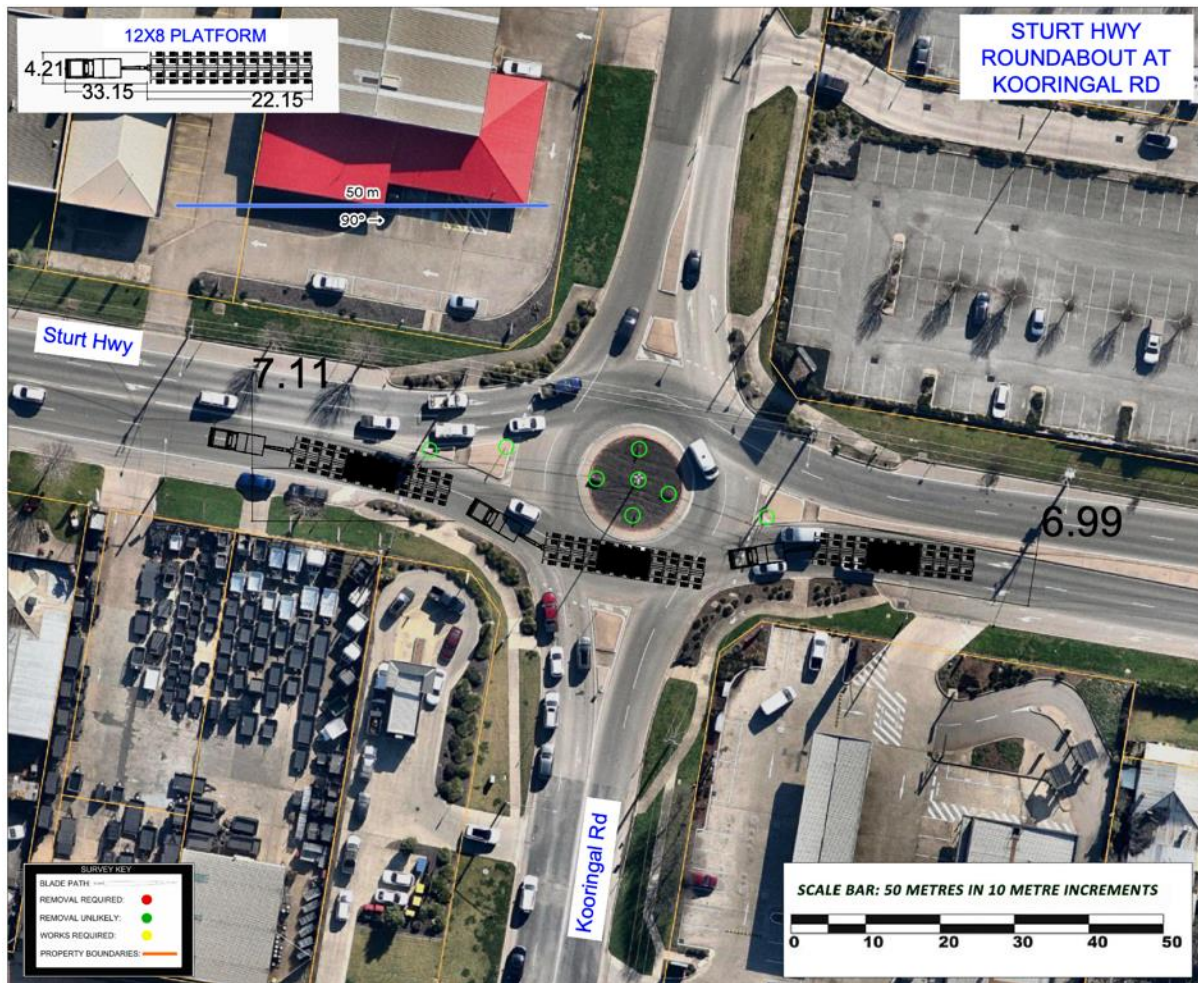


Figure 15 - Sturt Hwy Roundabout 2

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/VeavHs6e4AjLagqDA>

PROCEDURE: Travel directly ahead. Suitable clearance on this section of road.

ROAD MODIFICATIONS: Nil.

416.4.0 Km's: Sturt Highway Roundabout 3



Figure 16 - Sturt Hwy Roundabout 3

GPS LINK FOR SECTION OF ROAD:

PROCEDURE: Travel directly ahead. Suitable clearance on this section of road.

ROAD MODIFICATIONS: Nil.

419.0 Km's: Sturt Highway Roundabout 4



Figure 17 - Sturt Highway Roundabout 4

GPS LINK FOR SECTION OF ROAD: <https://goo.gl/maps/fx388veUAjbykiyPA>

PROCEDURE: Travel directly ahead. Suitable clearance on this section of road.

ROAD MODIFICATIONS: Nil.

515.1 Km's: Newell Hwy onto Audley St



Figure 18 - Newell Hwy onto Audley St

GPS LINK FOR SECTION OF ROAD: <https://maps.app.goo.gl/TT6RUBBG71MC5Bdw6>

PROCEDURE: Left hand turn. Loads to cross to incorrect side of Newell Hwy and turn into incorrect side of Audley St.

ROAD MODIFICATIONS: Nil.

537.0 Km's: Irrigation Way onto Houghton Rd

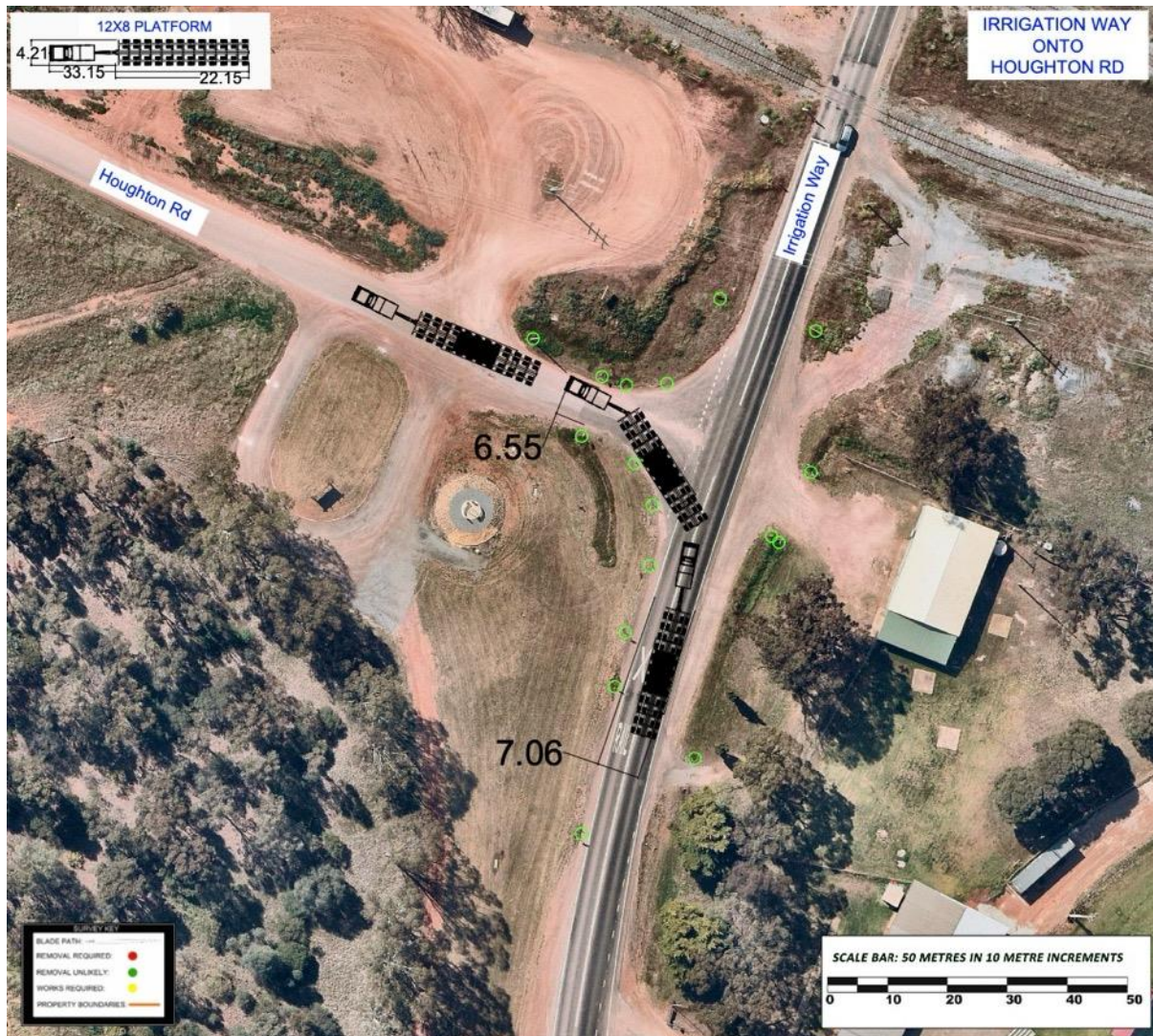


Figure 19 - Irrigation Way onto Houghton Rd

GPS LINK FOR SECTION OF ROAD: <https://maps.app.goo.gl/6uJnKCitAZdDWZAb7>

PROCEDURE: Left hand turn

ROAD MODIFICATIONS: Nil.

539.0 Km's: Houghton Rd onto Hulme Rd/Site Entry

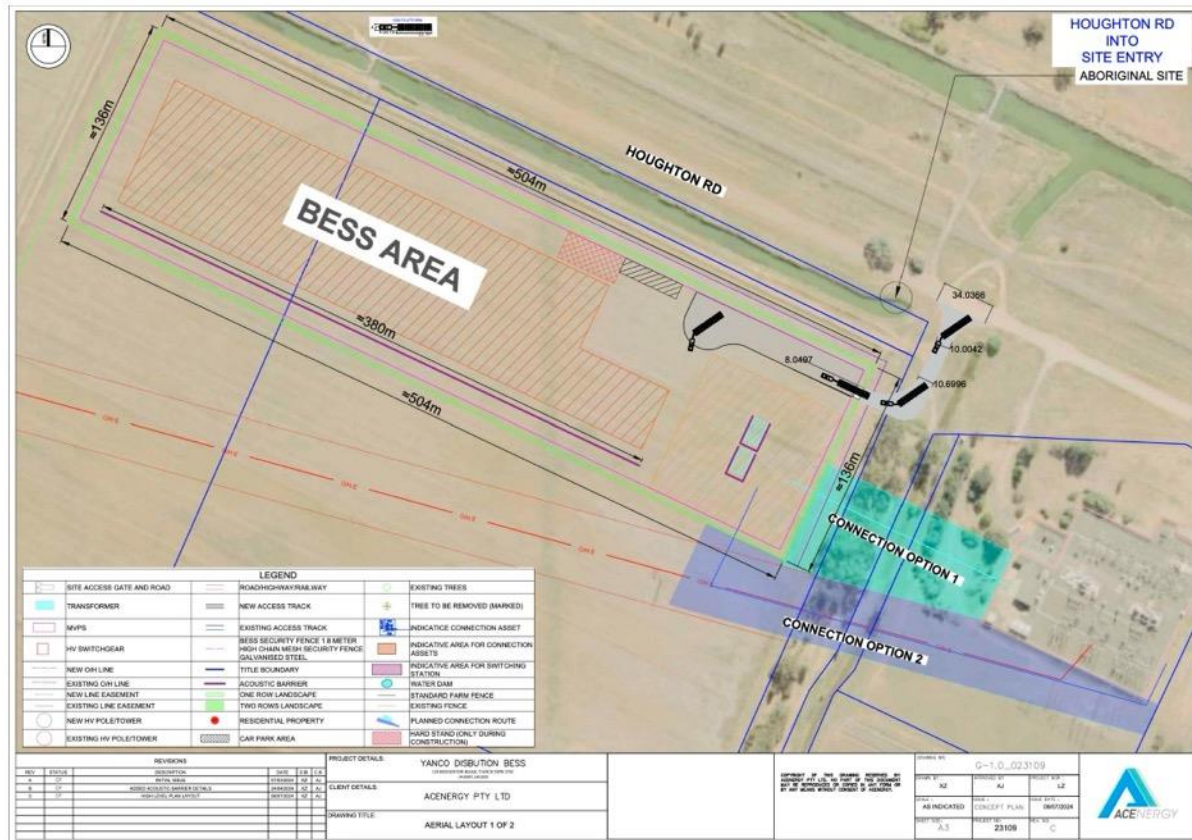


Figure 20 - Houghton Rd onto Hulme Rd/Site Entry

GPS LINK FOR SECTION OF ROAD: <https://maps.app.goo.gl/1uXZZKFLLpmzqKB77>

PROCEDURE: Left hand turn followed by right hand turn

ROAD MODIFICATIONS: The design of the site entrance is suitable for the swept path of the transporter.

8.0 Parking locations on route

The following are a list of suitable parking bay locations on the route.

103.0 Km's: Hume Highway - Sutton Forest Rest Area



Figure 21 - Hume Highway - Sutton Forest Rest Area

GPS LINK: <https://maps.app.goo.gl/9cqNHN1KzNZeqNrU8>

PROCEDURE: Merge to left

ROAD MODIFICATIONS: Nil.

283.0 Km's: Hume Highway Parking - Reddy Creek Rest Area



Figure 22 - Hume Highway Parking - Reddy Creek Rest Area

GPS LINK: <https://maps.app.goo.gl/3sXQh6P1MN8Vy3549>

PROCEDURE: Merge to left

ROAD MODIFICATIONS: Nil.

343.0 Km's: Hume Highway - Big Ben Creek Rest Area



Figure 23 - Hume Highway - Big Ben Creek Rest Area

GPS LINK: <https://maps.app.goo.gl/i8MFF3RWZdzzr4Ee7>

PROCEDURE: Merge to left

ROAD MODIFICATIONS: Nil.

373.0 Km's: Sturt Highway - Hume Highway Exit Stopping Bay



Figure 24 - Sturt Highway - Hume Highway Exit Stopping Bay

GPS LINK: <https://maps.app.goo.gl/kypeAP1x2jqBJd8F8>

PROCEDURE: Merge to left

ROAD MODIFICATIONS: Nil.

480.0 Km's: Sturt Highway - Kywong Rest Area



Figure 25 - Sturt Highway - Kywong Rest Area

GPS LINK: <https://maps.app.goo.gl/VUULuiYjDyMSJmd57>

PROCEDURE: Merge to left

ROAD MODIFICATIONS: Nil.

9.0 Conclusion

After studying all options and undertaking a route survey, the route in its current condition (excluding the construction of the site entry) will not require any upgrades before it could be deemed suitable for transporting the proposed load.

The following are the key points that need to be taken into consideration, if the project moves forward with this route.

BRIDGES:

- A TfNSW bridge assessment has been undertaken for the transport of the transformer listed in this report, based on a 12x8 platform trailer. The report assumes that all structures are in fair to good condition, and do not have any inadequacies.
- The vehicle travelling as a permit vehicle can be permitted to travel over the requested route as shown in this permit subject to the following:
 1. The vehicles travel on all the bridges on the route at a speed not exceeding 10 km/h with no sudden braking or acceleration. No other vehicles are permitted on the bridge while the Permit vehicle is on the bridge.
 2. The vehicle shall travel only along centreline of the carriageway of all the bridges (except BN0952).
Note: The centreline of the carriageway on the bridge is the centreline of the roadway between the faces of the barriers/kerbs.
 3. On Masters Road On Ramp onto Princes Motorway at BN0952 Bridge on MR 602,
Over F.6, at Fig Tree, Masters Road Bridge: the vehicle shall travel along the left (southern) line marking of the chevron.
[Note: The left line marking of the chevron, is on the southern side of the chevron and the line borders the chevron median pattern marking.
 4. Greater Sydney and Southern Region's concurrence is obtained to the movement of the vehicles over the route.
 5. Transport firm is required to obtain approval from third party asset owners including but not limited to UGL/ARTC, Sydney Trains (formerly Railway Access Corporation or State Rail Authority), NSW Ports, and Department of Land and Water Conservation or private infrastructure owners for travel over their infrastructures.
 6. Councils' approval is obtained by the transport firm for travel over the structures on the route maintained by the Councils, and for travel over the local roads.
 7. The transport firm shall satisfy itself that adequate height clearance is available under the overhead structures on the above route. The firm should refer to Region for further details.

8. The transport firm shall satisfy itself that the vehicle width including load can navigate the bridges on the above route. The firm should refer to Region for further details.

9. This approval is for the direction of route from **Port Kembla to Yanco** along the route stated above, with no laden return trip.

OVERHEAD STRUCTURES: (5.2 Maximum loaded height)

- There are a number of overhead structures between Pt Kembla and the Yanco Big BESS. There is only one structure on this route that would be within the 200mm tolerance that TfNSW allow. This structure is the University overpass on the Princes Highway at Wollongong.
- The University overpass on the Princes Motorway at Wollongong has a maximum allowable load height of 4.8 metres. (The load listed in this report can stay under the 4.8 metres minimum clearance **IF** placed onto a suitable transporter, and travel under the overpass as per the procedure listed in this report.
- If another transporter is used for this move and exceeded the 4.8 metres, then they could still travel to this project but would need to take the Wollongong High load detour via Memorial Drive and the Princes Highway that would allow a loaded height of up to 5.2 metres.

- **Summary**

Loads up to 4.8m loaded height can travel from Port Kembla to Yanco on the proposed route.

- With the transport dimensions provided by the client (L*W*H = 7500*2750*4000mm) the proposed transport combination can be lowered to 4.9m overall transport height.
- Loads between 4.8m and 5.2m loaded height could travel from Port Kembla to Yanco BESS but would need to take the detour via Memorial Drive and the Princes Highway.

OVERHEAD UTILITIES

- An allowable transport height of 5.0 Metres is approved on this route. Essential Energy approval is attached as per Appendix B.

VEGETATION

- There are no major vegetation works required on the route.

WIDTH

- The maximum width of the proposed transport combination is 4.2m.

PAVEMENT

- The route up until Houghton Rd is of highway standard. Houghton Road to the site is gravel. Non sealed roads will need to be maintained to a suitable level to accommodate the proposed weight of the load.
- The turn from Houghton Rd into the site will require widening with hardstand to accommodate the swept path of the trailer.
- Non sealed roads may be adversely affected by wet weather preventing travel.

ROADWORKS

- The project will need to start discussions with government authorities at least 12 months prior to transformer transport to understand if the project would conflict with any upcoming roadworks. Once a TMP has been approved for the transport of the transformer, then the exact movement dates need to be communicated with transport NSW to make all road stakeholders aware of the movements.

WOLLONGONG

- The University Drive overpass on the Princes Motorway dictates the maximum allowable height for load over 45m in length being 4.9m high.
- The Transformer could use a bypass around University Drive bridge but then cannot exceed a loaded height of 5.2 metres as there is no alternative route out of Pt Kembla if they exceed 5.2m. high.

SITE

- The site design has suitable access for the proposed transporter, if constructed to plan

10.0 Pinch Points

The following are the pinch points on these routes:

- **FURTHER ROUTE ASSESMENTS:** It is advised that the transport company checks the route at least 2 months prior to the actual movement.
- **RAIL CROSSINGS:** Nil
- **SPOTTER/STEERER:** A spotter should travel with the load to assist the driver on any sections of the route that are listed as a pinchpoint.
- **UNIVERSITY BRIDGE OVERPASS:**
The University overpass on the Princes Motorway at Wollongong has a maximum allowable load height of 4.8 metres. (The load listed in this report can stay under the 4.8 metres minimum clearance **IF** placed onto a suitable transporter, and travel under the overpass as per the procedure listed in this report.
- **MT OUSLEY INTERCHANGE PROJECT:**
An interchange is under construction on the Princes Highway at the intersection of Mt Ousley Road. The upgrades will at times affect the transport of OSOM loads through these works. The transport company should make contact with the project at least 4 weeks out and again 1 week out to understand if there will be a conflict with the movement of the listed load through this worksite.
Project contact: Fulton Hogan: 1800792918 &
MountOusleyInterchange@fultonhogan.com.au

PINCHPOINT PROCEDURES

Whilst some pinch points are known along the route demonstrating a method of negotiating each individual hazard would be flawed as traffic conditions are constantly changing.

It is crucial that appropriate measures are applied to avoid impact to road users and road infrastructure, the chosen route has been assessed and the load is capable of navigating the route, however local traffic conditions can create pinch points.

A pinch point is an area identified by the lead pilot and relayed to the convoy as having the potential to interfere with the swept path of the load, pinch points can be created by road furnishings, roundabouts, narrow sections of road, road kill, corners, road works, parked vehicles, damaged pavement, this list is not exhaustive.

For the purposes of this traffic management plan identified pinch points will follow the following protocol.

The lead pilot must travel a sufficient distance in front of the load so as to survey the swept path required for the Transformer, this will allow sufficient time to relay back road conditions or choke points to allow the driver to halt the load before causing congestion to other road users.

In the event of parked vehicles or local traffic conditions preventing the load from safely navigating the permitted route, the load cannot proceed until it is safe to do so.

The lead pilot will warn all oncoming traffic of the impending load, when the way forward for the transporter is established as being clear the load may proceed.

If built up queued traffic is behind the load, ensure that an opportunity to allow this traffic to pass is taken at the first safe opportunity.

The procedure for crossing bridges is reliant on only the Transformer being on the bridge during the crossing, this will require a concentrated effort from the escort team to ensure that all vehicular traffic both in front of and behind the load are warned of the hazard.

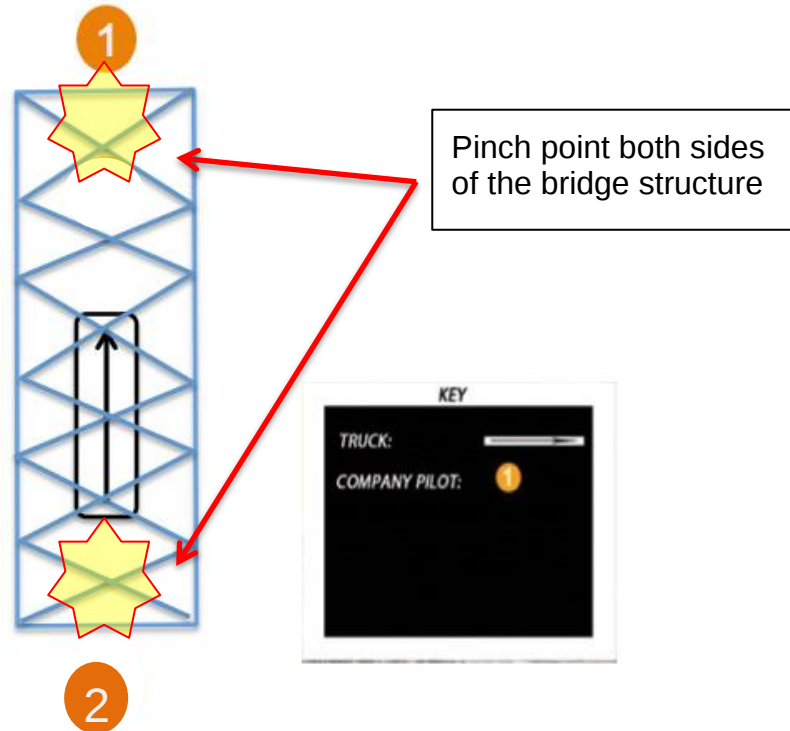
It is crucial that pinch points are discussed at the toolbox briefing and that all parties are aware of the protocols in place. Drivers should familiarise themselves with the route including nominated bypasses for heavy vehicles along the route.

If there is any doubt as to the viability of accessing the permitted route the load must not continue until the way forward has been deemed appropriate.

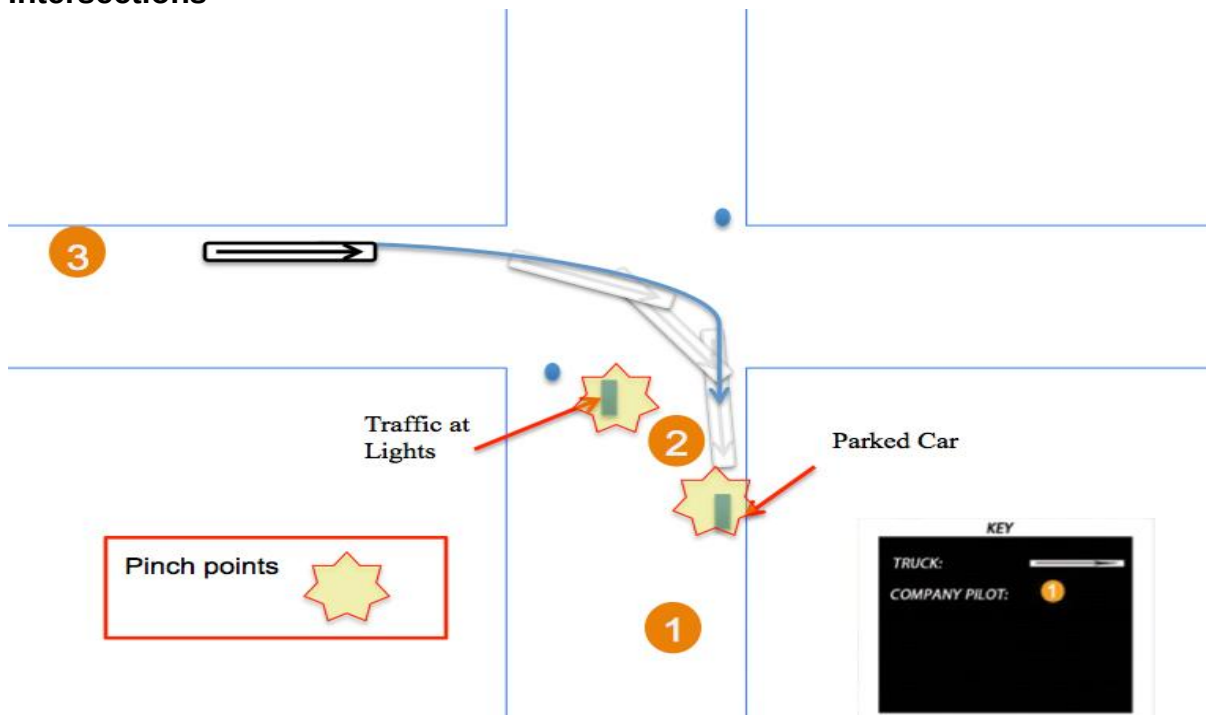
For more detail analysis of coping with roadwork refer to section 11.

Examples Of Pinch Points

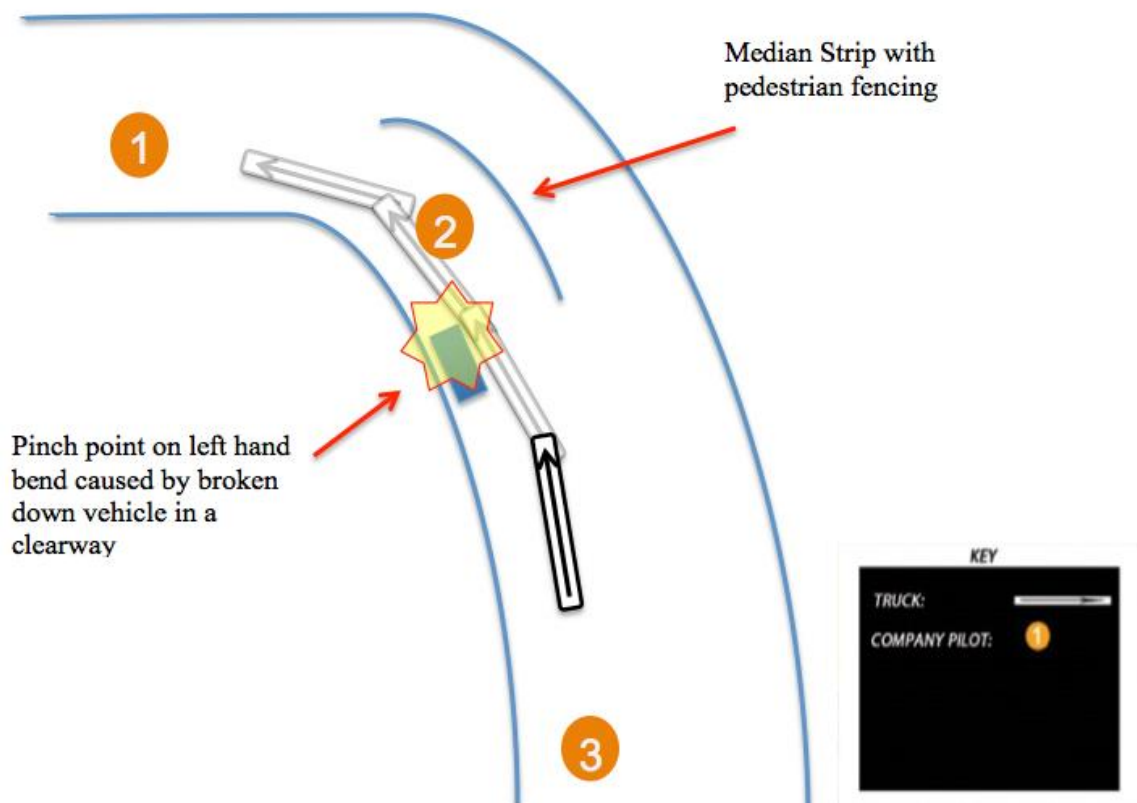
Bridge Crossings



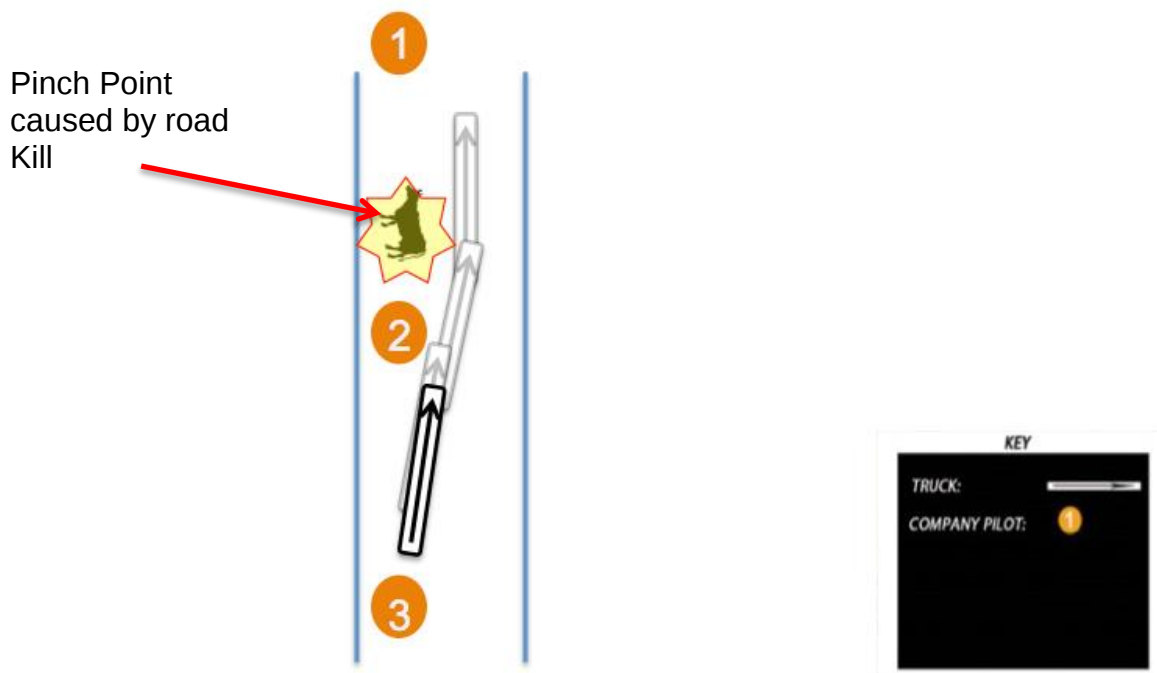
Intersections



Bends



Road Kill



11.0 Managing Queued Traffic Behind the Load

During the journey the interaction with other road users will require management of queued traffic.

The protocol to provide queued traffic an opportunity to pass the load will be reliant on the rear pilot constantly monitoring the queue of traffic and relaying this information back to the convoy, the lead pilot in conjunction with the driver will identify suitable areas that allow a safe passing point for the passing vehicles.

The lead escort will also determine safe areas to halt the load to allow backed up vehicles to pass. Safe pull over areas can include turn off into Private Roads and/or other roads, pull over on the shoulder during over taking lanes, designated pull over/ rest stop areas or service stations, these areas will be a hardstand area, or an area wide enough for the escort to direct vehicles around the combination.

The load MUST pull over or slow to allow the backed-up vehicles to pass. Rear pilot will inform all other pilots and driver when there has been a lag from last pull over and if other cars have been following for a short distance, in this instance apply the passing protocol again, this will continue throughout the journey as required to ensure queued traffic do not experience excessive delays. The driver and pilots will also allow vehicles to pass at any opportunity that allows a safe area for this vehicle and its load to pull over safely and will.

12.0 Project timing

The Yanco Bess project will start to be constructed in Q4 2025 and will take place over a 33-week construction period. The delivery of the transformers will take place around Q2 2026 roughly 25 to 26 weeks into the 33-week program.

WEEK 25:

Monday: Loading transformer at Port Kembla

Tuesday: Transport transformer Port Kembla to Galore

Wednesday: Transport transformer Galore to Yanco Bess and unload

Thursday: Yanco BESS to Port Kembla empty travel

Friday: Loading transformer at Port Kembla

Saturday: Fatigue rest day

Sunday: Fatigue rest day

WEEK 26:

Monday: Transport transformer Port Kembla to Galore

Tuesday: Transport transformer Galore to Yanco Bess and unload

Wednesday: Yanco BESS to Port Kembla empty travel

13.0 Fatigue schedule



Sydney
PO Box 271, Penrith NSW 2751
Ph: 02 4721 7633 Fx: 02 47217644
Em: sydney@rja.com.au

Adelaide
PO Box 6072, Burton SA 5110
Ph: 08 8280 5541 Fx: 08 8280 8365
Em: adelaide@rja.com.au

Newcastle
16 Yilen Close, Beresfield NSW 2322
Ph: 02 4966 1788 Fx: 02 4966 1744
Em: newcastle@rja.com.au

Trip Schedule

Schedule Details

Sch No SCH02332

Date 7/02/2025 9:34:26 am

Written By

Consulted

Schedule Notes:

- This Schedule has been written based on values known at the time for good driving conditions and no known fatigue related issues prior to starting the trip.
- Do not drive to the schedule if you felt tired. Stop revive survive
- No attempt should be made to make up for lost time on a schedule.
- Please modify all times according to your real start time.
- You must still fill in your Logbook, exactly as the hours you have worked.

Please work with the Scheduler who wrote this to make the schedule better for all.

Start	End	Hr	Day	Km	avg	Type	Location	Notes
12:00am	2:45am	2.75	1	0	0	Rest	Penrith	Rest break
2:45am	3:00am	0.25	1	0	0	Working	Penrith	Prestart
3:00am	6:00am	3.00	1	120	40	Driving	Penrith to Port Kembla	Empty travel
6:00am	6:30am	0.50	1	0	0	Paid Rest	Port Kembla	Rest break
6:30am	9:30am	3.00	1	0	0	Working	Port Kembla	Loading
9:30am	11:59pm	14.48	1	0	0	Rest	Port Kembla	Rest break
12:00am	12:45am	0.75	2	0	0	Rest	Port Kembla	Rest break
12:45am	1:00am	0.25	2	0	0	Working	Port Kembla	Prestart and toolbox
1:00am	3:30am	2.50	2	103	41	Driving	Port Kembla to Sutton Forest	Loaded travel
3:30am	4:00am	0.50	2	0	0	Paid Rest	Sutton Forest	Rest break
4:00am	9:00am	5.00	2	270	54	Driving	Sutton Forest to Tarcutta	Loaded travel
9:00am	9:30am	0.50	2	0	0	Paid Rest	Tarcutta	Rest Break
9:30am	12:30pm	3.00	2	107	36	Driving	Tarcutta to Galore	Loaded travel
12:30pm	11:59pm	11.48	2	0	0	Rest	Galore	Rest Break
12:00am	5:45am	5.75	3	0	0	Rest	Galore	Rest break
5:45am	6:00am	0.25	3	0	0	Working	Galore	Prestart and toolbox



Stop, Revive, Survive



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Trip Schedule

Schedule Details

Sch No SCH02332

Date 7/02/2025 9:34:26 am

Written By

Consulted

Schedule Notes:

- This Schedule has been written based on values known at the time for good driving conditions and no known fatigue related issues prior to starting the trip.
- Do not drive to the schedule if you fell tired. Stop revive survive
- No attempt should be made to make up for lost time on a schedule.
- Please modify all times according to your real start time.
- You must still fill in your Logbook, exactly as the hours you have worked.

Please work with the Scheduler who wrote this to make the schedule better for all.

Start	End	Hr	Day	Km	avg	Type	Location	Notes
6:00am	8:00am	2.00	3	59	30	Driving	Galore to Yanco	Loaded travel
8:00am	11:00am	3.00	3	0	0	Working	Yanco	Unloading
11:30am	12:00pm	0.50	3	0	0	Paid Rest	Yanco	Rest break
12:00pm	5:00pm	5.00	3	196	39	Driving	Yanco to South Gundagai	Empty Travel
5:00pm	11:45pm	6.75	3	0	0	Rest	South Gundagai	Rest break
11:45pm	11:59pm	0.23	3	0	0	Working	South Gundagai	Prestart
12:00am	5:00am	5.00	4	380	76	Driving	South Gundagai to Penrith	Empty Travel



Stop, Revive, Survive



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14.0 References

Australian Load Restraint Guide
Rex J Andrews P/L Drawings
Rex J Andrews Route Study # 431 REV04
Acenergy
Google Earth/Maps
Nearmaps
NHVR (OSOM)
NHVAS Maintenance Management (NHVAS21193)
NHVAS Basic Fatigue Management (NHVAS21193)

Disclaimer:

This route study is a guide only. Government approvals would be required before these routes could be deemed suitable for transporting the components over the listed routes.

Any, and all parties using information contained in this submission do so at own risk.

RJA accepts no responsibility for the use of all information contained within this report.

Actual approved routes may differ from those surveyed.

Proposed routes may change subject to approvals from authorities.

This study was undertaken using data supplied by Rex J Andrews P/L. Equipment and swept paths might vary if using transport methodology other than the data supplied by Rex J Andrews.

15.0 Appendix A: TfNSW Bridge investigation.

16.0 Appendix B: Essential Energy clearance letter.

Appendix 6 – Request for Information Response

TfNSW SEARs response (20 February 2024)

The TfNSW SEARs requirements were detailed in their response dated 20 February 2024, as follows:

- *The Environmental Impact Study to be submitted as part of the environmental planning process will need to include a Traffic Impact Assessment (TIA) to address the impact of traffic.*

TfNSW requires the TIA be tailored to the scope of the proposed development and include, but not be limited to, the following, as shown in Table 10.

Table 10: TfNSW SEARs requirements

TfNSW SEARs requirements	Traffic Engineers Response
Consideration of transport related cumulative impacts associated with the adjacent Whitehaven coal mine construction staff and the staff anticipated for the Whitehaven solar farm will need to be provided. Early discussions with Transport for New South Wales regarding the impact on the intersect of the Kurrajong Creek Road/Kamilaroi Highway.	This is unrelated to the Yanco BESS development, as the referenced location for the “Whitehaven solar farm” is about 550 km northeast of Yanco. We understand this comment is in error and should be disregarded when considering the transport impacts of the Yanco BESS.
Traffic volumes including: — Existing background traffic, — Project-related traffic for each phase or stage of the project, — Projected cumulative traffic at commencement of operation, and a 10-year horizon post commencement.	For traffic, refer to: — Section 2.3 for existing volumes — Section 3.2 for project-related and projected cumulative volumes
Traffic characteristics including: — Number and ratio of heavy vehicles to light vehicles, — Peak times for existing traffic, — Peak times for project-related traffic including commuter periods, — Proposed hours for transportation and haulage, — Interactions between existing and project-related traffic.	For traffic characteristics, refer to: — Section 2.3 for existing traffic — Section 3.2 for development-related traffic

TfNSW SEARs requirements	Traffic Engineers Response
Capacity analysis using Austroads Guide to Road Design at intersections with classified (State) road/s, and where relevant, analysis of any other intersections along the proposed transport route/s.	For capacity analysis, refer to Section 5.2
Heavy vehicle and OSOM routes: — In addition to the requested TIA, Separate Concept-level route analysis based on high level 3D swept path drawings to Identify the return routes for OSOM movements and indicate locations where civil works are needed and indicative pinch points. — The TIA is required to include details of OSOM movements, including volumes, times for OSOM movements to occur and identify the location of pull-over bays / rest areas on OSOM routes (including GPS coordinates) and confirmation such facilities can physically accommodate (in terms of size, width and accessibility) the largest OSOM vehicle. — Undertake a logistics route analysis that includes: — Details of the road geometry and alignment along the identified transport route/s, including existing formations, crossings, bridges, intersection treatments and any identified hazards, including: ▪ Available sight distances at the development site access and nearby intersections and any constraint to achieving the required sight distance for the posted speed limit. ▪ An assessment of turn treatment warrants in accordance with Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for intersections on identified transport route/s, identifying the existence of the minimum basic turn treatments	For the OSOM route assessment (completed by others), refer to Appendix 5 – OSOM Route Assessment Report. Further information has been included in the report, refer to Section 3.1.4.

TfNSW SEARs requirements	Traffic Engineers Response
and addressing the need for any warranted higher order treatments. ▪ Bridge Assessments for any at risk bridges on the classified road network due to dimensions and weight of OSOM vehicles. ▪ Swept path analysis demonstrating the largest design vehicle can enter and leave the development, and simultaneously pass through intersections along the proposed transport route/s. The design vehicle templates used in the swept path analysis software are also requested in order for TfNSW to review the performance within the software (e.g. Autodesk Vehicle Tracking or Transoft AutoTURN). — Highlighting each at-risk road structures that the haulage route crosses including bridges, traffic signals, signage, major culverts, and minor culverts that may not meet the desirable cover to cater for proposed axle loads. — National Heavy Vehicle Regulator (NHVR) approved routes identified on the Restricted Access Maps (RAV MAP) are to be utilised for the heavy vehicle routes for the proposed development. Please note NHVR permits do not cover civil works required along any proposed OSOM route. Any works required along the OSOM route must be included within the scope of works in the SSD to ensure the development is constructable. — Identify and provide the following measurements parameters of OSOM components / materials to be moved: — Identify types and numbers of OSOM vehicles proposed to be used for the project.	

TfNSW SEARs requirements	Traffic Engineers Response
— Overall combination load length, width, height and mass for components and nominated vehicles. — Maximum component length, widths and heights (including clearance to overhead obstructions such as structures, utilities and vegetation), — Wheelbase dimensions, — Maximum trailer articulation angle(s), — Minimum overhang heights above the road surface, — Axle loads and axle group loads in terms of both tonnes and Equivalent Standard Axles (refer to Austroads Guide to Pavement Technology).	
Cumulative impacts: — Identify and assess implications of any road and rail projects that may occur during OSOM movements on proposed OSOM routes. — Identify projects that will have overlapping construction periods and assess the cumulative traffic impacts with emphasis on the following: — Cumulative impacts from traffic generated from construction workforces in terms of origin-destination routes, access, AM/PM peaks where they overlap with other projects. — Cumulative impacts of heavy vehicle movements in terms of AM/PM peaks and routes where there is an overlap with other projects. — Cumulative impacts and consideration in relation to timing of movements of OSOMs where other projects will utilise the same routes as proposed for this development. Please note, given the high number of renewable energy and other large scale projects requiring haulage of OSOM components on the road network, restrictions, and limitations on OSOM	For cumulative impacts, refer to: — Appendix 5 – OSOM Route Assessment Report for all OSOM movements. — Section 3.5 for projects with potential overlapping construction periods.

TfNSW SEARs requirements	Traffic Engineers Response
movements may be imposed. In this regard, it is recommended that you engage earlier with TfNSW's Freight Branch – Special Permits team to discuss access needs and timing.	
Identify accommodation (and transport) needs and facilities available within the local region, to service the project staff, in addition to understanding the cumulative impacts of concurrent accommodation (and transport) needs of staff from other projects. Details of measures employed to promote and enforce safe commuter traffic movements are to be included.	For the project accommodation needs, refer to Section 3.1.6.
Road safety assessment of haulage route/s. Where road safety concerns are identified at specific locations on haulage routes, TfNSW suggests the TIA be supported by a targeted Road Safety Audit undertaken by suitably qualified persons in accordance with Austroads Guidelines	The traffic impact assessment identified no road safety concerns that required action.
A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.	For the review of crash data, refer to Section 2.4.
Project schedule: - Hours and days of work, number of shifts and start and end times, - Identify the approximate project's targeted construction commencement date/s. - Identify the phases and stages of the project, including construction, operation and decommissioning.	For the project schedule, refer to Section 3.1

TfNSW SEARs requirements	Traffic Engineers Response
The origins, destinations and routes for: - Commuter (employee and contractor) light vehicles and pool vehicles (including. shuttle buses), - Heavy (haulage) vehicles, - OSOM vehicles.	For the origins, destinations and routes for: - Light vehicles, refer to Section 3.1.2 - Heavy Vehicles, refer to Section 3.1.3 - OSOM, refer to Appendix 5 – OSOM Route Assessment Report
Identify the necessary road network infrastructure upgrades that are required to cater for and mitigate the impact of project related traffic on both the local and classified road network for the development (for instance, road widening and/or intersection treatments). In this regard, strategic design drawing/s are to be submitted with the SSD application for any identified road infrastructure and access upgrades. Any identified road infrastructure upgrades will need to be to the satisfaction of TfNSW and Council. Works must be appropriately designed in accordance with Austroads Guide to Road Design for the existing posted speed limit, including provision of Safe Intersection Sight Distance (SISD). Note: The design needs to comply with TfNSW Strategic design requirements for DAs.	For the necessary road network upgrades, refer to: Appendix A4.1 – Strategic Design – Houghton Road / Irrigation Way Appendix A4.2 – Strategic Design – Development Access / Hulme Road / Houghton Road
The layout of the internal road network, parking facilities and infrastructure.	For the development layout, refer to Appendix 2 – Development Plan
Impact on rail corridors and level crossings along transport route/s detailing any proposed interface treatments, where applicable	The rail line is active but with minimal services, as follows: one passenger train in each direction per day during the grain season. GrainCorp may load up to 8 trains (per year), at most one per day. The traffic impact assessment did not identify any impacts on rail corridors and level crossings that required action.
Controls for transport and use of any dangerous goods in accordance with State Environmental Planning Policy No. 33 – Hazardous and Offensive Development, the Australian	This will be addressed in the Preliminary Hazard Assessment prepared by others for our client.

TfNSW SEARs requirements	Traffic Engineers Response
Dangerous Goods Code and AS4452 Storage and Handling of Toxic Substances.	
Detailed plans identifying the proposed location of any: - Project-related infrastructure within and outside of the project boundary. - Transmission line infrastructure, or any other project-related structures, within a road reserve. In respect to this matter the following information is required: - Overhead clearances, - Construction methods, - Potential traffic mitigation measures for construction, - Location of infrastructure within or adjacent to the road reserve, - Excavation or fill requirements adjacent or within road corridors, - Access required to construct and maintain the infrastructure, - Permanent or temporary connection/access to classified roads.	For any infrastructure related to the project, refer to Appendix 4 – Intersection Designs .

SEARS Response

The key issues relevant to Transport that were flagged in the SEARs and the traffic engineers' responses are detailed in Table 11.

Table 11: SEARS Key Issues

SEARS Key Issues	Traffic Engineers Response
an assessment of the peak and average traffic generation, including over-dimensional vehicles/ heavy vehicles requiring escort and construction worker transportation	Refer to Section 5.3 for the development traffic impact assessment.
an assessment of the likely transport impacts to the development site access route(s), including over-dimensional vehicles/ heavy vehicles requiring escort, site access point(s),	Concerning transport impacts, refer to the following:

SEARS Key Issues	Traffic Engineers Response
any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance	— Appendix 5 – OSOM Route Assessment Report, for all OSOM transport impacts — Section 5.2 for intersection performance and for external road impacts — Section 5.4 for access location and operation.
a cumulative impact assessment of traffic from nearby developments	Refer to Section 3.5 for the cumulative impact of other nearby developments.
provide details of measures to mitigate and / or manage potential impacts, including a schedule of all required road upgrades (including those resulting from the heavy vehicle and over-mass / over-dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authorities	Concerning mitigation measures, refer to the following: — Appendix 5 – OSOM Route Assessment Report, for all OSOM transport impacts — Appendix 4 – Intersection Designs for all proposed upgrades.

Council Response (19 March 2024)

In an email, dated 19 March 2024, from the Manager of Roads and Drainage, the following comments were provided in response to some matters raised by the client for the development, refer to Table 12.

Table 12: Council response to the client's questions

Client Question	Council Response
Access Issue	
Does the council support the project access to the site via Irrigation Way and Houghton Road?	Yes, the council supports access to the project via Houghton Road and Hulme Road.
Road Upgrades	
We propose the following upgrades and maintenance:	
Upgrading Houghton Road is considered unnecessary	Additional maintenance grading may be required during construction. Increased traffic and additional loads will increase deterioration.
Upgrade the access at the intersection of Houghton Road and Hulme Road	The intersection of Houghton Road and Hulme Road is to be upgraded in accordance with the requirements of the Austroads Guide to Road Design Part 4, which requires minimum servicing of 19 m articulated vehicles. It should be checked against the OSOM Swept Vehicle Path.

Client Question	Council Response
	Similar to the Example of the “Rural Property Access” design shown in Austroads.
Conduct pre- and post-construction Dilapidation Reports to support relevant repair works for any project-related damage on Houghton Road.	Agreed, to be completed by 3 rd party.
We kindly seek council's requirements on building this new road section	As per Council Guidelines – Rural Road specification minimums: — 8 m road pavement formation — 7 m 14/7 mm double-double bitumen seal — Geotechnical investigation and pavement design to be completed in accordance with Austroads Guide to Pavement Technology and Industry Best Practice — Designed for a design period of 20 years — 1% growth rate — Seal width to cater for swept path coverage of the OSOM vehicle.

DPHI Response

The key issues relevant to transport in the response from DPHI are detailed in Table 13.

Table 13: DPHI Key Issues

DPHI Key Issues	Traffic Engineers Response
Is the current route for heavy vehicles requiring escort (HVRE) suitable? Noting the height restriction of 5.2m, what is the height of HVRE? Pg 6 of the OSOM assessment indicates it would be ~5.5m	The OSOM route assessment confirms the proposed route is suitable, subject to minor upgrades, as listed in the report's Conclusion. Furthermore, refer to p 28 of the OSOM report in Appendix 5 – OSOM Route Assessment Report , where it is confirmed that the load can be lowered to 4.9 m when required.
Has the car parking area been enlarged as per the recommendation of the Traffic Impact Assessment?	The client updated the development plan to include a designated space for the required car parking.

DPHI Key Issues	Traffic Engineers Response
	Refer to Section 4.1 of this report.
How will 25 light vehicles accommodate 70 construction workers?	Refer to Section 3.1.2 of this report.
How many shuttle buses are proposed and are these included in heavy vehicle numbers? Where are they coming from?	Refer to Section 3.1.2 of this report.
Confirm the length of the largest design vehicle? How many 12.5 m single-unit trucks, how many 19 m articulated trucks and how many 26 m, if proposed?	Refer to Section 3.1.3 of this report.
Will any heavy vehicles be required during operations? I.e. for the replacement of any infrastructure.	Refer to Section 3.1.3 of this report.
How many heavy vehicles requiring escort are proposed?	Refer to Section 3.1.4 of this report.
Is the site access subject to upgrades existing at this time?	Refer to Section 3.1 of this report.

TfNSW Response (19 December 2024)

TfNSW Comment	Trafficworks Response
1. Land ownership detail and access arrangements	
Section 2.2.2 provides a complicated land ownership of Houghton Road. Evidence of consultation with permission from landowners including Transport Asset Holding Entity (TAHE) must be provided. Consultation with other stakeholders with right of access on this land should also be undertaken and a final agreement for the use of this road provided to DPHI.	Consultation records will be provided as part of the Response to Submissions (RtS) report.
2. Update strategic concept designs for intersection road upgrades	
Strategic concept design for the proposed intersections with Irrigation Way will need to be updated in line with the following requirements:	

TfNSW Comment	Trafficworks Response
a) Houghton Road/Irrigation Way rural basic right turn (BAR) A values appear to have been designed for the posted speed of 60 km/h. It is TfNSW practice to design for 10km/h above posted speed limit. This would increase the A value to 22.5m.	The A-value of the turn lane has been increased to 22.5m whilst still avoiding impacts to the rail crossing. Refer to the updated Strategic Design Plans.
b) Houghton Road is a gazetted B-Double route to enable B-Doubles access to the GrainCorp Silos. The BAR S values should be rectified to allow for a 26m D Double not a 19m semi-trailer.	The proximity of the intersection to the train line makes it impossible to increase the S-value to the standard of B-doubles. However, the largest vehicle accessing this intersection for the construction of the development (other than the OSOM loads) will be a 19.0 m semi-trailer. Therefore, the S value adopted for the proposed intersection upgrades are appropriate for the construction volumes. Refer to the updated Strategic Design Plans.
c) B-Double tracks on the chevroned median to complete the left turn out manoeuvre. A driver is likely to align their movement to the edge of the median and track further into the shoulder. This has the potential for heavy vehicles to track over the shoulder / verge interface and may result in edge break. TfNSW requests the shoulder be widened to accommodate this.	Plans have been updated to remove the island and only provide a single line which can comfortably accommodate the swept paths. Refer to the updated Strategic Design Plans.
d) Considering point 2(c), updated swept paths are required for the design vehicle demonstrating concurrent turn movements in all directions.	Additional swept paths have been showing concurrent movements. Refer to the updated Strategic Design Plans.
e) Applicant is to consider the potential risks of installing a rural basic right turn (BAR) treatment at Houghton Road close to the access to Yanco rural Fire Station driveway and the railway line.	No issues as this has a shoulder with no kerb and could potentially improve access to the fire station. Plans have been updated to better demonstrate the access to the fire station. Refer to the updated Strategic Design Plans.
f) Drainage detail must be provided on the strategic concept designs for intersections proposed to be widened. This includes a typical cross section. An example can be provided to understand the required detail if required.	Preliminary drainage has been shown on the plan based on example cross-sections provided by TfNSW. These designs will be further refined during detailed design.

TfNSW Comment	Trafficworks Response
3. Traffic Impacts	
a) The updated TIA must demonstrate the full staging/timing of the traffic volumes and works required, including any pre-construction minor works/enabling works. It must also identify any mitigation measures (e.g., TTM) and the flow-on impacts of this work. Separate turn warrant assessments are also to be completed for peaks of any pre-construction minor works.	There are only 2 stages associated with the proposed development, being the ‘construction phase’ and the ‘operational phase’. There is no ‘pre-construction’ phase as ‘enabling works’ have been incorporated in the ‘construction phase’. Turn warrant assessments have been undertaken for the peak period with assessments during other periods being redundant as they will be lower warrants than the peak. All required works, as shown on the Strategic Design plans, will be constructed during Phase 1 of the project. There are no pre-construction minor works proposed / required. Refer to the updated Strategic Design Plans.
b) The peak traffic distribution provided in Section 3.3 has made assumptions about the directional split for construction traffic, however, the TIA does not detail the basis for the distribution assumption. Additional information regarding the origin and destination and routes for construction traffic is required to be provided within the revised TIA.	The report has been updated to further expand on the assumptions with a summary provided below: Light Vehicles: The 75%-25% split reflects the population distribution and workforce locations. Yanco, Leeton, and Griffith, located to the north, have larger populations and provide a significant labour force for construction activities. Narrandera, to the south, has a smaller population, leading to fewer workers accessing the site from that direction. Heavy Vehicles: The 30%-70% distribution is based on supplier locations. Narrandera serves as a regional hub for steel and concrete suppliers, leading to a higher proportion of heavy vehicle deliveries from the south. Meanwhile, Yanco and Leeton have fewer such suppliers, justifying the lower percentage of heavy vehicles arriving from the north. Refer to Section 3.3. While this assumption is not highly precise, the sensitivity analysis in Section 5.3.2 considers

TfNSW Comment	Trafficworks Response
	worst-case scenarios for both turning directions, providing a robust and reliable assessment.
c) The intersection with Houghton Road and Irrigation Way is close to a GrainCorp Silo. Evidence of consultation with GrainCorp must be provided regarding their traffic volumes and peak seasons in the form of a letter from GrainCorp. The TIA is to be revised to either: i. The turn warrants assessment is to be revised in accordance with Austroads Guide to Traffic Management and Road Design to include the turning and background traffic volumes associated with the peak harvest traffic volumes for the Houghton Road/Irrigation Way intersection or ii. Alternatively, identify enforceable mitigation measures that will restrict the construction traffic volumes for the project during the harvest season to ensure that the project traffic will conform with the proposed intersection treatments, during this period.	Following discussions with GrainCorp, the traffic impact assessment report has been updated to include information about the GrainCorp operation. In summary, the site's peak hour volumes have been conservatively estimated to be 20 trips. These volumes have been incorporated into the traffic analysis with no major impacts on the turn lane requirements or the intersection capacity. Refer to Section 3.5.2
d) Include within the revised turn warrant assessment any cumulative construction overlaps with the nearby Yanco Solar Farm in the background and turning traffic volumes, where the projects have overlapping timeframes, and include overlap of other nearby developments. There does not appear to have been full consideration of possible cumulative traffic volumes for the affected state roads. If the BESS roads are not to be used by the solar farm, details on how this will occur should be provided.	The TIA included an assessment of the Yanco Solar farm and indicated a minimal impact on the proposed development. In any case, the TIA has been updated to further explore the impact of the solar farm construction be included the likely construction vehicles along Irrigation Way. Refer to Section 3.5.1
e) The TIA is to be updated to assess the impacts caused by traffic during the peak hour and potential short stacking between railway lines prior to entering the Houghton Road intersection. The following is to be considered: i. Minimal storage is available between the railway lines on the approach to Houghton Road. A diagram is to be provided that demonstrates how large project vehicles will	i. The SIDRA assessment shows the 95th percentile queue for the right turn into the site is 0.4 vehicles, meaning it is statistically unlikely that there would be more than one vehicle queuing for this right turn. Accordingly, swept path assessments were prepared that demonstrate a semi-trailer can comfortably pass another semi-trailer waiting to turn into Houghton Street (230136-SKT-11).

TfNSW Comment	Trafficworks Response
safely navigate the crossing and avoid queuing. ii. SIDRA modelling is to be provided regarding queuing volumes iii. Detail on how mitigation measures including intersection upgrades will be implemented.	ii. See above iii. despite point i above; the mitigation measures to be implemented will be linemarking, including a hatched box, as shown on the Strategic Design plan. Refer to the updated Strategic Design Plans.
f) Clarification is required if Houghton Road is to be the only road used for departure access from the state road network for the project and no other roads (i.e., intersection of Euoley Road). If other intersections with the state road network are to be used, detailed assessment of the traffic impacts as outlined in the SEARs for this project will be required.	Houghton Road is the only proposed access to the state road network.
g) Identify mitigation measures to avoid construction traffic during Yanco Sporting Field game days	Consultation with the Council's team that manages the Yanco Sporting Field should be undertaken to establish days when heavy vehicle deliveries should not be made to the site (e.g., game days). The traffic management plan for the construction period will contain measures to ensure that consultation is maintained with council associated with the operation of the Yanco Sportsground. Refer to Section 3.5.3
4. Update high-risk OSOM route assessment for all routes The following section provides overall considerations for the identified route from the Port Kembla in the assessment provided, which need to be resolved and included within the revised TIA.	
a) Traffic of heavy mass vehicles and vehicles with very large axle group loadings are proposed, which may be an issue for older short span bridges. The OSOM route requires bridge and culvert assessments to be undertaken. Contact spu@transport.nsw.gov.au to apply for the bridge and culvert assessment review for the state road network assets. Note: Results of the bridge assessments may result in a change to the route which must be provided in an updated route assessment. TfNSW encourages the Applicant to consult on bridge assessments.	A TfNSW bridge assessment has already been included, with a summary provided in Section 9 of the OSOM Route Survey (Appendix 5 of TIA). Refer to Appendix A of the OSOM Route Survey for full bridge assessment.

TfNSW Comment	Trafficworks Response
b) The RJA route assessment does not include all relevant TfNSW projects or other third-party projects that are currently under construction, or will be completed, on the State road network for either route. The route assessment must be updated to include mitigation measures or modifications required to navigate any identified road or rail project along the routes (i.e., upgrades to the Princes Highway entrance at Wollongong / University of Wollongong).	Mt Ousley Interchange Project is identified and assessed in Section 10 of the OSOM Route Survey.
c) An extensive review of the height obstructions along the high-risk OSOM route (e.g., powerlines and gantry heights) is required, and mitigation measures to navigate them must be clearly identified.	Height review of Essential Energy (EE) powerlines and structures is completed, with EE's permit letter attached as Appendix B of the OSOM Route Survey.
d) Any pavement widening or other road modifications identified within swept path review of pinch points along the state road network must be accommodated by strategic concept designs, prepared in accordance with TfNSW strategic concept design fact sheet (2D section) and must include typical sections for any changes to the roadside drainage.	No road modifications are identified along the state road network. The client proposed to upgrade the intersection of Houghton Rd - Irrigation Way, with strategic concept design attached as Appendix 4-A4.1 of the TIA report.
e) Updated swept paths are also required for the check high risk OSOM vehicle to demonstrate they can access the intersection of Houghton Road any other relevant intersections on the state road network without requiring further road widening or modifications to the state road network formation.	Swept paths are shown in the OSOM Route Survey, except for that of the intersection of Houghton Road is provided in Appendix 4-A4.3 of the TIA.
f) Swept paths and parking plans must be provided for each pullover, layby, and rest area on OSOM routes, demonstrating applicable high-risk OSOMs can physically be accommodated and mitigate impacts to other road users.	Refer to updated Section 8 of the OSOM Route Survey.
g) The route assessment needs to include temporary safety mitigation measures and remediation treatments. I.e., where raised concrete medians are required to be removed,	There are no proposed road modifications and therefore temporary safety measures and remediation treatments are not required.

TfNSW Comment	Trafficworks Response
please state how this will be remediated post construction.	
h) Strategic concept designs are to be provided to identify the removal and relocation of any TCS or light poles (if identified within the revised route assessment) in relation to the state road network.	No removal and relocation of TCS or light poles are identified.
i) Timing of high-risk OSOM deliveries within the construction schedule, indicative weekly program(s), and timeframe to complete deliveries from relevant port to the site are required.	Details are provided in Section 12 of the OSOM Route Survey.
j) A vertical typical curve assessment is to be provided for the rail underpass on Sturt Highway at Wagga Wagga before any further consideration of the proposed route is made. This is required as the clearances of the underpass may impact the viability of the transport route for blade components.	The vertical assessment is relevant for the delivery of wind turbine blades, which typically exceed 70–80 metres in length. In comparison, Yanco BESS is a standalone battery energy storage project with the largest proposed OSOM load being two HV transformers. The total transport length is 44.9 metres, with a platform trailer length of 21.6 metres. This is significantly shorter than the dimensions of wind turbine blades. Given that the proposed OSOM load (including the platform trailer) is much shorter than the dimensions of wind blade deliveries, the vertical and horizontal assessments for the rail underpass are not required. The proposed transport route remains viable for the Yanco BESS Project.
k) Consideration of the height constraints along the Hume Highway must be undertaken, including the Fairway Drive overpass which has a 5.2m maximum restriction.	Transport load height is lowered to 4.9m and load dimensions updated in Section 3.0. Height constraints have been reviewed. A high load detour may be required to avoid University Overbridge on the Princes Motorway at Wollongong with detour instructions provided on page 16 and 17 of the OSOM Route Survey. The load can be transported without issues via this detour. Note that the Fairway Drive overpass is not part of the proposed OSOM route for this development.
l) Updated route assessment identifying any roundabout intersections to be removed, (this includes those along the Sturt Highway	Review of assessment confirms that no roundabouts will be removed. Comments have

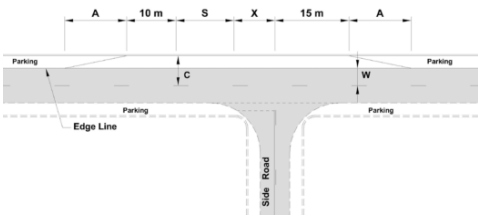
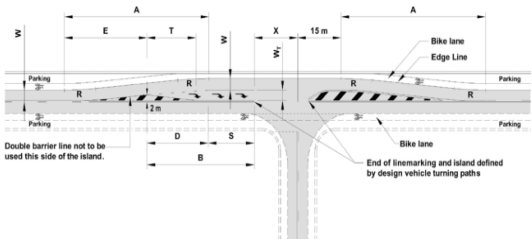
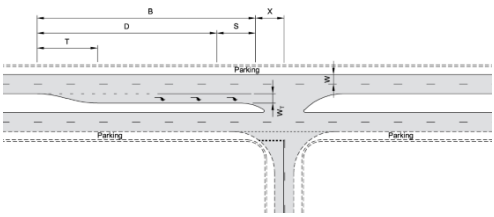
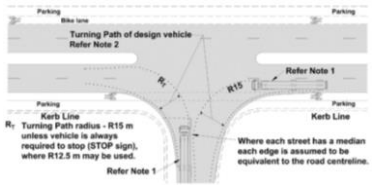
TfNSW Comment	Trafficworks Response
identified on page 13): i. Clarification on whether a portion of roundabouts will be removed or if it is proposed to mount existing annulus(es). If mounting is required, assessment of the existing suitability or upgrades required to the roundabouts for the movements must be included. ii. Swept paths and road design plans for impacts on the roundabout(s). iii. Vegetation trimmed or removed and other infrastructure to be removed or modified	been updated on page 12 and 13 of the OSOM Route Survey.
5. Proximity to Rail Corridor rail impacts The site is located adjacent to the non-operational rail corridor from Yanco to Willbriggie. This part of the rail corridor is currently non-operational, however TfNSW is required to ensure that the rail corridor is able to become operational in the future with no significant additional safety risks or costs as a result of new development. Further, the works required for Irrigation Way / Houghton Road intersection on Lot 1 DP 931848 & Lot 1 DP 1072592 is within the CRN operational rail corridor from Narrandera to Yanco and Yanco to Griffith. The following must be considered in relation to the rail corridor in the response to submissions:	
a) Access to Rail Corridor – It is noted that that the proposed Irrigation Way/Houghton Road intersection upgrades is within the railway land/ rail corridor. Therefore, prior commencing the intersection upgrade works, the applicant shall submit Licence for access application to UGLRL third party works.	Noted
b) Rail Crossing – The applicant shall provide an updated TIA that addresses any short stacking issue over the level crossing near to the proposed intersection upgrade. The updated TIA must investigate this issue and include mitigation measures to any short stacking issues across the level crossing.	Signage and line marking to be installed north of the railway line to advise drivers not to store between the railway lines. A traffic management plan will be implemented to ensure that all staff are instructed not to store across the railway lines. Refer to Section 5.3.2
c) Potential Contamination – Rail corridors are generally deemed to be contaminated unless otherwise provide by sample testing. In accordance with State Environmental Planning Policy (Resilience and Hazards) 2021 - Section 4.6 'Contamination and remediation to be considered in determining development application' (Previously State environmental Planning Policy No. 55 – Remediation of Land),	It is within rail land but not operational land. Also the land is not changing use so no change to receptor pathway (ie, works are road works within road). Land is suitable for the proposed use without remediation therefore SEPP requirements are met. The client advises further details will be provided in the Response to Submissions (RtS) report.

TfNSW Comment	Trafficworks Response
the consent authority must consider whether the land is contaminated.	
d) Transport Route Assessment – In the RTS stage, if the proposed construction route (Port Kembla) is crossing any CRN rail corridor/rail infrastructures, the applicant is advised to include identified crossings on CRN rail corridor in the updated EIS documents and TIA. In addition, if any adverse impacts to CRN corridors are identified, the applicant shall seek approvals from UGLRL and TfNSW.	Noted, this will be addressed in the Traffic Management Plan.
e) Cranes and Equipment - In the RTS stage, the applicant should outline whether the construction would involve the use of Equipment in the air space above the rail corridor of the CRN.	Not applicable
f) Stormwater Management - Excavation In, above, or adjacent to rail corridor - In RTS stage, the applicant should outline whether the proposed BESS and any other activities would involve any excavation more the 2m below ground level within the rail corridor or within 25m of the rail corridor.	ACE response Clarification on guidelines: The relevant guideline, being Section 2.99 of SEPP 2021, applies to development that involves the penetration of ground to a depth of at least 2 m below ground level (existing) on land and within 25 m of a rail corridor. Response: The proposal does not include activity falling into the above definition. The excavation associated with intersection upgrade at Houghton Road - Irrigation Way will not reach 2 m.
g) Survey - The applicant shall provide an accurate survey locating the development with respect to the rail boundary and rail infrastructure. The work is to be undertaken by a registered surveyor, to the satisfaction of UGLRL on behalf of TfNSW.	Noted by the applicant
h) Construction - The applicant shall submit a Risk Assessment/Management Plan and Safe Work Method Statement (SWMS) detailing any impact on the CRN rail corridor to UGLR and TfNSW and obtain written approval.	Noted by the applicant and evidence of the consultation will be provided in the RtS report.

Appendix 7 – Turn treatments

A6.1 – Urban turn treatments

Table 14: Turn Treatment Descriptions (**Urban**) (Source: Section 7.7, 7.8 and 8.3 of Austroads Guide to Road Design Part 4A)

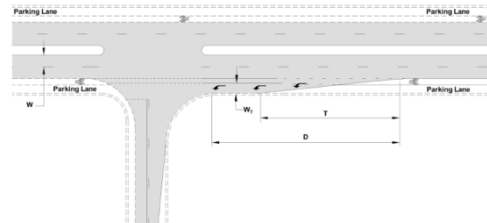
Turn treatment	Description	
BAR	BASic Right turn treatment on the major road, features a widened area (usually in place of parking) on the major road that allows through vehicles to pass to the left of turning vehicles (<i>Figure 7.6 of Austroads Guide to Road Design Part 4A</i>).	
CHR(S)	CHannelised Right (Short) turn is a shorter version of the Channelised Right turn treatment which is reduced by removing space provided for storage in the right lane. This treatment type can only be used with line marking (<i>Figure 7.7 of Austroads Guide to Road Design Part 4A</i>).	
CHR	CHannelised Right turn treatment has two vehicle travel paths (through and right turns) separated by physical or painted medians or islands (<i>Figure 7.8 of Austroads Guide to Road Design Part 4A</i>).	
BAL	BASic Left turn treatment on the major road has a radius large enough to accommodate a design vehicle turning left into the minor road without crossing the centre line of the minor road (<i>Figure A15 of Austroads Guide to Road Design Part 4</i>).	

Turn treatment

Description

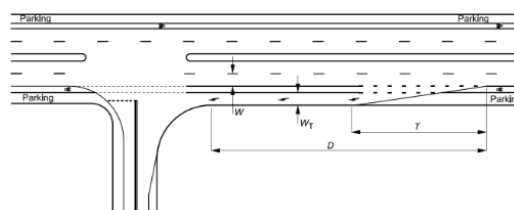
AUL(S)

AUXiliary Left (**S**hort) turn treatment is a shorter version of the Auxiliary Left turn treatment which is reduced by allowing some deceleration to occur in the through lane on the major road. This turn treatment also allows through vehicles to pass to the right of turning vehicles (*Figure A17 of Austroads Guide to Road Design Part 4*).



AUL

AUXiliary Left turn treatment is a left turn lane on the major road that allows through vehicles to pass to the right of turning vehicles (*Figure 8.6 of Austroads Guide to Road Design Part 4A*).



A6.2 – Rural turn treatments

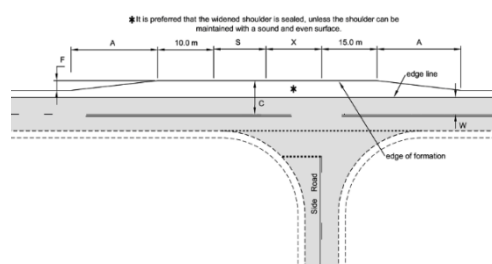
Table 15: Turn Lane Treatment Descriptions (**Rural**) (Source: Section 7.5 and 8.2 of Austroads Guide to Road Design Part 4A)

Turn treatment

Description

BAR

BAasic Right turn treatment on the major road, features a widened area (usually in place of parking) on the major road that allows through vehicles to pass to the left of turning vehicles (*Figure A6 of Austroads Guide to Road Design Part 4*).

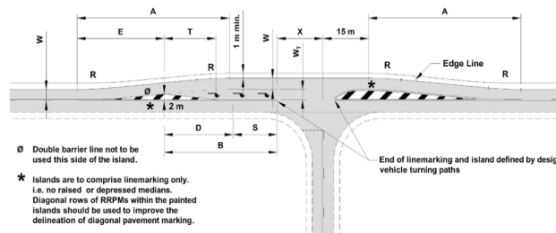


Turn treatment

Description

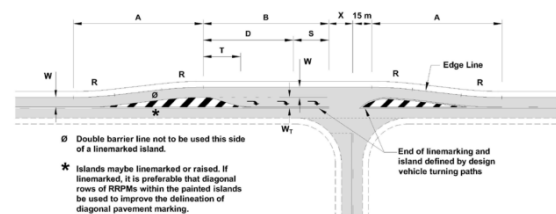
CHR(S)

CHannelised Right (**S**hort) turn is a shorter version of the Channelised Right turn treatment which is reduced by removing space provided for storage in the right lane. This treatment type can only be used with line marking (Figure A7 of Austroads Guide to Road Design Part 4).



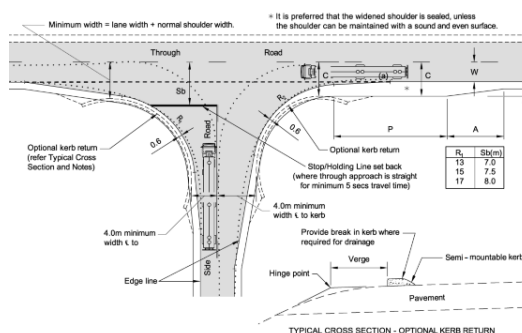
CHR

CHannelised Right turn treatment has two vehicle travel paths (through and right turns) separated by physical or painted medians or islands (Figure A8 of Austroads Guide to Road Design Part 4).



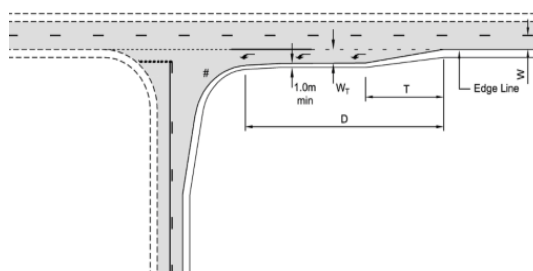
BAL

BAsic Left turn treatment on the major road has a radius large enough to accommodate a design vehicle turning left into the minor road without crossing the centre line of the minor road (Figure 8.2 of Austroads Guide to Road Design Part 4A).



AUL(S)

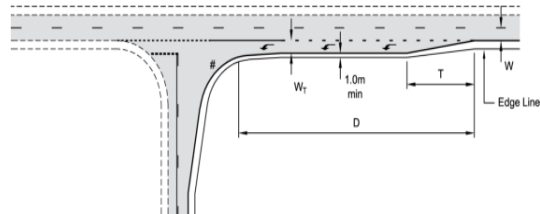
AUXiliary Left (**S**hort) turn treatment is a shorter version of the Auxiliary Left turn treatment which is reduced by allowing some deceleration to occur in the through lane on the major road. This turn treatment also allows through vehicles to pass to the right of turning vehicles (Figure 8.3 of Austroads Guide to Road Design Part 4A).



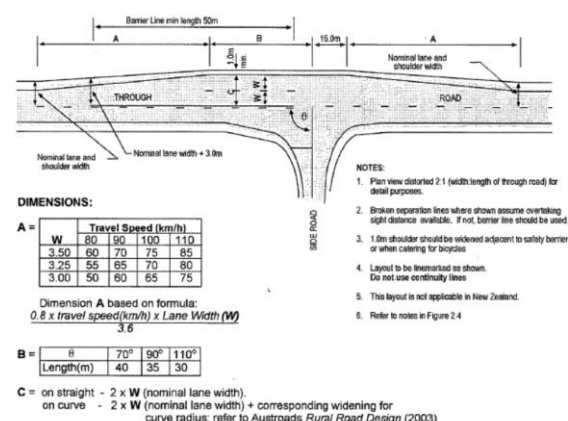
Turn treatment

Description

AUL AUXiliary Left turn treatment is a left turn lane on the major road that allows through vehicles to pass to the right of turning vehicles (*Figure 8.4 of Austroads Guide to Road Design Part 4A*).



AUR In addition to the above, DoT will allow the use of the rural **AUXiliary lane Right** turn treatment (from GTEP Part 5) in lieu of the CHR(s) treatment, (refer *Sections 7.5.2 and 7.7.2 of VicRoads Supplement to AGRD4A*)



Appendix 7 – Acronyms and terms

Acronyms / terms	Definition
AGRD4	Austroads Guide to Road Design Part 4 – Intersections and crossings
AGRD4A	Austroads Guide to Road Design Part 4A – Unsignalised and signalised intersections
AGTM6	Austroads Guide to Traffic Management Part 6 – Intersections, interchanges and crossings management
AGTM8	Austroads Guide to Traffic Management Part 8 – Local street management
AS/NZS2890.2	Australian Standard 2890.2 Parking facilities Part 2: Off-street commercial vehicle facilities
DPE	Department of Planning and Environment
ESD	Entering site distance
SIDRA	SIDRA intersection – micro analytical traffic engineering software to model the performance of intersections
SISD	safe intersection sight distance
TIA	traffic impact assessment
TfNSW	Transport for New South Wales
vpd	vehicles per day
vph	vehicles per hour