



Traffic & Transportation Direction

Wathagar Solar Farm Stage 2

2910 Gwydir Highway, Wathagar

Traffic Impact Assessment

May 2025

Reference: 745 rep02 250509 draft

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Prepared for: Hiringa Sundown Project Trust

Status: Final report

Date: 9 May 2025

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1. Introduction

1.1 Project Overview

Amber Organisation Pty Ltd has been engaged by Hiringa Sundown Project Trust (HSPT) to conduct a review of the traffic implications of the Wathagar Solar Farm Stage 2 and prepare a Traffic Impact Assessment.

The project will connect to the existing Stage 1 Solar Farm and will be the primary power supply for the Good Earth Green Hydrogen and Ammonia (GEGHA) Project to be constructed on the western side of this site. The GEGHA Project is the subject of a separate application for approval.

As outlined in the Statement of Environmental Effects (SoEE) the Wathagar Solar Farm Stage 2, the development will consist of:

- Civil works to prepare the site.
- Fixed PV array structures.
- Inverters and step-up transformers to convert direct current (DC) electricity produced by the solar PV panels into alternating current (AC) capable of being connected to the electrical grid.
- Battery storage containers with up to 30 MWh of combined storage capacity.
- Associated cabling, communications, and switching infrastructure.
- Surrounding chain link fence with gates for access.

The project scope also includes the upgrade of the existing Wathagar Gin main entry. A strategic concept design of the upgrade is included for reference in Appendix B.

A plan showing the development footprint of the project is shown in Figure 1, with the Wathagar Solar Farm Stage 2 component highlighted in green.

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1.2 Statutory Assessment Requirements

Given the nature, scope and scale of the project, the planning controls under the Environmental Planning and Assessment Act 1979 and the State Environmental Planning Policy (SEPP – State and Regional Development) 2011 the project is defined as a ‘Regional Development’.

1.3 Road Authority Consultation

A Traffic Impact Assessment (TIA) report was prepared in relation to the GEGHA Project and submitted to the Planning Portal in March 2025 (Ref: *GEGHA TIA, Amber, dated 8 March 2025*). Whilst this project is subject to a separate planning application, the report was uploaded as a reference document for the Stage 2 Solar Farm project.

TfNSW provided comments to this TIA in letter dated 7 April 2025. The comments raised by TfNSW are outlined in Table 1 along with a response and reference location.

Table 1: TfNSW Comments and Response

Matter No.	TfNSW Comment	Response	Reference Location
Clarification on Wathagar Solar Farm Traffic Impact Assessment			
1.	<i>The provided Traffic Impact Assessment appears to be written to support the State Significant Development – Good Earth Green Hydrogen and Ammonia Project. Whilst it is understood the projects overlap and will utilise the same access points the TIA is written in a way that refers to the Wathagar Solar Farm as a separate project. The TIA is to be amended to assess the Wathagar Solar Farm as the subject application and assess the cumulative impact of the Ammonia Project and the existing gin facility and farming land uses. The SEE alone only provides minimal detail on the traffic assessment.</i>	To provide further clarity, this TIA has been prepared which provides an assessment of the Wathagar Solar Farm Stage 2 only. It is based on the traffic surveys, key findings and assessment of the provided GEGHA TIA.	This Document and SoEE.
2.	<i>The Statement of Environmental Effects provides that all project traffic will utilise Gwydir Highway to access the site however in the next line notes that an alternative entry for heavy vehicles via Watercourse Road is also available. The updated SEE and TIA is to clarify which accesses will be utilised and for what purposes. A full assessment of impacts should be completed for both intersections if both are to be used.</i>	Both access points are being considered as options, as follows: Scenario 1 involves the use of an upgraded main access to the Gwydir Highway. Scenario 2 involves the use of the existing access via Watercourse Road and Goonal Road to allow the project to commence should the upgrade not be undertaken prior to on-site works commencing. Worst-case assessments have been undertaken which assume all traffic via one approach (i.e. all via an upgraded site access or all via Watercourse Road and Goonal Road).	Section 3.3 and 6

Matter No.	TfNSW Comment	Response	Reference Location
		Utilising the Wathagar gin entry is preferred as it provides the shortest route in and out of the solar farm site however HSPT are seeking flexibility to consider use of both access options during construction. The completed upgrade is required to provide continued operational access enabling occasional deliveries of goods via heavy vehicles up to 26m B-double in size.	
Traffic Analysis and Turn warrant assessment requirements			
3.	<i>There are discrepancies in the data within the Traffic Impact Assessment compared to the Statement of Environmental Effects. The TIA references tube counts commissioned for the Gwydir Highway completed during June 2024 whilst the SEE refers to a traffic survey completed in August 2023. These should be corrected and raw data from the tube counts provided in the updated SEE/TIA.</i>	The 2023 and 2024 traffic count data are included in this assessment. The traffic volumes recorded as part of the 2023 intersection surveys showed volumes that were marginally higher on the Gwydir Highway during the peak hours than the more recent 2024 surveys. As a result, the 2023 volumes were used to undertake further traffic assessment.	Section 2.3, 4, 6.1
4.	<i>The worst-case scenario of cumulative impacts has not been assessed for the solar farm. Table 10 of the TIA provides a list of projects in relation to the GEGHA project and not the solar farm as the subject application as per point 1. The timing of construction / operation of projects needs to be clarified and the cumulative traffic volumes for these projects are to be included in the background traffic (through and turning volumes) in an updated turn warrant assessment.</i>	The Stage 2 Solar Farm project will be undertaken and operational prior to the GEGHA Project. The cumulative assessment reflects this staging. The cumulative assessment outlined in this report shows that the impact of state significant projects in the broader region, as well as on-site activities, would be negligible.	Section 4.3.5
5.	<i>Traffic volume assumptions for the development are different between the TIA and SEE. TIA references the Solar Farm as a cumulative traffic volume, and notes that up to two heavy vehicle and twelve light vehicles would be expected during the morning and evening peak. The SEE however notes that heavy vehicle movements are to equate 1 per day. The Traffic Volumes for the AM/PM are to be re-assessed throughout both documents to ensure they align.</i>	The discrepancies are related to the different ways the assessments were undertaken (noting they apply to different projects). Updated project traffic volumes and cumulative impacts are provided as part of this TIA.	Section 4.3.1, 4.3.5
6.	<i>The Traffic Volumes in the TIA note that a growth rate of 1.5% has been applied however this has not been clarified within the SEE which appears to rely on older data from 2023. Please confirm a growth rate has been applied to the data in the</i>	The growth rate has been applied for the assessment of the impacts of the Stage 2 Solar Farm as outlined in this report	Section 4, 6.1

Matter No.	TfNSW Comment	Response	Reference Location
	<i>SEE and ensure the TIA and SEE data aligns.</i>		
Vehicle Type Discrepancies and Swept Path diagrams			
7.	<i>The Statement of Environmental Effects refers to the use of 46 road trains to transport materials to site however the application has not assessed the impacts of the use of road trains. The TIA does not appear to mention the use of road trains. The following is to be considered:</i> <i>a. Approved routes must be used for road train transportation,</i> <i>b. The intersection is to be designed for the use of road trains entering the site and passing the site (in particular consider width of BAR/BAL),</i> <i>c. Swept path diagrams are provided within the Statement of Environmental Effects however they are completed for a B Double heavy vehicle not a road train. They also appear to demonstrate the vehicle travelling on the edge of the intersection. The design is to be reviewed to ensure that lane width and shoulder width can accommodate the check vehicles turning arc within the existing pavement.</i>	After confirmation of the construction methodology, the largest vehicle to be used for the construction and operation of Solar Farm Stage 2 are 19m semitrailers (split road trains with a single trailer). In order to ensure the suitability of the road upgrade for future use, 26m B-Doubles were conservatively selected as the design vehicle. The swept paths of 26m B-Doubles are therefore suitable.	Section 4.3.1, Appendix B
Requirements for revised Strategic Concept Designs			
8.	<i>The following section details the required updates to be addressed within a revised strategic concept design for the site access with the Gwydir Highway:</i> <i>a. Include typical section diagrams for the site access and Gwydir Highway demonstrating Austroads requirements can be met. TfNSW can provide an example diagram with the level of detail required on request.</i> <i>b. Include concept level pipe-culvert design information as per Austroad guidelines (at intersection between site-road and Gwydir Road).</i> <i>c. The full environmental footprint of the intersection should be identified on the proposed plans. This should include a typical section demonstrating the inclusion of batters, safety barriers and drainage requirements that can often require a larger footprint than first considered.</i> <i>d. The provided concept plan identifies removal of two trees in the intersections clear zone to accommodate the BAL /</i>	The strategic concept design has been updated to respond to these comments, as follows: a. Typical road sections for both the site access and Gwydir Highway will be included in the Strategic Concept Design submission. b. An assessment of the existing topography and drainage conditions has determined that a culvert crossing is not required, as all existing surface flows run parallel to the access road via existing drainage swales and do not cross the access road. As such, an additional pipe or culvert crossing at the site access road is not considered necessary. c. The full extent of the proposed intersection works has been modelled and is shown on the Strategic Concept Design plans. The proposed footprint remains outside of the existing swale locations and does not necessitate upgrades to these swales. The footprint of the intersection, including batters, has been illustrated. Based on current	Appendix B

Matter No.	TfNSW Comment	Response	Reference Location
	<i>BAR. Appropriate assessment by Council and the proponent should occur and the removal added to all strategic concept designs.</i>	assessments, safety barriers and additional drainage infrastructure (e.g. culverts or swales) are not required. d. An arborist assessment should be undertaken to determine the condition of the existing trees and confirm whether removal is required. Based on the current concept design, the tree located on the left-hand side of the access road is likely to require removal, as the proposed works encroach upon its Tree Protection Zone. The tree on the right-hand side may potentially be retained, subject to further assessment.	
Timing of works			
9.	<i>TfNSW advises the intersection upgrade is to be completed prior to the commencement of the first project using the intersection. Both projects will need to be conditioned to include the required intersection treatment. The TIA/SEE must be updated to address this requirement.</i>	The upgrade of the existing site access forms part of the project scope of Stage 2 Solar Farm and would be preferential to be completed and used during the construction phase. An assessment also shows that access via the existing connection of the project site to Watercourse Road and Goonal Road would be suitable to accommodate the project construction traffic, should the planned upgrade at the existing main gin access not occur prior to the commencement of construction of the Stage 2 Solar Farm. Accordingly, the requirement for the upgrade to be completed prior to construction commencing for Stage 2 Solar Farm is not considered warranted.	Section 3.3, 6.
10.	<i>The timing and assessment of the impacts relating to pre-construction minor works are to be included within the revised TIA/SEE.</i>	The impact of pre-construction minor-works is negligible and would represent up to one or two light vehicles per day.	Section 4.2

1.4 Purpose of Document

This Traffic Impact Assessment has been prepared to assess the construction, operational and decommissioning traffic impacts, and the access arrangements of the project. It is based on surveys and observations at the site and our experience of similar developments elsewhere. The assessment details how road impacts of the project traffic, particularly from heavy vehicle use, would be avoided or managed using road-use management strategies.

More specifically, the report addresses the following key matters:

- Details of both light and heavy vehicle traffic volumes and proposed transport routes;
- An assessment of the potential traffic impacts of the project on road network function and safety;

- An assessment of the capacity of the existing road network to accommodate the type and volume of traffic generated by the project;
- Details of measures to mitigate and/or manage potential impacts; and
- Details of access roads and how these connect to the existing road network and ongoing operational maintenance.

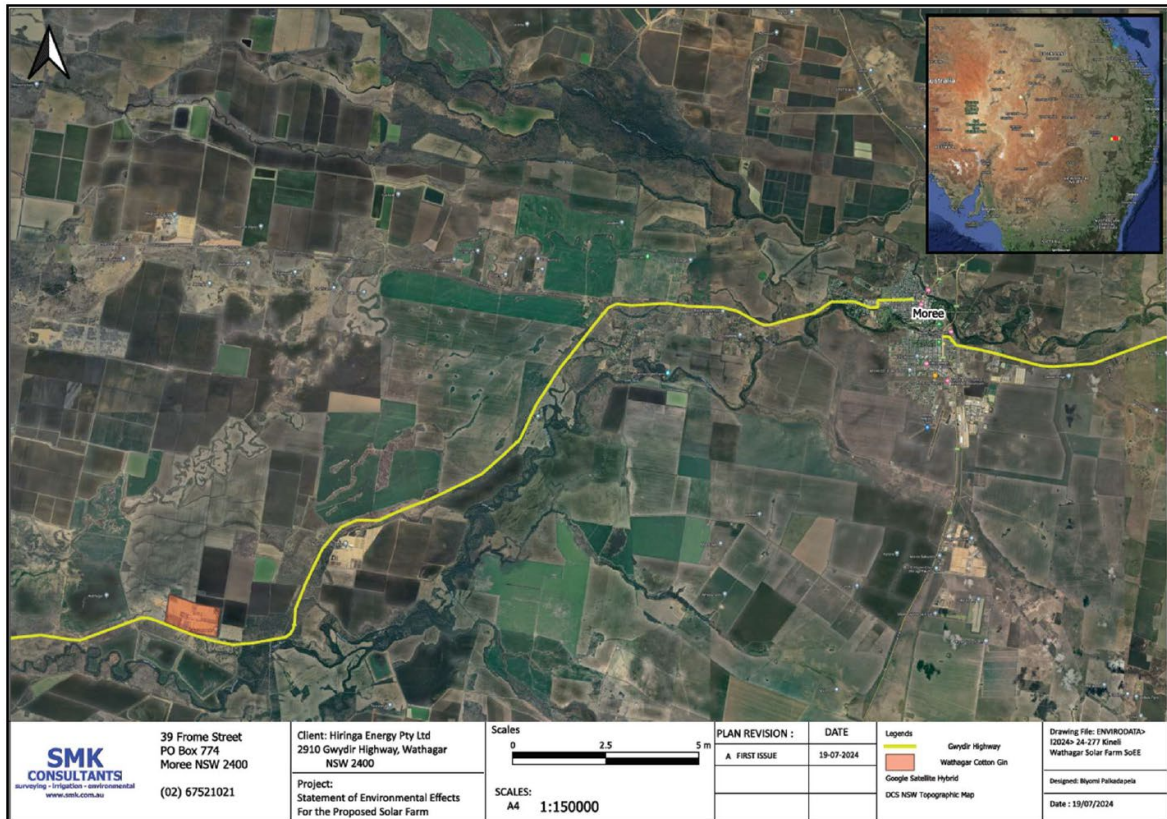
The traffic assessment has been undertaken in accordance with the *TfNSW Guide to Transport Impact Assessments* and relevant Austroads Guidelines.

2. Existing Conditions

2.1 Site Location

The proposed development site is 2910 Gwydir Highway, Wathagar. The site is located approximately 33 kilometres southwest of Moree. Figure 2 shows the location of the site in relation to the broader regional context.

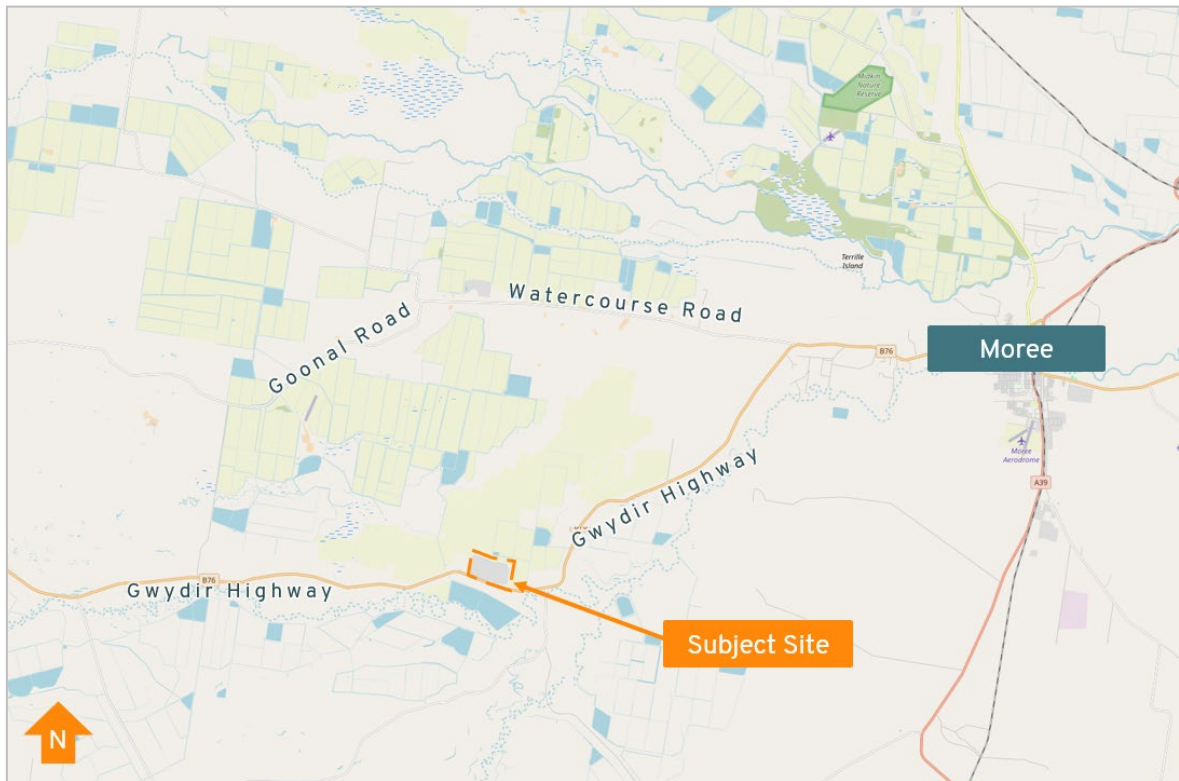
Figure 2: Regional Context Map



Source: SoEE, SMK Consultants

Figure 2 shows that the location of the site in northwest NSW, approximately between Sydney and Brisbane. Figure 3 shows the site location and surrounding road network.

Figure 3: Site Location and Road Network

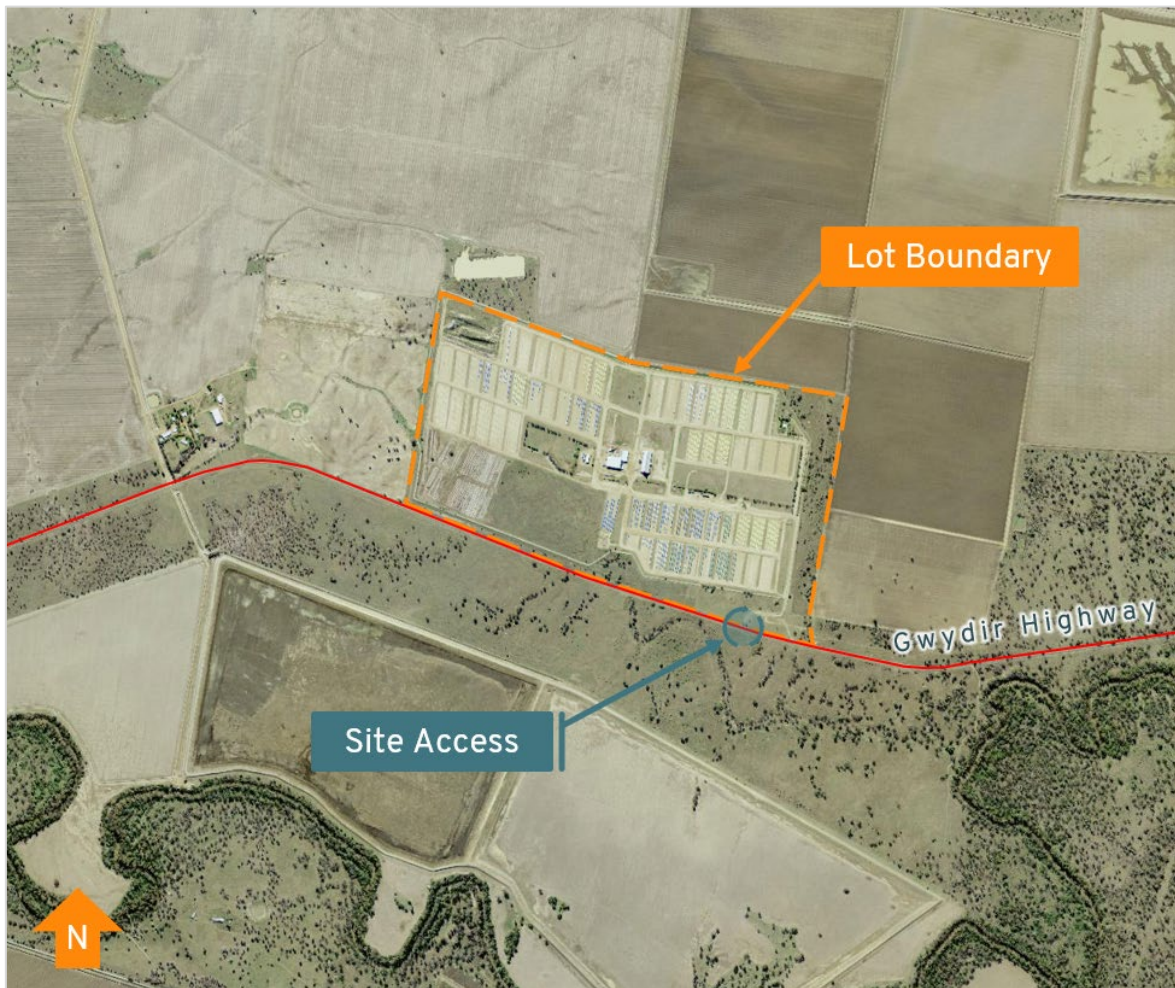


Source: OpenStreetMaps

The figure shows the site has direct access to the State Road network via the Gwydir Highway. Access to the site is also available via Watercourse Road and Goonal Road which connect to private access roads to the site which was used for the construction of Wathagar Solar Stage 1.

The site and the surrounding area are zoned RU1 - Primary Production and are primarily occupied by agricultural or vegetated land. Figure 4 provides an aerial photograph of the site and the surrounding area. It shows that the surrounding area is predominantly agricultural or vegetated land and that the site is situated on the northern side of Gwydir Highway and the Mehi River.

Figure 4: Aerial Photograph of Site and Surrounds



Source: SIX Maps

The site is used as the Wathagar Cotton Gin and includes a range of existing and planned components as outlined in Table 2. Efficiencies in waste cotton processing has enabled a former section of waste cotton storage to be available for development of the project.

Table 2: Key Site Components

Component	Description
Wathagar Gin	The Wathagar Gin has been in operation since 1988 and has a throughput capacity of over 200,000 bales per annum. Operation of the gin is seasonal but it typically operates from April until August. The Gin holds an active Environmental Protection Licence number 10832.
Wathagar Levee	The site is surrounded by an approximate 1-2.5 metre levee bank which was installed under Flood Work Approval 90FW833508. In addition to a flood defence barrier, the levee provides a visual barrier between site and the Gwydir Highway.
Wathagar Solar Farm Stage 1	Wathagar Solar Farm Stage 1 is an 8.65MW (DC) Solar farm that was commissioned in July 2023. Its purpose is to provide the power requirements of the Wathagar Gin. It also exports to the grid to support local loads and it does this year-round.
Wathagar Solar Farm Stage 2	Wathagar Solar Farm Stage 2 (considered by this report) involves the construction and operation of a 27 MW (DC) solar farm adjacent to the existing Stage 1 Solar Farm and 30MWh of Battery Energy Storage System (BESS).

Component	Description
Good Earth Green Hydrogen and Ammonia (GEGHA)	The GEGHA Project is an integrated solar energy to hydrogen and ammonia plant with a primary objective is to safely construct and operate a green hydrogen and ammonia plant that is capable of delivering an annual production of up to 2,200 tonnes of hydrogen and up to 4,500 tonnes of ammonia to regional destinations. This component is separate to the development considered by this report and is planned to commence once the Stage 2 Solar Farm is complete and operational.
Essential Energy Wathagar Substation	The Essential Energy Wathagar Substation is located to the east of the existing solar farm and supplies the cotton gin and other local loads. It includes a transformer and corresponding switchgear and connects to adjacent transmission lines.

2.2 Road Network

Gwydir Highway is a State Road under the care and management of Transport for New South Wales (TfNSW). It runs in an east-west alignment from South Grafton and its termination with the Castlereagh Highway near Walgett. Within the vicinity of the site, it has a sealed carriageway width of approximately 6.5 metres accommodating one lane of traffic in each direction. It has a speed limit of 110 km/h with a relatively flat and straight alignment.

Watercourse Road is a local road that connects to the Gwydir Highway approximately 10 kilometres east of Moree and operates east-west on the north site of Gwydir Highway for approximately 127 kilometres before reconnecting with the Gwydir Highway in Collarenebri. In the vicinity of the site it has a sealed carriageway width of 6.0 metres accommodating two-way vehicle movement.

The intersection of the Gwydir Highway and Watercourse Road is controlled with a Give Way sign that applies to Watercourse Road as the minor road approach.

Photographs 1 and 2 show Gwydir Highway at its connection with Watercourse Road.

Photograph 1: Gwydir Highway Looking West



Photograph 2: Gwydir Highway Looking East



Goonal Road is a municipal local road that extends south from Watercourse Road then west to its connection with Gwydir Highway, providing access to properties in the area on the north side of the Gwydir Highway. A sealed carriageway width of approximately 6.0 metres accommodating two-way vehicle movement is provided on Goonal Road between Watercourse Road and private internal roads that access the site.

2.3 Traffic Volumes

2.3.1 Gwydir Highway

Amber commissioned seven day pneumatic tube count surveys for the Gwydir Highway on the east and west sides of the main Gin access. The counts were undertaken for a seven day period commencing 12 June 2024. The survey results are provided in Appendix A with a summary presented in Table 3.

Table 3: Gwydir Highway Traffic Volumes – Adjacent to Site Access

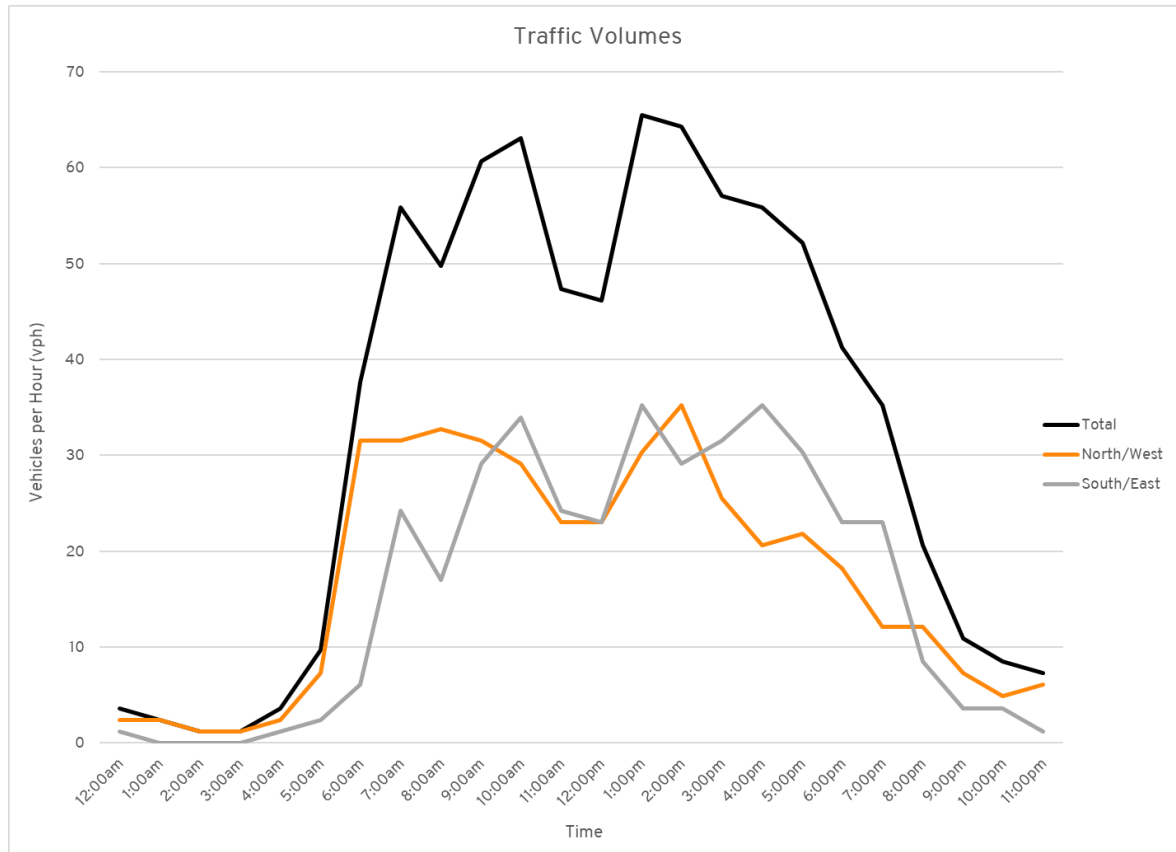
Location	Direction	Weekday Traffic (vpd)	Weekday AM Peak (vph)	Weekday PM Peak (vph)	85 th Percentile Speed	Heavy Vehicle Percentage
East of Site Access	Eastbound	319	28 (10am)	29 (1pm)	108.7 km/h	28%
	Westbound	341	24 (10am)	25 (1pm)	108.3 km/h	
	Both Directions	660	52 (10am)	52 (1pm)	108.4 km/h	
West of Site Access	Eastbound	304	24 (11am)	28 (1pm)	105.9 km/h	31%
	Westbound	327	25 (11am)	24 (1pm)	106.0 km/h	
	Both Directions	631	49 (11am)	52 (1pm)	105.8 km/h	

The survey data indicates the Gwydir Highway currently experiences a low level of daily traffic in the order of 650 vehicles per day which is split evenly between eastbound and westbound vehicles. The 85th percentile speed is within the posted speed limit and the road accommodates approximately 30% heavy vehicle traffic.

A review of the data shows that the current Gin would be expected to generate at least 29 vehicle per day to and from the east (i.e. to/from Moree area) based on the difference in traffic volumes recorded by the counters.

The average Monday to Friday hourly volumes recorded to the east of the site access are shown graphically in Figure 5.

Figure 5: Average Week Day Traffic Volumes on Gwydir Highway near Site Access



The figure shows that the traffic volumes along the highway with a relatively consistent volume of traffic between 7:00am and 6:00pm on weekdays, with volumes lower over lunchtime (11am to 12noon), evening and overnight.

Overall, the data indicates Gwydir Highway currently accommodates a relatively low level of traffic for its road classification.

2.3.2 Intersection Volumes

To gain an improved understanding of the current operation of the road network Amber commissioned a turning movement count surveys at the intersection of the Gwydir Highway and Watercourse Road, and at the site access. The survey was undertaken on Thursday 24 August 2023 from 6:00am to 10:00am and from 3:00pm to 7:00pm. The full survey results are presented within Appendix A and the peak hour survey results for the intersections are presented in Figure 6 and Figure 7.

Figure 6: Peak Hour Survey Results – Watercourse Road

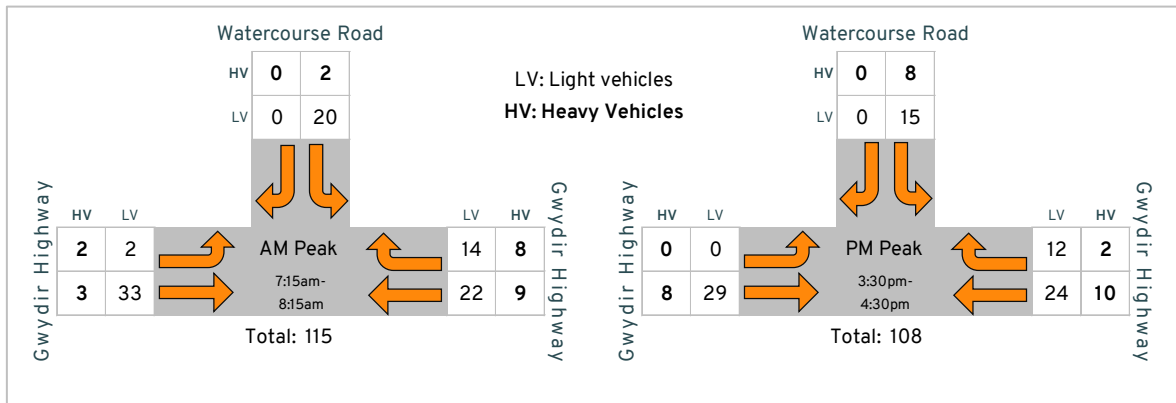
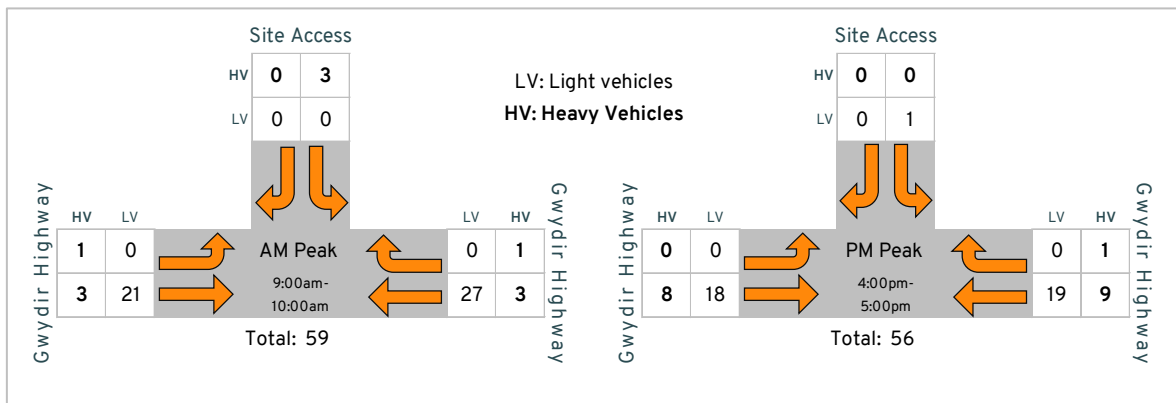


Figure 7: Peak Hour Survey Results – Gin Access



In summary, the survey results indicate:

- Both intersections carry relatively low levels of traffic with approximately 110 movements and 60 movements recorded at the Watercourse Road and site access intersections, respectively.
- Based on a 10% peak hour to daily traffic volume relationship, Gwydir Highway would be expected to carry approximately 600 vehicles per day past the site¹. Watercourse Road would be expected to carry approximately 400 vehicles per day.
- The peak hours recorded at the intersections varied with volumes relatively consistent over the survey period.
- The surveys showed that most traffic to Watercourse Road and the site access were to and from the east, which would be expected given the proximity to Moree and other regional centres.

Overall, the results indicate both intersections accommodate low levels of traffic.

Notably, the traffic volumes recorded as part of the intersection surveys showed volumes that were marginally higher on the Gwydir Highway during the peak hours. As a result they have been used for the purposes of further assessment as outlined in Section 4 and 6.1.

¹ This compares well with available TfNSW data, with volumes from Station 1D 91051 (10km east of the site closer to Moree) recording 600 vehicles per day with 34% heavy vehicles with an even distribution over the course of a day.

2.3.3 Agricultural Activities

The nature of the surrounding area and seasonal cotton growing activities means that traffic volumes vary over the year. To gain an understanding of this variation, data was obtained for activity at the Wathagar (site) Weighbridge over a 12-month period to August 2023.

A total of 914 truck movements through the weighbridge were recorded. The distribution over the months of the year shown in Figure 8.

Figure 8: Wathagar Weighbridge Truck Activity 2022/23

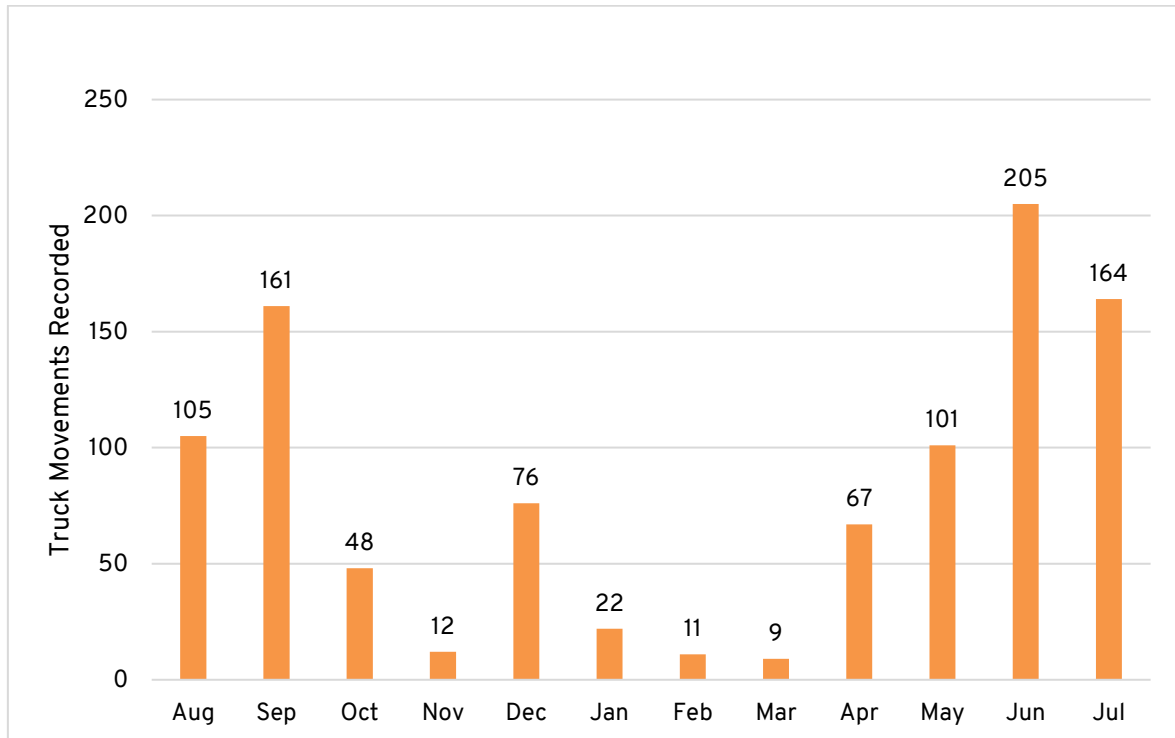
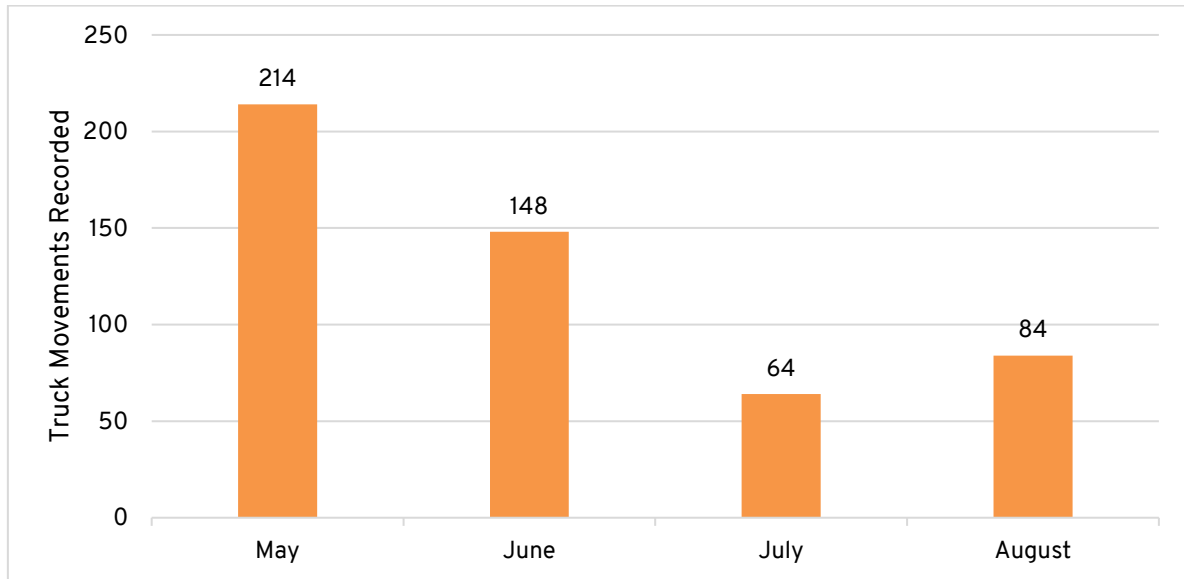


Figure 8 shows that the peak activity occurred in June with activity levels elevated between May and September. Activity was generally lower outside this period except for in December.

Similar counts were undertaken over the peak between May and September in 2024 which are shown graphically in Figure 9.

Figure 9: Wathagar Weighbridge Truck Activity 2024



The results in 2024 show the season peaked earlier but the overall traffic volumes were similar to the average volumes recorded over 2022 and 2023.

Overall, the results show that August is within the time of year when agricultural activities are elevated. Accordingly, the results of the turning movement count surveys reflect the typical operating conditions of the surrounding road network.

2.4 Public Transport Services

No public transport services are provided within the vicinity of the site. A train station and regional airport are in the township of Moree approximately 33 kilometres north east of the site.

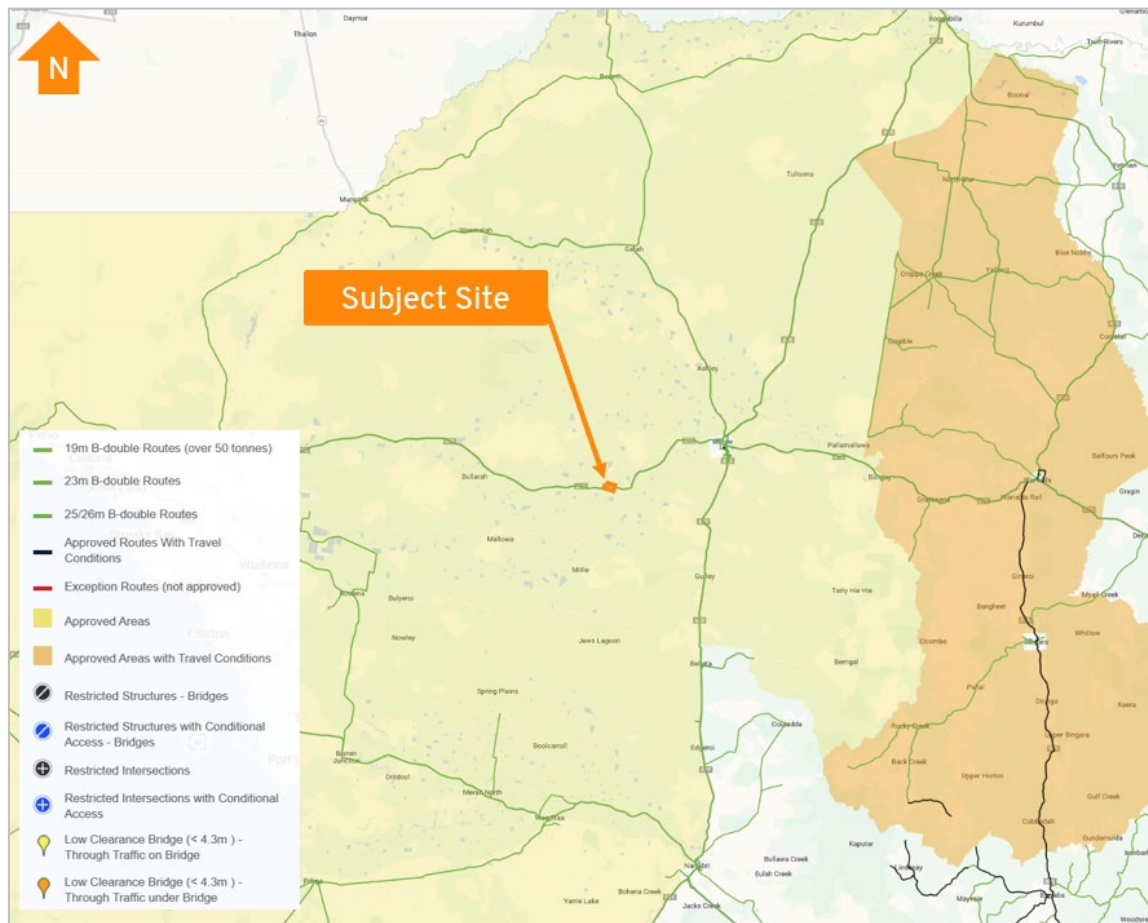
School bus routes currently operate along Watercourse Road and Gwydir Highway east of Watercourse Road with two services per day for pick-up and drop-off to schools in Moree. The services operate between 7:00 and 8:00am in the morning and 3:30 and 4:30pm in the afternoon, on school days only.

It is understood that the services are operated by Reynolds & Fogarty out of Moree (front office contact number: 02 6752 2287 and email: office@moreebus.com.au).

2.5 Restricted Vehicle Access

The National Heavy Vehicle Regulator (NHVR) manages maps that outline approved routes for restricted access vehicles, including B-Doubles and Class 1 OSOM vehicles. The B-Double and Class 1 OSOM maps are shown respectively in Figure 10 and Figure 11

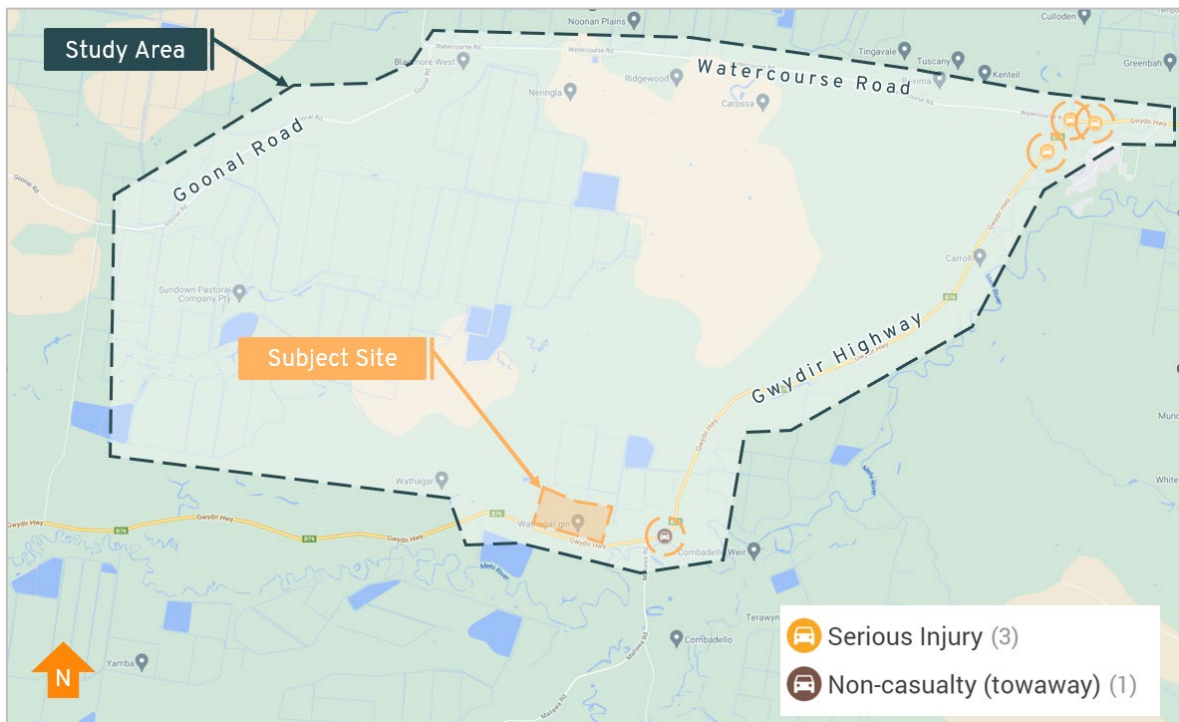
Figure 10: NHVR Restricted Access Vehicle Map



Source: NHVR Restricted Vehicle Access Map

Figure 10 indicates the Gwydir Highway, and the broader surrounding area (shown in yellow), are approved routes for B-Doubles.

Figure 12: Crash Statistics



Source: NSW Crash Data (Open Data), Google Maps

The figure shows that a total of three crashes occurred in the vicinity of Watercourse Road and the Gwydir Highway and one mid-block crash on the Gwydir Highway approximately 2.4 kilometres east of the site access which did not result in an injury. No other crashes were recorded in the study area.

The three crashes that occurred at the intersection of Watercourse Road and the Gwydir Highway all resulted in serious injuries. These crashes comprised:

- An off-carriageway crash involving a road train on the Watercourse Road approach to the intersection, which occurred in 2018,
- A crash in 2022 involving a light truck and motorcycle near a driveway approximately 500 metres to the east of the intersection, and
- An off-carriageway crash involving a light truck on the Gwydir Highway approximately 900 metres south of the intersection that occurred in 2022.

A review of the crashes shows that they are mixed in regard to location, road user group and type, without a clear pattern that would indicate a significant existing road safety issue.

Accordingly, given the road classification and use, it is concluded that the surrounding road network is currently operating in a relatively safe manner.

3. Project Description

3.1 Proposed Works

As outlined in the SoEE, the Wathagar Solar Farm Stage 2 development will consist of:

- *Civil works to prepare the site.*
- *Fixed PV array structures.*
- *Inverters and step-up transformers to convert direct current (DC) electricity produced by the solar PV panels into alternating current (AC) capable of being connected to the electrical grid.*
- *Battery storage containers with up to 30 MWh of combined storage capacity.*
- *Associated cabling, communications, and switching infrastructure.*
- *Surrounding chain link fence with gates for access.*

Principal access to the site is to be confirmed and would be either:

- Directly to the State Road network via an upgraded main Gin access to the Gwydir Highway.
- The existing unsealed private road network connecting to Goonal Road, Watercourse Road and the Gwydir Highway.

An existing secondary (emergency) access is available via an internal dirt road that is maintained by Sundown Pastoral and leads out to the Gwydir Highway to the west of the plant. The access arrangements are discussed in further detail below.

3.2 Construction Information

The physical construction of the project is expected to commence in late-2025 and take approximately 20 weeks.

Construction activities would be undertaken during standard daytime construction hours, as follows:

- Monday to Friday: 7am – 6pm
- Saturday: 7am – 1pm
- No work on Sundays or public holidays.

Any construction outside of these normal working hours would only be undertaken if it is allowable within consent conditions or with prior approval from relevant authorities.

A peak workforce of approximately 33 personnel would be on-site during peak construction periods with the workforce expected to be primarily located in Moree and the surrounding region during construction.

A Traffic Management Plan (TMP) would be prepared by the appointed contractor prior to construction commencing as outlined in Section 7.

3.3 Access Arrangements

A total of two scenarios are being considered for access to the project as outlined in turn below.

3.3.1 Scenario 1

Utilise the main access off the Gwydir Highway into the Wathagar Cotton Gin for the purposes of the project. This would be upgraded with a Basic Left Turn (BAL) and Basic Right Turn (BAR) turn treatment for a 26 metre long B-Double design vehicle. The upgrade will result in modest shoulder widening and a removal of up to two planted trees.

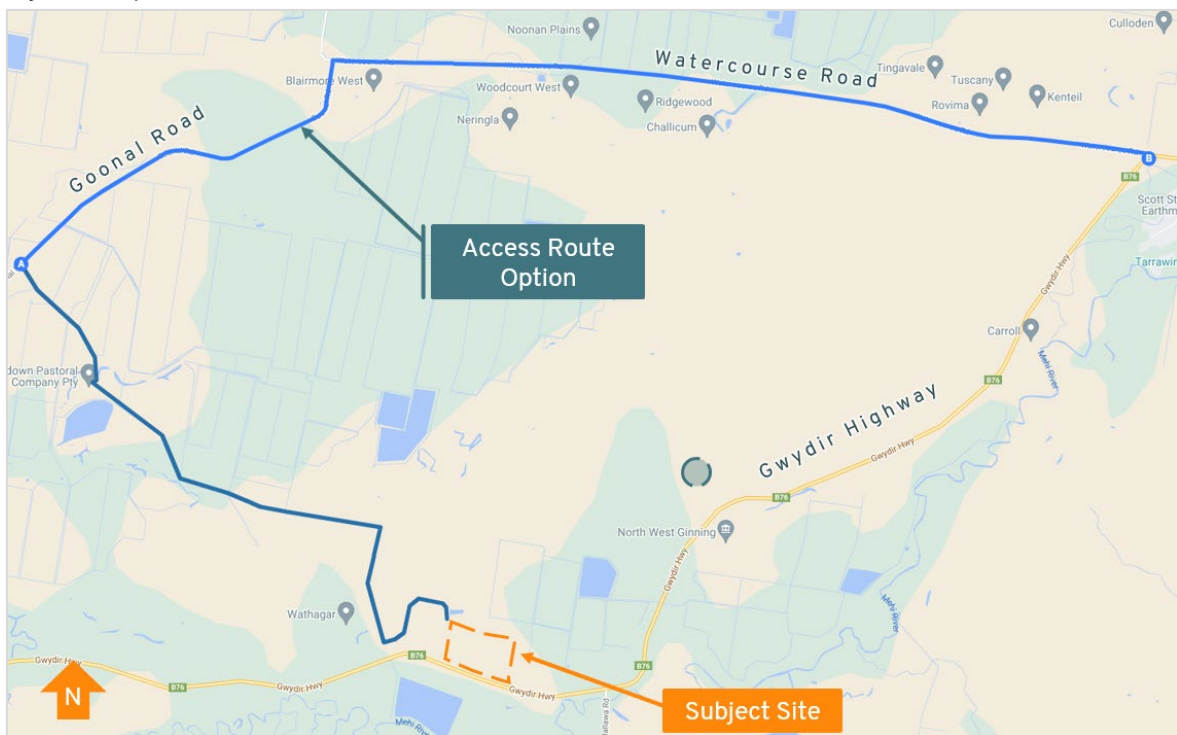
The timing of the works to upgrade the access are to be confirmed.

A strategic concept plan of the upgrade is presented in Appendix B for reference.

3.3.2 Scenario 2

Utilise the existing unsealed private road network, Goonal Road and Watercourse Road from the Gwydir Highway, as shown in Figure 13. This route was utilised for construction activities associated Wathagar Solar Farm Stage 1.

Figure 13: Option 2 Access Route



Source: Google Maps

The route shown in Figure 13 would be used for heavy vehicle project traffic in the event on-site project construction works commence prior to the main site access being upgraded.

4. Traffic Assessment

Traffic generated by the project can be separated into three distinct stages: construction, operation and decommissioning. The peak traffic generating potential is during construction which generates trips associated with the workforce accessing the Project Area and the delivery of raw materials and plant. During operation the project is expected to generate a much lower amount of traffic associated with maintenance personnel infrequently accessing the Project Area for routine monthly maintenance and unplanned outage service work. Decommissioning is anticipated to generate a similar level of traffic to the construction stage.

The following provides an assessment of the potential traffic impacts of the Project on the road network function for each of the three stages.

4.1 Definitions

The following terminology is referenced throughout this section and within the remainder of the report.

Table 4: Traffic Assessment Definitions

Terminology	Definition
Vehicle Trip	A trip is defined as a one way vehicular movement from one point to another excluding the return journey. Therefore, a return trip to and from the site is counted as two trips.
Vehicle Trips per Day (vpd)	The volume of traffic (number of trips) occurring within a 24-hour period. For traffic volumes associated with the Project, this value is generally an even number to reflect the arrival and departure of each vehicle.
Vehicle Trips per Hour (vph)	The volume of traffic (number of trips) occurring within a one hour period.
Heavy Vehicle	A vehicle with a Gross Vehicle Mass (GVM) or Aggregate Trailer Mass (ATM) of more than 4.5 tonnes as defined in the Heavy Vehicle National Law (HVNL).
General Access Vehicle (GAV)	General Access Vehicles (GAV) don't require a permit or notice to access road networks; these vehicles have as-of-right access to the network unless signposted otherwise (e.g. a bridge tonnage restriction).
Restricted Access Vehicle (RAV)	Restricted Access Vehicles (RAV) include Class 1, 2 or 3 vehicles that operate under a notice or permit and vehicles operating under higher mass limits (HML) that have restrictions on the parts of the road network they can access.
Oversize and/or Overmass (OSOM) Vehicle	OSOM vehicles are defined as Class 1 vehicles under the Heavy Vehicle National Law. A vehicle or vehicle combination is considered to be OSOM if it exceeds any general access mass or dimension limits.
High Risk Oversize/Overmass Vehicle (requiring escort)	OSOM vehicles exceeding certain criteria for length, height, rear overhang, forward projection, width or total combination weight. These vehicles are subject to Transport Management Plans (TMPs) which provide a comprehensive planning and execution focus to ensure that these movements are carried out in a safe and responsible manner with reduced impact on other road users and road infrastructure. These vehicles also require a pilot vehicle/escort.

4.2 Pre-Construction Minor Works

The impact of pre-construction minor-works is negligible and would represent up to one or two light vehicles per day, typically associated with surveyors or consultants visiting the site. The existing sealed access into the Wathagar gin is considered adequate to accommodate pre-construction minor-works.

4.3 Construction Phase

4.3.1 Construction Traffic Generation

Construction traffic generated by the Project on a day-to-day basis can be broadly separated into the following categories as outlined in Table 5.

Table 5: Standard Construction Traffic

Terminology	Definition
Light Vehicles	The use of light vehicles will be associated with transporting the workforce to/from the Project Area. Measures to encourage car pooling would form part of a future Traffic Management Plan as outlined in Section 7.3. To undertake a conservative assessment, it has been assumed that each light vehicle would have an average occupancy of 1.5 people.
Heavy Vehicles	
Rigid Trucks	Rigid Trucks have a typical length between 8 and 13 metres.
Truck and Dog	Truck and Dog vehicles consist of a rigid truck towing either a dog trailer or a pig trailer and are not more than 19 metres in length. A dog trailer is a trailer with axles at either end of the trailer, a pig trailer has the axles centred on the trailer.
Semitrailers	These vehicles consist of a truck and a single trailer with a total length of 19 metres. For this project, semitrailers used for the project will take the form of split, single trailer road trains.
B-Doubles	B-Doubles consist of a truck with two trailers and have a maximum length of 26 metres.
Non High Risk OSOM (not requiring escort)	Class 1 OSOM vehicles which can operate on approved networks subject to travel conditions, including vehicle combinations carrying goods such as cranes.

The peak hour for construction traffic will occur at the start and end of the day when workers are transported to/from the Project Area. Most workers will typically arrive on-site between 6:00am and 7:00am and depart between 4:00pm and 6:00pm. Workers generally have staggered finish times which results in the evening peak hour being less pronounced, however for the purposes of this assessment it is conservatively assumed that the evening peak hour Project traffic is the same as the morning peak, and the evening Project peak hour occurs from 5:00pm to 6:00pm.

The construction traffic volumes for the Project have been provided by the Applicant. It is anticipated that during peak construction the Project would generate up to 44 light vehicle trips and 14 heavy vehicle trips per day. Table 6 summarises the forecast traffic volumes expected to be generated during the construction period of the Project.

Table 6: Traffic Generation During Construction Period

Vehicle Type		Average Construction Periods		Peak Construction Period	
		Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)	Vehicle Trips per Day (vpd)	Peak Hour Trips (vph)
Light Vehicles		10	5	44	22
Heavy Vehicles	Rigid Trucks	0	0	0	0
	Truck and Dog	0	0	0	0
	Semitrailers	2	1	10	0
	B-Doubles	0	0	0	0
	Non High Risk OSOM	0	0	4	1
	<i>HV Subtotal</i>	2	1	14	1
Total		12	6	58	23

Overall, the Project is expected to generate up to 23 vehicle trips per hour in the morning and evening construction peak hours during the peak construction period, which would reduce to 6 vehicles trips during the average construction periods.

A review of Table 6 also shows that:

- The largest heavy vehicles expected to regularly access project site are 19 metre long articulated vehicles.
- Deliveries associated with heavy vehicles are primarily expected to occur during the day with only one heavy vehicle trip anticipated to occur during the peak hours during the peak construction period.
- No Rigid Trucks, Truck and Dog and B-Double type heavy vehicles are expected to access the project during construction. However, in the event that any of these truck types are required, any trip would replace that generated by a semitrailer (i.e. there would be no net increase to the total expected number of heavy vehicles during peak construction periods).

4.3.2 Non High Risk OSOM Vehicles

There is anticipated to be a up to a total of six non High-Risk OSOM vehicles to transport battery containers which may be classified as over mass (but not over dimensional).

There may also be a mix of other non-high risk OSOM vehicles required for construction activities which includes vehicles and plant like:

- cranes
- drum rollers
- excavators
- graders
- compactors
- pile driving rig
- cable trenching and laying equipment

It is anticipated that the vehicles would comply with the Class 1 exemption notices and would be able to operate on the approved NSW Special Purpose Vehicle Network. The vehicles would access the site from the which is rated to accommodate complying vehicles.

4.3.3 High-Risk OSOM Vehicles

No High-Risk OSOM vehicles are required for the project.

4.3.4 Traffic Distribution

It is anticipated that the majority of the workforce for the construction of the Project would be located in Moree and the surrounding area. Materials and equipment will generally be sourced from within Moree or the surrounding area where practicable. The majority of larger plant is expected to be delivered from Port of Brisbane, with some specialist plant delivered from other locations in New South Wales.

Accordingly, the following distribution for the AM peak hour has been adopted:

- **Light vehicles:** 90% from the east, 10% from the west; and
- **Heavy Vehicles:** 100% from the east.

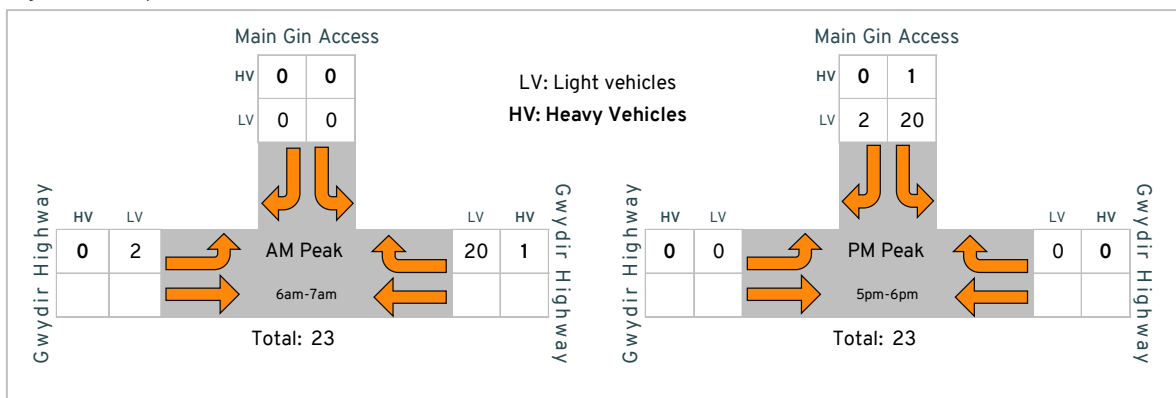
During the morning peak all vehicle trips would be toward the site and in the evening peak all vehicle trips would be away from the site. The majority of heavy vehicle trips would be distributed throughout the day and would be split evenly between inbound and outbound trips.

Based on the traffic distribution above the estimated vehicle trips generated by the site during the peak hours are described below for the two access scenarios.

4.3.4.1 Scenario 1 – Main Gin Access

Scenario 1 involves the use of the existing main Gin access for all construction traffic. Based on the traffic generation and distribution characteristics described above, the anticipated increase in traffic volumes during construction at the site access intersection is shown in Figure 14.

Figure 14: Expected Construction Peak Hour Traffic Generation – Scenario 1

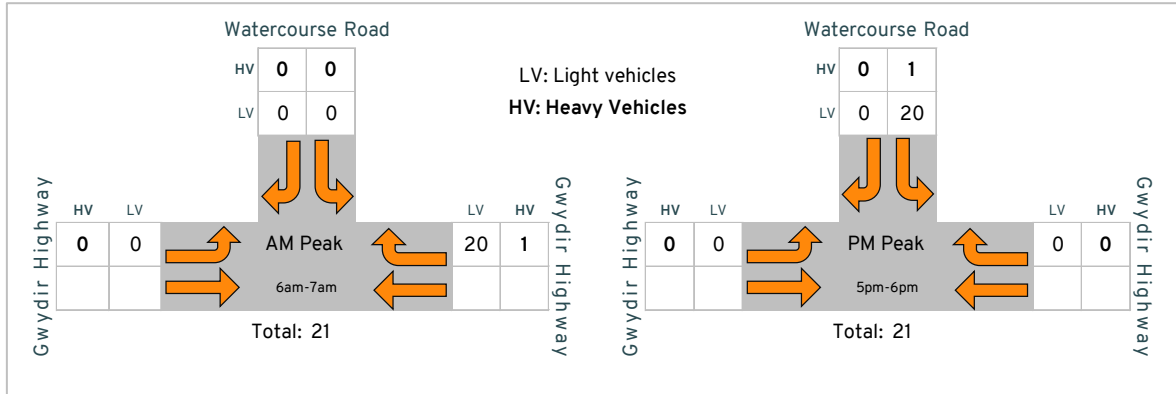


The figures show that the additional trips generated during the construction peak hours will predominately to/from the east.

4.3.4.1 Scenario 2 – Watercourse Road

Scenario 2 involves the use of Goonal Road and Watercourse Road from the Gwydir Highway for construction vehicles (as shown in Figure 13 above). The anticipated increase in traffic volumes during construction peak hours at the intersection of Gwydir Highway and Watercourse Road is shown in Figure 15.

Figure 15: Expected Construction Peak Hour Traffic Generation – Scenario 2



It should be noted that the small percentage of light vehicles (10%) that have an origin and destination to the west of the project area would use the existing Gin access to arrive and depart the site.

4.3.5 Cumulative Traffic Impacts

The primary traffic impact of the Project is generated during construction which is anticipated to commence in late-2025 and take approximately 20 weeks. A summary of the major projects proposed in the surrounding area, along with other projects is provided in Table 7 with a description and assessment of potential cumulative impacts.

Table 7: Assessment of Cumulative Impacts of Nearby Developments

Project	Description	Potential Vehicle Conflict
Heavy Duty Pavement Upgrade, Narrabri to Moree (Under Construction)	Implementation of heavy duty pavement upgrades between Narrabri and Moree on the Newell Highway	Sections near Moree are due for completion in late-2024, with the project expected to be completed by early 2026. As a result of the construction program there is not expected to be interaction between construction traffic.
Inland Rail - Narrabri to North Star Phase 1 (Commissioning Phase)	Construction of approximately 170 kilometres of upgraded track between Narrabri and North Star, excluding the Mehi-Gwydir floodplain. The project forms part of the Inland Rail project	The project is nearing completion. As a result there is not expected to be interaction between construction traffic.

Project	Description	Potential Vehicle Conflict
Inland Rail - Narrabri to North Star Phase 2 (Approvals Phase)	Upgrade of approximately 15 km of the existing rail line track and track formation within the Narrabri to North Star corridor running from Moree north to beyond the Camurra Bypass, including the Mehi-Gwydir river crossings.	There is potential for construction of both projects to overlap. The traffic generated from both projects may interact along the Newell Highway on the northern side of Moree.
Moree Solar Farm (Constructed)	Development of a 56 MW solar farm and associated infrastructure.	The project is complete. As a result there is not expected to be interaction between construction traffic.
Moree Hospital Redevelopment (Construction Tender Released)	Redevelopment of the existing Moree Hospital, including upgraded facilities and modern clinical services.	There is potential for construction of both projects to overlap. The traffic generated may interact in the township of Moree.

The above assessment indicates that part of the Inland Rail project, pavement upgrade works on the Newell Highway, and the Moree Hospital Redevelopment could interact with the project. However, these interactions would be expected to occur in the township of Moree or on the Newell Highway, at least 30 kilometres from the project area. The impacts of these projects near the project area would be expected to be negligible.

There are also the cumulative impacts associated with the operation of Solar Farm Stage 1 and operation of the Wathagar Gin, which could interact with project construction traffic.

A summary of the potential interactions is provided in Table 8 with an assessment of potential cumulative impacts.

Table 8: Assessment of Cumulative Impacts at Wathagar Gin

Project	Description	Potential Vehicle Conflict
Stage 1 Solar Farm (Operational Activities)	An operational 8.65MW solar farm adjacent to site	The operation of the solar farm generate is not expected to generate any traffic on a day-to-day basis.
Wathagar Gin (Operational Activities)	Existing cotton ginning facility	The operational characteristics of the Gin are not expected to significantly change in the future with the operation to be within exiting development controls and licences that apply. Existing traffic to and from the site recorded in recent traffic surveys is considered reflective of future conditions.
Good Earth Green Hydrogen & Ammonia Project (Prepare EIS)	Construction and operation of a proposed green hydrogen and green ammonia production and storage facility	The present schedule reflects that any construction activities associated with the GEGHA project are to commence only after the Stage 2 Solar Farm work are complete and operational. However, there is a chance that Solar Stage 2 project could be delayed, which may result in the GEGHA project commencing during the commissioning/testing phase of Solar Stage 2 (i.e. after the construction peak) Therefore it has been assumed that the GEGHA project could generate up to 20 light vehicles and 4 heavy vehicles in the construction peak hours. This represents a very conservative assessment as the GEGHA project would not commence during the construction peak of Solar Stage 2.

A review of Table 8 shows that cumulative impact expected with projects on the site are expected to be negligible with the only project with a potential to generate traffic being the GEGHA project, in the unlikely event the Solar Stage 2 project is delayed.

The potential cumulative impact of the GEGHA project is shown in Figure 16 and Figure 17 for the respective access scenarios.

Figure 16: Expected Cumulative Construction Peak Hour Traffic Generation – Scenario 1

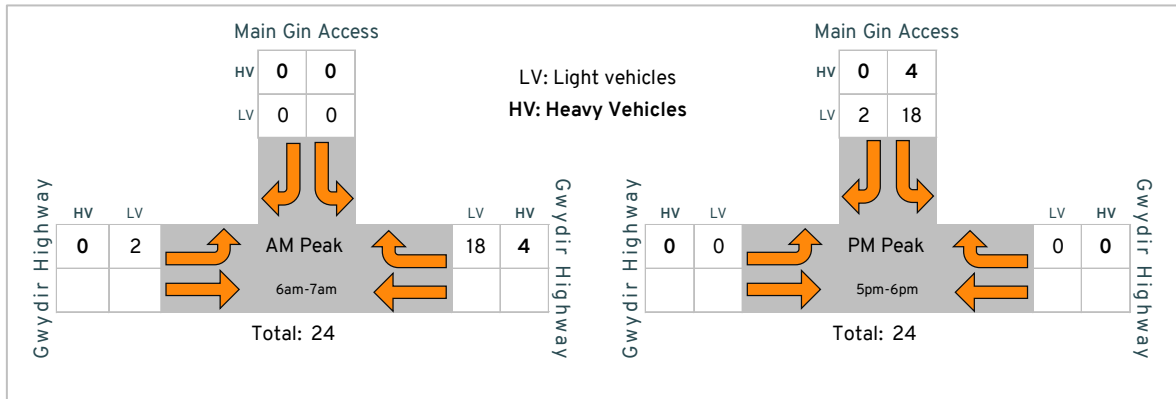
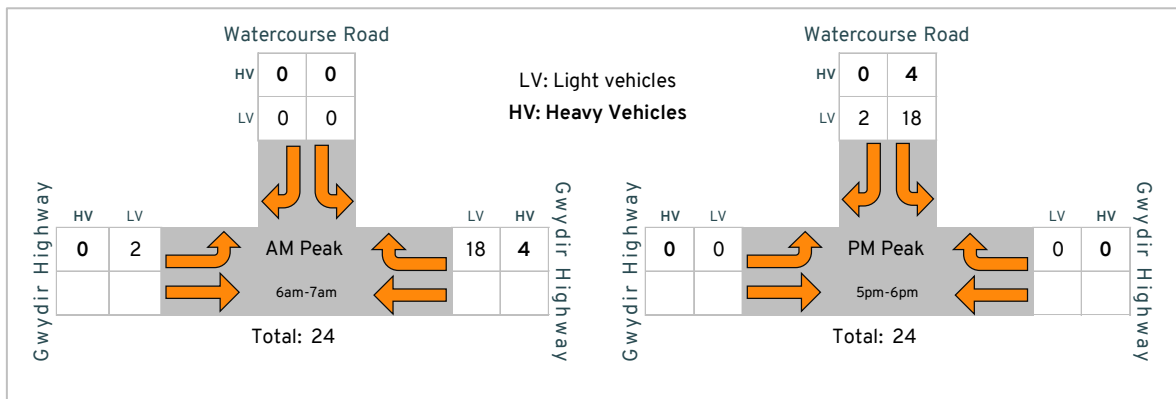


Figure 17: Expected Cumulative Construction Peak Hour Traffic Generation – Scenario 2



The figures show the potential impact of the GEGHA project, noting that this impact would only be expected to occur in the unlikely event that the Solar Farm Stage 2 project is delayed.

4.3.6 Traffic Assessment

All traffic travelling to/from the Project Area would travel via the Gwydir Highway. An assessment of the mid-block operation of the road has been carried out to determine the ability of the road network to accommodate the traffic expected to be generated during the peak construction period.

An important consideration in determining the impact of a development proposal on the road system is to assess the effect on traffic efficiency, the objective of which is to maintain the existing level of service. Level of Service is defined within the *Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis* as:

‘... a qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers. A level of service definition generally describes these conditions in terms of factors

such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience, and safety.'

Levels of service are designated from A to F from best (free flow conditions) to worst (forced flow with stop start operation, long queues and delays). Table 4.5 of the RTA Guide sets out two-way hourly road capacities for two-lane roads for different levels of service and based on different terrain types. The maximum volume to achieve LOS A for a level rural road with up to 15% heavy vehicle traffic is in the order of 530 vehicle trips per hour.

The expected traffic volumes along the Gwydir Highway have been determined based on the morning and evening peak of construction traffic which occurs from 6:00am-7:00am and 5:00pm-6:00pm, respectively. The traffic volumes consist of the sum of the following:

- Existing surveyed traffic volumes along Gwydir Highway at the site access adjusted by a 1.5% compounded annual growth rate to reflect the construction period in 2026;
- The potential cumulative impacts of projects as described in Section 4.3.5; and
- Peak hour construction traffic volumes outlined within Table 6.

The traffic volumes accommodated on the Gwydir Highway during the peak hours are shown within Table 9, which is based on the surveyed traffic volumes presented in Section 2.3.1 and the anticipated traffic generation associated with the site and cumulative impacts as presented above.

Table 9: Expected Peak Hour Traffic Volumes During Construction

Road	AM Peak: 6:00am-7:00am			PM Peak: 5:00pm-6:00pm		
	Existing Volume	Expected Volume	LOS	Existing Volume	Expected Volume	LOS
Gwydir Highway	38vph	85vph	A	58vph	105vph	A

Therefore, during the peak hours of construction Gwydir Highway would accommodate approximately 85 and 105 vehicles per hour during peak construction periods (AM and PM respectively) which is well within the capacity of the road network, and the road is expected to continue to operate with a good level of service based on Table 4.5 of the RTA Guide.

The level of service would be similar on Watercourse Road and Goonal Road during construction should they be used for access given the current low level of traffic on these roads and the modest increase associated with the project.

During the middle of the day the traffic movements are expected to be predominantly associated with heavy vehicles with approximately eight to ten vehicles per hour (arriving and departing). This increase in traffic would be within the daily variation of traffic volumes on the Gwydir Highway and can be readily accommodated on the road network.

Accordingly, the road network is able to readily accommodate the traffic generated by the development during the construction periods.

4.4 Operational Phase

During operation, the solar farm is expected to generate a minimal level of traffic associated with maintenance and operation services. The solar farm is expected to require monthly maintenance with up to two personnel resulting in a traffic generation of up to 4 vehicle trips on relevant days

which would result in a negligible change to the traffic environment. There would also be occasional heavy vehicles (up to 26m B-Doubles) delivering plant and equipment to the site, but only as required for maintenance.

4.5 Decommissioning Phase

At the end of the operational life of the Project all infrastructure would be dismantled and removed from the Project Area. Internal roads, if not required for ongoing farming purposes would be removed and the site reinstated as close as possible to its original state.

Traffic generation during decommissioning would be similar to traffic generation during the average construction period. A comprehensive Traffic Management Plan would be prepared prior to the decommissioning phase in conjunction with the relevant road authorities which would ensure adequate road safety and road network operations are maintained.

5. Heavy Vehicle Route Assessment

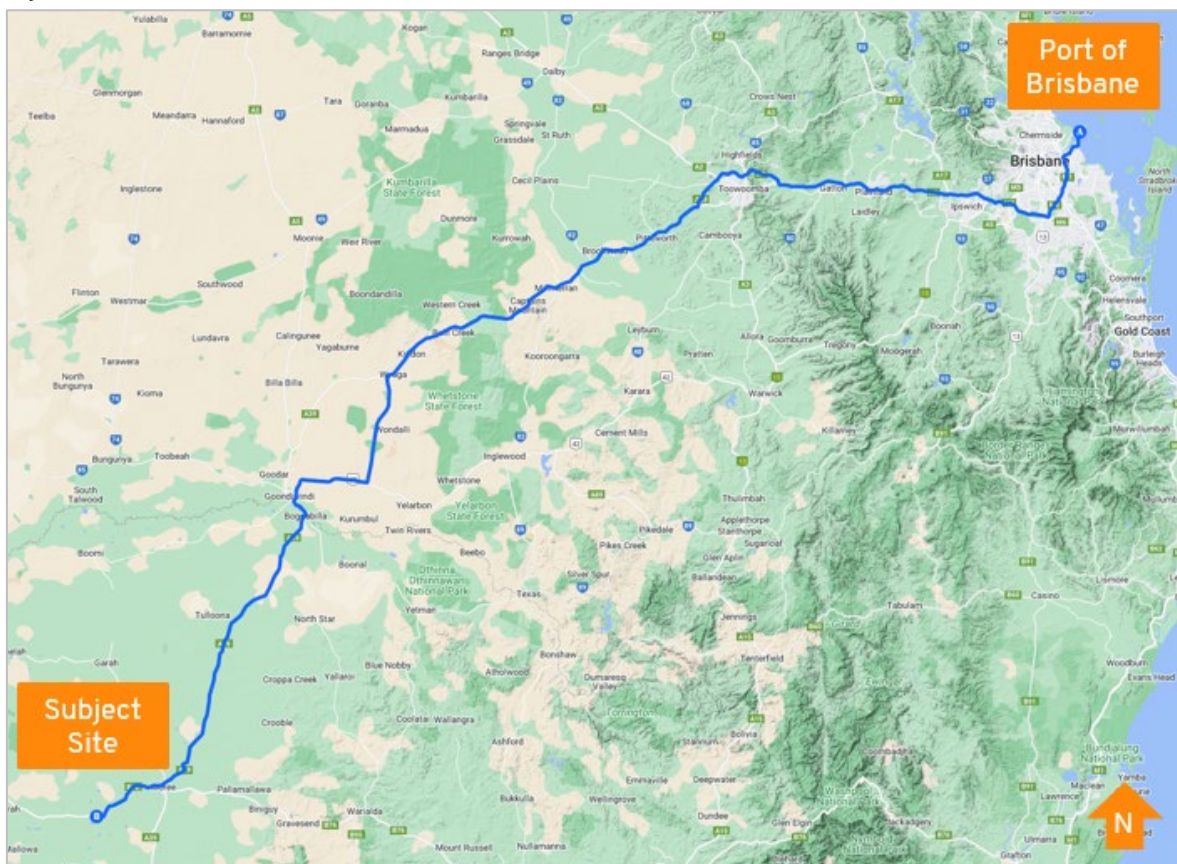
The Port of Brisbane and the Port of Newcastle have been identified as the preferred ports where most specialist plant would be imported.

The following sections provides a review of the proposed access routes for heavy vehicles including non-high risk OSOM vehicles travelling from the port.

5.1.1 Port of Brisbane

Figure 18 shows the proposed access route from the Port of Brisbane.

Figure 18: Access Route from Port of Brisbane to Site



Source: Google Maps (NHVR Route Planner ID: 1FRR5-0)

Table 10 provides a summary of the roads used. The access route measures approximately 538 kilometres and utilises roads that are designated for heavy vehicles as outlined within the relevant NHVR Route Maps presented above.

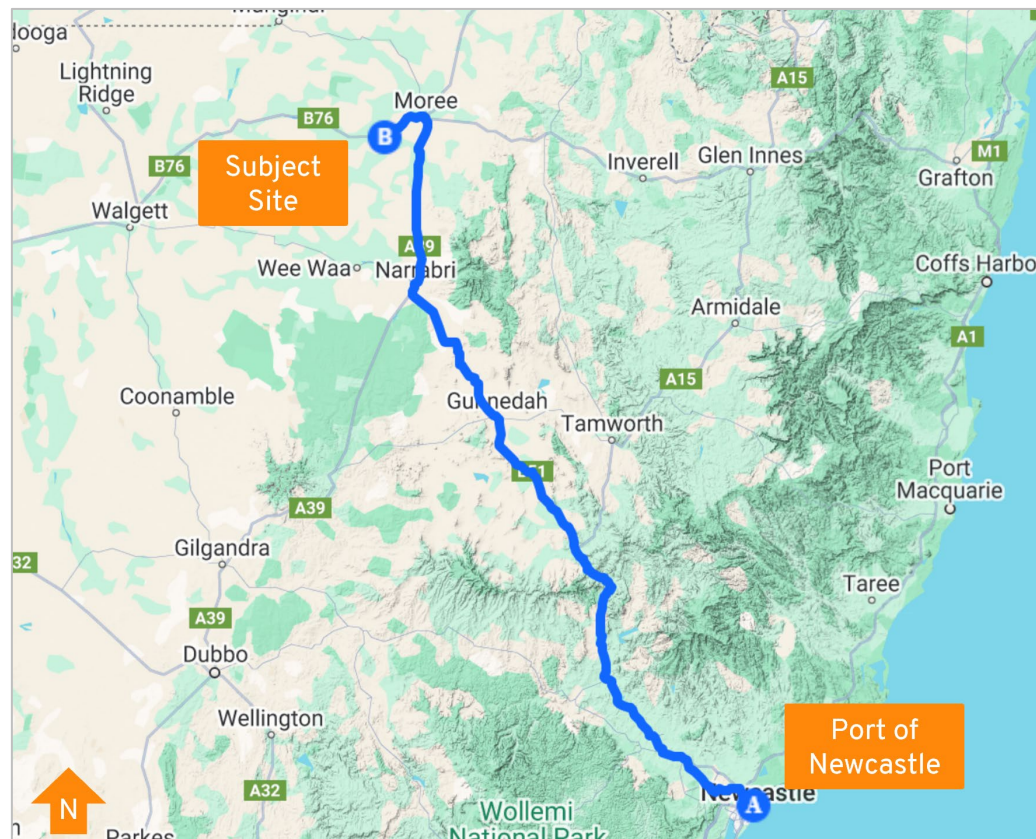
Table 10: Heavy Vehicle Route - Access Roads – Port of Brisbane

Road Name	State	Jurisdiction	B-Double / Class 1 OSOM Approved
Port Drive	Queensland	Department of Transport and Main Roads (TMR)	Approved
Lytton Road, Hemmant			
Port of Brisbane Motorway			
Gateway Motorway			
Logan Motorway			
Ipswich Motorway			
Warrego Highway			
Gore Highway			
Leichhardt Highway			
Cunningham Highway			
Newell Highway	New South Wales	Transport for NSW (TfNSW)	Approved
Gwydir Highway			

5.1.2 Port of Newcastle

Figure 19 shows the proposed access route from the Port of Newcastle.

Figure 19: Access Route from Port of Newcastle to Site



Source: Google Maps (NHVR Route Planner ID: 2MF37-6)

Table 11 provides a summary of the roads used from the Port of Newcastle. The access route measures approximately 530 kilometres and like the route from the Port of Brisbane, utilises roads that are designated for heavy vehicles as outlined within the relevant NHVR Route Maps presented above.

Table 11: Heavy Vehicle Route - Access Roads – Port of Newcastle

Road Name	State	Jurisdiction	B-Double / Class 1 OSOM Approved
Selwyn Street	New South Wales	Newcastle City Council	Approved
George Street			
Industrial Drive		Transport for NSW (TfNSW)	Approved
Maitland Road			
John Renshaw Drive			
Hunter Expressway			
New England Highway			
Kamilaroi Highway			
Newell Highway			
Gwydir Highway			

5.1.3 Summary

The key haulage route to site primarily utilise suitable State Roads that are rated and pre-approved for up to B-Double / Class 1 OSOM vehicle combinations. These routes are suitable to accommodate the heavy vehicles to site without the need for any permanent road upgrades or changes.

It is noted that some specialist materials will be sourced from other locations in NSW such as cranes. The exact transportation routes are to be confirmed by would principally be via State Roads designated for Class 1 OSOM vehicles as outlined within the relevant NHVR Route Maps.

Approval would be sought prior to travel from the relevant road authorities via the NHVR prior to travel.

5.2 Mitigation Measures

A TMP is to be developed to minimise the impact of construction traffic as outlined in Section 7.

It is recommended the TMP include the following measure:

- Heavy vehicles should avoid travel during school peak periods and school bus operation (between 7:00 and 8:00am and 3:30 to 4:30pm on school days), and to limit the interaction of larger vehicles and vulnerable road users.

Following implementation of the proposed mitigation measure, it is concluded that the road network is suitable to accommodate the future heavy vehicle traffic volumes generated by the Project.

6. Site Access Assessment

6.1 Turn Treatments

Austrroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings specifies the turning treatments required at intersections. An assessment has been undertaken for both site access scenarios via the main Gin access or Watercourse Road to determine the suitable treatment for access to ensure safety at the State Road network.

In order to undertake an assessment of the worst-case scenario, assessments have been undertaken for both the construction peak (hour starting 6:00am) and the road network peak (as identified in Section 2.3 and shown in Figure 6 and Figure 7) inclusive of a 1.5% per annum growth rate. They have been undertaken with the project and consideration to cumulative traffic provided in Section 4.3.4 and 4.3.5. During the road network peak hour, the construction light vehicle traffic volumes are reduced as staff have already arrived at site.

The traffic volumes have been plotted against the requirements of Figure 3.25 of the *Austrroads Guide* and are shown in Figure 20 and Figure 21 for the main Gin access and Watercourse Road intersections are presented in the respective sections below for each scenario.

6.1.1 Scenario 1: Main Gin Access / Gwydir Highway

Figure 20: Turn Treatment Assessment Results – Main Gin Access

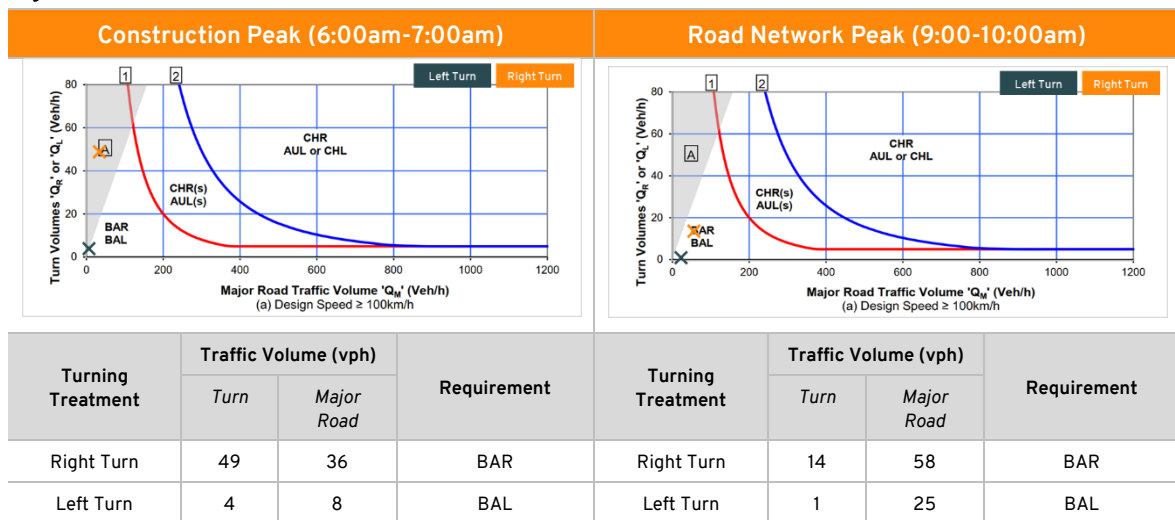


Figure 20 confirms that for that during the construction and road network peak hour the intersection at the main Gin access would require a Basic Left Turn (BAL) and Basic Right Turn (BAR) treatment should all construction traffic use this access.

A strategic concept plan of an upgrade to the existing main access with a Basic Left Turn (BAL) and Basic Right Turn (BAR) turn treatment for a 26 metre long B-Double design vehicle is provided in Appendix B. This exceeds the size of the anticipated largest heavy vehicle to regularly access the site during construction (19 metre long articulated vehicles) and is therefore considered suitable.

The site access design meets the turn treatment requirements outlined above. It is therefore concluded that it is suitable to accommodate the vehicles expected to access the site.

6.1.2 Scenario 2: Watercourse Road / Gwydir Highway

Figure 21: Turn Treatment Assessment Results – Watercourse Road / Gwydir Highway

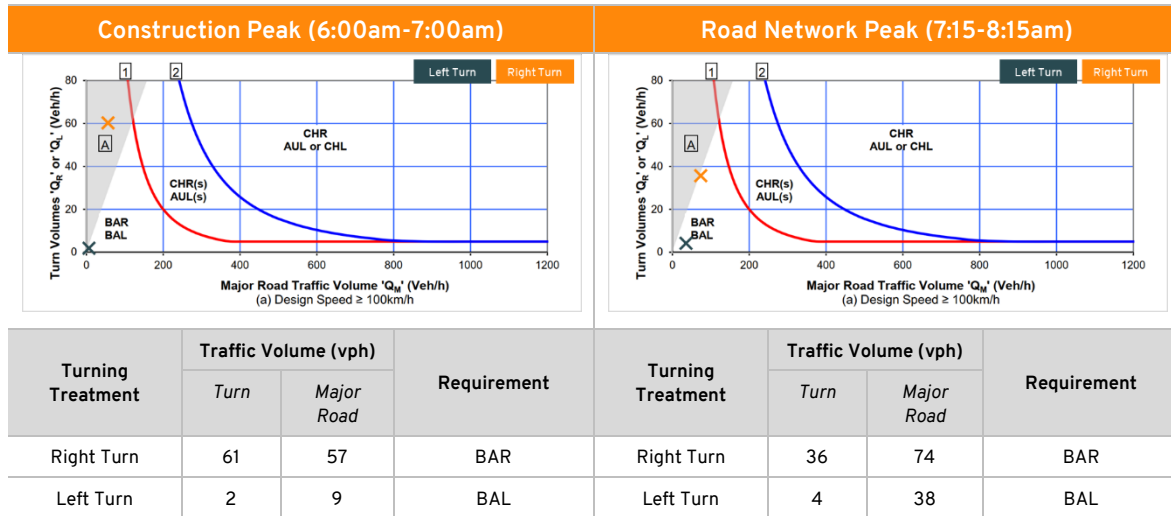


Figure 21 shows that for that during the construction and road network peak hour the intersection of Watercourse Road and Gwydir Highway would require a Basic Left Turn (BAL) and Basic Right Turn (BAR) treatment.

The intersection is already provided with basic turning treatments suitable for heavy vehicle use, noting that it is with a B-Double approved area, is currently used for access by large farming machinery, and was used as part of the construction access route for the Wathagar Solar Stage 1.

It is also noted that the local road network on this access route (Watercourse Road and Goonal Road) is sealed and suitable to accommodate the expected heavy vehicle traffic in a manner consistent with Wathagar Solar Stage 1.

6.1.3 Summary

The turn treatment assessments presented above show that both the main Gin access and the intersection of Watercourse Road of Gwydir Highway would generate requirements for Basic Left Turn (BAL) and Basic Right Turn (BAR) treatments.

The concept design for the upgrade at the main Gin access presented in Appendix B would meet the requirements, with the existing Watercourse Road and Gwydir Highway intersection already provided with suitable turn treatments.

Accordingly, the intersection treatments for both scenarios are considered suitable to enable access via the main Gin access or via Watercourse Road and the local road network.

6.2 Sight Distance

Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the Safe Intersection Sight Distance (SISD) as the minimum sight distance which should be provided along the major road at any intersection. Table 3.1 of the guide specifies the SISD required for various design speeds.

The Gwydir Highway has a speed limit of 100km/hr and 110 km/hr east and west of Watercourse Road, respectively.

As a result a design speed of 110 km/hr has been adopted for the intersection of Watercourse Road / Gwydir Highway, and 120 km/hr at the main Gin access. This results in a requirement of 300 and 341 metres of SISD, respectively based on a reaction time of 2.5 seconds.

6.2.1 Scenario 1: Main Gin Access / Gwydir Highway

A review of site pictures and aerials confirms that the visibility at the main Gin access exceeds the requirements for 341 metres given the relatively flat and straight alignment of the road network. The sight distance for each direction is depicted within Figure 22.

Figure 22: Sight Distance Assessment – Main Gin Access



The available sight distance at the main Gin access and Watercourse Road are presented in the with SISD drawings provided as part of the strategic designs prepared in Appendix B.

6.2.2 Scenario 2: Watercourse Road / Gwydir Highway

Similarly, a review of the visibility at Watercourse Road shows that the requirements of the Austroads Guide are met with an SISD in excess of 300 metres in both directions. The sight distances are depicted within Figure 23 and drawings provided in Appendix C.

Figure 23: Sight Distance Assessment – Watercourse Road / Gwydir Highway



6.2.3 Summary

Based on the above assessments, vehicles are expected to be able to safely enter the State Road network at both intersections used in the respective access scenarios.

7. Traffic Management Plan

It is recommended that a TMP be prepared prior to commencement of construction of the development. The TMP should be prepared and implemented in accordance with Australian Standard 1742.3 and the Work Health and Safety Regulation 2017. The TMP would provide additional information regarding the traffic volumes and distribution of construction vehicles that is not available at this time including:

- Road transport volumes, distribution and vehicle types broken down into:
 - Hours and days of construction.
 - Detailed schedules for phasing/staging of the project.
- The origin, destination and routes for:
 - Employee and contractor light vehicles.
 - Heavy vehicle traffic.
 - Oversize/overmass vehicles.
- A map of the primary haulage routes highlighting critical locations including sensitive interfaces and land uses such as schools and school zones, including schools and school zones within Moree.
- An induction process for vehicle operators and regular toolbox meetings.
- A complaint resolution and disciplinary procedure.
- Local climatic conditions that may impact road safety of employees throughout all Project phases (e.g. fog, wet and significant dry, dusty weather), including measures and protocols to ensure safe access to and from the site.

The following provides recommended measures that should be adopted within the TMP to minimise the impact of construction traffic along the road network.

7.1 Driver Protocols

Management of vehicular access to and from the site is essential in order to maintain the safety of the general public as well as the workforce. A Driver Code of Conduct is to be implemented as a measure to maintain safety within and around the site, as well as along the key routes to site:

- All vehicles would enter and exit the site in a forward direction.
- Heavy vehicle movements should avoid peak bus operating times and school zones to limit the interaction of larger vehicles and vulnerable road users.
- Safety initiatives for impacts to residential areas and/or school bus zones. This include regular reminders about the locations of school zones on the haulage routes to site, and the applicable speed zones through Moree. This includes the St Philomena's School Zone on the Gwydir Highway in Moree.
- Utilisation of only the designated transport routes.
- Construction vehicle movements are to abide by finalised schedules as agreed by the relevant authorities.

7.2 Information and Communication

The implementation of a community information and awareness program would assist in managing the traffic impacts. Prior to construction commencing and during the construction period, a program of consultation shall be initiated to ensure local residents are aware of construction traffic accessing the Project Area. This program may include elements of the following as appropriate to the phase of works:

- Specific emails, newsletters and individual letter drops to neighbouring residents along the access route to the Project.
- Provision of a website providing details of the status of works and contact details for complaints or enquiries.
- Provide key contact personnel and contact details, including out of hours contact information to residents, schools, public activities and business operating alongside the local route.
- Neighbours would be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.

7.3 Carpooling

The Proponent has advised that a carpooling program would be implemented to support sharing of vehicle trips for the workforce travelling to/from the site. The program would include:

- Incentives or benefits to encourage the use of carpooling.
- A roster system to rotate the carpooling drivers.
- Regular toolbox meeting sessions identifying method of travel to work and facilitating cooperation between workers.
- Allocating a team member to be responsible for management of the carpooling program.

7.4 On-Site Mitigation Measures

On-site mitigation measures targeted at safety and reducing the impact of on-site transport would include:

- On-site speed restrictions.
- Appropriate dust suppression measures.
- Maintenance program for on-site access tracks to ensure safe access.
- Loading and unloading is proposed to occur within the work area. No street or roads would be used for material storage at any time.
- Sufficient car parking is to be provided on-site to ensure vehicles do not park on the surrounding road network.
- All car parking and loading areas to be designed in accordance with Council requirements.

The above recommendations will ensure the construction traffic would have a minimal impact to the capacity and safety of the surrounding road network. The TMP would be prepared in conjunction with consultation with Transport for NSW and Moree Plains Shire Council.

8. Conclusion

Amber Organisation Pty Ltd has been engaged by Hiringa Sundown Project Trust to conduct a review of the traffic implications of the Wathagar Solar Farm Stage 2 Solar and prepare a Traffic Impact Assessment.

The Project Area is located on the north side of Gwydir Highway, approximately 33 kilometres southwest of Moree within the Gwydir Valley cotton growing region. Access to the site is proposed either via the existing main Gin access connecting directly to the Gwydir Highway which would be upgraded, or via Watercourse Road, Goonal Road and private internal roads.

The construction period is expected to commence in late-2025 and take approximately 20 weeks. A construction workforce of up to 33 personnel would be on-site during the peak construction phase and would primarily be drawn from the nearby town of Moree.

Specialist plant is expected to be predominately delivered from the Port of Brisbane. General construction materials and equipment will be sourced from within Moree or the surrounding area where practicable.

The above assessment determined the following:

- The site is expected to generate up to 58 vehicle trips per day during the peak construction period, including 14 heavy vehicle trips.
- A small component of the heavy vehicle traffic to site will be OSOM vehicles, however none of the OSOM vehicles required are classed as High-Risk OSOM.
- The principal haulage access route to site from the Port of Brisbane utilises State Roads that are designated for heavy vehicle use within the NHVR National Network Map.
- Two site access points are being contemplated for the project. A direct upgraded connection to the Gwydir Highway and the main Gin access, or via the existing unsealed private road network connecting to Goonal Road, Watercourse Road and the Gwydir Highway.
- An assessment of both access scenarios confirms that both access points and routes are able to suitably accommodate the project traffic and are provided with adequate sight distance to allow vehicles to safely enter the road network.
- In order to mitigate the impacts of the development during construction a TMP would be prepared which should include the recommendations provided within this document.
- During operations, the project is expected to require monthly maintenance with up to two personnel and associated heavy vehicles (as required) resulting in a traffic generation of up to 4 vehicle trips per day which on relevant days which would result in a negligible change to the traffic environment.

Accordingly, based on the assessment above and subject to the provision of appropriate management measures as part of a future TMP, it is concluded that the road network is able to accommodate the traffic generated by the development during the construction, operational and decommissioning stages, and safe access is provided to and from the project.

Appendix A

Traffic Survey Results



TRANS TRAFFIC SURVEY

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AUTOMATIC COUNT SUMMARY

Street Name :	Gwydir Hwy	Location :	East of Property 2908 Access
Suburb :	Moree	Start Date :	00:00 Wed 12/June/2024
Machine ID:	YC962XE9	Finish Date :	00:00 Wed 19/June/2024
Site ID:	3248	Speed Zone :	100 km/h
Prepared By :	Vo Son Binh	Email:	binh@trafficsurvey.com.au

GPS information Lat 29° 33' 36.58 South		Direction of Travel		
		Both directions	Westbound	Eastbound
Long 149° 36' 16.29 East				
Traffic Volume : (Vehicles/Day)	Weekdays Average	660	341	319
	7 Day Average	629	325	304
Weekday AM	10:00	52	24	28
Peak hour start PM	13:00	54	25	29
Speeds : (Km/Hr)	85th Percentile	108.4	108.3	108.7
	Average	98.5	98.6	97.9
Classification % :	Light Vehicles up to 5.5m	72.4%	72.7%	73.1%

Location

GPS Information [Load Google Map \(internet required\)](#)
(Latitude, Longitude) -29.560162, 149.604525



[Speed Data](#) [Speed Graph](#) [Speed Bin](#)
[Volume Data](#) [Volume Graph](#) [Classification](#)



QUALITY ASSURED COMPANY BY ISO 9001:2015
OH&S SYSTEM CERTIFIED TO ISO 4801:2001
ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

Status of movement – Covid 19

"Traffic behaviour is not the same as pre-pandemic (traditional morning/afternoon peak is much less pronounced and school start/finish times are much more pronounced), the current patterns are close enough to what probably is going to be a 'COVID normal' situation for at least the next year or two. Workplaces are currently not all yet open. These results should be used for indicative assessment only."



Site Gwydir Hwy

[Back to Site Summary Page](#)

Direction Both directions ▼

Day 7 Days ▼

Note: #N/A "Modal Speed" means too few data points

Hour Start	Total Vehicles	Average Speed	85th percentile	Modal Speed	Minimum Speed	Maximum Speed	Standard Deviation
00:00	3	95.9	100.7	94	57.1	119.9	3.6
01:00	1	99.8	102.8	102	85.3	126.9	3.7
02:00	0	N/A	N/A	N/A	N/A	N/A	N/A
03:00	0	N/A	N/A	N/A	N/A	N/A	N/A
04:00	1	107.8	110.2	111	73.8	135.5	1.8
05:00	7	99.0	105.2	97	60.0	124.0	5.0
06:00	30	94.1	106.7	99	36.3	128.7	7.2
07:00	39	96.3	109.3	105	28.9	130.2	7.4
08:00	38	98.9	108.6	97	38.0	125.0	8.3
09:00	45	97.2	110.3	92	29.5	125.8	7.5
10:00	52	99.0	111.0	100	32.1	125.5	7.6
11:00	42	99.5	109.4	99	35.8	124.5	7.9
12:00	39	98.4	108.7	100	40.6	125.3	8.0
13:00	48	97.1	109.9	100	32.0	124.0	7.9
14:00	47	94.5	108.5	99	20.5	126.1	7.4
15:00	45	95.0	107.3	100	27.4	124.9	7.7
16:00	42	100.0	111.4	103	34.3	125.7	7.8
17:00	37	99.7	111.3	99	39.5	130.6	7.9
18:00	33	95.2	106.8	94	37.1	127.8	8.5
19:00	25	94.5	107.5	88	35.4	124.5	7.2
20:00	17	97.8	109.9	86	44.5	143.2	7.5
21:00	8	100.4	109.1	101	66.2	131.8	6.0
22:00	7	103.0	110.4	103	74.8	124.0	5.6
23:00	5	104.0	109.0	103	42.9	132.6	4.2
Summary	611	98.5	108.4	99	20.5	143.2	6.6



Site Gwydir Hwy

Direction Both directions ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	17/06/2024	18/06/2024	12/06/2024	13/06/2024	14/06/2024	15/06/2024	16/06/2024	Total	Average	Total	Average	Total	Average
AM Peak	10:00	09:00	07:00	08:00	10:00	11:00	10:00	N/A	10:00	N/A	10:00	N/A	11:00
PM Peak	13:00	14:00	14:00	14:00	13:00	12:00	12:00	N/A	13:00	N/A	13:00	N/A	12:00
00:00	1	4	2	3	5	7	1	23	3	15	3	8	4
01:00	1	1	4	3	3	4	2	18	3	12	2	6	3
02:00	0	0	3	1	1	2	0	7	1	5	1	2	1
03:00	0	0	2	1	0	2	1	6	1	3	1	3	2
04:00	1	0	6	2	3	1	4	17	2	12	2	5	3
05:00	8	10	7	9	4	12	5	55	8	38	8	17	9
06:00	24	38	29	30	35	29	22	207	30	156	31	51	26
07:00	46	32	59	43	49	36	20	285	41	229	46	56	28
08:00	26	37	45	55	44	39	24	270	39	207	41	63	32
09:00	46	49	49	50	56	40	24	314	45	250	50	64	32
10:00	54	48	52	49	57	50	46	356	51	260	52	96	48
11:00	33	27	42	50	42	58	44	296	42	194	39	102	51
12:00	36	29	39	41	47	51	51	294	42	192	38	102	51
13:00	54	42	51	50	72	35	37	341	49	269	54	72	36
14:00	37	48	75	62	44	38	26	330	47	266	53	64	32
15:00	50	40	51	51	46	48	40	326	47	238	48	88	44
16:00	44	40	62	40	45	48	28	307	44	231	46	76	38
17:00	45	43	37	40	49	28	28	270	39	214	43	56	28
18:00	30	32	40	33	36	29	36	236	34	171	34	65	33
19:00	29	40	22	32	22	25	16	186	27	145	29	41	21
20:00	20	19	19	10	21	8	22	119	17	89	18	30	15
21:00	8	16	7	5	12	9	5	62	9	48	10	14	7
22:00	3	8	6	8	12	9	5	51	7	37	7	14	7
23:00	2	13	5	3	6	9	1	39	6	29	6	10	5
Total	598	616	714	671	711	617	488	4415	634	3310	662	1105	556
% Heavy	35.62%	32.31%	26.05%	25.19%	24.47%	27.07%	21.11%	27.43%		28.43%		24.43%	

TRANS TRAFFIC SURVEY

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AUTOMATIC COUNT SUMMARY

Street Name :	Gwydir Hwy	Location :	West of Property 2908 Access
Suburb :	Moree	Start Date :	00:00 Wed 12/June/2024
Machine ID:	JM649CN6	Finish Date :	00:00 Wed 19/June/2024
Site ID:	3249	Speed Zone :	100 km/h
Prepared By :	Vo Son Binh	Email:	binh@trafficsurvey.com.au

GPS information Lat 29° 33' 32.13 South		Direction of Travel		
Long 149° 35' 58.43 East		Both directions	Westbound	Eastbound
Traffic Volume : Weekdays Average		631	327	304
(Vehicles/Day) 7 Day Average		590	306	284
Weekday AM	11:00	49	25	24
Peak hour start PM	13:00	52	24	28
Speeds : 85th Percentile		105.8	106.0	105.9
(Km/Hr) Average		97.1	97.3	96.6
Classification % :	Light Vehicles up to 5.5m	68.9%	69.2%	69.1%

Location

GPS Information [Load Google Map \(internet required\)](#)
(Latitude, Longitude) -29.558926, 149.599564



[Speed Data](#) [Speed Graph](#) [Speed Bin](#)
[Volume Data](#) [Volume Graph](#) [Classification](#)



QUALITY ASSURED COMPANY BY ISO 9001:2015
OH&S SYSTEM CERTIFIED TO ISO 4801:2001
ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

Status of movement – Covid 19

"Traffic behaviour is not the same as pre-pandemic (traditional morning/afternoon peak is much less pronounced and school start/finish times are much more pronounced), the current patterns are close enough to what probably is going to be a 'COVID normal' situation for at least the next year or two. Workplaces are currently not all yet open. These results should be used for indicative assessment only."



Site Gwydir Hwy

[Back to Site Summary Page](#)

Direction Both directions ▼

Day 7 Days ▼

Note: #N/A "Modal Speed" means too few data points

Hour Start	Total Vehicles	Average Speed	85th percentile	Modal Speed	Minimum Speed	Maximum Speed	Standard Deviation
00:00	4	90.5	95.8	94	48.2	116.6	4.2
01:00	1	96.1	98.6	95	78.4	122.7	3.1
02:00	0	N/A	N/A	N/A	N/A	N/A	N/A
03:00	0	N/A	N/A	N/A	N/A	N/A	N/A
04:00	1	103.3	106.4	107	84.1	139.9	1.7
05:00	6	97.2	103.0	98	62.6	123.9	5.4
06:00	26	97.1	107.6	98	42.7	128.0	7.5
07:00	33	99.0	110.1	101	42.4	125.4	7.7
08:00	39	99.0	109.6	101	41.7	126.2	7.8
09:00	40	96.9	107.5	98	40.7	126.1	7.4
10:00	47	96.4	106.8	95	48.1	124.6	7.0
11:00	47	96.2	107.2	95	48.1	121.1	7.4
12:00	43	95.8	106.8	96	36.8	125.1	7.6
13:00	47	95.1	105.3	97	44.5	125.0	7.2
14:00	40	96.2	106.2	97	51.4	126.8	6.8
15:00	42	95.8	106.6	98	41.3	123.7	7.0
16:00	41	96.0	107.3	98	44.9	127.3	7.3
17:00	33	96.7	108.2	95	44.0	127.1	7.7
18:00	27	96.0	106.6	94	59.8	126.6	7.3
19:00	18	96.2	106.0	96	52.2	126.9	7.7
20:00	12	98.8	107.4	97	66.5	126.9	7.1
21:00	6	97.8	103.1	98	78.0	134.6	5.1
22:00	7	99.6	105.2	102	64.0	121.2	5.0
23:00	5	100.5	105.9	103	47.7	123.9	3.8
Summary	565	97.1	105.8	98	36.8	139.9	6.3



Site Gwydir Hwy

Direction Both directions ▼

[Back to Site Summary Page](#)

Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	7 days		Weekday		Weekend	
Date	17/06/2024	18/06/2024	12/06/2024	13/06/2024	14/06/2024	15/06/2024	16/06/2024	Total	Average	Total	Average	Total	Average
AM Peak	11:00	08:00	11:00	11:00	10:00	11:00	10:00	N/A	11:00	N/A	11:00	N/A	11:00
PM Peak	15:00	15:00	14:00	14:00	13:00	12:00	12:00	N/A	13:00	N/A	13:00	N/A	12:00
00:00	1	4	2	4	6	7	1	25	4	17	3	8	4
01:00	1	1	4	3	3	4	2	18	3	12	2	6	3
02:00	0	0	2	1	1	2	0	6	1	4	1	2	1
03:00	0	0	2	1	0	2	1	6	1	3	1	3	2
04:00	1	0	6	2	3	1	4	17	2	12	2	5	3
05:00	8	10	7	9	4	12	6	56	8	38	8	18	9
06:00	23	35	26	23	30	32	16	185	26	137	27	48	24
07:00	43	29	51	37	44	26	14	244	35	204	41	40	20
08:00	35	49	48	48	42	33	22	277	40	222	44	55	28
09:00	42	44	41	42	52	40	29	290	41	221	44	69	35
10:00	51	45	46	37	54	42	45	320	46	233	47	87	44
11:00	54	42	55	57	36	51	44	339	48	244	49	95	48
12:00	47	40	42	39	43	54	47	312	45	211	42	101	51
13:00	54	42	51	49	66	46	32	340	49	262	52	78	39
14:00	34	42	61	53	40	37	26	293	42	230	46	63	32
15:00	55	46	53	50	45	26	32	307	44	249	50	58	29
16:00	48	42	60	39	45	35	27	296	42	234	47	62	31
17:00	43	42	34	36	37	21	23	236	34	192	38	44	22
18:00	27	27	33	26	35	23	27	198	28	148	30	50	25
19:00	19	28	16	25	18	21	10	137	20	106	21	31	16
20:00	15	15	13	11	12	8	9	83	12	66	13	17	9
21:00	6	9	4	4	12	8	5	48	7	35	7	13	7
22:00	3	8	6	18	11	4	5	55	8	46	9	9	5
23:00	2	13	5	3	6	9	1	39	6	29	6	10	5
Total	612	613	668	617	645	544	428	4127	592	3155	630	972	492
% Heavy	36.93%	34.42%	29.04%	28.85%	29.15%	31.99%	24.77%	30.94%		31.60%		28.81%	

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

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Intersection of Gwydir Hwy and Private Access, Moree

GPS -29.559643, 149.601761

Date:	Thu 24/08/23
Weather:	Fine
Suburban:	Moree
Customer:	Amber

North:	Private Access
East:	Gwydir Hwy
South:	N/A
West:	Gwydir Hwy

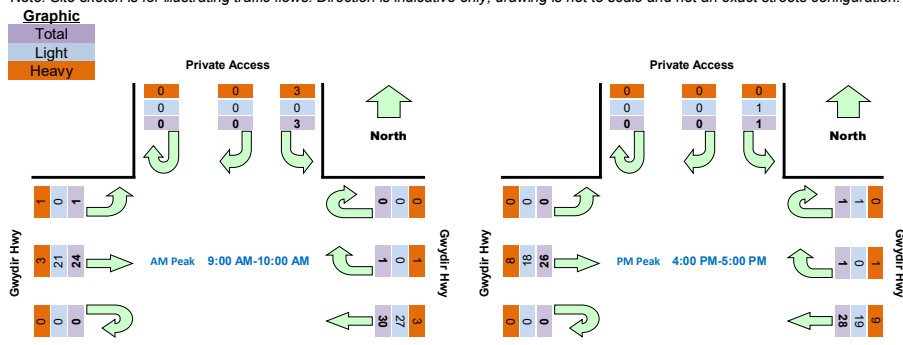
Survey	AM:	6:00 AM-10:00 AM
Period	PM:	3:00 PM-7:00 PM
Traffic	AM:	9:00 AM-10:00 AM
Peak	PM:	4:00 PM-5:00 PM

All Vehicles

Time		North Approach Private Access			East Approach Gwydir Hwy			West Approach Gwydir Hwy			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
6:00	6:15	0	0	0	0	0	2	0	2	0	36	
6:15	6:30	0	0	0	0	0	6	0	2	0	42	
6:30	6:45	0	0	0	0	0	11	0	1	0	41	
6:45	7:00	0	0	0	0	6	3	0	3	0	43	
7:00	7:15	0	0	1	0	0	6	0	3	0	42	
7:15	7:30	0	1	0	0	0	3	0	2	1	47	
7:30	7:45	0	0	1	1	0	5	0	7	0	52	
7:45	8:00	0	1	0	0	0	7	0	3	0	53	
8:00	8:15	0	0	0	0	0	7	0	7	1	54	
8:15	8:30	0	0	0	0	1	9	0	2	0	50	
8:30	8:45	0	0	0	0	1	6	0	8	0	47	
8:45	9:00	0	1	0	0	0	6	0	5	0	49	
9:00	9:15	0	0	0	0	0	7	0	3	1	59	Peak
9:15	9:30	0	0	1	0	0	5	0	3	0		
9:30	9:45	0	0	2	0	1	9	0	5	0		
9:45	10:00	0	0	0	0	0	9	0	13	0		
15:00	15:15	0	0	0	0	0	1	0	5	0	37	
15:15	15:30	0	0	0	0	0	3	0	7	0	47	
15:30	15:45	0	0	1	0	0	2	0	7	0	52	
15:45	16:00	0	0	0	0	0	4	0	7	0	56	
16:00	16:15	0	0	0	0	0	7	0	9	0	57	Peak
16:15	16:30	0	0	1	1	0	9	0	4	0	57	Peak
16:30	16:45	0	0	0	0	0	7	0	7	0	54	
16:45	17:00	0	0	0	0	1	5	0	6	0	51	
17:00	17:15	0	0	0	0	0	4	0	12	0	49	
17:15	17:30	0	0	0	0	0	3	0	9	0	39	
17:30	17:45	0	0	0	0	0	6	0	5	0	38	
17:45	18:00	0	0	0	0	0	4	0	6	0	36	
18:00	18:15	0	0	1	0	0	1	0	4	0	33	
18:15	18:30	0	0	0	0	0	2	0	9	0		
18:30	18:45	0	0	0	0	0	4	0	5	0		
18:45	19:00	0	0	1	0	1	2	0	3	0		

Peak Time		North Approach Private Access			East Approach Gwydir Hwy			West Approach Gwydir Hwy			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
9:00	10:00	0	0	3	0	1	30	0	24	1	59
16:00	17:00	0	0	1	1	1	28	0	26	0	57

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



TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

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Intersection of Gwydir Hwy and Watercourse Rd, Moree

GPS -29.462068, 149.737048

Date:	Thu 24/08/23
Weather:	Fine
Suburban:	Moree
Customer:	Amber

North:	Watercourse Rd
East:	Gwydir Hwy
South:	N/A
West:	Gwydir Hwy

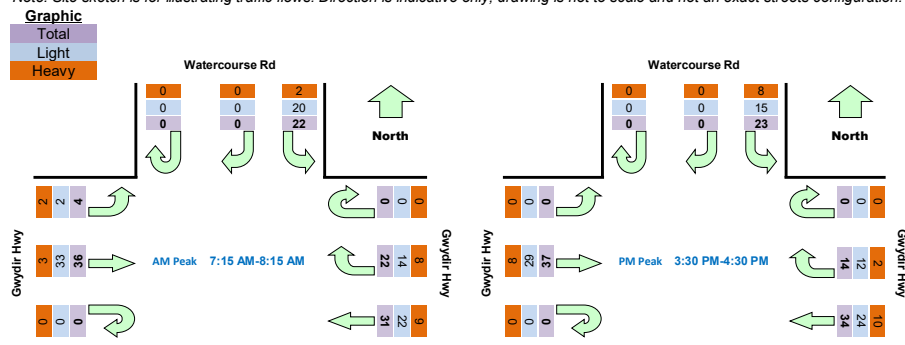
Survey	AM:	6:00 AM-10:00 AM
Period	PM:	3:00 PM-7:00 PM
Traffic	AM:	7:15 AM-8:15 AM
Peak	PM:	3:30 PM-4:30 PM

All Vehicles

Time		North Approach Watercourse			East Approach Gwydir Hwy			West Approach Gwydir Hwy			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
6:00	6:15	0	0	1	0	5	8	0	2	0	80	
6:15	6:30	0	1	2	0	3	13	0	3	0	85	
6:30	6:45	0	3	1	0	3	19	0	3	0	93	
6:45	7:00	0	1	1	0	6	4	0	1	0	88	
7:00	7:15	0	0	4	0	7	5	0	5	0	107	
7:15	7:30	0	0	9	0	6	3	0	12	0	115	Peak
7:30	7:45	0	0	3	0	6	11	0	3	1	111	
7:45	8:00	0	0	5	0	5	6	0	14	2	105	
8:00	8:15	0	0	5	0	5	11	0	7	1	103	
8:15	8:30	0	0	5	0	3	7	0	11	0	99	
8:30	8:45	0	0	2	0	5	8	0	3	0	86	
8:45	9:00	0	1	7	0	6	8	0	8	0	92	
9:00	9:15	0	1	6	0	5	9	0	4	0	85	
9:15	9:30	0	0	2	0	2	5	0	4	0		
9:30	9:45	0	0	5	0	4	12	0	3	0		
9:45	10:00	0	0	4	0	1	7	0	11	0		
15:00	15:15	0	0	6	0	1	3	0	10	0	93	
15:15	15:30	0	0	6	0	5	4	0	8	1	101	
15:30	15:45	0	0	7	0	4	4	0	8	0	108	Peak
15:45	16:00	0	0	6	0	4	9	0	7	0	102	
16:00	16:15	0	0	6	0	4	9	0	9	0	102	
16:15	16:30	0	0	4	0	2	12	0	13	0	98	
16:30	16:45	0	0	5	0	2	2	0	8	0	103	
16:45	17:00	0	0	2	0	2	11	0	11	0	106	
17:00	17:15	0	0	1	0	8	5	0	10	0	103	
17:15	17:30	0	0	5	0	1	8	0	22	0	101	
17:30	17:45	0	0	2	0	2	10	0	5	1	91	
17:45	18:00	0	0	4	0	6	6	0	7	0	93	
18:00	18:15	0	0	5	0	1	4	0	12	0	86	
18:15	18:30	1	0	4	0	2	9	0	10	0		
18:30	18:45	0	0	1	0	3	10	0	8	0		
18:45	19:00	0	0	0	0	2	8	0	6	0		

Peak Time		North Approach Watercourse			East Approach Gwydir Hwy			West Approach Gwydir Hwy			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
7:15	8:15	0	0	22	0	22	31	0	36	4	115
15:30	16:30	0	0	23	0	14	34	0	37	0	108

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



Appendix B

Concept Intersection Design Gwydir Highway / Site Access

GWYDIR HIGHWAY INTERSECTION UPGRADE

WATHAGAR NEW SOUTH WALES

STRATEGIC CONCEPT DESIGN

PLAN NUMBER	DRAWING TITLE
MKR00959-200-C0000	COVER SHEET AND INDEX
MKR00959-200-C0040	KEY PLAN
MKR00959-200-C0100	CIVIL WORKS LAYOUT PLAN
MKR00959-200-C0310	TYPICAL SECTIONS PLAN
MKR00959-200-C1700	SWEPT PATH ANALYSIS LAYOUT PLAN - DESIGN VEHICLE
MKR00959-200-C1800	SIGHT LINE LAYOUT PLAN
MKR00959-200-C1801	SIGHT LINE LONGITUDINAL SECTIONS
MKR00959-200-C1900	LOCAL AREA TRAFFIC MANAGEMENT LAYOUT PLAN



LOCALITY DIAGRAM

SHEET @ 1:1250

SHEET @ 1:1000

SHEET @ 1:375

LOT 2
DP773266

LOT 55
DP751793

LOT 7300
DP1161855

GWYDIR HIGHWAY

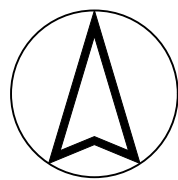
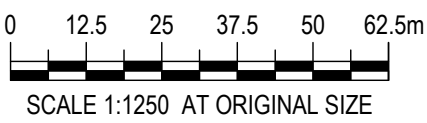
ROAD 02

GWYDIR HIGHWAY

- PROPOSED

 - CIVIL WORKS BOUNDARY
 - SHEET LAYOUT (1:375 SCALE)
 - SHEET LAYOUT (1:1000 SCALE)
 - SHEET LAYOUT (1:1250 SCALE)
- EXISTING

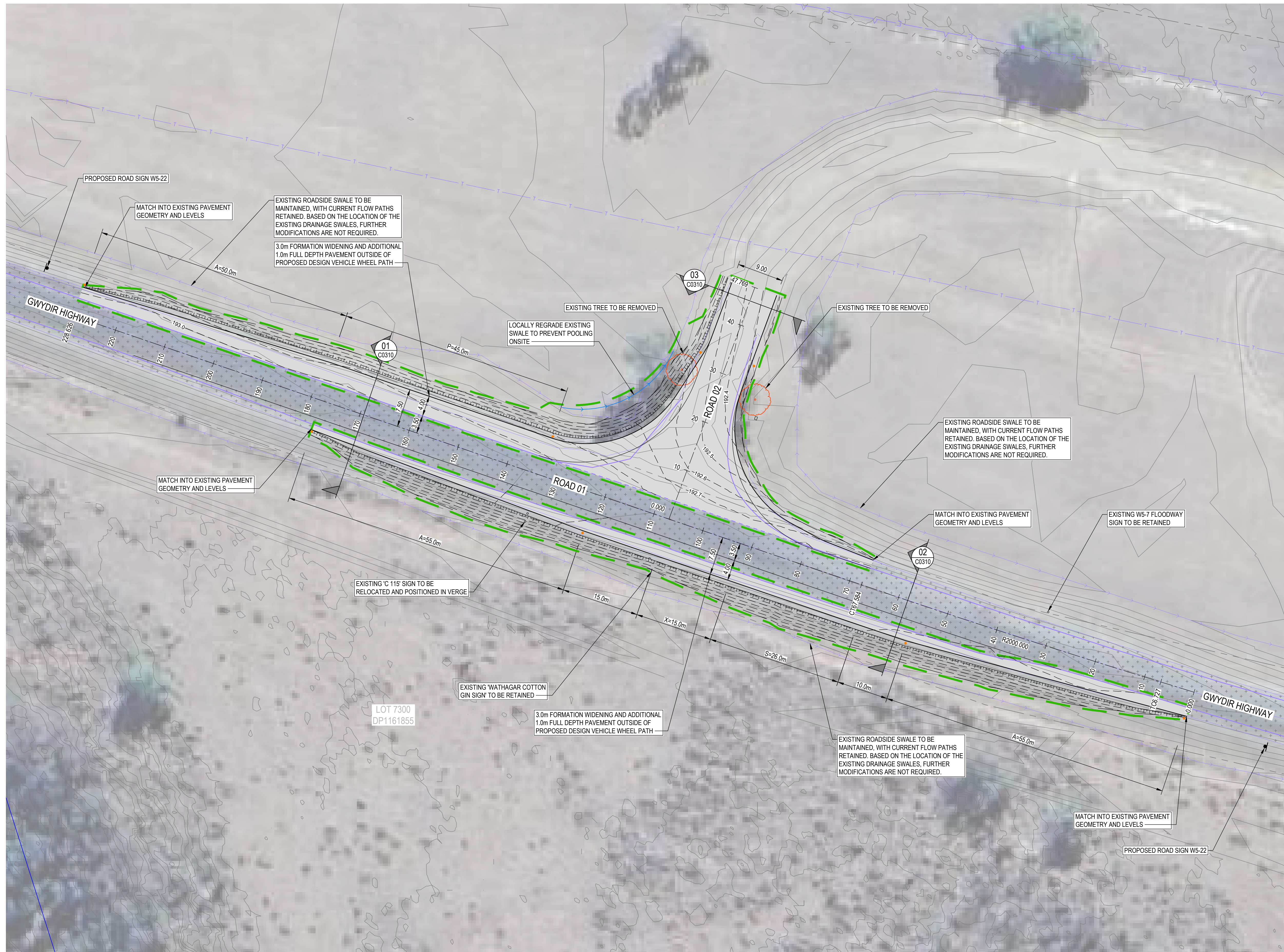
 - LOT BOUNDARY
 - WATER COURSE
 - LINEMARKING
 - EDGE OF BITUMEN
 - ROAD CENTRELINE



1	11.04.25	ISSUED FOR APPROVAL	JMN	JMA	
REV	DATE	DESCRIPTION	AMD BY	APP BY	

DRAWN: J.NEWELL	DESIGNED: J.NEWELL
DRAFT CHECK: H.SMITH	DESIGN CHECK: H.SMITH
APPROVED:	J.AGUSTIN
NOT FOR CONSTRUCTION	

GWYDIR HIGHWAY INTERSECTION UPGRADE STRATEGIC CONCEPT DESIGN KEY PLAN			
DRAWING NUMBER MKR00959-200-C0040	SHEET No.	ORIG. SIZE A1	REVISION 1



PROPOSED

LOT BOUNDARY

ROAD CENTERLINE AND CHAINAGE

CONTOURS (0.1m)

PAVEMENT

SWALE INVERT

SIGN

GUIDE POST

EXISTING

LOT BOUNDARY

CONTOURS (0.1m)

PAVEMENT

ELECTRICAL ABOVE GROUND

COMMUNICATIONS

ROAD CENTRELINE

LINEMARKING

EDGE OF BITUMEN

SWALE INVERT

FENCE

TREE (TO BE REMOVED)

LEGEND

CIVIL WORKS BOUNDARY

LOT BOUNDARY

ROAD CENTERLINE AND CHAINAGE

CONTOURS (0.1m)

PAVEMENT

SWALE INVERT

SIGN

GUIDE POST

ELECTRICAL ABOVE GROUND

COMMUNICATIONS

ROAD CENTRELINE

LINEMARKING

EDGE OF BITUMEN

SWALE INVERT

FENCE

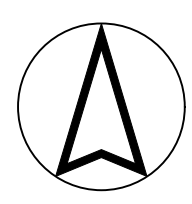
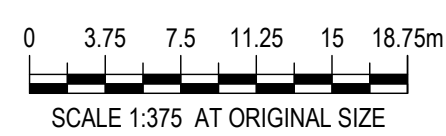
TREE (TO BE REMOVED)

- NOTES:
- ALL PROPOSED WORKS WILL BE CONSTRUCTED TO MATCH THE EXISTING PAVEMENT AND IN ACCORDANCE WITH AUSTRROADS GUIDE TO PAVEMENT TECHNOLOGY PART 2 STRUCTURAL DESIGN 2024 AND TfNSW QA SPECIFICATIONS
 - PROPOSED LINE MARKING TO BE AUDIO TACTILE LINE MARKING AND MATCH INTO EXISTING



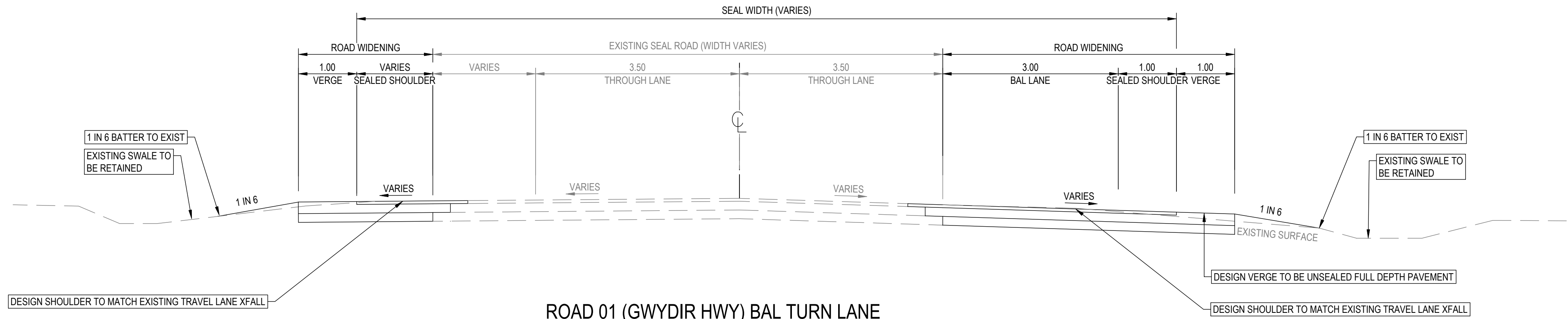
UTILITY INFORMATION SHOWN ON THE PLANS DOES NOT DEPICT ANY MORE THAN THE PRESENCE OF A SERVICE, BASED ON AVAILABLE DOCUMENTARY EVIDENCE. THE PRESENCE OF A UTILITY SERVICE, ITS SIZE AND LOCATION SHOULD BE CONFIRMED BY FIELD INSPECTION, PRIOR TO THE COMMENCEMENT OF WORKS AND THE RELEVANT UTILITY PLANS OBTAINED BY DIALLING PH 1100 (BEFORE YOU DIG). CAUTION SHOULD BE EXERCISED WHEN WORKING IN THE VICINITY OF ALL UTILITY SERVICES.

REV	DATE	DESCRIPTION	AMD BY	APP BY
1	11.04.25	ISSUED FOR APPROVAL	JMN	JMA



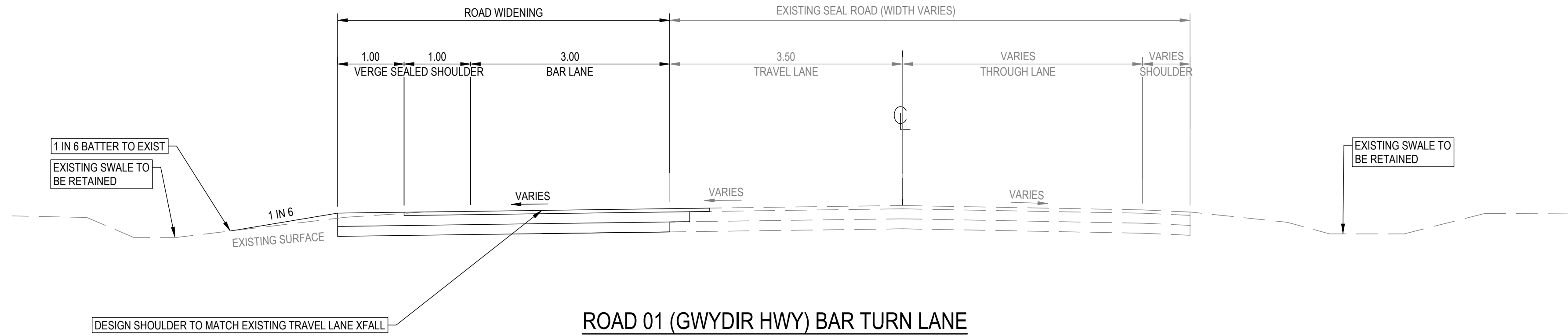
DRAWN: J.NEWELL	DESIGNED: J.NEWELL
DRAFT CHECK: H.SMITH	DESIGN CHECK: H.SMITH
APPROVED:	J.AGUSTIN
NOT FOR CONSTRUCTION	

GWYDIR HIGHWAY INTERSECTION UPGRADE STRATEGIC CONCEPT DESIGN CIVIL WORKS LAYOUT PLAN			
DRAWING NUMBER MKR00959-200-C0100	SHEET No.	ORIG. SIZE A1	REVISION 1



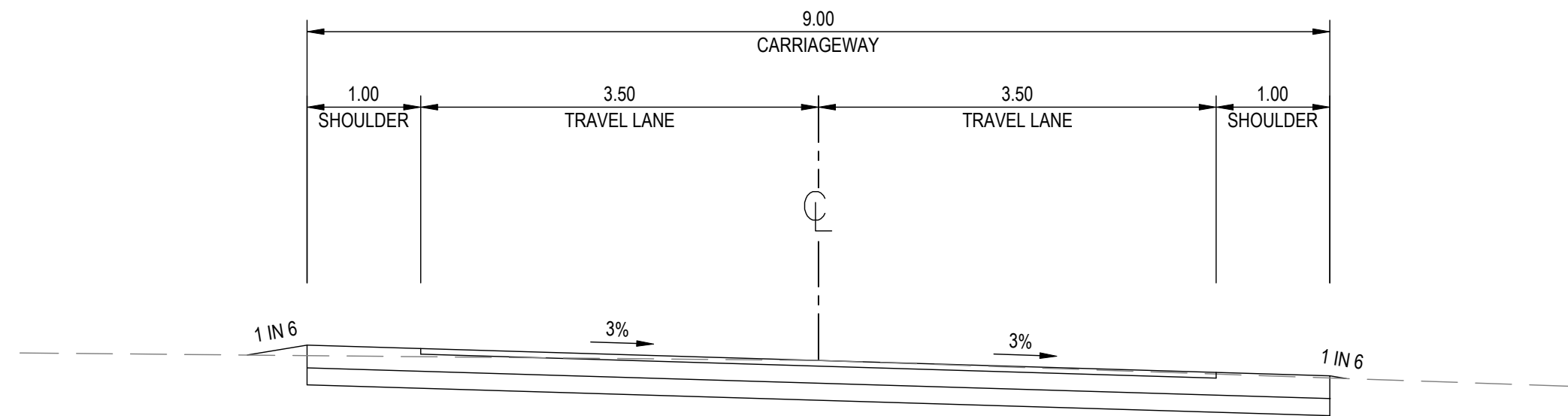
ROAD 01 (GWYDIR HWY) BAL TURN LANE

SECTION 01
SCALE 1:50



ROAD 01 (GWYDIR HWY) BAR TURN LANE

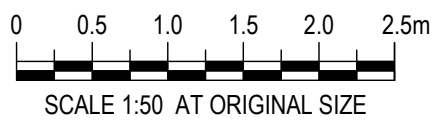
SECTION 02
SCALE 1:50



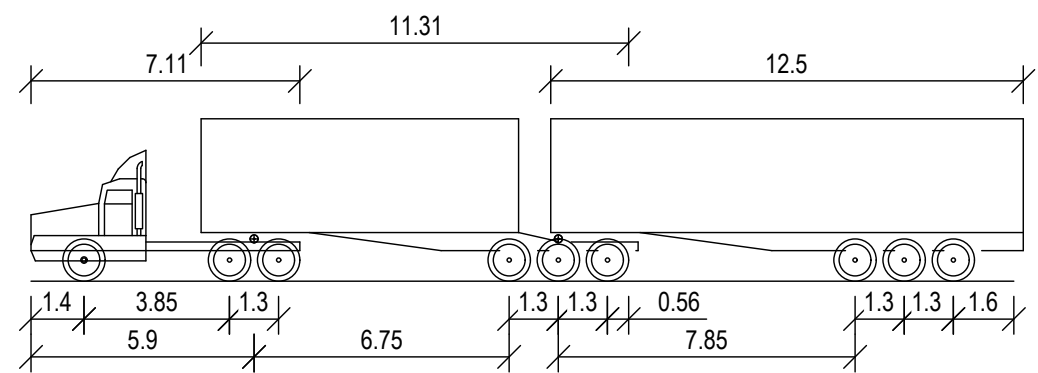
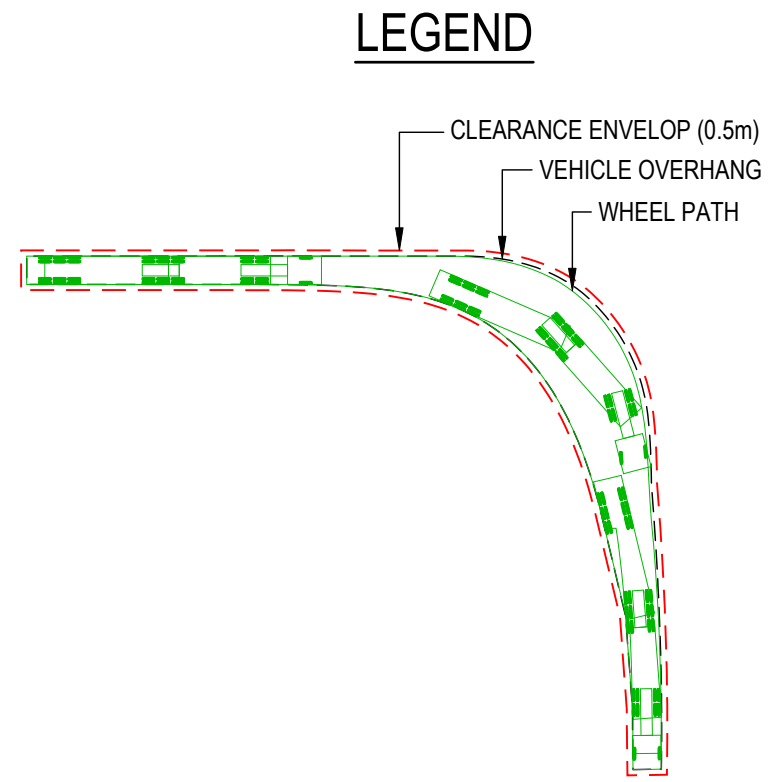
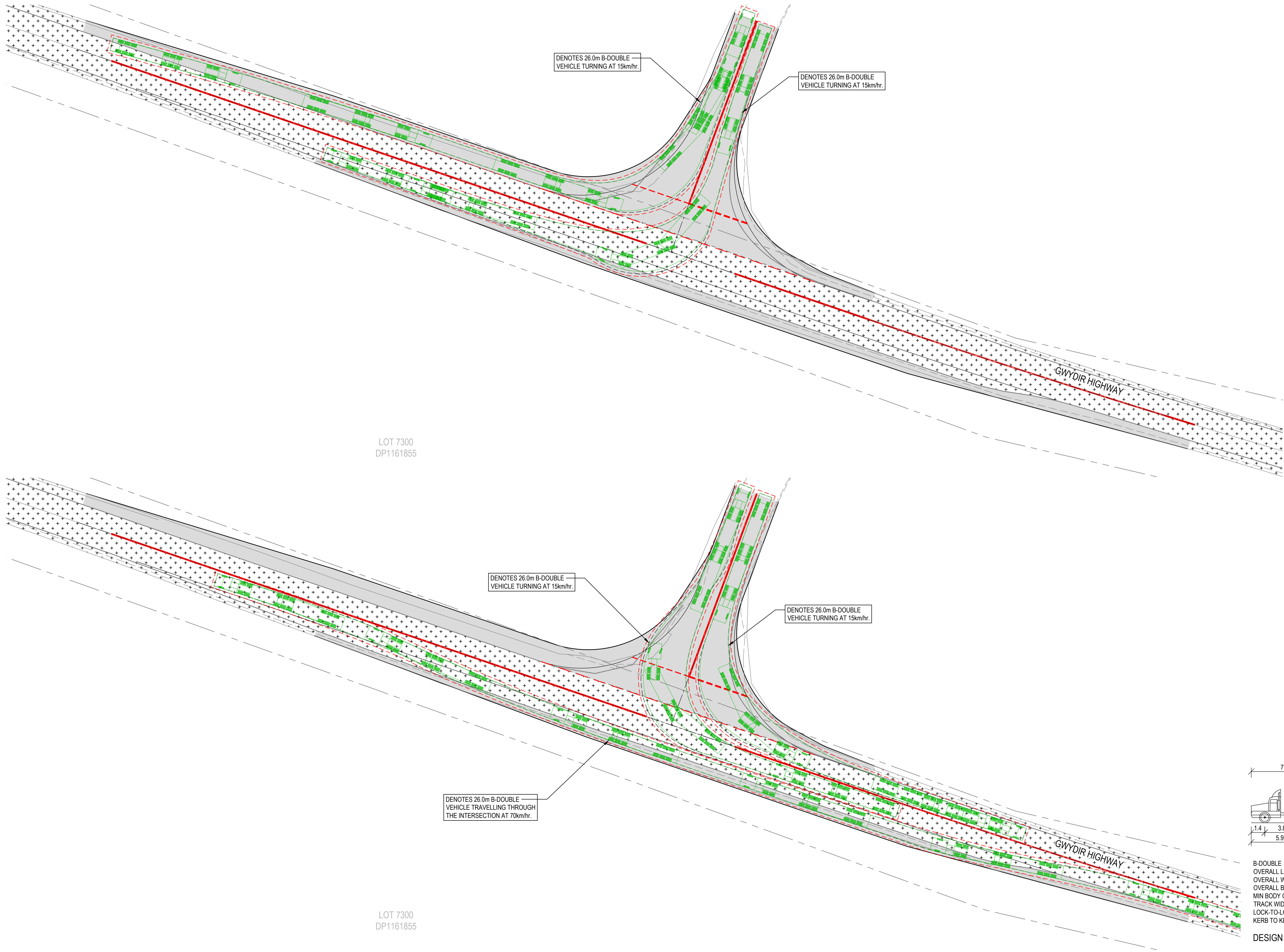
ROAD 02 (9m WIDE) SITE ACCESS

SECTION 03
SCALE 1:50

1	11.04.25	ISSUED FOR APPROVAL	JMN	JMA	
REV	DATE	DESCRIPTION	AMD BY	APP BY	



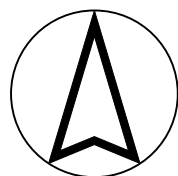
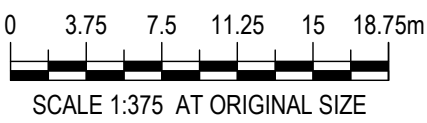
DRAWN: J.NEWELL	DESIGNED: J.NEWELL	GWYDIR HIGHWAY INTERSECTION UPGRADE STRATEGIC CONCEPT DESIGN TYPICAL SECTIONS PLAN			
DRAFT CHECK: H.SMITH	DESIGN CHECK: H.SMITH				
APPROVED:	J.AGUSTIN				
NOT FOR CONSTRUCTION		DRAWING NUMBER MKR00959-200-C0310	SHEET No.	ORIG. SIZE A1	REVISION 1



B-DOUBLE	
OVERALL LENGTH	26.000m
OVERALL WIDTH	2.500m
OVERALL BODY HEIGHT	4.300m
MIN BODY GROUND CLEARANCE	0.540m
TRACK WIDTH	2.500m
LOCK-TO-LOCK TIME	6.00s
KERB TO KERB TURNING RADIUS	15.000m

DESIGN VEHICLE

REV	DATE	DESCRIPTION	AMD BY	APP BY
1	11.04.25	ISSUED FOR APPROVAL	JMN	JMA



HIRINGA

MAKER ENG

DRAWN: J.NEWELL	DESIGNED: J.NEWELL
DRAFT CHECK: H.SMITH	DESIGN CHECK: H.SMITH
APPROVED:	J.AGUSTIN

NOT FOR CONSTRUCTION

GWYDIR HIGHWAY INTERSECTION UPGRADE
STRATEGIC CONCEPT DESIGN
SWEEP PATH ANALYSIS LAYOUT PLAN
DESIGN VEHICLE

DRAWING NUMBER MKR00959-200-C1700	SHEET No.	ORIG. SIZE A1	REVISION 1
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PROPOSED

SSID (SAFE INTERSECTION SIGHT DISTANCE)

LINE OF SIGHT

VEHICLE

EXISTING

LOT BOUNDARY

ROAD CENTRELINE

LINEMARKING

EDGE OF BITUMEN

SIGHT DISTANCE 01 (SISD)	
D _T (DECISION TIME)	5.0s
d (COEFFICIENT OF DECELERATION)	0.29
a (LONGITUDINAL GRADE IN %)	-0.5%
V (OPERATING SPEED)	120km/h
SISD	365.59m

SIGHT DISTANCE 02 (SISD)	
D _T (DECISION TIME)	5.0s
d (COEFFICIENT OF DECELERATION)	0.29
a (LONGITUDINAL GRADE IN %)	0.5%
V (OPERATING SPEED)	120km/h
SISD	358.85m

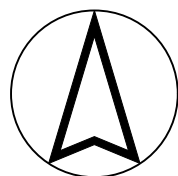
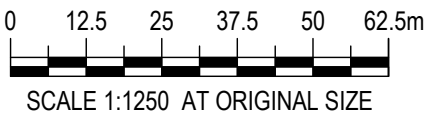
SIGHT DISTANCE 01 - (S.I.S.D)

- SISD (SAFE INTERSECTION SIGHT DISTANCE) = 365.6m
- DT (DECISION TIME) = 5.0 sec
- V (DESIGN SPEED) = 110km/h (SIGN POSTED SPEED +10km/h)
- D (COEFFICIENT OF DECELERATION) = 0.29
- A (LONGITUDINAL GRADE) = -0.5%

SIGHT DISTANCE 02 - (S.I.S.D)

- SISD (SAFE INTERSECTION SIGHT DISTANCE) = 358.8m
- DT (DECISION TIME) = 5.0 sec
- V (DESIGN SPEED) = 110km/h (SIGN POSTED SPEED +10km/h)
- D (COEFFICIENT OF DECELERATION) = 0.29
- A (LONGITUDINAL GRADE) = +0.5%

1	11.04.25	ISSUED FOR APPROVAL	JMN	JMA	
REV	DATE	DESCRIPTION	AMD BY	APP BY	

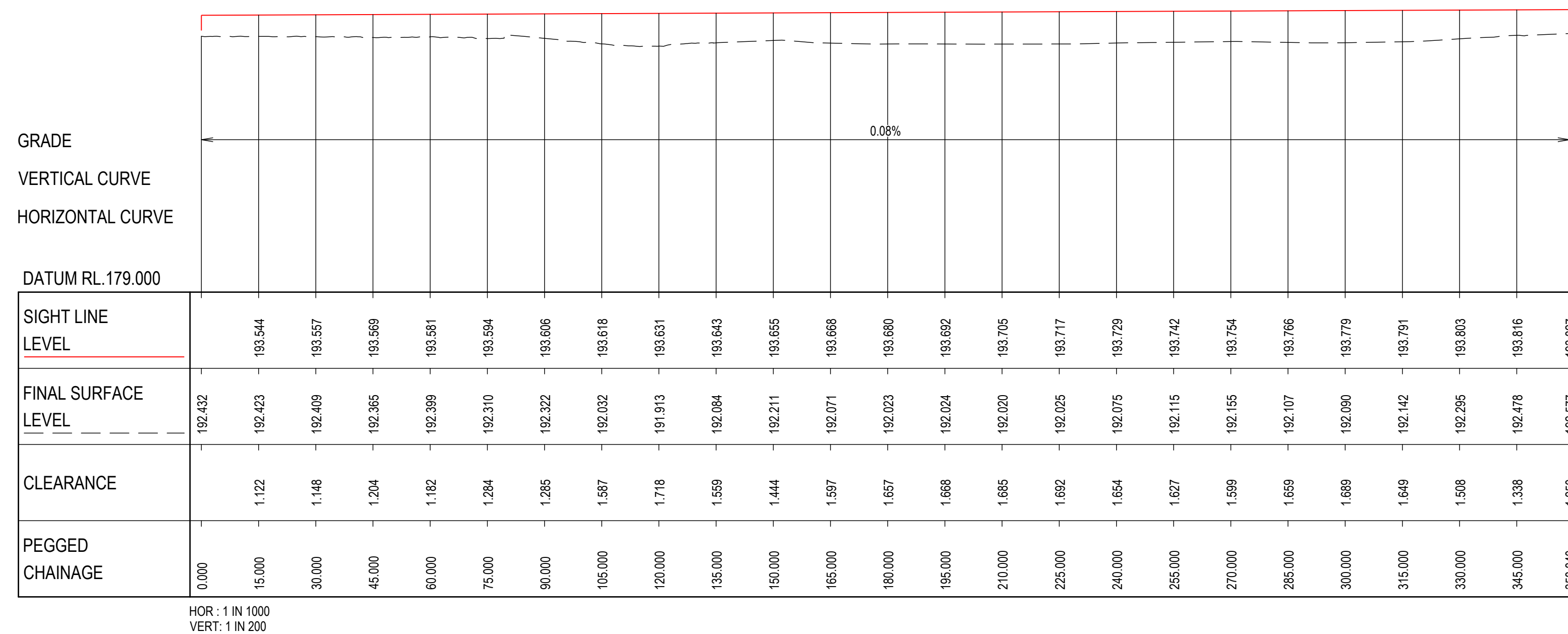
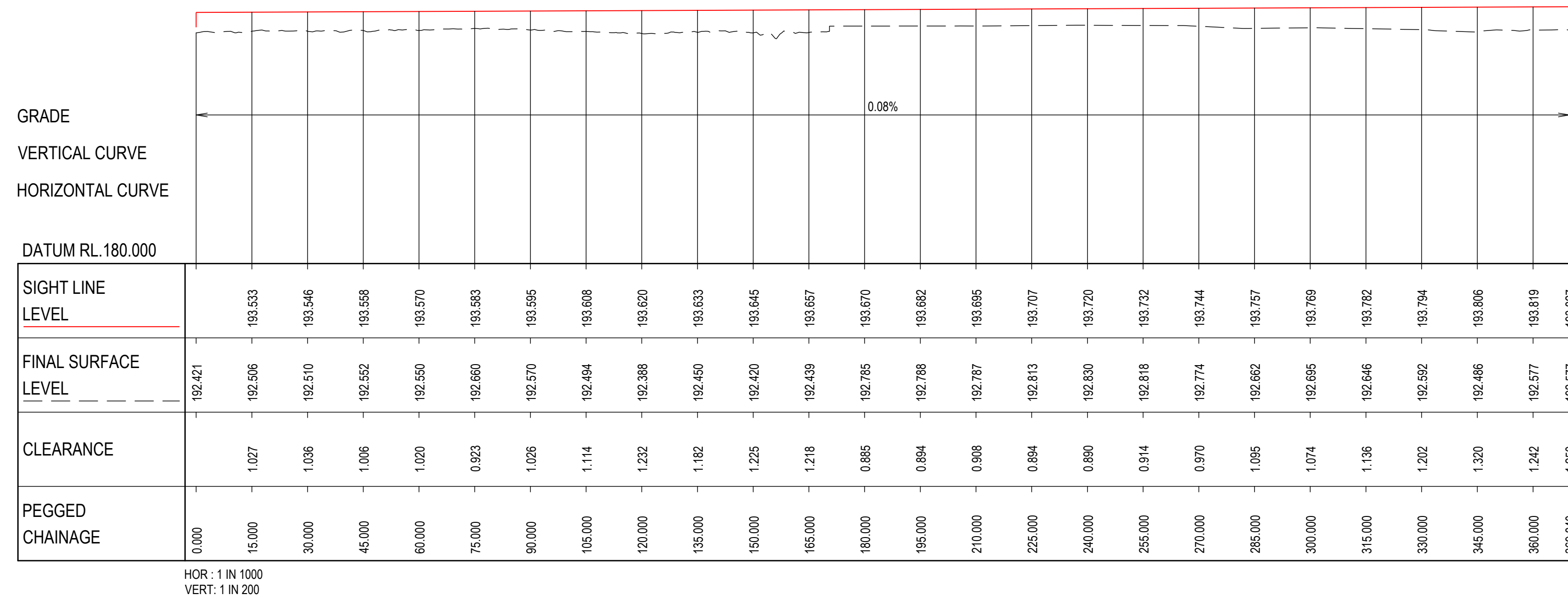


DRAWN: J.NEWELL	DESIGNED: J.NEWELL
DRAFT CHECK: H.SMITH	DESIGN CHECK: H.SMITH
APPROVED:	J.AGUSTIN

NOT FOR CONSTRUCTION

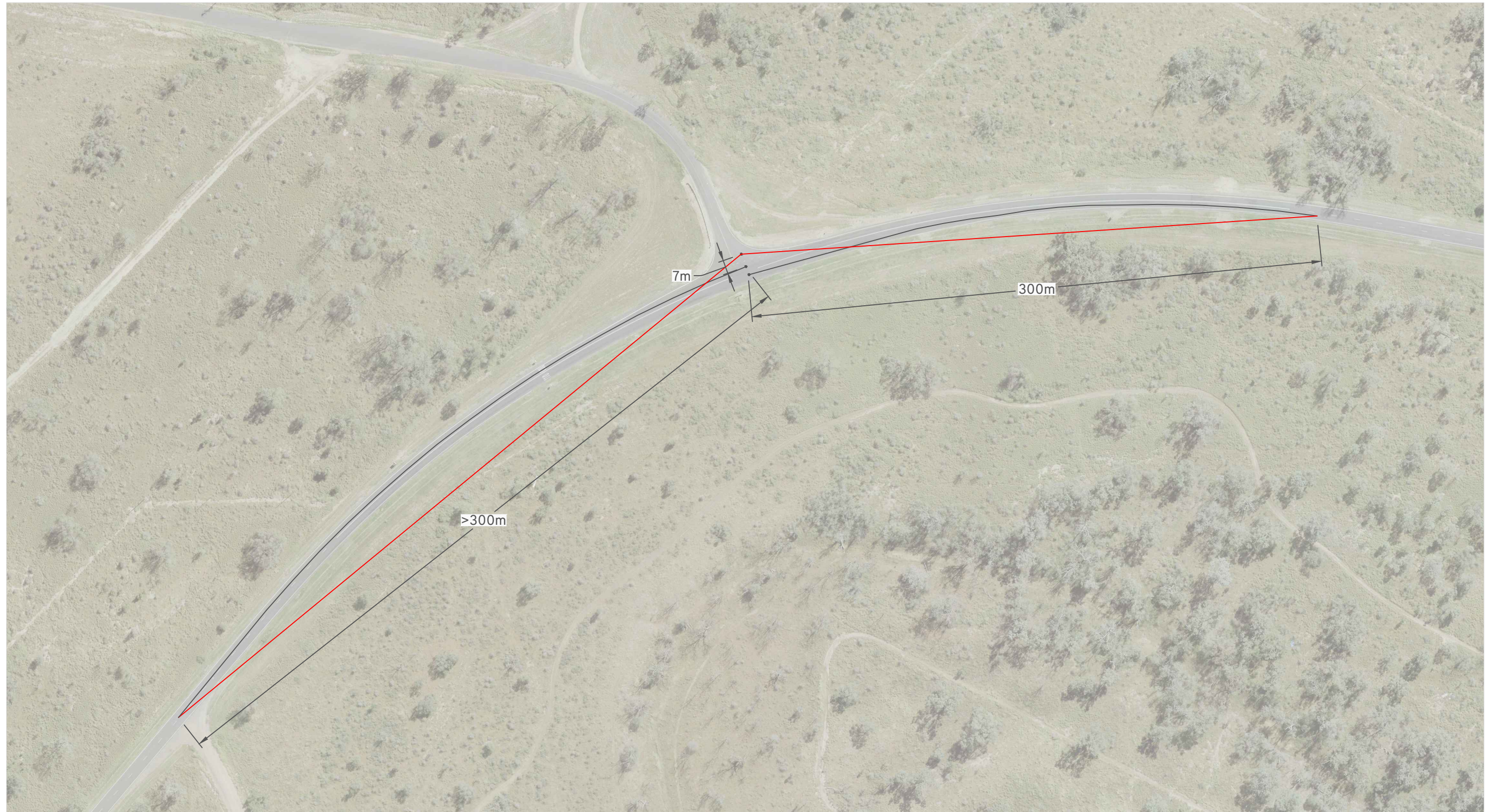
GWYDIR HIGHWAY INTERSECTION UPGRADE
STRATEGIC CONCEPT DESIGN
SIGHT LINE LAYOUT PLAN

DRAWING NUMBER MKR00959-200-C1800	SHEET No.	ORIG. SIZE A1	REVISION 1
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Appendix C

Sight Distance Assessment Gwydir Highway / Watercourse Road



Sight Distance

Sight Line



Good Earth Green Hydrogen And Ammonia Project
Watercourse Road / Gwydir Highway
Sight Distance Assessment

DRAWN: TD
DATE: 17/12/2024
DWG NO: 745 - SD01
SCALE at A3: 1:2000 (m)