

**Whitehaven
Solar Farm Project**

Environmental Impact Statement



WHITEHAVEN COAL



KURRAJONG CREEK RD
NARRABRI COAL
OPERATIONS

GIVE
WAY

Whitehaven Solar Farm Road Transport Assessment

Prepared for:

Whitehaven Energy Pty Ltd

24 January 2025

The Transport Planning Partnership

Whitehaven Solar Farm Road Transport Assessment

Client: Whitehaven Energy Pty Ltd

Version: Final

Date: 24 January 2025

TPP Reference: 22302

Quality Record

Version	Date	Prepared by	Approved by	Signature
Final	24/01/2025	PJD	PJD	

Table of Contents

1	Introduction	1
2	The Project and its Traffic Generation	4
2.1	Project Description	4
2.2	Project Assessment Scenarios	6
2.3	Construction Stage Traffic	9
2.3.1	Construction Workforce Traffic	9
2.3.2	Construction Heavy Vehicle Traffic	10
2.4	Operational Stage Traffic	10
2.5	Decommissioning Stage Traffic	11
2.5.1	Decommissioning Workforce Traffic	11
2.5.2	Decommissioning Heavy Vehicle Traffic	11
2.6	Project Traffic Summary	12
3	Road Transport Environment	13
3.1	Road Network	13
3.2	Kurrajong Creek Road Level Crossing	15
3.3	Traffic Volumes	15
3.4	Road Crash History	18
3.5	Changes to Road Environment	19
3.5.1	Narrabri Mine	20
3.5.2	Highway Intersection Upgrade	24
3.5.3	Narrabri South Solar Farm	25
3.5.4	Silverleaf Solar Farm	26
3.5.5	Vickery Extension Project	27
3.5.6	Boggabri Coal Mine	28
3.5.7	Maules Creek Coal Mine	29
3.5.8	Tarrawonga Coal Mine	29
3.5.9	Rocglen Coal Mine	30
3.5.10	Inland Rail – Narramine to Narrabri	31
3.5.11	Queensland Hunter Gas Pipeline	32
3.5.12	Narrabri Gas Project	33
3.5.13	Narrabri Lateral Pipeline	33
3.6	Cumulative Implications of Road Environment Changes	34
4	Project Impacts	37

4.1	Project Construction.....	37
4.1.1	Average Day Construction Activity.....	37
4.1.2	Peak Day Construction Activity	38
4.2	Project Operations	40
4.3	Project Decommissioning	40
4.4	Impact on Level Crossing and Queues	41
4.5	Impact on Kurrajong Creek Road	41
4.6	Project Site Access Intersection	42
4.7	Road Safety	44
4.8	Oversize or Overmass Vehicles	44
4.9	Car Parking.....	47
4.10	Mitigation Measures	48
5	Summary and Conclusions	49

Tables

Table 1.1: SEARs Requirements – Reference Summary.....	1
Table 2.1: Summary of Key Project Attributes	6
Table 2.2: Summary of Project Traffic Generation	12
Table 3.1: Surveyed Average Weekday Total Two-way Traffic 2019	15
Table 4.1: Project Impacts on Peak 15-Minute Westbound Demand at Level Crossing.....	41

Figures

Figure 1.1: Project Location	2
Figure 2.1: Project General Arrangement	5
Figure 2.2: Project Site Intersection	8
Figure 3.1: Kurrajong Creek Road facing East from near Mayfield Road	14
Figure 3.2: Traffic Survey Locations	16
Figure 3.3: Surveyed Traffic Across Kurrajong Creek Road Level Crossing 2019.....	17
Figure 3.4: Westbound Level Crossing Demand Before Intersection Upgrade	35
Figure 3.5: Westbound Level Crossing Demand After Intersection Upgrade	36
Figure 4.1: Westbound Level Crossing Demand – Average Day Project Construction.....	37
Figure 4.2: Westbound Level Crossing Demand – Peak Day Project Construction	39

Figure 4.3: Level Crossing Westbound Demand – Peak Day Project Decommissioning.....	40
Figure 4.4: Rural Property Access for Articulated Vehicles	43
Figure 4.5: Oversize Overmass Indicative Transport Route.....	46

References

Australian Road Research Board (2011), *Safety on rural roads: run-off-road, head-on and intersection crashes*.

Austroads (2020), *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management*.

Austroads (2023a), *Guide to Road Design Part 4: Intersections and Crossings: General*.

Austroads (2023b), *Austroads Design Vehicles and Turning Path Templates Guide*.

Boggabri Coal Operations Pty Ltd (2019), *Boggabri Coal Mine 2018 Annual Review*.

Boggabri Coal Operations Pty Ltd (2020), *Boggabri Coal Mine 2019 Annual Review*.

Cardno (2021), *Boggabri Coal Mine Modification 8 Traffic and Transport Assessment*.

Constructive Solutions Pty Ltd (2022), *Narrabri Underground Mine Stage 3 Extension Project – Kamilaroi Highway and Kurrajong Creek Road Proposed Intersection Upgrade*.

GHD (2016), *Narrabri Gas Project Traffic Impact Assessment*.

GHD (2019), *Narrabri 120 MW Solar Farm Environmental Impact Statement*.

GTA Consultants (2017), *Tarrawonga Coal Mine Rocglen Coal Mine Approved Road Transport Route Audit*.

GTA Consultants (2018), *Vickery Extension Project, Gunnedah Basin, NSW, Road Transport Assessment*.

Halcrow (2011), *Tarrawonga Coal Project Road Transport Assessment*.

Hunter Gas Pipeline Pty Ltd (2008), *Queensland Hunter Gas Pipeline Environmental Assessment*.

Impact Traffic Engineering (2017), *Narrabri Solar Farm – Old Gunnedah Road, Narrabri Traffic and Transport Assessment*.

JacobsGHD (2020), *ARTC Inland Rail Narromine to Narrabri Project Traffic and Transport Assessment Technical Report 10*.

Narrabri Coal Operations Pty Ltd (2022), *Shuttle Bus Traffic Control Protocol*.

National Heavy Vehicle Regulator (2024), Viewed 17 September 2024,
<https://maps.nhvr.gov.au/>

Santos (2022a), *Hunter Gas Pipeline Project Background and Status Fact Sheet September 2022*.

Santos (2022b), *Narrabri Lateral Pipeline Scoping Report*.

Santos (2023), *Pipeline Route: HGP route*, Viewed 21 February 2023,
<https://huntergaspipeline.com.au/pipeline-route/>.

The Transport Planning Partnership (2020), *Narrabri Underground Mine Stage 3 Extension Project Road Transport Assessment*.

The Transport Planning Partnership (2021a), *Narrabri Mine Modification 7 Road Transport Review*.

The Transport Planning Partnership (2021b), *Narrabri Underground Stage 3 Extension Project Response to Submissions*.

The Transport Planning Partnership (2021c), *Narrabri Underground Stage 3 Extension Project Response to Submissions – Supplementary Submission*.

The Transport Planning Partnership (2023), *Tarrawonga Coal Mine – Haulage Hours Modification Road Transport Assessment*.

Transport and Traffic Planning Associates (2008), *Proposed Queensland to Hunter Gas Pipeline Assessment of Traffic Impacts and Management Implications*.

Transport for New South Wales (2020), *Additional Access Conditions for oversize and overmass heavy vehicles and loads*.

1 Introduction

This report has been prepared on behalf of Whitehaven Energy Pty Ltd (a wholly owned subsidiary of Whitehaven Coal Limited [Whitehaven]), to present the findings of an assessment of the road transport implications of the Whitehaven Solar Farm Project (the Project). The Project is located approximately 25 kilometres (km) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council Local Government Area, in the New England North West region of New South Wales (NSW) (Figure 1.1).

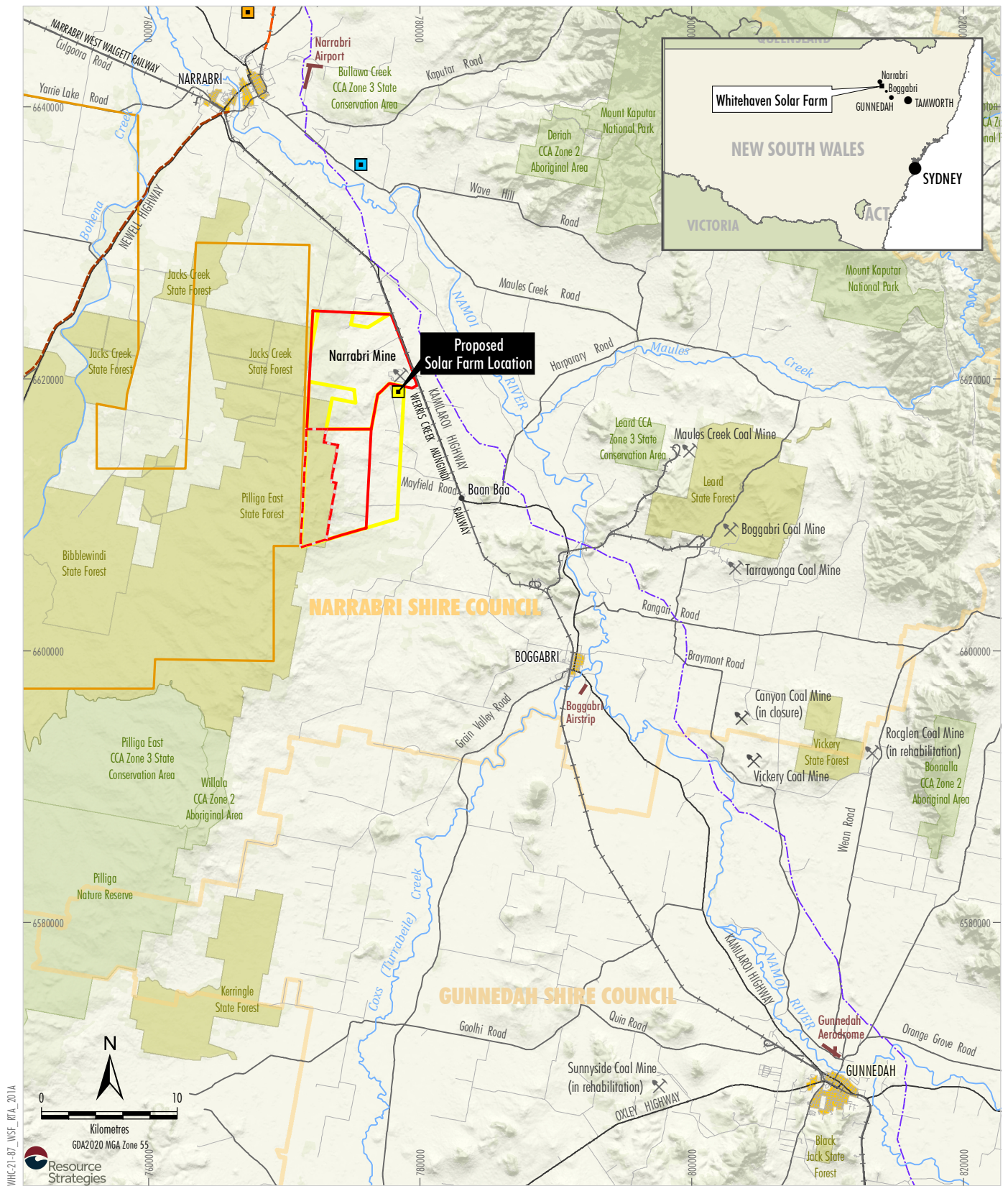
The Project would be located adjacent to the existing Narrabri Mine on Whitehaven-managed land and would include approximately 26 megawatt (MW) direct current (DC) of solar electricity generation and construction of a 10 Megawatt DC Battery Energy Storage System (BESS). The Project would provide behind-the-meter electricity supply to the Narrabri Mine via the existing 66 kilovolt (kV) electricity transmission line (ETL).

Whitehaven Energy Pty Ltd is the proponent of the Project and is seeking approval for the Project as a State Significant Development (SSD) under Section 4.36 of the *Environmental Planning and Assessment Act 1979*. This Road Transport Assessment forms part of the Environmental Impact Statement (EIS) which has been prepared to accompany the development Application for the Project. The Secretary's Environmental Assessment Requirements (SEARs) and where they are referenced in this Road Transport Assessment is stated in Table 1.1 below.

Table 1.1: SEARs Requirements – Reference Summary

SEARs Requirements	Section Reference
Transport – including: an assessment of the peak and average traffic generation, including over-dimensional vehicles/ heavy vehicles requiring escort and construction worker transportation;	Section 2
an assessment of the likely transport impacts to the site access route(s) including for over-dimension vehicles/ heavy vehicles requiring escort, site access point(s), any Crown land, particularly in relation to the capacity and condition of the roads, road safety and intersection performance;	Section 4
a cumulative impact assessment of traffic from nearby developments; and	Section 3.6
provide details of measures to mitigate and / or manage potential impacts including a schedule of all required road upgrades (including resulting from heavy vehicle and over mass / over dimensional traffic haulage routes), road maintenance contributions, and any other traffic control measures, developed in consultation with the relevant road authority.	Section 4.12

The Transport Planning Partnership has also prepared this Road Transport Assessment to address relevant input to the SEARs from Transport for NSW (TfNSW) and Narrabri Shire Council.



WHITEHAVEN COAL

WHITEHAVEN SOLAR FARM
Regional Location

Figure 1.1

The remainder of this report is set out as follows:

- Section 2 describes the Project, the scenarios adopted for this assessment, and the Project's anticipated traffic generation characteristics;
- Section 3 presents a description of the existing road transport environment, including traffic volumes, road safety history, expected changes in conditions, and the operating conditions;
- Section 4 assesses the impacts of the Project on the road network conditions, including an assessment of the proposed access conditions; and
- Section 5 presents the conclusions of the study.

2 The Project and its Traffic Generation

2.1 Project Description

The Project involves installation of a 26 MW solar photovoltaic (PV) facility adjacent to the existing Narrabri Mine, and would involve the following primary components and activities (Figure 2.1):

- construction and operation of approximately 50,000 solar PV panels to provide electricity supply for the Narrabri Mine;
- construction of a substation that facilitates connection to the existing 66 kV overhead ETL;
- construction of an overhead ETL to connect the proposed substation to the existing 66 kV overhead ETL, north of Kurrajong Creek Road;
- construction and operation of ancillary infrastructure including access roads, inverter stations, temporary staging areas, perimeter fencing and operations and maintenance buildings;
- construction and operation of a BESS;
- ongoing maintenance activities; and
- decommissioning and rehabilitation of the site.

Table 2.1 (on page 6) provides a summary of the key attributes of the Project.

Construction of the Project is anticipated to occur over approximately six to nine months, commencing in 2025. Construction activities would employ an average of approximately 30 personnel, and a peak of 65 personnel. The peak personnel may be present for up to three months of the construction period. Construction activities would occur between 7:00 am and 6:00 pm Monday to Friday, and between 8:00 am and 1:00 pm on Saturdays.

The design operational life of the Project is approximately 50 years, with operational activities occurring 24 hours, 7 days a week throughout the operational life. Operational activities for the Project would include ongoing maintenance of infrastructure, including servicing of infrastructure, repairs and vegetation management. Maintenance activities would be intermittent and informed by remote monitoring, and would generally occur between 7:00 am and 6:00 pm, 7 days a week. Ongoing employment during the operational life would involve less than one Full Time Equivalent (FTE) worker.

At the end of the life of the Project, decommissioning and rehabilitation activities would occur, including removal of all infrastructure from the site.

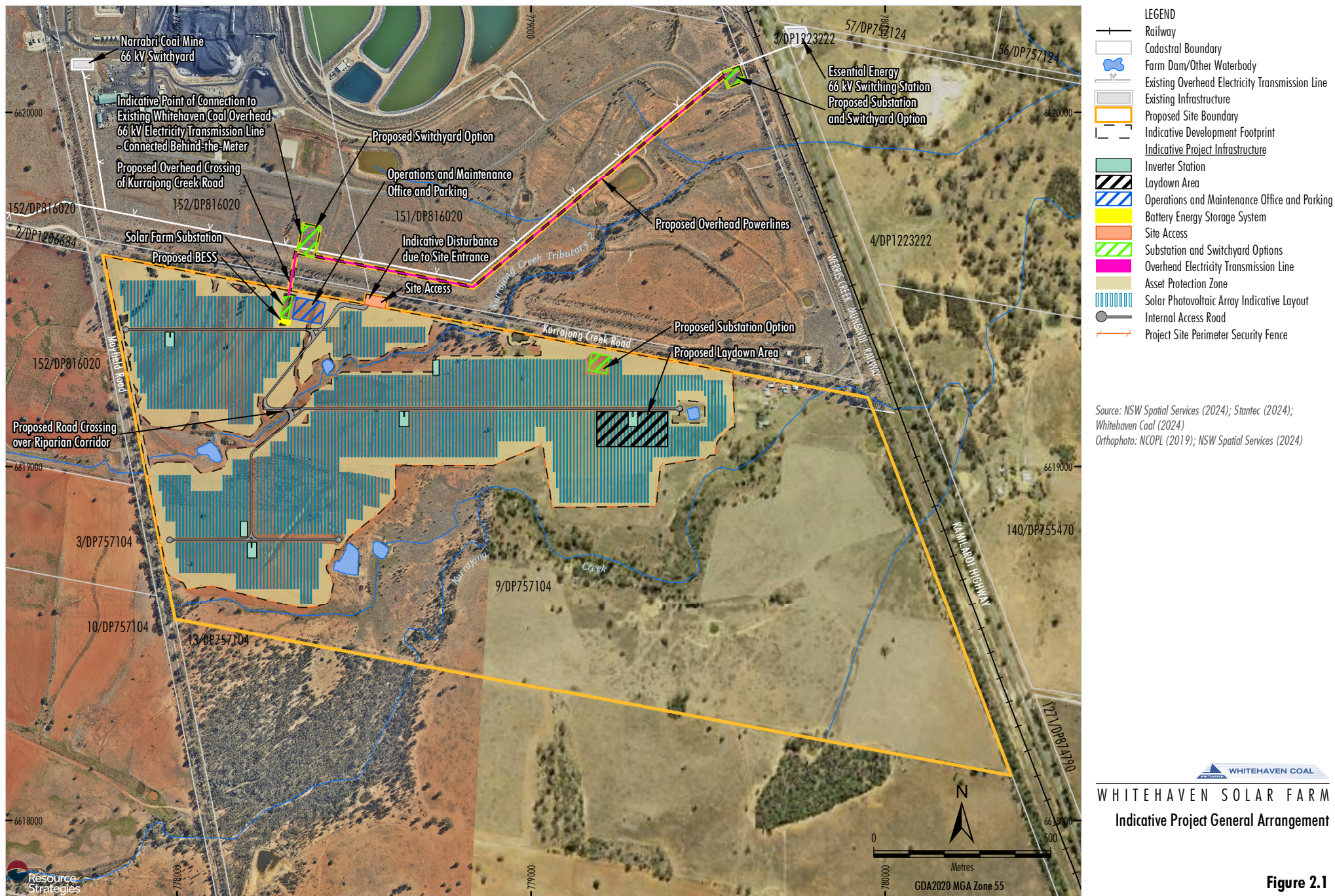


Figure 2.1

Table 2.1: Summary of Key Project Attributes

Project Component	Summary Description
Size and Purpose	26 MW DC, 20 MW AC for behind-the-meter electricity supply to the Narrabri Mine.
Project Area	Indicative Project general arrangement of approximately 100 ha.
Solar Configuration	50,000 PV panels in a north to south alignment. - East to west tracking system (single axis).
Access Route	The proposed access route is via the Kamilaroi Highway and Kurrajong Creek Road.
Power Infrastructure	- Substation. 66 kV connector to the existing 66 kV ETL.
BESS	10 Megawatt Hour DC. - Centralised system. - Lithium battery.
Site Entry	Site entry would be via a constructed access point on Kurrajong Creek Road.
Construction	- Construction period of approximately 6-9 months. - Employment of approximately 30 personnel on average during its construction, with peak construction requiring approximately 65 personnel. - Construction undertaken between 7:00 am and 6:00 pm Monday to Friday, and between 8:00 am and 1:00 pm on Saturdays.
Operational Life	The design operational life is approximately 50 years.
Decommissioning and Rehabilitation	Decommissioning at the end of the of Project life, involving the removal of all infrastructure with a proposed final land use to comprise a combination of native vegetation and agricultural (pasture).
Capital Investment	Approximately \$55M.
Hours of Operation	24 hours, 7 days a week with scheduled maintenance activities generally undertaken between 7:00 am and 6:00 pm, 7 days a week

Note: ha = hectares.

Vehicular access for the Project is proposed via the Project site access road, to be constructed on Kurrajong Creek Road approximately 700 metres (m) east of Mayfield Road. Vehicles would enter and exit the Project site access road via Kamilaroi Highway and Kurrajong Creek Road only.

2.2 Project Assessment Scenarios

With respect to the potential impacts on the road transport environment, the Project would conservatively generate traffic over three distinct periods, these being:

- a construction stage, with short-term traffic generation anticipated to occur over nine months commencing 2025;
- an operational stage, with long-term very low traffic generation over a period of approximately 50 years; and
- a decommissioning stage, short-term peak traffic generation at the end of the life of the Project, assumed to occur in approximately 2075.

Consent for the Narrabri Underground Stage 3 Extension Project (SSD-10269) (refer to Section 3.5.1) includes Condition B67, which requires the upgrade of the intersection of the Mine Access Road with Kurrajong Creek Road and Kamilaroi Highway or alternative measures acceptable to the Planning Secretary and TfNSW. While the intended timing of the Project is that construction would commence in 2025, the timing of the intersection upgrade or other measures relative to the Project stages described above is not yet known. This assessment therefore considers the following potential scenarios:

- construction stage occurring before, during or after the intersection upgrade;
- operational stage occurring before, during or after the intersection upgrade; and
- decommissioning stage after intersection upgrade.

The traffic trip generation and distribution for each of these scenarios are discussed in the following sections.

The primary constraint on the performance of the road network in the vicinity of the Project is the level crossing on Kurrajong Creek Road west of Kamilaroi Highway (Figure 2.2) (refer to Section 3.2), notably the potential for inbound traffic to Narrabri Mine and properties on the local roads to be delayed by train movements through the crossing. The inbound traffic demands peak during the early morning, with inbound volumes being significantly lower at all other times of the day. Previous assessments (TTPP, 2020; 2021a; 2021b) have demonstrated that outside of periods when the level crossing is closed to road traffic, the intersection of Kamilaroi Highway with Kurrajong Creek Road operates at good levels of service with substantial spare capacity, and is anticipated to do so with future growth in traffic on both roads. Further analysis of the operation of the intersection outside of periods of closures of the level crossing is not considered to be warranted.

This assessment therefore focusses on the future demands for westbound movements from Kamilaroi Highway towards the Narrabri Mine, local properties and the Project, due to the potential for these demands to result in queues on Kamilaroi Highway should the peak demands coincide with a coal train moving through the level crossing.



Source: Orthophotos - Whitehaven Coal (2017);
NSW Trade & Investment (2017); NCOPL (2018)



 WHITEHAVEN COAL
WHITEHAVEN SOLAR FARM
Project Site Intersection

Figure 2.2

2.3 Construction Stage Traffic

2.3.1 Construction Workforce Traffic

The Project construction workforce would be transported between the site and the townships of Narrabri and Boggabri using shuttle buses, similar to those currently provided for the Modification 7 workforce (refer to Section 3.5.1.1). The primary routes for the shuttle buses would be:

- Narrabri via Kamilaroi Highway, Kurrajong Creek Road and the Project Site access road;
- Narrabri via Old Gunnedah Road, Turrawan Road, Kamilaroi Highway, Kurrajong Creek Road and the Project Site access road; and
- Boggabri via Kamilaroi Highway, Kurrajong Creek Road and the Project Site access road.

Consistent with the workforce at Narrabri Mine, it is anticipated that approximately 60 percent of the construction workforce would reside in and around Narrabri, and 40 percent would reside in and around Boggabri. Assuming use of mid-size 20-seat shuttle buses such as Toyota Coaster or Fuso Rosa, with a separate bus used for each of the two Narrabri routes described above, to transport the average construction workforce of 30 personnel, it is anticipated that the Project would require:

- two buses to/from Narrabri; and
- one bus to/from Boggabri.

To transport the peak construction workforce of 65 personnel, the Project would require:

- two to three buses to/from Narrabri; and
- two buses to/from Boggabri.

As the construction hours do not directly align with the Narrabri Mine shift change times, it is likely that the same bus fleet would be used to transport both Narrabri Mine and Project workers, resulting in some efficiencies in the total number of buses used and trips generated, with the potential for buses to be laden with passengers in both directions of travel. However, as a robust assessment, it is assumed that after transporting workers from Narrabri or Boggabri to the Project in the morning, empty buses would return to Narrabri or Boggabri for the day, returning to the Project to collect workers at the end of the day.

The shuttle bus operations would be managed so that buses arrive just prior to the start of the proposed construction hours in the morning, and just after the end of the proposed construction hours in the evening. Assuming that all buses leave the construction site when not in use during the day and return to either Boggabri or Narrabri, it is anticipated that on weekday mornings the buses would arrive between approximately 6:45 am and 7:00 am and depart between 7:00 am and 7:15 am. On weekday evenings, the buses would arrive between approximately 5:45 pm and 6:00 pm, and depart between 6:00 pm and 6:15 pm.

2.3.2 Construction Heavy Vehicle Traffic

Construction activities would generate an average of five heavy vehicle deliveries per day, which, taking into consideration the arrival and departure of each truck, would generate 10 heavy vehicle trips on the road network. On a peak day, up to 10 heavy vehicle deliveries may occur, generating 20 heavy vehicle trips on the road network. Based on the types of vehicles likely to supply materials and personnel to site, the largest vehicle that will regularly be required during the Project construction is likely to be a semi-trailer. B-doubles may also access the site, however this is likely to be infrequent and would be managed to avoid the peak periods during which the Narrabri Mine workforce travels (i.e. would generally occur after 9 am and before 4 pm). It is expected that this traffic would travel to and from the south on Kamilaroi Highway.

Occasionally, oversized vehicles would be required to deliver large plant components, expected to include the transformer for the substation, and the switching station. Oversized vehicles such as a 50 tonne crane may also need to access the site to place the infrastructure such as the substation components.

Construction heavy vehicles would be expected to arrive and depart the site wholly within the proposed construction hours. This assessment assumes that 10 percent of the daily heavy vehicle trips may occur within the same hour as the workforce peak trips.

2.4 Operational Stage Traffic

The operational stage of the Project is estimated to commence in approximately June 2025. When operational, the Project would be monitored remotely by existing Narrabri Mine employees 24 hours per day and seven days per week. On a typical day, one person would attend the site to undertake ongoing routine maintenance and monitoring of the Project infrastructure. Once operational, the need for deliveries and visitors to the site would be very limited, and would occur only on a very occasional basis when maintenance or repairs are required. Based on this, it is conservatively estimated that there would be two vehicle movements on average per day during operations. The Project's operational traffic characteristics would not be impacted by the upgrading of the intersection of Kamilaroi Highway with Kurrajong Creek Road.

As the Project's traffic generation when operational would be very low and well within the day-to-day variations in traffic conditions, this study does not specifically assess potential traffic impacts of the Project during its operational phase.

2.5 Decommissioning Stage Traffic

Decommissioning of the Project would take approximately six months, and involve approximately 15 personnel. A detailed schedule of decommissioning activities would be developed prior to the work being undertaken, however for the purpose of this assessment, it has been assumed that the travel characteristics of the decommissioning activity would be similar to those occurring during the construction phase.

2.5.1 Decommissioning Workforce Traffic

Allowing for the arrival of workers at the start of the day and departure at the end of the day using shuttle buses, the decommissioning workforce of 15 personnel would require one bus to/from Narrabri and one bus to/from Boggabri.

Consistent with the travel characteristics of the construction workforce, it is assumed that after transporting decommissioning workers from Narrabri or Boggabri to the Project in the morning, empty buses would return to Narrabri or Boggabri for the day, returning to the Project to collect workers at the end of the day.

The shuttle bus operations would be managed so that buses arrive just prior to the start of the proposed decommissioning activity hours in the morning, and just after the end of the proposed decommissioning hours in the evening. Assuming that all buses leave the construction site when not in use during the day and return to either Boggabri or Narrabri, it is anticipated that on weekday mornings the two buses would arrive between approximately 6:45 am and 7:00 am and depart between 7:00 am and 7:15 am. On weekday evenings, the two buses would arrive between approximately 5:45 pm and 6:00 pm, and depart between 6:00 pm and 6:15 pm.

2.5.2 Decommissioning Heavy Vehicle Traffic

For the purpose of this assessment, it is assumed that decommissioning activities would generate a similar number of heavy vehicle movements as the construction activity. On this basis, decommissioning activity is estimated to generate an average of 10 heavy vehicle trips on the road network per day, and 20 heavy vehicle trips on a peak day.

Consistent with the construction activity, the largest vehicle that will regularly be required during the Project decommissioning is likely to be a semi-trailer. B-doubles may also access the site, however this is likely to be infrequent. Occasionally (estimated to be approximately three times over the life of the Project), oversized vehicles may be required to remove large plant components. It is expected that this traffic would travel to and from the south on Kamilaroi Highway.

2.6 Project Traffic Summary

Table 2.2 summarises the peak hour and daily Project-generated traffic forecast on average and peak days during the construction and operational stages of the Project. These vehicles would travel to and from the North or South on Kamilaroi Highway as summarised in Table 2.2.

Table 2.2: Summary of Project Traffic Generation

Vehicle Type	Peak Hour (vehicles per hour)				Daily (vehicles per day)			
	Average Day		Peak Day		Average Day		Peak Day	
	to/from North	to/from South	to/from North	to/from South	to/from North	to/from South	to/from North	to/from South
Construction Stage								
Buses	4	2	6	4	8	4	12	8
Heavy	-	1	-	2	-	10	-	20
Total	4	3	6	6	8	14	12	28
Decommissioning Stage								
Buses	2	2	2	2	4	4	4	4
Heavy	-	1	-	2	-	10	-	20
Total	2	3	2	4	4	14	4	24

Buses 50% inbound, 50% outbound in peak hours.

Heavy vehicles 100% inbound in AM peak and 100% outbound in PM peak.

3 Road Transport Environment

3.1 Road Network

The Project is accessed via Kamilaroi Highway, Kurrajong Creek Road and the proposed Project Site Access Road. Key features of the existing access roads and other roads in the local region are briefly described below.

Kamilaroi Highway is a State Road which provides access through regional centres such as Gunnedah, Boggabri and Narrabri. In the vicinity of the Narrabri Mine, Kamilaroi Highway has a sealed surface with a single travel lane in each direction, sealed shoulders and a posted speed limit of 100 kilometres per hour (km/h). At its intersection with Kurrajong Creek Road, Kamilaroi Highway is widened with channelised left and right turn lanes for vehicles turning into Kurrajong Creek Road, and sealed shoulders on both sides of Kamilaroi Highway. Kamilaroi Highway is an approved route for use by eligible oversize overmass (OSOM) vehicles, and its intersection with Kurrajong Creek Road has been upgraded for the Narrabri Mine to be suitable for the OSOM vehicles that are occasionally required to access the mine site.

Kurrajong Creek Road is a local road which extends between the Kamilaroi Highway and Mayfield Road. Kurrajong Creek Road extends approximately 80 m westward from the Kamilaroi Highway, crossing the Werris Creek Mungindi Railway at an actively controlled level crossing with flashing lights, warning bells and boom barriers. It then turns south through 90 degrees on the western side of the Werris Creek Mungindi Railway and runs parallel to the railway for approximately 800 m, then curves to an approximately east-west alignment for approximately 2.1 km to Mayfield Road. This part of Kurrajong Creek Road is shown in Figure 3.1, and is a sealed two-way road with no centre line marking, and a posted speed limit of 80 km/h. Together with other local roads including Merrilong Lane and Longsight Lane, Kurrajong Creek Road provides vehicular access for the local rural properties on the western side of the Werris Creek Mungindi Railway.

Figure 3.1: Kurrajong Creek Road facing East from near Mayfield Road



The **Narrabri Mine Access Road** is a sealed two-way road which extends westward from a 90-degree bend in Kurrajong Creek which lies to the west of the Werris Creek Mungindi Railway. It is approximately 7 m wide, widening on bends, and is marked with double two-way barrier lines along its length. It has a posted speed limit of 60 km/h, reducing to 40 km/h as it approaches the Narrabri Mine infrastructure area and car park.

Mayfield Road provides a north-south link between the western end of Kurrajong Creek Road adjacent to Narrabri Mine, and the Kamilaroi Highway approximately 8 km south of the intersection of the Kamilaroi Highway with Kurrajong Creek Road. Mayfield Road is a sealed two-way road with no centre line marking between Kurrajong Creek Road and its intersection with Merrilong Lane and remains unsealed for approximately 6.5 km between that intersection and the Kamilaroi Highway. Mayfield Road crosses the Werris Creek Mungindi Railway at a level crossing which is passively controlled with “STOP” sign controls. Mayfield Road is signposted as being used by school buses.

3.2 Kurrajong Creek Road Level Crossing

All vehicles accessing the Narrabri Mine travel through the level crossing (LXM 534) on Kurrajong Creek Road. A railway crossing signal assembly (RX-5) incorporating a "RAILWAY CROSSING" (R6-25) sign, "STOP ON RED SIGNAL" (R6-9) sign, flashing lights, and a boom barrier is provided on each approach. "RAIL X" and "STOP" line pavement marking is provided on the eastern and western approaches to the level crossing, and the roads are marked with edge lines and double two-way barrier lines, enhanced with a narrow concrete median approximately 14 m long on each approach to prevent drivers from driving around the lowered barrier. Advance warning signs of the presence of the level crossing are provided for both northbound and southbound drivers on Kamilaroi Highway.

The Narrabri Mine generates an average of four trains per day and a peak of eight trains per day. Each train crosses the level crossing on Kurrajong Creek Road when entering the Narrabri Mine Balloon Loop and again when exiting the balloon loop, thus the Narrabri Mine-generated trains occupy the crossing an average of eight times per day, and a peak of 16 times per day. The Narrabri Mine-generated train movements occur 24 hours per day and seven days per week.

3.3 Traffic Volumes

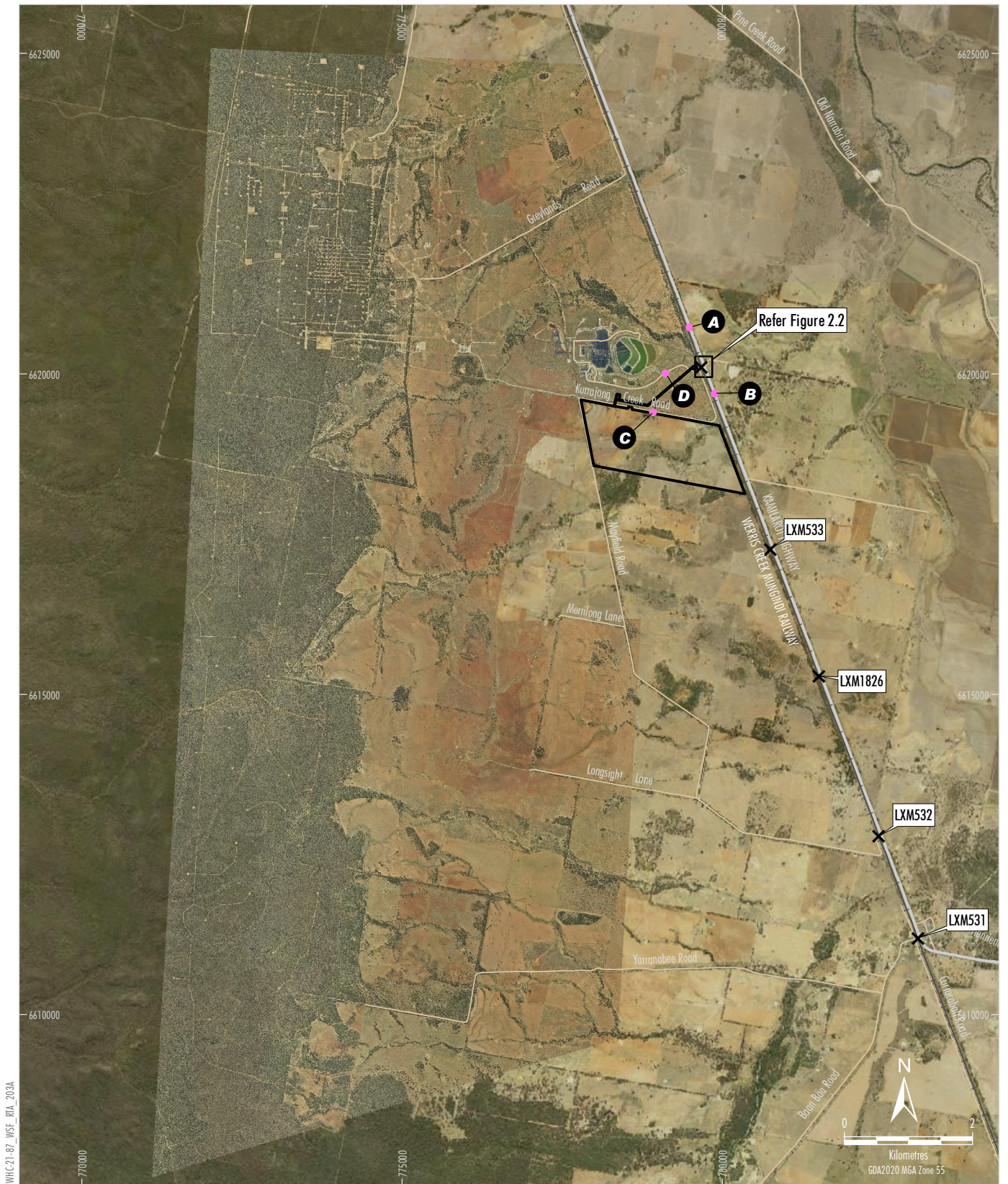
Traffic surveys were conducted during June 2019 on Kamilaroi Highway, Kurrajong Creek Road and the Mine Access Road, and at the intersections of Kurrajong Creek Road with Kamilaroi Highway and the Mine Access Road (TPP, 2020). The locations of the traffic surveys are presented in Figure 1.1, and key results are summarised in Table 3.1, which presents the surveyed total average weekday traffic at the survey location. The peak hours in Table 3.1 are the busiest hours recorded at each survey location, which do not necessarily coincide with each other.

In Table 3.1, heavy vehicles include single unit rigid trucks and buses with two, three or four axles and up to 14.5 m long, as well as articulated vehicles (which include semi-trailers and rigid trucks with trailers, B-Doubles and road trains where permitted).

Table 3.1: Surveyed Average Weekday Total Two-way Traffic 2019

Road and Location	AM Peak Hour (vehicles per hour)			PM Peak Hour (vehicles per hour)			Daily (vehicles per day)	
	Hour	Light Vehicles	Heavy Vehicles	Hour	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Narrabri Mine Access	6:00 am	124	4	4:00 pm	80	5	784	76
Kamilaroi Highway North	8:00 am	133	31	5:00 pm	180	28	2,016	483
Kamilaroi Highway South	8:00 am	143	27	4:00 pm	184	23	2,099	431
Kurrajong Creek Road	8:00 am	3	0	3:00 pm	4	0	25	3

Source: TPP (2020).



WHC21-87_MSF_RTA_203A

- LEGEND**
-  Rail Crossing
 -  Traffic Count Location
 -  Proposed Site Boundary

Source: NCOPL (2019); NSW Spatial Services (2019);
TTPP (2020)

 **WHITEHAVEN COAL**
WHITEHAVEN SOLAR FARM
Traffic Survey Locations

Figure 3.2

At the time of the traffic surveys, there were 270 Whitehaven employees and 253 FTE contractors based at Narrabri Mine. This total of 523 FTE workers is consistent with the peak 520 FTE workforce expected at the Mine, excluding an additional 42 FTE additional workers required over a five year period and approximately 20 additional personnel present periodically for short-term construction activities as infrastructure development occurs. Narrabri Mine production data shows that June 2019 represents maximum operating conditions, and was the highest run-of-mine coal production month for the 2018-2019 financial year. The traffic surveys are therefore considered to represent peak operational conditions at Narrabri Mine prior to commencement of the approved Narrabri Underground Mine Stage 3 Extension Project, and the Narrabri Mine Modification 7 as described in Section 3.5.1.

The intersection turning movement survey at the intersection of Kamilaroi Highway with Kurrajong Creek Road was undertaken between 5:00am and 7:00 pm on Tuesday 25 June 2019. The surveyed distribution of traffic travelling westbound into Kurrajong Creek Road from Kamilaroi Highway and eastbound from Kurrajong Creek Road to Kamilaroi Highway is presented on a 15-minute basis in Figure 3.3.

Figure 3.3: Surveyed Traffic Across Kurrajong Creek Road Level Crossing 2019

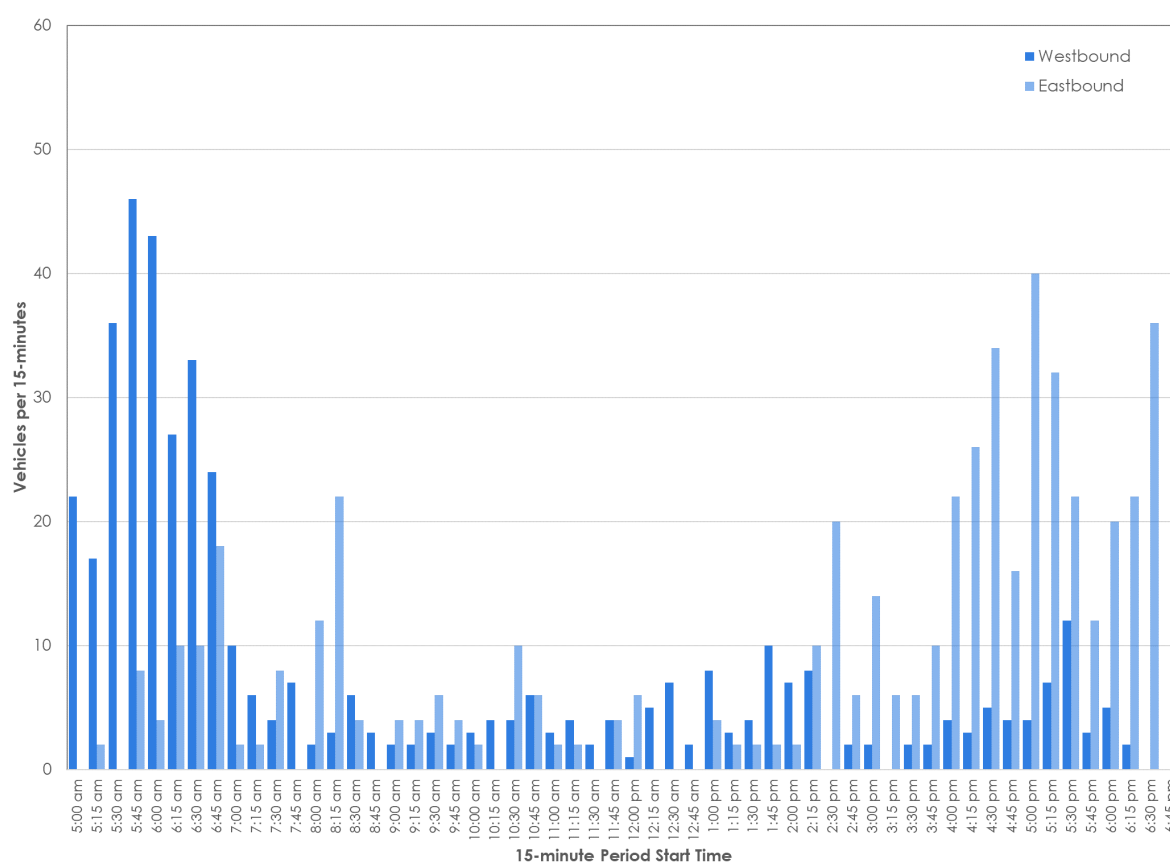


Figure 3.3 indicates that the westbound traffic peaks between 5:45 am and 6:00 am when 46 westbound vehicles were recorded, and remains very low at between 0 and 12 vehicles westbound during all 15 minute periods after 7:00 am.

3.4 Road Crash History

Road crash information was obtained from TfNSW Centre for Road Safety for the five year period 1 January 2017 to 31 December 2021. The data include those crashes which conform to the national guidelines for reporting and classifying road vehicle crashes based on the following criteria:

- The crash was reported to the police.
- The crash occurred on a road open to the public.
- The crash involved at least one moving vehicle.
- The crash involved at least one person being killed or injured or at least one motor vehicle being towed away.

Crash data were reviewed for the primary access routes relevant to the Project and surrounding roads:

- the Kamilaroi Highway between Narrabri and Baan Baa;
- Kurrajong Creek Road; and
- Mayfield Road, Merrilong Lane and Longsight Lane (local access roads, not Project access roads).

Over the investigation period and routes reviewed:

- no crashes were reported on Kurrajong Creek Road, Mayfield Road, Merrilong Lane or Longsight Lane; and
- no crashes were reported at or near the intersection of Kamilaroi Highway and Kurrajong Creek Road.

A total of 14 crashes occurred along Kamilaroi Highway, resulting in two fatalities, seven people being seriously injured, and 10 people being moderately injured. The most common general crash type was single-vehicle “off path” crashes, which accounted for 11 of the crashes. Two crashes involved vehicles travelling in the same direction, and one involved vehicles travelling in opposite directions.

The high proportion of crashes involving single vehicles leaving the carriageway, known as run-off-road (ROR) crashes, is consistent with the TfNSW Centre for Road Safety crash and casualty statistics for NSW, which indicate that over the period 2017 to 2021 inclusive, 66 percent of all crashes in 100 km/h and 110 km/h speed zones in country areas were off path or out of control vehicle crashes. The Australian Road Research Board (2011) states that known causes of ROR crashes include:

- driver behaviours such as speed, inattention, avoidance manoeuvres, errant vehicles;
- driver impairment including fatigue, alcohol, drugs, mood state;

- road conditions such as horizontal alignment, shoulder deficiencies, slippery surface, poor delineation, damaged surfaces;
- vehicle failure; and
- environmental conditions such as rain, fog, snow, livestock or native fauna.

The two fatal crashes which occurred on the Kamilaroi Highway over the period investigated are detailed below:

- 24 November 2017 at 4:06 am, 300 m south of Kurrajong Creek Road. The crash occurred in fine weather, on a dry road surface, in darkness. A northbound car travelling at 100 km/h lost control on a straight section of undivided road, and left the carriageway to the right and struck a tree. Fatigue was nominated as a contributing factor to the crash. As well as one fatality, two other people were moderately injured.
- 14 January 2018 at 8:30 am, 320 m south of Goodyers Lane (approximately 2.3 km south of Kurrajong Creek Road). The crash occurred on a dry road surface in fine weather, and in daylight. A northbound four wheel drive (4WD) travelling at 100 km/h lost control on a straight undivided section of the Kamilaroi Highway, and left the carriageway to the right and struck a drain or culvert and then struck a tree. Fatigue was nominated as a contributing factor to the crash.

Fatigue was nominated as a contributing factor in both of the fatal crashes. A driver is assessed as having been fatigued if they were described by police as being asleep, drowsy or fatigued, or if their vehicle performed a manoeuvre which suggested loss of concentration due to fatigue (e.g., travelled to the wrong side of a straight road and was involved in a head-on crash, or ran off a straight road or to the outside of a curve and was not directly identified as having been travelling at excessive speed and no other relevant manoeuvre was identified).

Six of the crashes on the Kamilaroi Highway identified speeding and/or fatigue as a contributing factor to the crash, and one of the 18 vehicles involved in the crashes was a heavy vehicle.

The data do not highlight any specific location with a notably poor crash history which may suggest an inherent concern with the road layout at that location.

3.5 Changes to Road Environment

Compared with the traffic conditions surveyed on Kamilaroi Highway in the vicinity of the Project in 2019 (Section 3.3), future traffic conditions can be expected to vary over time as a result of changes to major developments in the region as well as background growth in traffic not attributable to a specific development. TTPP has identified approved or proposed developments in the region that may impact traffic conditions over the life of the Project compared with those surveyed in 2019. These are discussed below.

3.5.1 Narrabri Mine

The Narrabri Mine is operated by Narrabri Coal Operations Pty Limited (NCOPL). Project Approval 08_0144 allows for the production and processing of up to 11 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal until July 2044 at Narrabri Mine.

Mining operations are permitted to occur 24 hours per day and seven days per week, and construction activity is permitted to occur between 7:00 am and 6:00 pm Monday to Sunday. Product coal is transported by train from the Narrabri Mine, using the Narrabri Mine Balloon Loop and on to the Werris Creek Mungindi Railway. The Narrabri Mine generates an average of four trains per day and a peak of eight trains per day.

3.5.1.1 Narrabri Mine Modification 7

Modification 7 to Project Approval 08_0144 was approved in November 2021, hence its traffic generation was not captured in the 2019 traffic surveys described in Section 3.3.

Modification 7 involves the extraction of coal from the previously approved Longwalls 201 and 202 footprint using bord and pillar mining methods, rather than the previously approved longwall mining method. The bord and pillar mining will occur concurrently with the existing longwall operations over approximately five years, with the maximum ROM coal production remaining within the previously approved Stage 2 limit of 11 Mtpa.

Modification 7 requires approximately 42 FTE personnel in addition to the previously existing operational workforce over a period of five years. The 42 FTE workers would comprise 60 additional personnel working on a seven days on, seven days off roster, such that approximately 30 additional workers would be present on any one day. The additional workers would be employed over two 12-hour shifts each day, with half being present for the day shift and half being present for the night shift. Conditions 25A and 25B of Project Approval 08_0144 relate to the use of shuttle buses for the transport of the additional workforce required for Modification 7, as follows:

“25A. Unless otherwise agreed by the Secretary following consultation with TfNSW, the Proponent must ensure that at least 15 employees, calculated as a weekly average, are transported to and from the site by shuttle bus during each of the morning and evening peak traffic periods of 05:30 am to 07:30 am and 5:30 pm to 7:30 pm.

25B. Should the modification application 08_0144 MOD 7 workforce requirements increase above 15 employees per shift, the Proponent must ensure that an equivalent number of additional employees are transported to and from the site by shuttle bus for each shift during peak traffic periods, as required by condition 25A.

Note: The modification application 08_0144 MOD 7 EA assumed that approximately 15 employees would be required for each shift (split between day and night). Therefore approximately 30 employees would be rostered on at any one time within a 24 hour period.”

In accordance with Project Approval 08_0144 Condition 25C of Schedule 4, a Shuttle Bus Protocol was prepared and approved by the Department of Planning, Industry and Environment in March 2022. The protocol (NCOPL, 2022) includes:

- a Code of Conduct for shuttle bus drivers;
- procedures to follow when coal train movements impact the railway crossing on Kurrajong Creek Road;
- nominated routes to be taken by shuttle buses when travelling to and from the mine;
- a program to monitor and report shuttle bus utilisation by employees; and
- outlines roles and responsibilities.

The protocol requires that *“Shuttle bus drivers must not queue within the vehicle turnoff and storage bays on the Kamilaroi Highway when coal train movements impact the railway level crossing on Kurrajong Creek Road. When coal trains are moving across the railway level crossing on Kurrajong Creek Road, shuttle bus drivers must:*

- *continue driving along the Kamilaroi Highway;*
- *park up at a safe and legal location to wait for the coal train to clear the level crossing and for any queued traffic to disperse before entering the Kurrajong Creek Road turnoff.”*

The shuttle bus drivers are also required to contact the Narrabri Mine coal handling and preparation plant (CHPP) Control Room prior to arrival at the intersection to obtain advice on current or upcoming coal train movements that may impact the level crossing on Kurrajong Creek Road.

TPP has reviewed shuttle bus utilisation data provided by NCOPL for 139 days during 2022 and 2023, which record the number of people travelling in shuttle buses arriving at Narrabri Mine. Excluding the arrivals of buses carrying a driver only (assuming those buses are used for pick up of workers), the records indicate that up to 32 workers per day arrived by shuttle bus. The number of bus arrivals recorded per day varied between one and seven. Over the available data period:

- an average of approximately 16 workers per day travelled by shuttle bus;
- there was an average of three bus arrivals (including driver-only arrivals) per day;
- approximately 68 percent of bus arrivals were recorded during the morning period, and 32 percent during the evening period;
- during the morning period, approximately 25 percent of bus arrivals occurred between 5:45 am and 6:00 am, and approximately 63 percent occurred between 6:00 am and 6:15 am; and
- during the evening period, approximately 51 percent of bus arrivals occurred between 6:00 pm and 6:15 pm, approximately 22 percent occurred between 5:00 pm and 5:15 pm, and 17 percent occurred between 5:00 pm and 5:15 pm.

TTPP (2021a) assessed the potential traffic generation of Modification 7 should the additional workforce travel by private vehicles with no car pooling rather than by shuttle bus. That assessment found that the additional average workforce of 30 people present on site each day, with shift changes occurring at 6:30 am and 6:30 pm, would be expected to generate:

- 15 vehicle trips inbound to Narrabri Mine prior to 6:30 am;
- 15 vehicle trips outbound from Narrabri Mine after 6:30 am;
- 15 vehicle trips inbound to Narrabri Mine prior to 6:30 pm; and
- 15 vehicle trips outbound from Narrabri Mine after 6:30 pm.

Consistent with the assumptions for the Project traffic, it is assumed that two-thirds of the Modification 7 workforce would travel in the 15-minute periods immediately before the shift start time and following the end of the shift changeover time.

If the additional workforce required at Narrabri Mine for Modification 7 was present following completion of the upgrade to the intersection of Kamilaroi Highway and Kurrajong Creek Road, the shuttle bus service would no longer be required, and it is assumed that the workforce would travel by private car, with traffic generated as above, in addition to that captured in the traffic surveys described in Section 3.3.

With the use of shuttle buses, approximately 11 day shift workers and five night shift workers travel by shuttle bus and the remainder (four day shift and ten night shift workers) travel by private vehicle. With no allowance for car pooling (which would reduce private vehicle trip generation), those workers are estimated to generate:

- 4 vehicle trips inbound to Narrabri Mine prior to 6:30 am;
- 10 vehicle trips outbound from Narrabri Mine after 6:30 am;
- 10 vehicle trips inbound to Narrabri Mine prior to 6:30 pm; and
- 4 vehicle trips outbound from Narrabri Mine after 6:30 pm.

Based on the shuttle bus records, on a typical day, the average three shuttle bus arrivals per day are estimated to generate the following westbound trips on Kurrajong Creek Road west of Kamilaroi Highway:

- 1 shuttle bus inbound between 5:45 am and 6:00 am;
- 1 shuttle bus inbound between 6:00 am and 6:15 am; and
- 1 shuttle bus inbound between 6:00 pm and 6:15 pm.

Outbound trips are assumed to occur in the 15-minute period following each arrival. If the additional workforce required at Narrabri Mine for Modification 7 was present before completion of the upgrade to the intersection of Kamilaroi Highway and Kurrajong Creek Road, the workforce would travel by shuttle bus and private car, with traffic generated as above, in addition to that captured in the traffic surveys described in Section 3.3.

3.5.1.2 Narrabri Underground Mine Stage 3 Extension Project

Consent for the Narrabri Mine Underground Mine Stage 3 Extension Project (SSD-10269) was granted on 1 April 2022. The Narrabri Mine Underground Mine Stage 3 Extension Project involves an extension to the south of the approved underground mining area to gain access to additional coal reserves within Mining Lease Applications (MLA) 1 and 2, and development of supporting surface infrastructure. ROM coal production would occur at a rate of up to 11 Mtpa, with mining operations permitted until 31 December 2044.

Although the Narrabri Underground Stage 3 Extension Project was approved by the NSW Independent Planning Commission, approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* is currently pending.

The Narrabri Mine Underground Mine Stage 3 Extension Project consent is subject to Condition B67, which requires the upgrade of the intersection of the Mine Access Road with Kurrajong Creek Road and Kamilaroi Highway or alternative measures acceptable to the Planning Secretary and TfNSW. The upgrade or other measures are required to a standard that prevents queuing of vehicles into the Highway's through lanes arising from mine traffic queuing at the Kurrajong Creek Road railway level crossing while also providing sufficient deceleration space for vehicles outside of the highway's through lanes. The design of the intersection upgrade (or approved alternative measures) is to be agreed with TfNSW.

Until such time as the intersection upgrade (or approved alternative measures) is completed, conditions 25A and 25B of development consent 08_0144 as referenced in Section 3.5.1.1 are to be implemented. Details of the intersection upgrade (or approved alternative measures) have not yet been developed or agreed with TfNSW.

The Road Transport Assessment undertaken for the Narrabri Mine Underground Mine Stage 3 Extension Project (TTPP, 2020) found that during the short periods of construction activity, the Narrabri Mine Underground Mine Stage 3 Extension Project would generate up to 50 additional vehicle trips per day, and up to 22 additional vehicle trips during the peak hours associated with the Narrabri Mine traffic. That was a conservatively high estimate which assumed that each of the additional construction workers will drive a car to Narrabri Mine, with no car pooling. While that assessment robustly assumed that all arrivals and departures associated with the construction activity would coincide with the peaks of background Mine-generated traffic, this is unlikely. With standard construction activity typically being between 7:00 am and 6:00 pm, the personnel would typically arrive between 6:30 am and 7:00 am, and depart between 6:00 pm and 6:30 pm. Consistent with the assumptions for the Project traffic, it is assumed that two-thirds of the Narrabri Mine Underground Mine Stage 3 Extension Project construction workforce would travel in the 15-minute periods immediately before the shift start time and following the end of the shift changeover time.

3.5.2 Highway Intersection Upgrade

As discussed in Section 3.5.1, Condition B67 of the Narrabri Mine Underground Mine Stage 3 Extension Project requires the upgrade of the intersection of the Mine Access Road with Kurrajong Creek Road and Kamilaroi Highway, or alternative measures to prevent queuing of vehicles into the Highway's through lanes arising from mine traffic queuing at the Kurrajong Creek Road railway level crossing, while also providing sufficient deceleration space for vehicles outside of the highway's through lanes. The design of the intersection upgrade or alternative measures has not yet been finalised or agreed with TfNSW.

An assessment undertaken by Constructive Solutions Pty Ltd (2022) recommends that the southbound channelised right turn lane and the northbound auxiliary left turn lanes be extended, with installation of advance warning signs on approach to the intersection advising of potential queues ahead, inclusive of train-activated flashing lights. The lane extensions would accommodate the required taper and deceleration requirements appropriate to the 100 km/h speed environment on Kamilaroi Highway, together with the storage requirements appropriate for the forecast 95th percentile queue during the busiest 15 minute period in 2032. The queues were assessed by TTPP (2021b and 2021c) including analysis of the length of time that coal trains close the level crossing to road traffic, and the probability of closures of various lengths overlapping with the peak 15 minutes of inbound road traffic to Narrabri Mine. That analysis was based on a westbound volume of 51 vehicles on Kurrajong Creek Road during the peak 15-minute period, noting the analysis assumed overlapping of inbound traffic generated by the mine's operational and construction traffic that would be unlikely to occur in practice due to the spread of shift start times.

For the purpose of this assessment, it is broadly assumed that the intersection upgrade would involve lengthening of the storage lanes as recommended by Constructive Solutions, with no change to the priorities or level crossing controls. While the details of the intersection upgrade or alternative measures are not yet finalised, it is anticipated that, should the intersection be physically upgraded, the construction activity to achieve the upgrade would be subject to a Construction Traffic Management Plan (CTMP), requiring appropriate management to minimise impacts on Kamilaroi Highway, Kurrajong Creek Road, the Mine Access Road, and the rail corridor operations. The CTMP would need to ensure that implications of the work on all traffic (road and rail) through the site are fully considered, with the level crossing and its controls being integral to the management plan for the safe operation of both road and rail traffic.

It is anticipated that the CTMP would include measures to minimise the generation of any additional vehicle trips westbound across the level crossing during the peaks associated with the Narrabri Mine and Project activities. This may include implementation of bus services for workers associated with the roadworks, and/or provision of car parking for those workers in a location that does not contribute to traffic on Kurrajong Creek Road across the level crossing, and/or management of construction hours for the roadworks to minimise impacts during background peak periods.

It is expected that the CTMP would be prepared in consultation with Australian Rail Track Corporation, taking into consideration the distinct peaks that occur due to traffic travelling to and from Narrabri Mine, the periodic closures of the level crossing, and aiming to minimise impacts to road traffic during the mine peak periods.

3.5.3 Narrabri South Solar Farm

Development Consent (SSD-8387) was granted for the Narrabri South Solar Farm (NSSF) in December 2018. It is proposed to be located on Old Gunnedah Road approximately 10 km southeast of Narrabri. Impact Traffic Engineering (2017) prepared an assessment of the traffic and transport implications of the NSSF. That indicates that the construction workforce is likely to be accommodated in Narrabri and travel to the site via Maitland Street and Old Gunnedah Road. Deliveries are expected to be sourced from local quarries (gravel), Narrabri (water), and Newcastle (solar farm modules and substation components). The delivery vehicles from Newcastle would use Kamilaroi Highway past the Project to access the site via Newell Highway, Tibbereena Street, Fitzroy Street, Maitland Street and Old Gunnedah Road.

The external traffic generation of the NSSF would peak at approximately 76 vehicle trips per day during the busiest month of its construction stage (Impact traffic Engineering, 2017). Those trips would include 46 trips by staff in cars and shuttle buses, and 30 heavy vehicle trips. During the busiest month, the heavy vehicles would be associated with the site set-up and access road construction, the PV plant delivery and erection, and the substation component delivery and erection. Once the site set-up and access road construction are completed, the number of heavy vehicle movements would reduce to three per day, which appear to be those associated with the transport of the solar farm modules and substation components. It is therefore expected that construction of the NSSF would generate an average of three heavy vehicle movements per day on Kamilaroi Highway past the Project.

The construction period would be approximately six to nine months, with construction occurring 7am to 6pm on weekdays and 8am to 1pm on Saturdays. Construction of NSSF has not yet commenced.

Once operational, the NSSF would generate negligible vehicle trips, as it would be remotely operated with low numbers of workers required for routine maintenance activities only. The NSSF would have an operational life of approximately 35 years.

The timing of construction of the NSSF is not known. As its construction activity would generate an average of only three heavy vehicle movements per day on Kamilaroi Highway past the Project and its operational activity would generate negligible traffic, it has not been considered further in this assessment.

3.5.4 Silverleaf Solar Farm

The Silverleaf Solar Farm is an approved 120 MW solar farm, located approximately 4 km north of Narrabri with frontages to Newell Highway and Logans Lane. Approval for the Silverleaf Solar Farm (SSD 9358) was granted by the Minister for Planning and Public Spaces on 21 April 2022. The EIS prepared for the Silverleaf Solar Farm (GHD, 2019) indicates that construction is expected to take between nine and 12 months, and the operational lifespan of the solar farm is 35 years.

The site access for both construction and operational stages would be located on Logans Lane. With regard to traffic implications of the Silverleaf Solar Farm during construction, GHD (2019) indicates that there would be a peak of about 80 heavy vehicle trips (i.e. 40 inbound and 40 outbound) to and from the site per week throughout the construction period, with average heavy vehicle deliveries being substantially less. There would also be a maximum of 240 light vehicle trips per day (120 inbound and 120 outbound) during peak periods of construction, with average light vehicle trips being considerably lower. The construction vehicle trips would be undertaken during standard construction hours, or just before to allow workers to get to site. GHD (2019) does not provide details on the distribution of construction vehicle trips on the surrounding road network, and indicates that:

A construction traffic management plan would be developed in consultation with NSW Roads and Maritime Services and Narrabri Shire Council. This would include the proposed intersection upgrade at the Kamilaroi Highway and Logans lane intersection, and other measures that would be required.

With regard to traffic implications of the Silverleaf Solar Farm when operational, GHD (2019) indicates that:

During operation, the [Silverleaf Solar Farm] would not impact on the operation of the surrounding road network. Vehicle numbers would be low and limited to those associated with maintenance activities, which would occur infrequently.

The construction and operation of the Silverleaf Solar Farm is not expected to impact traffic conditions on the Kamilaroi Highway past the Project over an extended period, and it has not been considered further in this assessment.

3.5.5 Vickery Extension Project

Consent for the Vickery Extension Project (SSD 7480) was granted by the NSW Independent Planning Commission in August 2020 and by the Federal Environment Minister in September 2021. The Vickery Extension Project includes development of an on-site CHPP, train load out facility, and a rail spur to connect to the main Werris Creek Mungindi Railway. Extracted coal would be transported by rail. The Vickery Extension Project is approved to operate for a period of 25 years. In April 2023, Whitehaven announced its intentions to commence development of a limited early mining scenario for the Vickery Extension Project. Whitehaven has since commenced construction and early mining of the Vickery coal deposit, comprising a low capital project that will utilise surplus coal processing and washing infrastructure at the Whitehaven CHPP, as well as existing road haulage, rail and port capacity. The transport of ROM coal from Vickery Coal Mine commenced in April 2024.

GTA Consultants (2018) assessed the road-based trip generation of the Vickery Extension Project for three scenarios, including during its peak construction stage, during its initial mining operational stage, and at its peak mining operational stage. That assessment forecast the peak hourly traffic expected to be generated by the Vickery Extension Project on the Kamilaroi Highway between Rangari Road and Narrabri (i.e. past the Project) as follows:

Vickery Extension Project Construction Stage (Year 1)

- 0 light and 0 heavy vehicles between 6:00 am and 7:00 am; and
- 0 light and 0 heavy vehicles between 6:00 pm and 7:00 pm.

Vickery Extension Project Initial Operational Stage (Year 2)

- 3 light and 0 heavy vehicles between 6:00 am and 7:00 am; and
- 2 light and 0 heavy vehicles between 6:00 pm and 7:00 pm.

Vickery Extension Project Longer Term Operational Stage (Year 12)

- 22 light and 0 heavy vehicles between 6:00 am and 7:00 am; and
- 22 light and 0 heavy vehicles between 5:00 pm and 6:00 pm.

The additional traffic forecast to be generated by the Vickery Extension Project on Kamilaroi Highway past the Project is low and does not coincide with the surveyed peak volumes on Kamilaroi Highway. The Vickery Extension Project traffic would not travel on Kurrajong Creek Road. The potential impact of the Vickery Extension Project traffic on road network operational conditions on and around Kurrajong Creek Road, the level crossing and the intersection with Kamilaroi Highway is therefore considered to be very low.

3.5.6 Boggabri Coal Mine

The Boggabri Coal Mine is operated by Idemitsu Australia and is approved (Project Approval 09_0182 [as modified]) to produce up to 8.6 Mtpa of ROM coal, with an on-site CHPP and private rail spur and rail loop. The Boggabri Coal Mine is approved to operate until the end of December 2033.

The Boggabri Coal Mine is located southeast of the Project and has two vehicular accesses from the Kamilaroi Highway, each permitting left in and left out movements to and from the Kamilaroi Highway. The southbound access is located approximately 19 km from the Project, and the northbound access approximately 21 km from the Project.

Modification 8 to Project Approval 09_0182 proposes an increase to the approved maximum depth of mining to recover additional coal resource, and construction of a fauna movement crossing over the haul road. At the time of writing, Modification 8 had been on exhibition, some amendments made to the mine plans, and a Submissions Report prepared. Cardno (2021) examined the traffic implications of Modification 8, together with the impacts of the workforce at Boggabri Coal Mine being higher than originally considered in the Environmental Assessment.

Cardno (2021) indicates that the workforce at Boggabri Coal Mine is forecast to be an average 620 FTEs from 2022 to 2039, with a peak of 770 FTEs in 2025. The total workforce (inclusive of employees and contractors) at the end of 2018 was 590 people (Boggabri Coal Operations Pty Ltd, 2019) and at the end of 2019 was 542 people (Boggabri Coal Operations Pty Ltd, 2020). It is therefore estimated that at the time of the traffic surveys in mid-2019 (Section 3.3), the total workforce at Boggabri Coal Mine was approximately 566 people.

Based on the travel characteristics presented in Cardno (2021), the workforce of approximately 566 people in 2019 would be expected to have contributed the following trips on Kamilaroi Highway north of Boggabri Coal Mine:

- 16 light vehicle trips in the AM peak hour; and
- 23 light vehicle trips in the PM peak hour.

It can be expected that with the forecast change in the workforce, the total workforce at Boggabri Coal Mine would be an average of approximately 54 people and a peak of approximately 204 people more than were employed at the time of the traffic survey. Together with the traffic generated during construction of the fauna crossing, activity at Boggabri Coal Mine can be expected to increase traffic on Kamilaroi Highway past the Project. Based on the travel characteristics presented in Cardno (2021), the forecast additional 204 operational workers (peak) at the Boggabri Coal Mine in 2025, together with the deliveries of consumables and the Modification 8 construction activity would be expected to generate the following additional trips on Kamilaroi Highway north of Boggabri Coal Mine (above those occurring during the survey in 2019):

- 8 light vehicle and 4 heavy vehicle trips in the AM peak hour (5:45 am to 6:45 am); and
- 10 light vehicle and 0 heavy vehicle trips in the PM peak hour (4:00 pm to 5:00 pm).

Boggabri Coal Mine traffic would not travel on Kurrajong Creek Road. The potential impact of the forecast changes to traffic generated by the Boggabri Coal Mine on road network operational conditions on and around Kurrajong Creek Road, the level crossing and the intersection with Kamilaroi Highway is considered to be very low.

3.5.7 Maules Creek Coal Mine

The Maules Creek Coal Mine (Project Approval 10_0138 [as modified]) is an open cut mining operation which is approved to operate until the end of December 2034. It has vehicular access via Therribri Road and also via the left in and left out intersections on the Kamilaroi Highway also used by the Boggabri Coal Mine.

The vehicle trips generated by the Maules Creek Coal Mine would have been captured by the traffic surveys conducted on the Kamilaroi Highway. GTA Consultants (2018) estimated the traffic generated by the Maules Creek Coal Mine operational workforce on Kamilaroi Highway north of the Boggabri Coal Mine access in 2019, 2020 and 2030 as follows:

- 6 light and 2 heavy vehicles (shuttle buses) between 6:00 am and 7:00 am;
- 4 light and 1 heavy vehicles (shuttle buses) between 5:00 pm and 6:00 pm; and
- 30 light and 6 heavy vehicles (shuttle buses) per day.

The traffic generated by Maules Creek Coal Mine over the life of that mine is therefore expected to remain consistent with that captured during the 2019 traffic surveys.

3.5.8 Tarrawonga Coal Mine

The Tarrawonga Coal Mine (Project Approval 11_0047) is an open cut coal mine located approximately 42 km north-northwest of Gunnedah, which is approved to operate until December 2030. Vehicular access is via a private haul road to Rangari Road, and ROM coal is transported by road to the Whitehaven CHPP, located to the north of Gunnedah.

Some vehicle trips generated by the Tarrawonga Coal Mine may be expected to use the Kamilaroi Highway past the Project, generated by employees travelling to and from the site each day, and by deliveries and visitors to and from the north. The vehicle trips generated by the Tarrawonga Coal Mine would have been captured by the traffic surveys conducted on the Kamilaroi Highway. Halcrow (2011) assessed the expected traffic generation and distribution of the Tarrawonga Coal Mine Project. Based on that assessment, the contribution of the Tarrawonga Coal Mine (including haulage of gravel and domestic specification coal at maximum permitted rates) to traffic on the Kamilaroi Highway past the Project has been estimated at:

- 8 light and 0 heavy vehicles between 6:00 am and 7:00 am
- 0 light and 6 heavy vehicles between 4:00 pm and 5:00 pm; and
- 34 light and 44 heavy vehicles per day.

Tarrawonga Coal Mine traffic does not travel on Kurrajong Creek Road, and no further changes to traffic generated by the Tarrawonga Coal Mine on Kamilaroi Highway past the Project are anticipated.

In May 2023, Tarrawonga Coal Mine submitted a Modification Report to the Department of Planning and Environment. The Modification would authorise additional road haulage hours on the Approved ROM Coal Transport Route to enable Tarrawonga Coal Mine to achieve the currently consented 3.5 Mtpa ROM movement from Tarrawonga Coal Mine to the Whitehaven CHPP located in Gunnedah. A Road Transport Assessment was prepared by TTPP (2023) and indicated the proposed extension to the approved hours for dispatch of ROM coal would have acceptable impacts on the road network, with no change to the overall number of trips generated along the route by the Tarrawonga Coal Mine activity.

3.5.9 Rocglen Coal Mine

The Rocglen Coal Mine ceased mining operations in mid-2019. Since then, equipment has been decommissioned and rehabilitation activities commenced. The number of vehicle trips generated by the Rocglen Coal Mine on Kamilaroi Highway past the Project during the traffic surveys in June 2019 would be very low. An interview survey conducted at Rocglen Coal Mine by GTA Consultants (2017) found that over 12 hours:

- 0 light vehicle drivers arrived from Narrabri or Moree; and
- 4 heavy vehicle drivers arrived from Narrabri or Moree.

As Rocglen Coal Mine has ceased mining operations and its contribution to traffic conditions on the Kamilaroi Highway south of Narrabri during the traffic surveys was very low, no further consideration has been given to traffic generated by its operational activity during the traffic surveys nor future rehabilitation activity.

3.5.10 Inland Rail – Narromine to Narrabri

The Inland Rail is a 1,700 km freight rail project connecting Melbourne to Brisbane via regional Victoria, New South Wales and Queensland. It comprises 13 individual projects, one of which is the Narromine to Narrabri project, which is proposed to link the Parkes to Narromine section of Inland Rail to the Narrabri to North Star section of Inland Rail. The Narromine to Narrabri project was approved by the Minister for Planning on 21 February 2023 and consists of approximately 306 km of new single-track railway with crossing loops, with changes to some roads to facilitate construction and operation of the railway and ancillary infrastructure to support the railway. It will include a new rail corridor with a minimum width of 40 m, which would be sufficient to accommodate the infrastructure proposed for construction, as well as possible future expansion of crossing loops.

The Narromine to Narrabri project lies to the west of the Project, connecting to the Werris Creek Mungindi Railway north of Narrabri and passing to the west of Narrabri, crossing the Kamilaroi Highway at an overbridge before generally following the alignment of the Newell Highway for approximately 20 km to the south-southwest of Narrabri, before turning to the south-west and passing through the Pilliga East State Forest and north of Baradine. The rail alignment will not interact with Kamilaroi Highway or the Werris Creek Mungindi Railway south of Narrabri.

The proposed construction strategy (JacobsGHD, 2020) will divide the overall alignment into four main construction zones, with the Project site being located closest to Zone 4 Narrabri (Pilliga East State Forest to the northern end of the project site). Temporary workforce accommodation facilities will be provided near major population centres, including at Narrabri, accommodating up to 500 people.

Public roads will be used as access routes to and from the construction zones throughout construction of the Narromine to Narrabri project. A construction haul road will be built parallel to the railway alignment within the site, accessed via the public road network. The haul road will carry the majority of people, plant, equipment and materials. Travel associated with the Zone 4 Narrabri construction area will use Newell Highway and other public roads to the south and west of Narrabri and would not use Kamilaroi Highway near the Project. The construction of the Narromine to Narrabri project has therefore not been considered further in this assessment.

Once operational, the Narromine to Narrabri project will generate some vehicular traffic associated with maintenance and operations, however JacobsGHD (2020) indicates that this is not expected to be a significant increase above existing conditions. The number of road-based freight movements using the wider road network is anticipated to reduce, improving the overall operation of the road network, in particular, the Newell Highway. The potential impact on Kamilaroi Highway is unknown and has not been considered further in this assessment.

3.5.11 Queensland Hunter Gas Pipeline

The Queensland Hunter Gas Pipeline was approved by the NSW Minister for Planning in February 2009. It will involve the construction and operation of an approximate 825 km long high-pressure gas transmission pipeline from the Queensland border near Boomi to Newcastle (including a short pipeline lateral to the Maitland area) (Hunter Gas Pipeline Pty Ltd, 2008). The approved pipeline alignment is approximately 1.3 km to the east of Kamilaroi Highway near the Project.

An operational workforce of approximately 25 personnel would be required for the Queensland Hunter Gas Pipeline (Hunter Gas Pipeline Pty Ltd, 2008). Hunter Gas Pipeline Pty Ltd (2008) indicates that the construction workforce of approximately 600 personnel will be spread across two main working groups (spreads) along the pipeline alignment. It is expected that it would take approximately four months for each spread to move through an area. The construction workforce would be accommodated in temporary construction camps which would be related as the work sites move. The estimated vehicle movements per spread during construction are:

- 110 trucks for mobilisation and demobilisation of plant and equipment to the site;
- 90 semitrailer loads for mobilisation and demobilisation of construction camps;
- Combination of road and rail deliveries for transportation of pipe sections to temporary storage facilities;
- 26 trucks per day one-way for transportation of pipe sections from temporary storage facilities to the pipeline Right Of Way (ROW);
- The transportation of activities between the ROW and accommodation camp:
 - 60 light vehicles (mainly 4WDs) to transport up to 30 personnel daily one-way;
 - 25 trips per day for water cartage
 - Three trips per day for fuel deliveries
 - Two trips per day for camp service and waste removal;
 - Two trips per day for floating equipment around the construction ROW.

Pipeline construction would typically be carried out on a single 12-hour shift, with only limited personnel working at night. With regard to the movement of the workforce between the camps and construction sites, Transport and Traffic Planning Associates (2008) indicates that coaches would be used, which would reduce the number of trips made on roads during the construction stage. Should construction activity require closure of Kamilaroi Highway, Transport and Traffic Planning Associates (2008) anticipates that the pipe would be bored beneath the highway in order to limit the impact.

Since the pipeline was approved, Santos has acquired Hunter Gas Pipeline Pty Ltd which owns the approved underground gas pipeline route. Subject to receiving remaining government approvals, Santos has indicated that construction is expected to commence in early 2024 and is working to finalise the location of the pipeline, with alternative route options being considered to minimise impacts to landholders and sensitive areas (Santos, 2023). The existing and potential alternative routes under consideration lie to the east of Narrabri and Kamilaroi Highway, with the Narrabri Lateral Pipeline route crossing Kamilaroi Highway south of Baan Baan, noting its route is under assessment. Santos (2022a) indicates that construction activity would generate 350 jobs, rather than the 600 anticipated by Hunter Gas Pipeline Pty Ltd (2008).

As details of the accommodation camp locations, and work site locations are not known, details of potential impacts of the construction activity on vehicular access around the Project site cannot be quantified with any certainty. Any construction impacts would be of a short-term nature only.

The Queensland Hunter Gas Pipeline is therefore not expected to impact traffic conditions on the Kamilaroi Highway over an extended period in the vicinity of the Project, and it has not been considered further in this assessment.

3.5.12 Narrabri Gas Project

The Narrabri Gas Project involves the development and operation of a gas production field, including installation of gas wells, gas and water gathering systems, and supporting infrastructure, including a central gas processing facility located approximately 20 km south west of Narrabri. GHD (2016) assessed the traffic impacts of the Narrabri Gas Project, and found that the construction and operational traffic would primarily use Newell Highway to access the various facilities, with some limited access via Kamilaroi Highway close to Narrabri generating a peak of 70 vehicle trips per day over three days during the construction stage. The Narrabri Gas Project is therefore not expected to impact traffic conditions on the Kamilaroi Highway over an extended period south of Narrabri, and it has not been considered further in this assessment.

3.5.13 Narrabri Lateral Pipeline

Santos has lodged a Scoping Report (Santos, 2022b) with respect to the Narrabri Lateral Pipeline, which is proposed to connect the approved Narrabri Gas Project and Hunter Gas Pipeline to transport natural gas to the existing transmission network near Newcastle. The pipeline would extend from the approved gas processing facility at Leewood to the Hunter gas Pipeline east of Baan Baa. It would cross both the Kamilaroi Highway and Werris Creek Mungindi Railway near Baan Baa south of the Project. The Scoping Report indicates that construction (and to a lesser extent, operation) of the project would generate additional vehicle movements of the road network, including mobilisation of the workforce and delivery of construction materials.

A traffic impact assessment will be required and will assess the likely transport impacts of the Narrabri Lateral Pipeline cumulative with other developments, and will identify and measures to be implemented to mitigate any impacts during construction. As details of the construction and operational impacts of the Narrabri Lateral Pipeline are not yet known, and will be appropriately addressed in the context of other major projects, it has not been considered further in this assessment.

3.6 Cumulative Implications of Road Environment Changes

The review of potential cumulative changes to traffic conditions in the vicinity of the Project as a result of proposed new major developments or changes to existing major developments in the region has found that the key contributor to changes to traffic conditions near the Project during the anticipated construction period is the Narrabri Mine, which would generate traffic on both Kamilaroi Highway and Kurrajong Creek Road. Other developments in the region would have minor impacts on through traffic volumes on Kamilaroi Highway only, and those contributions are not all likely to occur concurrently.

As noted (Section 2.2), previous assessments (TTPP, 2020; 2021a; 2021b) have raised no concerns with the capacity of the Kamilaroi Highway or its intersection with Kurrajong Creek Road outside of periods when the level crossing is closed to road traffic. Given the minor potential impacts of other developments on Kamilaroi Highway traffic as described above, further analysis of the operation of the intersection outside of periods of closures of the level crossing is not considered to be warranted.

The baseline traffic volume demand forecast to travel westbound on Kurrajong Creek Road from Kamilaroi Highway are presented in Figure 3.4 and Figure 3.5 for before and after completion of the upgrade of the intersection of Kamilaroi Highway with Kurrajong Creek Road. These forecast demands include the traffic expected to be generated by the additional Modification 7 workforce, which is anticipated to be present for five years (nominally 2022 to 2027) and during a period of short-term construction activity at Narrabri Mine.

Figure 3.4 robustly assumes that none of the peak operational workforce surveyed in 2019 have made (or will make) use of the shuttle bus services, and that none of the short-term construction workforce at Narrabri Mine would make use of the shuttle bus services. It indicates that the baseline westbound traffic demand on Kurrajong Creek Road is expected to peak at 47 vehicles between 5:45 am and 6:00 am with the existing use of buses for the Modification 7 workforce prior to upgrading of the intersection. This peak demand includes one shuttle bus, which would operate in accordance with the Shuttle Bus Protocol (refer to Section 3.5.1.1), and so would not contribute to any queue should the level crossing be closed during that peak 15-minute period.

Figure 3.5 indicates that the baseline westbound demand on Kurrajong Creek Road is expected to peak at 48 vehicles between 6:00 am and 6:15 am without use of shuttle buses by the Modification 7 workforce following upgrading of the intersection. This is also below the 51 vehicles travelling westbound in a 15 minute period assessed by TTPP (2021b and 2021c) when considering the potential for queuing on Kamilaroi Highway.

Figure 3.4: Westbound Level Crossing Demand Before Intersection Upgrade

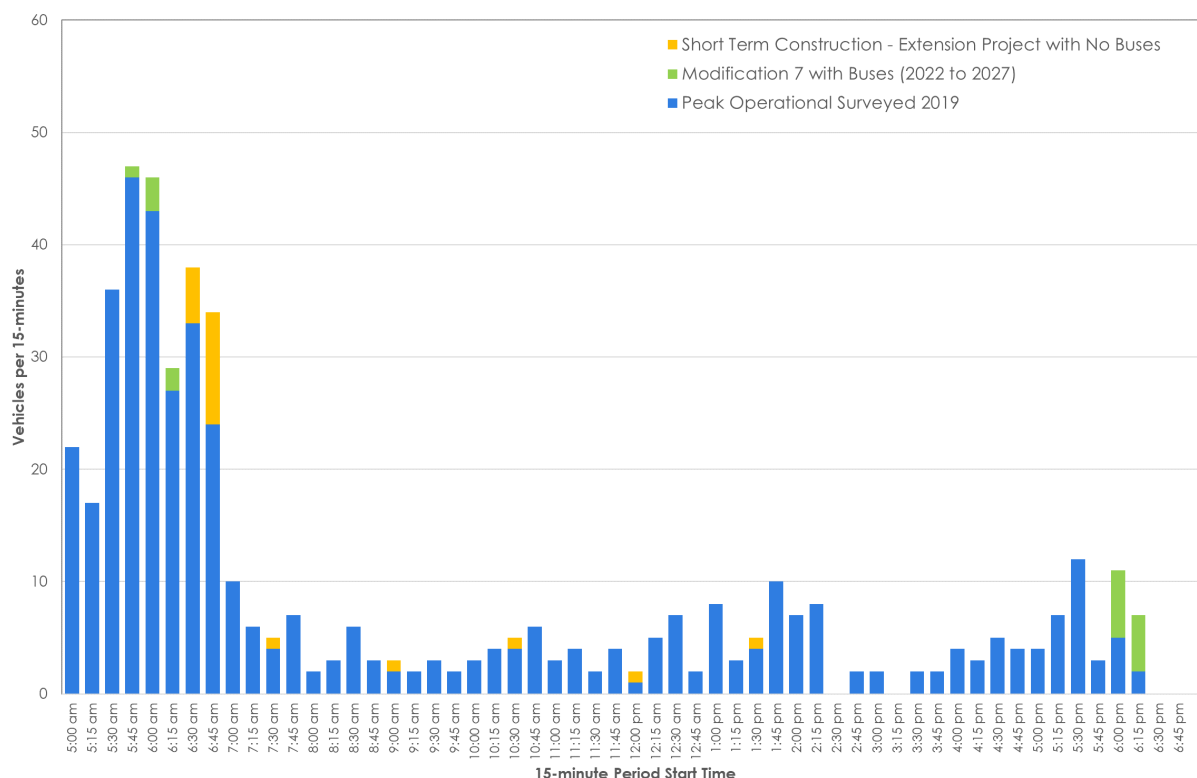
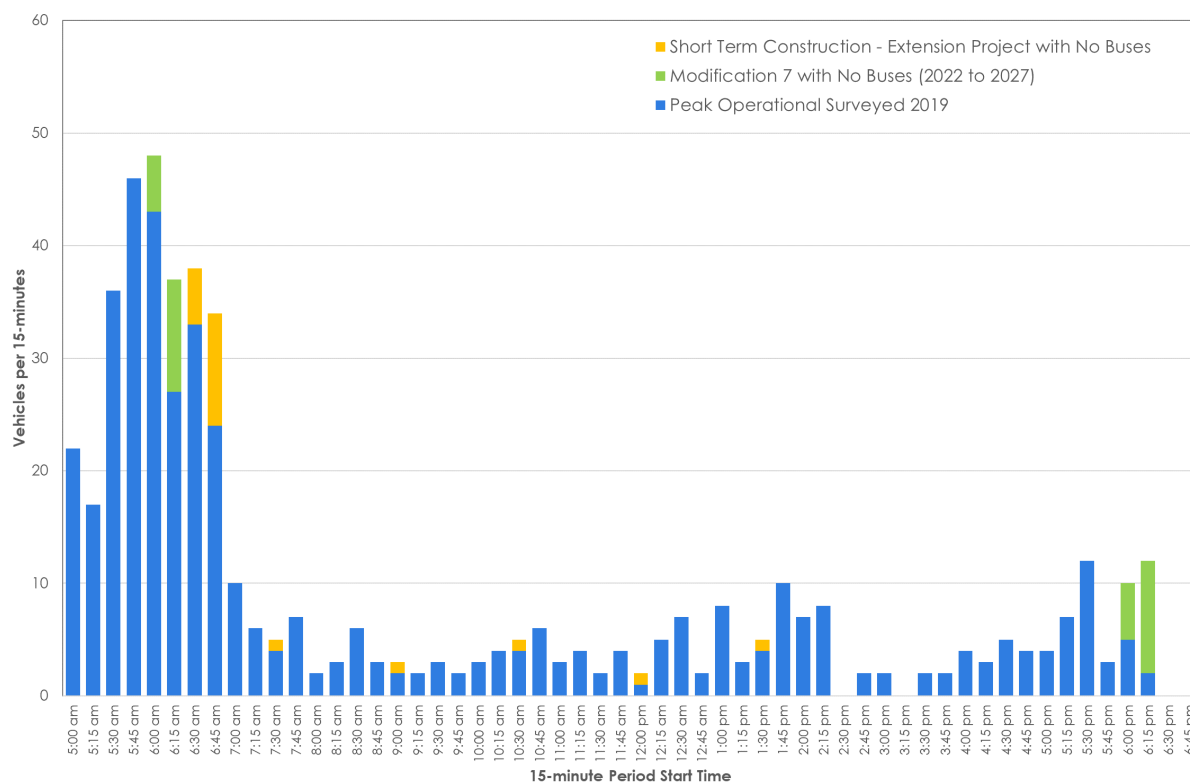


Figure 3.5: Westbound Level Crossing Demand After Intersection Upgrade



4 Project Impacts

4.1 Project Construction

4.1.1 Average Day Construction Activity

Figure 4.1 illustrates the forecast traffic demands westbound on Kurrajong Creek Road west of Kamilaroi Highway during the average day Project construction activity. This conservatively assumes that the Project construction activity may coincide with a short-term period of construction activity at Narrabri Mine, which will result in higher traffic demands than if those activities do not coincide.

Figure 4.1: Westbound Level Crossing Demand – Average Day Project Construction

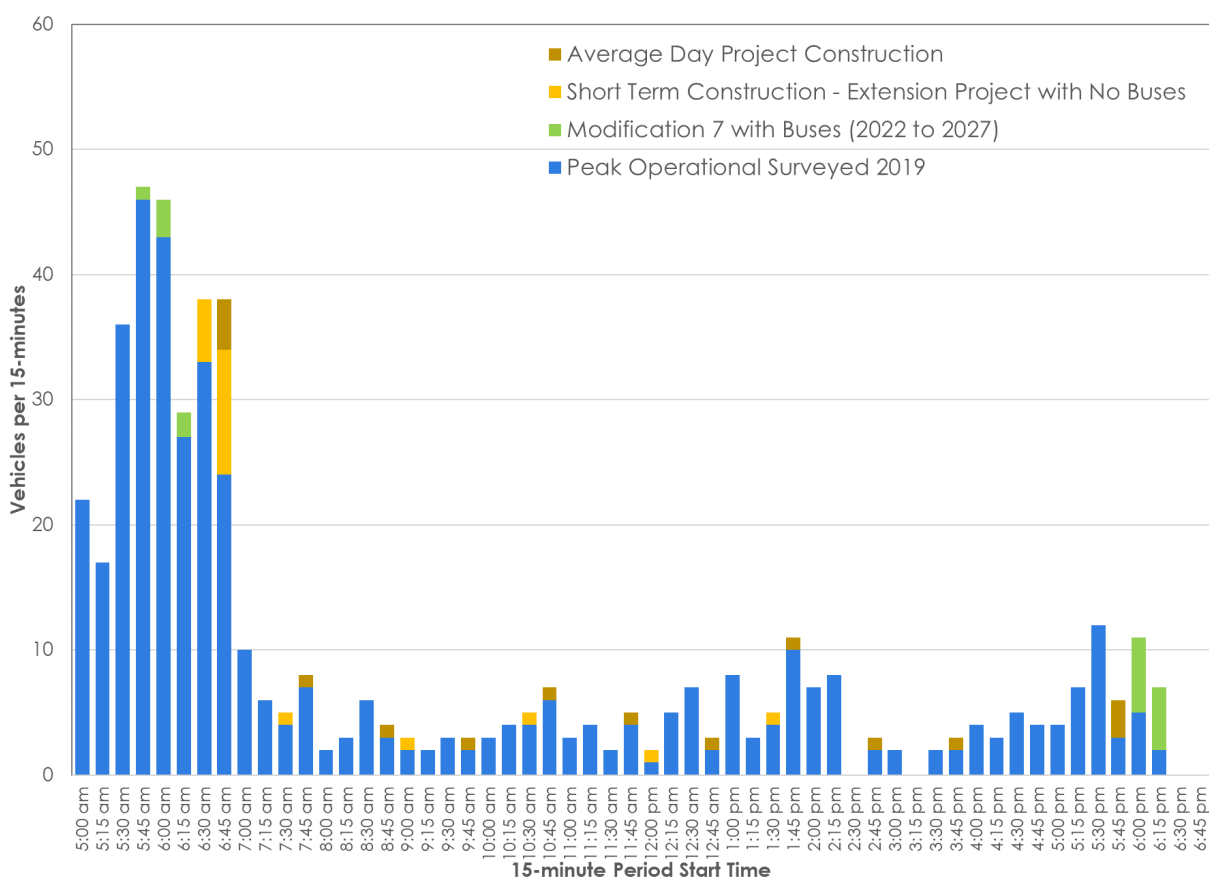


Figure 4.1 demonstrates that under the conditions described above, the westbound traffic generated on Kurrajong Creek Road by the average day Project construction activity would not coincide with the background peak demands. Consistent with the baseline conditions prior to upgrading of the intersection (Figure 3.4), the peak 15-minute volume of westbound traffic would continue to be 47 vehicles between 5:45 am and 6:00 am, which is below the peak of 51 vehicles in 15 minutes assessed by TTPP (2021b and 2021c) to consider the potential for queuing on Kamilaroi Highway during closure of the level crossing by coal trains. The peak of 47 vehicles includes one shuttle bus, which would operate in accordance with the Shuttle Bus Protocol (refer to Section 3.5.1.1), and so would not contribute to any queue should the level crossing be closed during that peak 15-minute period.

The average day Project construction activity would therefore not increase the potential for queuing on to Kamilaroi Highway during any peak 15-minute period.

4.1.2 Peak Day Construction Activity

Figure 4.2 illustrates the forecast traffic demands westbound on Kurrajong Creek Road west of Kamilaroi Highway during a peak day of Project construction activity prior to upgrading of the intersection of Kamilaroi Highway and Kurrajong Creek Road. As above, this conservatively assumes that the Project construction activity may coincide with a short-term period of construction activity at Narrabri Mine, which will result in higher traffic demands than if those activities do not coincide.

Figure 4.2: Westbound Level Crossing Demand – Peak Day Project Construction

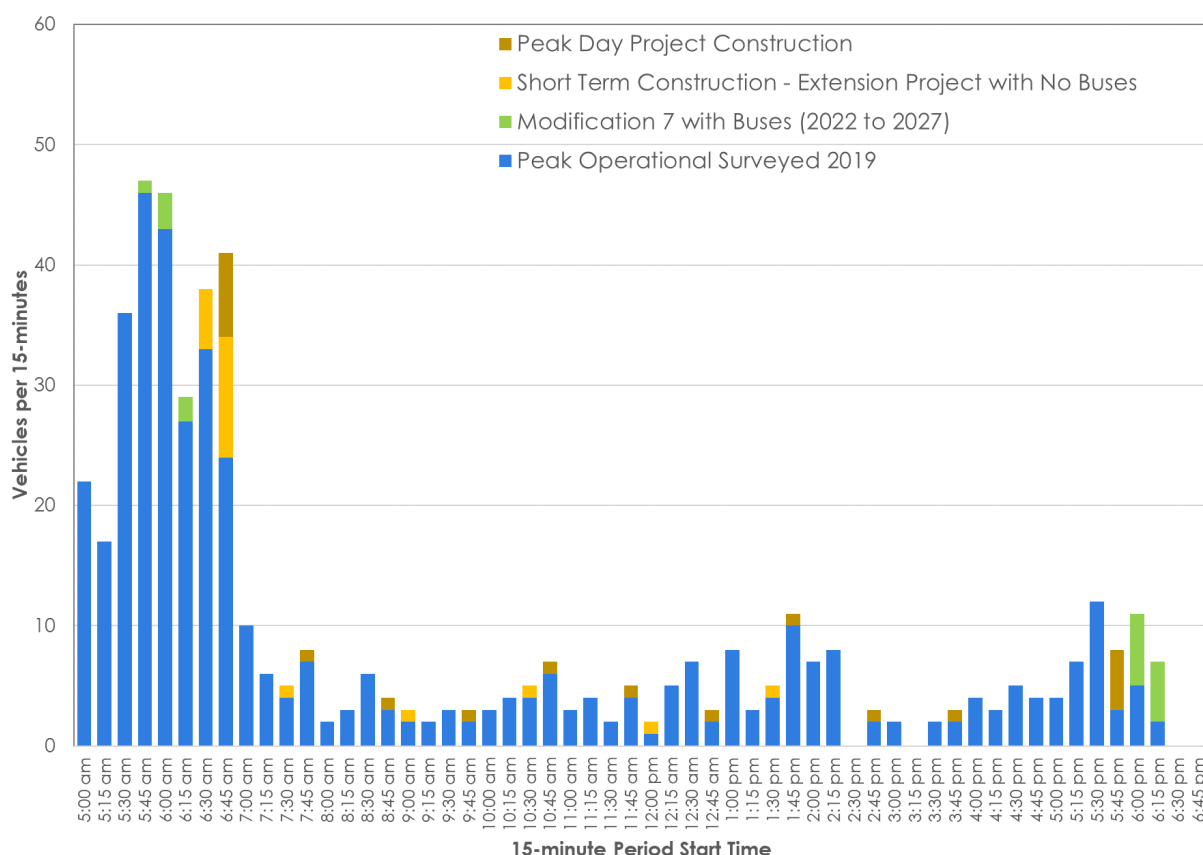


Figure 4.2 demonstrates that under the conditions described above, the westbound traffic generated on Kurrajong Creek Road by the peak day Project construction activity would not coincide with the background peak demands. Consistent with the baseline conditions prior to upgrading of the intersection (Figure 3.4), the peak 15-minute volume of westbound traffic would continue to be 47 vehicles between 5:45 am and 6:00 am, which is below the peak of 51 vehicles in 15 minutes assessed by TPP (2021b and 2021c) to consider the potential for queuing on Kamilaroi Highway during closure of the level crossing by coal trains. The peak of 47 vehicles includes one shuttle bus, which would operate in accordance with the Shuttle Bus Protocol (refer to Section 3.5.1.1), and so would not contribute to any queue should the level crossing be closed during that peak 15-minute period.

The peak day Project construction activity would therefore not increase the potential for queuing on to Kamilaroi Highway during any peak 15-minute period.

4.2 Project Operations

As described in Section 2.4, the Project's traffic generation when operational would be very low and well within the day-to-day variations in traffic conditions. No further assessment of the potential traffic impacts of the Project during its operational phase is warranted.

4.3 Project Decommissioning

As the Project would support the operation of the Narrabri Mine, decommissioning of the Project is unlikely to occur during ongoing peak operational activity at Narrabri Mine. Nevertheless, as a robust assessment, Figure 4.3 presents the cumulative westbound traffic across the level crossing assuming that a peak day of Project decommissioning activity coincides with the peak operational activity at Narrabri Mine. This does not allow for the Modification 7 workforce, which would be present for five years (i.e. 2022 to 2027), nor for the short term construction workforce at Narrabri Mine as it is unlikely that mine construction activity would occur during Project decommissioning.

Figure 4.3: Level Crossing Westbound Demand – Peak Day Project Decommissioning

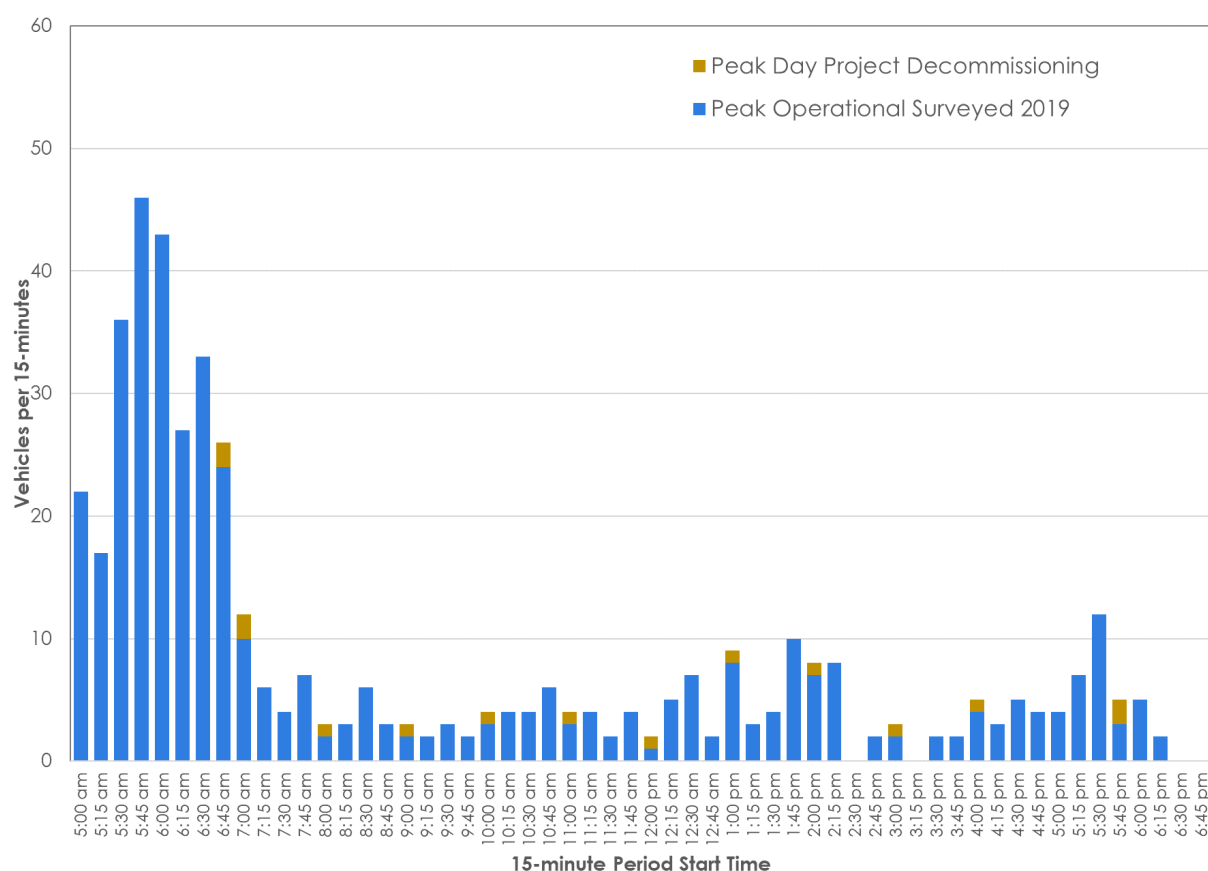


Figure 4.3 demonstrates that under these conditions, the westbound traffic generated on Kurrajong Creek Road by the Project decommissioning activity would not coincide with the baseline peak demands. The peak day of Project decommissioning activity would not further increase the peak vehicle queues on Kamilaroi Highway should the level crossing be closed by the movement of a coal train during the morning peak period.

The peak 15-minute volume of westbound traffic would remain below that assessed by TTPP (2021b and 2021c) when considering the potential queues on Kamilaroi Highway during closure of the level crossing by coal trains.

4.4 Impact on Level Crossing and Queues

The forecast impacts of the Project on the 15-minute peak demand for westbound traffic on Kurrajong Creek Road across the level crossing is summarised in Table 4.1.

Table 4.1: Project Impacts on Peak 15-Minute Westbound Demand at Level Crossing

	Peak Vehicles in 15-Minute Period
Surveyed 2019 – Narrabri Mine operational peak workforce	46
Previously Assessed by TTPP	
With Modification 7 Workforce and Extension Project Construction Activity	51
Project Construction	
Baseline With Modification 7 and Extension Project Construction Activity	47
Baseline with Project Average Day Construction	47
Baseline with Project Peak Day Construction	47
Project Decommissioning	
Baseline with Project Peak Day Decommissioning	46

The results in Table 4.1 indicate that the Project would not increase the westbound peak 15-minute traffic at the level crossing. The forecast peak demand during all stages of the Project would remain below that previously assessed by TTPP.

4.5 Impact on Kurrajong Creek Road

Project-generated traffic would use Kurrajong Creek Road between Kamilaroi Highway and the Project Site access intersection. As described in Section 2.6, the Project construction activity would generate up to 40 vehicle trips during peak hours, i.e., on a peak day of construction activity. With background peak volumes on Kurrajong Creek Road being three to four vehicles per hour (Table 3.1), the total traffic on Kurrajong Creek Road east of the Project Site access road would be up to 43 to 44 vehicles per hour.

The peak volume is well below that capacity of the road, and does not raise any concerns regarding operation of Kurrajong Creek Road during the peak construction stage.

4.6 Project Site Access Intersection

The Project Site access road would be constructed on Kurrajong Creek Road approximately 700 m east of Mayfield Road. Vehicles would enter and exit the Project Site access road via Kamilaroi Highway and Kurrajong Creek Road only, so vehicles would turn left into the site from Kurrajong Creek Road to enter the site, and turn right on to Kurrajong Creek Road to exit the site.

During construction, the largest vehicle to use the access regularly would be semi-trailers, with a possibility that infrequently, deliveries may be made by B-doubles. It is therefore recommended that the intersection layout be generally consistent with the Austroads minimum layout for articulated vehicle access, as shown in Figure 4.4. As all traffic would enter the access road via a left turn from Kurrajong Creek Road, and exit via a right turn to Kurrajong Creek Road, it would be appropriate to modify the layout shown in Figure 4.4 to exclude the geometric requirements related to heavy vehicles performing the left-turn movement from the minor road on to the major road. Consistent with Austroads guidelines, at the intersection, the Project Site access road would be aligned at 90 degrees (or not less than 70 degrees) to Kurrajong Creek Road.



Following completion of construction activity, the site access intersection layout described above would exceed the requirements for the operational traffic demands, and meet the requirements for the decommissioning activity.

Heavy vehicle access to and from the Project site has been reviewed by assessing the swept path of vehicles entering and exiting to and from Kamilaroi Highway, with a conceptual layout for the Project Site access intersection on Kurrajong Creek Road. Austroads (2023b) indicates that the design vehicle is the largest vehicle likely to **regularly** operate at a specific location rather than the largest of the vehicles that **may** operate at that location. A checking

vehicle is used to ensure satisfactory operation of these larger vehicles, which may be permitted to encroach on adjacent lanes or run over kerbs where there are no pedestrian paths. OSOM vehicles travelling with a permit are not used as a design vehicle unless they regularly use the route.

During construction, the largest vehicle to regularly access the Project would be semitrailers, with B-doubles used only infrequently. For the purpose of this review, the swept path assessment has however been undertaken on the basis of B-doubles accessing the Project, which demonstrates greater spatial requirements than would be relevant at most times. As the number of heavy vehicle deliveries would be relatively low on any one day, and the arrival and departure of heavy vehicle deliveries would be managed to minimise conflicting inbound and outbound movements, the conceptual layout of the access intersection assumes that outbound vehicles would wait within the site should an inbound heavy vehicle be approaching to enter the site. Similarly, outbound heavy vehicles (turning right) would give priority to inbound heavy vehicles (turning left) at the intersection of Kurrajong Creek Road and the Narrabri Mine access road.

The swept path assessment (refer to Appendix A) demonstrates that B-doubles can satisfactorily enter and exit the Project site to and from Kamilaroi Highway, and can pass a light vehicle travelling in the opposing direction on Kurrajong Creek Road. Inbound B-doubles would be able to satisfactorily turn left from the level crossing to Kurrajong Creek Road past an outbound B-double that is waiting to turn right. B-doubles turning left into the site would use the width of Kurrajong Creek Road to perform the manoeuvre, which is considered to be satisfactory for short-term construction activity with good sight distance and low traffic volumes on Kurrajong Creek Road.

4.7 Road Safety

Based on the review of the crash history of the roads relevant to the Project, it is considered that the roads in the local area have no particular accident pattern or causation factors which may be exacerbated by increased use of the road system resulting from the Project construction, operation or decommissioning activity stages.

4.8 Oversize or Overmass Vehicles

Construction activity at the Project may generate the need for the movement for oversize or overmass vehicles to transport equipment such as the transformer. Such movements would be negotiated with TfNSW, Narrabri Shire Council and other relevant authorities on a case-by-case basis. All oversize loads would be transported with the relevant permits obtained in accordance with *Additional Access Conditions for oversize and overmass heavy vehicles and loads* (TfNSW, 2020), and any other licences and escorts as required by the regulatory authorities.

The origin of OSOM vehicle movements required during construction of the Project is primarily expected to be the Port of Newcastle and the industrial area at Tomago. The NSW Oversize Overmass Load Carrying Vehicles Network map (National Heavy Vehicle Regulator [NHVR], 2024) provides details on the approved routes and travel conditions for eligible vehicles operating under the Heavy Vehicle National Law Notices. That map indicates that approved routes between the Port of Newcastle and Kamilaroi Highway are available.

Whitehaven has previously engaged contractors for OSOM vehicle movements to and from the adjacent Narrabri Mine. During 2024, GBP Heavy Haulage Pty Ltd held an OSOM Mass or Dimension Exemption Permit from NHVR for vehicles with laden dimensions of 5.9 m wide, 31 m long and 5.5 m high, with a total mass of 168.5 tonnes. That permit (476593V15) covered the following route between Hexham and Narrabri Mine (and the same route in reverse) (refer to Figure 4.5):

- ADE Power, 230 Old Maitland Road, Hexham NSW;
- Old Maitland Road, Hexham;
- Maitland Road, (Hexham – Tarro);
- New England Highway, (Tarro – Beresfield);
- John Renshaw Drive, (Beresfield – Buchanan);
- Hunter Expressway, (Buchanan – Lower Belford);
- New England Highway, (Lower Belford – Muswellbrook);
- Bell Street, Muswellbrook;
- Victoria Street, Muswellbrook;
- Market Street, Muswellbrook;
- New England Highway, (Muswellbrook – Willow Tree);
- Kamilaroi Highway, (Willow Tree – Gunnedah);
- Bloomfield Street, Gunnedah;
- Warrabungle Street, Gunnedah;
- Kamilaroi Highway, (Gunnedah – Baan Baa);
- Kurrajong Creek Road, Baan Baa; and
- Access Narrabri Coal Mine via Kurrajong Creek Road, Baan Baa NSW.



WHITEHAVEN SOLAR FARM
Oversize Overmass
Indicative Transport Route

Figure 4.5

The permit also covered a route which included access between Old Punt Road at Tomago and Boggabri Mine, south of the Project. The southern part of that route included:

- Old Punt Road, Tomago;
- Pacific Highway (Tomago – Tarro);
- Pacific Highway (Tarro – Hexham);
- New England Highway (Hexham – Tarro); then
- John Renshaw Drive and the route described above to the Boggabri Mine Access off Kamilaroi Highway.

TTPP understands that OSOM vehicle movements for the Project would be smaller than the vehicles used at the Narrabri Mine during the ongoing mining operations and relevant to Permit 476593V15 (OSOM dimensions for the Project are conservatively estimated to be 5 m wide, 26 m long and 5.5 m high). Hence, it is anticipated that access to the Project from Port of Newcastle or the Tomago industrial area for the OSOM vehicle movements required for the Project would be suitable, with no requirement for civil works to accommodate the anticipated largest vehicles. It is estimated by Whitehaven Energy that approximately three OSOM movements would be required over the life of the Project.

The movement of oversize or overmass vehicles would be avoided during the peak periods for the movement of the workforce to and from the Project and Narrabri Mine. As part of the permit for any Project-generated OSOM vehicle movements, the transport contractor would develop a TMP that would identify the specific load and vehicle dimensions and mass. The TMP would identify risks and measures to minimise the impact of the movement on the road network, addressing:

- the route to be used;
- escorts and pilot requirements;
- travel restrictions;
- timing of the movement;
- communication with local authorities, police and emergency services; and
- any minor temporary civil works that may be required to accommodate the vehicle.

4.9 Car Parking

Car parking and heavy vehicle delivery loading areas would be provided within the Project site to meet the demands during Project construction, operational and decommissioning activity. No parking or loading/unloading of vehicles would occur outside of the site.

4.10 Mitigation Measures

The assessment indicates that no specific measures would be required to satisfactorily accommodate the Project traffic on the road network. This is subject to:

- shuttle buses being operated for the Project's construction and decommissioning workforces, broadly consistent with the operations and Shuttle Bus Protocol that applies to the Modification 7 workforce;
- the management of Project construction hours to minimise the coincidence of Project-generated trips with Narrabri Mine-generated trips.

It is recommended that:

- a CTMP be prepared and implemented to guide the transport aspects of the Project construction activity, including management protocols to minimise the potential for opposing heavy vehicle movements to coincide, and a Drivers' Code of Conduct which outlines behavioural expectations for drivers associated with the Project construction activities;
- the movement of oversize or overmass vehicles be avoided during the peak periods for the movement of the workforce to and from the Project and Narrabri Mine; and
- to the extent possible, consideration be given to the timing of the Project construction activity to reduce the likelihood of peak Project construction activity coinciding with short term construction activity at Narrabri Mine.

5 Summary and Conclusions

The foregoing assessment has found that, subject to the operation of the shuttle bus service and Shuttle Bus Protocol as currently operating for the Narrabri Mine Modification 7 workforce, no specific mitigation measures would be required to accommodate the average or peak day Project construction, operational or decommissioning traffic.

A CTMP for any roadworks required for the upgrading of the intersection of Kamilaroi Highway and Kurrajong Creek Road (not Project-related) would set out appropriate management to minimise impacts of those works on Kamilaroi Highway, Kurrajong Creek Road, the Mine Access Road, and the rail corridor operations, and would be prepared in consultation with the relevant authorities, taking into consideration the Narrabri Mine and Project traffic conditions expected at the time of the activity.

It is recommended that:

- a CTMP be prepared and implemented to guide the transport aspects of the Project construction activity, including management protocols to minimise the potential for opposing heavy vehicle movements to coincide, and a Drivers' Code of Conduct which outlines behavioural expectations for drivers associated with the Project construction activities;
- the movement of oversize or overmass vehicles be avoided during the peak periods for the movement of the workforce to and from the Project and Narrabri Mine; and
- to the extent possible, consideration be given to the timing of the Project construction activity to reduce the likelihood of peak Project construction activity coinciding with short term construction activity at Narrabri Mine.

Traffic generated by the Project construction activity does not raise any concerns regarding the operation of Kurrajong Creek Road.

It is recommended that the Project Site access road intersection with Kurrajong Creek Road be generally consistent with the Austroads minimum layout for articulated vehicle access, modified to exclude the unnecessary geometric requirements related to heavy vehicles performing the left-turn movement on to Kurrajong Creek Road. Consistent with Austroads guidelines, at the intersection, the Project Site access road would be aligned at 90 degrees (or not less than 70 degrees) to Kurrajong Creek Road.

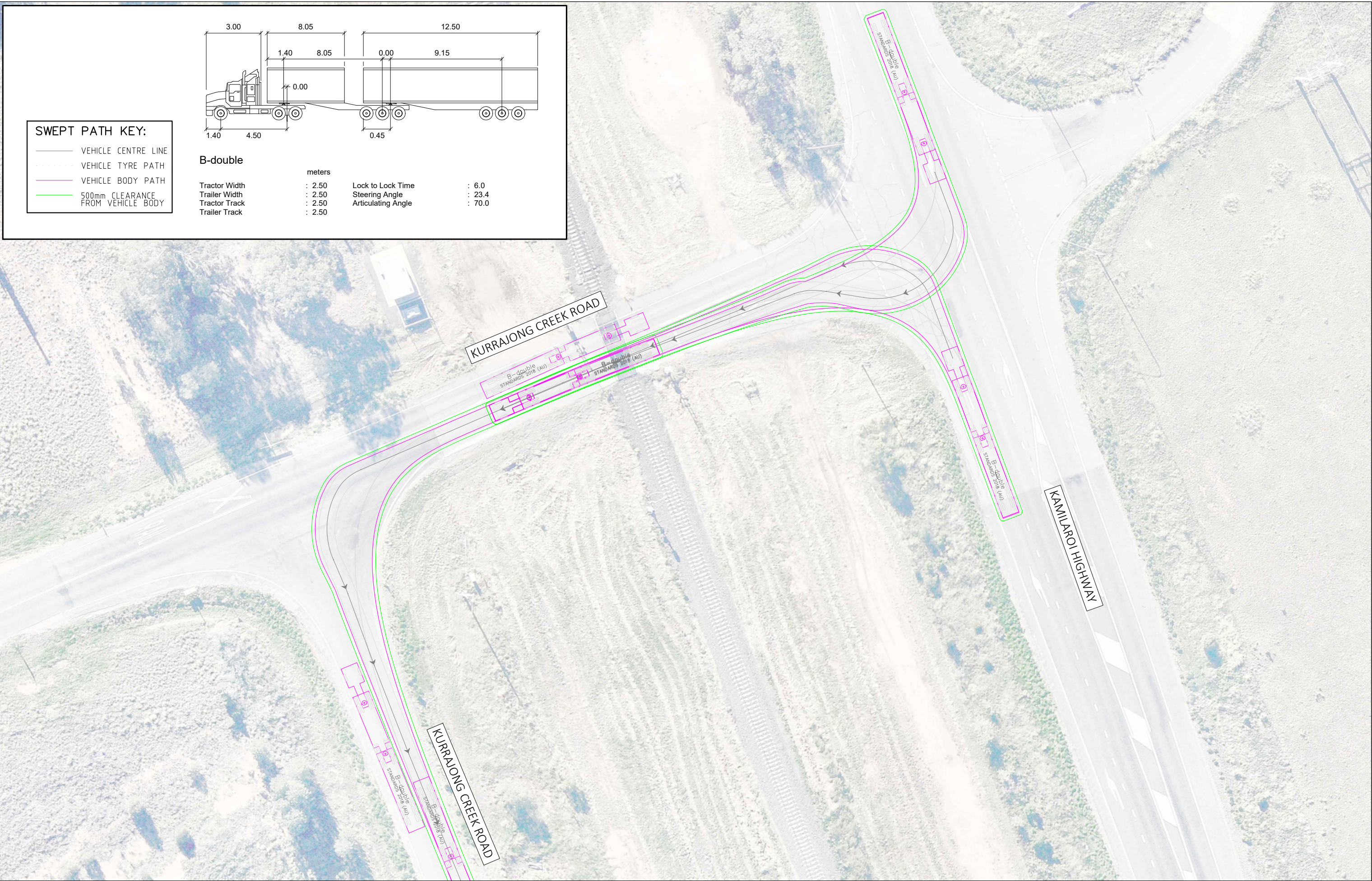
The roads in the local area have no particular accident pattern or causation factors which may be exacerbated by increased use of the road system resulting from the Project construction, operation or decommissioning activity stages.

Any oversize loads required for the Project would be transported in accordance with the relevant permits, and would avoid the peak periods for the movement of the workforce to and from the Project and Narrabri Mine.

Car parking and heavy vehicle delivery loading/unloading areas would be contained within the Project site to meet the demands during Project construction, operational and decommissioning activity. No parking or loading/unloading of vehicles would occur outside of the site.

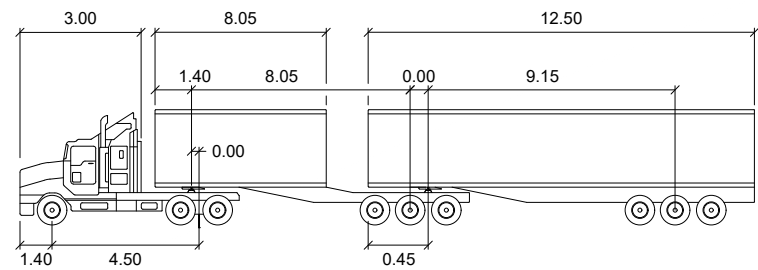
Appendix A

Swept Paths



SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY



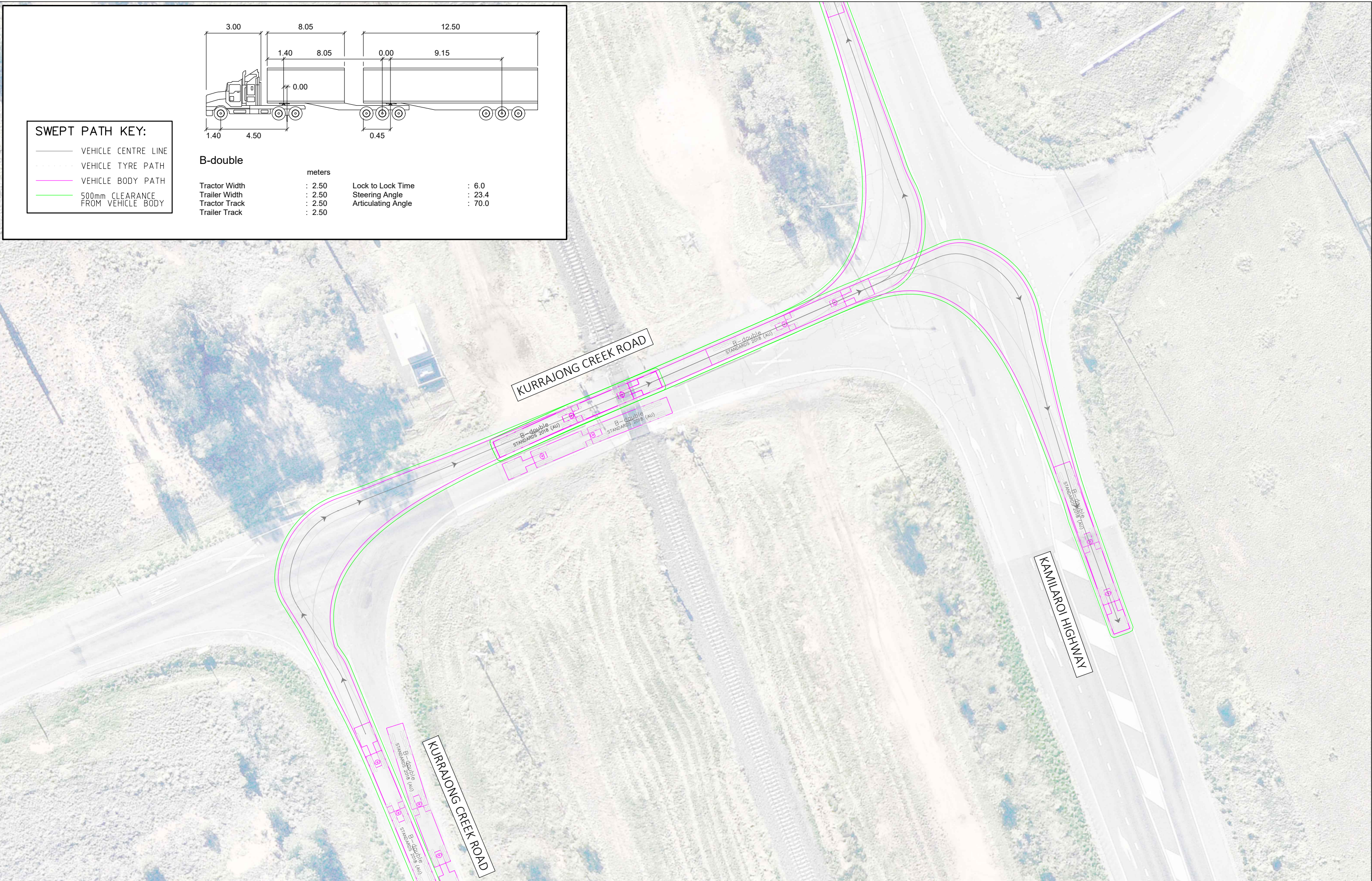
B-double			
	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	SY	KH	KH	22/11/24



PROJECT	WHITEHAVEN SOLAR FARM		
TITLE	SWEPT PATH ASSESSMENT - B-DOUBLE ACCESS		

DWG No. 22302CAD01-FIGURE 1		
DATE STAMP 22 November 2024		
PROJECT No. 22302	SCALE 1:500 @A3	REV. A

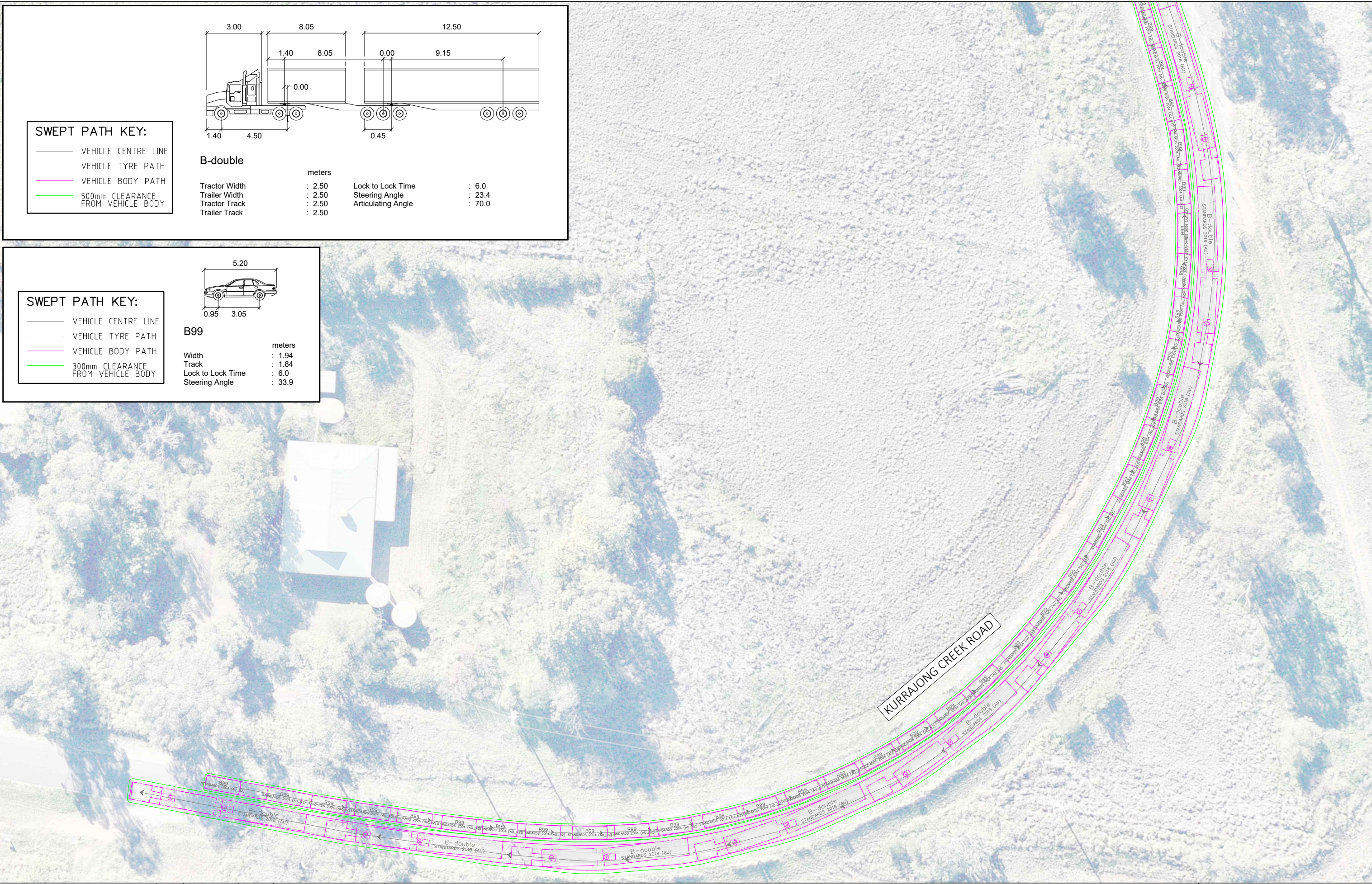
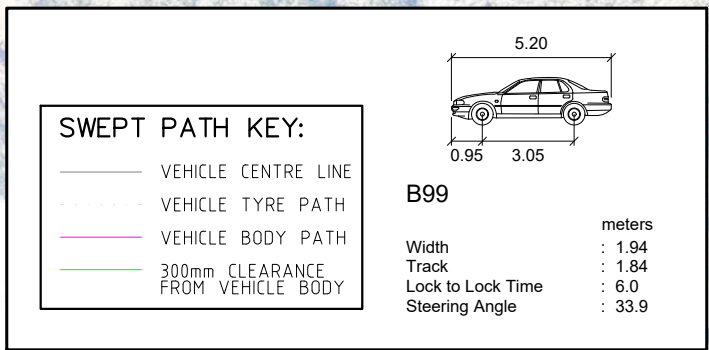
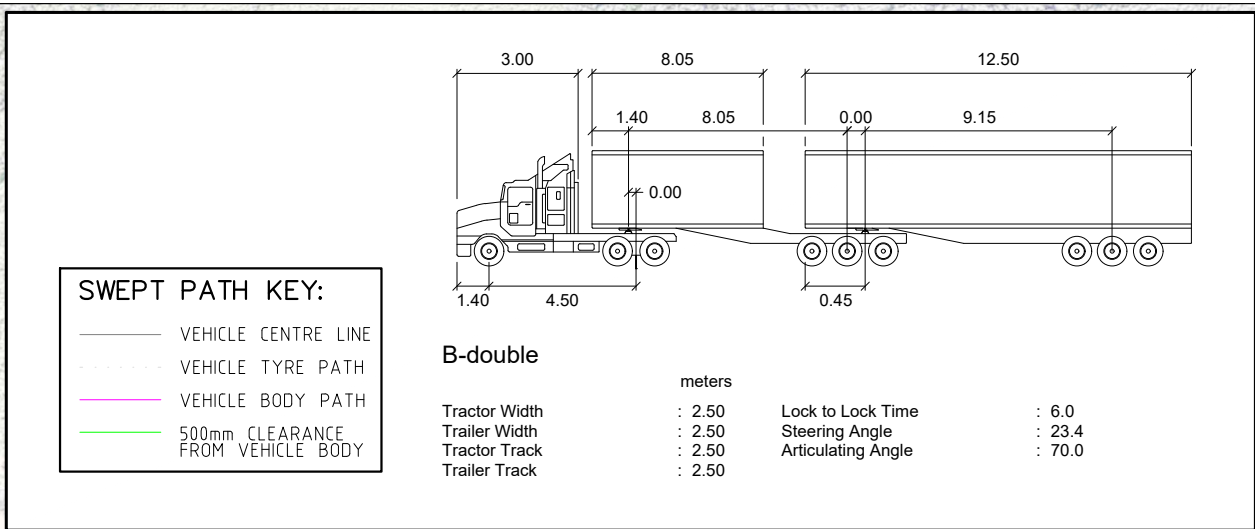


REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	SY	KH	KH	22/11/24



PROJECT	WHITEHAVEN SOLAR FARM		
TITLE	SWEPT PATH ASSESSMENT - B-DOUBLE ACCESS		

DWG No.	22302CAD01-FIGURE 2		
DATE STAMP	22 November 2024		
PROJECT No.	SCALE	REV.	
22302	1:500 @A3	A	

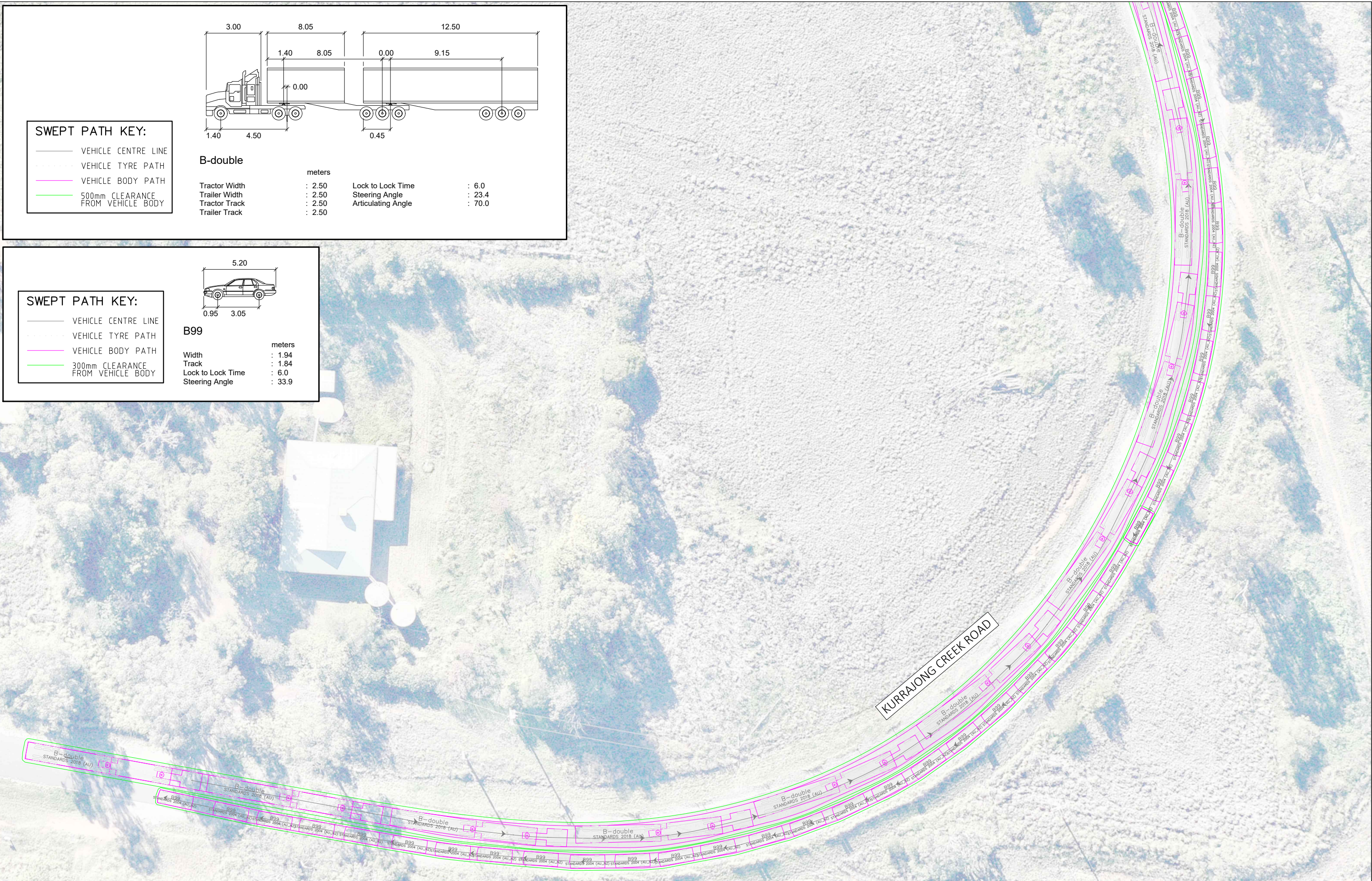


REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	SY	KH	KH	22/11/24



PROJECT	WHITEHAVEN SOLAR FARM
TITLE	SWEPT PATH ASSESSMENT - B-DOUBLE ACCESS

DWG No.	22302CAD01- FIGURE 3		
DATE STAMP 22 November 2024			
PROJECT No. 22302	SCALE 1:500 @A3	REV. A	



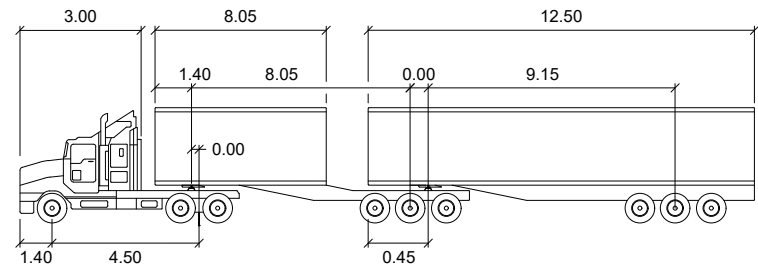
REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	SY	KH	KH	22/11/24



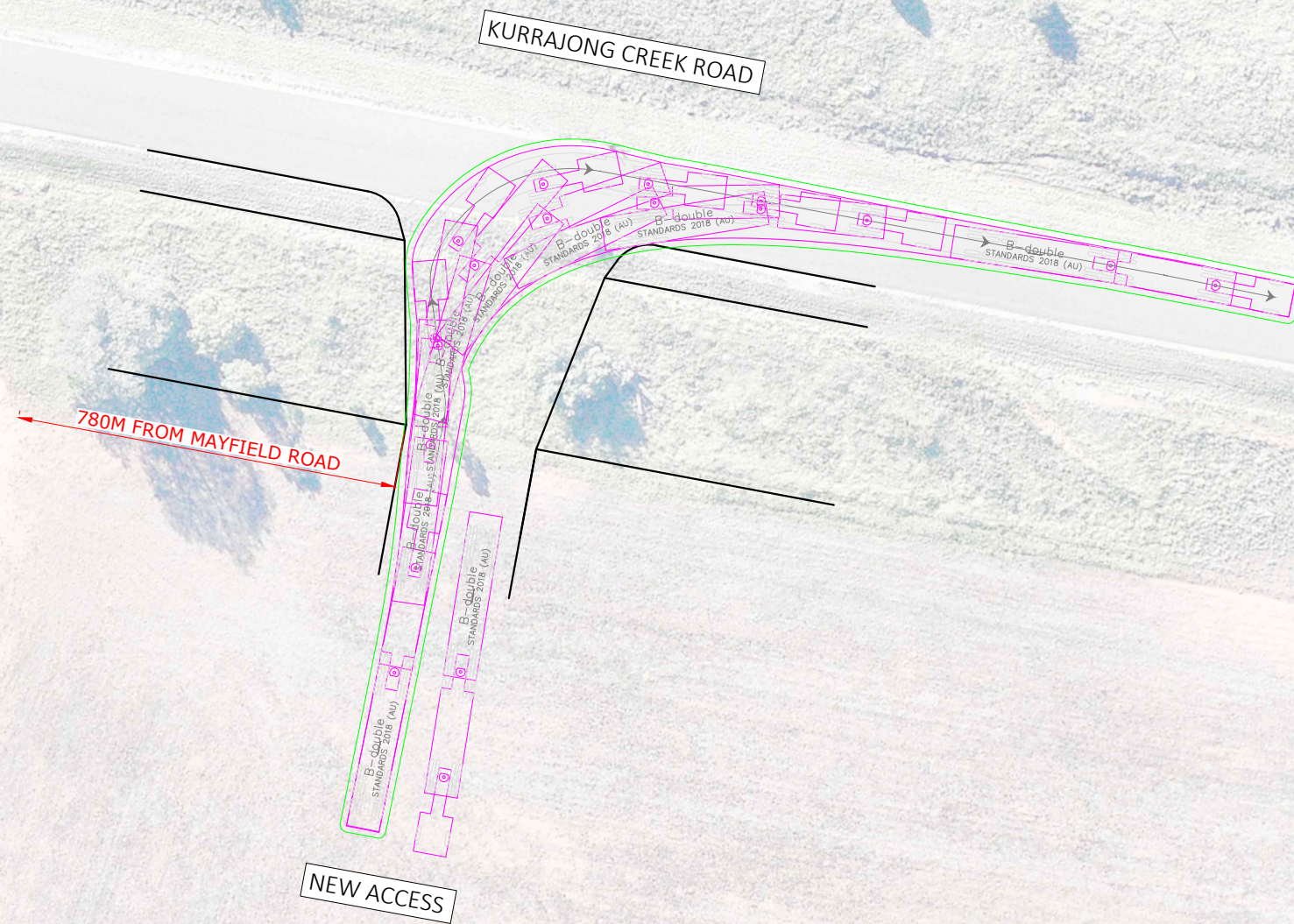
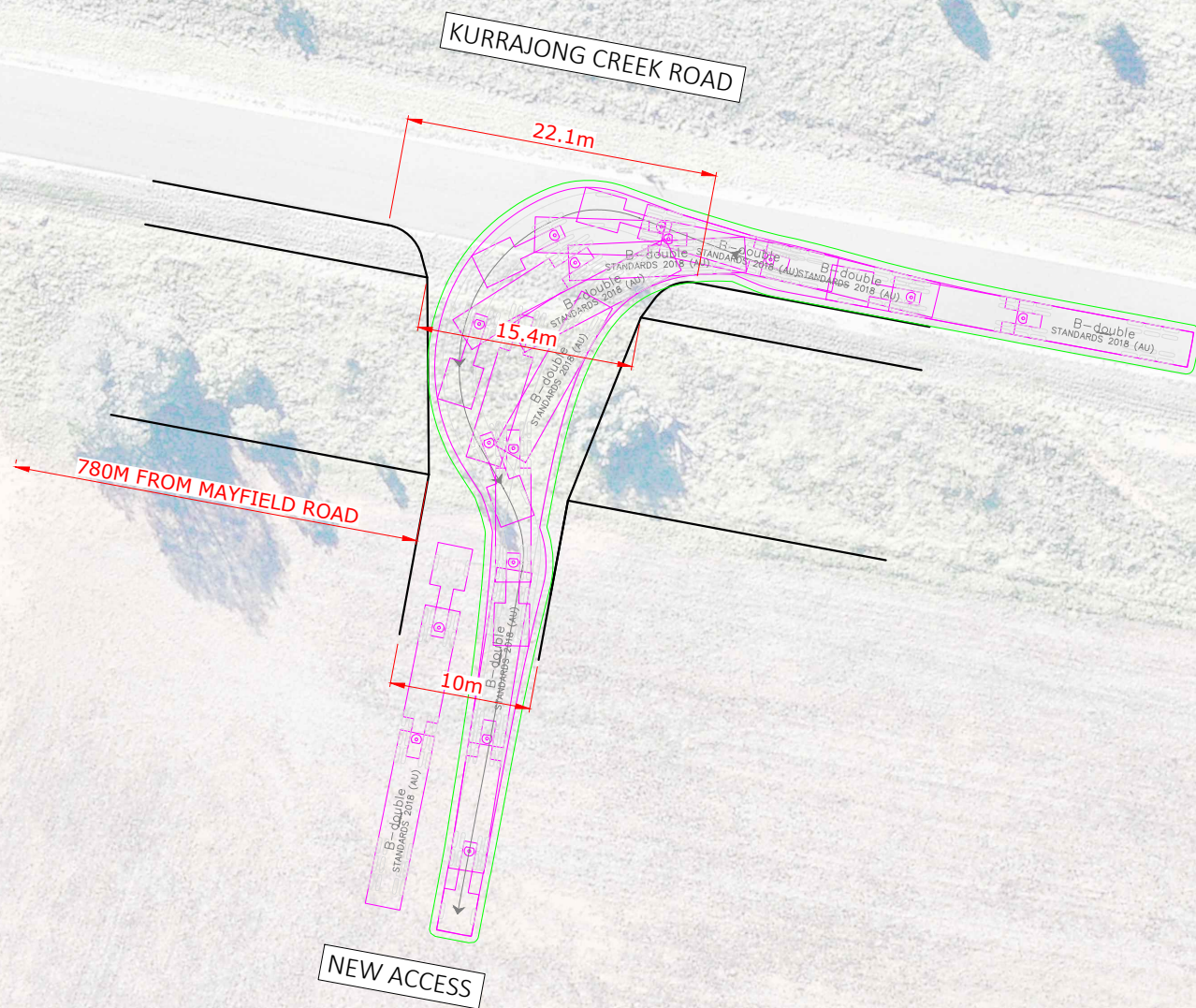
PROJECT	WHITEHAVEN SOLAR FARM		
TITLE	SWEPT PATH ASSESSMENT - B-DOUBLE ACCESS		

DWG No.		22302CAD01-FIGURE 4	
DATE STAMP		22 November 2024	
PROJECT No.	22302	SCALE	1:500 @A3
REV.	A		

- SWEPT PATH KEY:
- VEHICLE CENTRE LINE
 - VEHICLE TYRE PATH
 - VEHICLE BODY PATH
 - 500mm CLEARANCE FROM VEHICLE BODY



B-double			
	meters		
Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 23.4
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		



VEHICLE ENTERING

REV.	DESCRIPTION	DRAWN	CHECK	APP'D	DATE
A	ISSUE FOR DISCUSSION	SY	KH	KH	22/11/24



PROJECT

TITLE

WHITEHAVEN SOLAR FARM

SWEPT PATH ASSESSMENT - B-DOUBLE ACCESS

DWG No. 22302CAD01-
FIGURE 5

DATE STAMP
22 November 2024

PROJECT No. 22302	SCALE 1:500 @A3	REV. A
----------------------	--------------------	-----------

The Transport Planning Partnership
Suite 402 Level 4, 22 Atchison Street
St Leonards NSW 2065

P.O. Box 237
St Leonards NSW 1590

02 8437 7800

info@tpp.net.au

www.tpp.net.au