



# Traffic Engineering

Proposed Mixed Use Development  
At 146-152 Johnston Street, Casino  
On Behalf of Momentum Collective



## About TTM

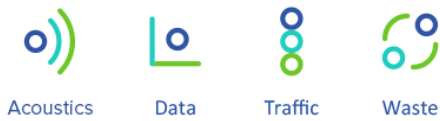
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## Revision Record

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## Contents

<b>1</b>	<b>Introduction .....</b>	<b>5</b>
1.1	Background .....	5
1.2	Scope.....	5
1.3	Site Location .....	6
1.4	Development Profile .....	7
1.5	Access.....	8
1.6	Parking.....	9
<b>2</b>	<b>Existing Transport Infrastructure.....</b>	<b>10</b>
2.1	The Road Network.....	10
2.2	Road Planning.....	10
2.3	Public Transport and Pedestrian Facilities.....	10
<b>3</b>	<b>Car Parking Arrangements .....</b>	<b>12</b>
3.1	Council Parking Supply Requirement .....	12
3.2	Site Car Parking Supply.....	12
3.3	Car Park Layout .....	13
3.4	Cyclist Access.....	15
3.5	Pedestrian Access.....	15
<b>4</b>	<b>Existing Traffic Volumes .....</b>	<b>16</b>
4.1	Peak Hour Traffic.....	16
4.2	Daily Traffic.....	18
<b>5</b>	<b>Estimated Future Transport Demands.....</b>	<b>19</b>
5.1	Estimated Development Traffic Generation.....	19
5.2	Estimated Development Traffic Distribution .....	20
<b>6</b>	<b>Traffic Impact Assessment .....</b>	<b>23</b>
6.1	Development Scenarios.....	23
6.2	Impact on Road Network .....	23
	6.2.1 Johnston St Core & Cluster Housing.....	23
	6.2.2 Clark St Chiff Housing .....	24
6.3	Impact on Safety .....	24

<b>7</b>	<b>Site Access Arrangements</b> .....	<b>27</b>
7.1	Proposed Access Arrangements and their Adequacy.....	27
<b>8</b>	<b>Service Vehicle Arrangements</b> .....	<b>30</b>
8.1	Proposed Service Vehicle Arrangements and their Adequacy .....	30
8.2	Refuse Collection.....	30
<b>9</b>	<b>Summary and Conclusions</b> .....	<b>31</b>
9.1	Development Access .....	31
9.2	Car Parking Arrangements.....	31
9.3	Impact on Surrounding Road Network.....	31
9.4	Service Vehicle Arrangements.....	31
9.5	Active Transport Facilities .....	31
9.6	Conclusion .....	31
<b>Appendix A</b>	<b>Proposed Site Plan</b> .....	<b>32</b>
<b>Appendix B</b>	<b>Swept Paths</b> .....	<b>33</b>

## Table Index

Table 1.1: Proposed land uses for Johnston Street Core & Cluster Housing.....	7
Table 1.2: Proposed land uses for Chiff Housing.....	8
Table 2.1: Local Road Hierarchy.....	10
Table 3.1: Parking Supply Requirement for Johnston Street Core & Cluster Housing development .....	12
Table 3.2: Parking Supply Requirement for Clark Street Chiff Housing development.....	12
Table 3.3: Parking Design Requirements for Johnston Street Core & Cluster Housing development.....	13
Table 3.4: Parking Design Requirements for Clark Street Chiff Housing development .....	14
Table 4.1: Existing Daily Traffic Volumes in 2020.....	18
Table 5.1: Proposed Development Peak hour Trip Generation Rates for Chiff Housing development.....	19
Table 5.2: Proposed Development Peak hour Trip Generation Rates for Core & Cluster 1 Housing development.....	19
Table 5.3: Proposed Development Peak Hour Trip distribution for Core & Cluster 1 Housing development..	20
Table 5.4: Proposed Development Peak Hour Trip distribution for Chiff Housing development.....	20
Table 6.1: Crash history adjacent to the proposed development.....	24
Table 7.1: Typical Vehicle crossover Requirements for the Johnston Street Access.....	27
Table 7.2: Typical Driveway Requirements for the Clark Street Access .....	28

## Figure Index

Figure 1.1: Site location .....	6
Figure 1.2: Site area .....	7
Figure 2.1: Cycle route in Casino (Richmonda Valley Active Bike Plan).....	11
Figure 4.1: Background Peak Hour Traffic Volumes in 2020 .....	17
Figure 4.2: Existing Peak Hour Traffic Volumes 2023.....	17
Figure 5.1: Traffic distribution from the proposed development to road network in AM peak hour .....	21
Figure 5.2: Traffic distribution from the proposed development to road network in PM peak hour .....	22
Figure 6.1: Crash history adjacent to the proposed development.....	25
Figure 6.2: Existing on-street parking facility effect on the sight line .....	25

# 1 Introduction

## 1.1 Background

TTM Consulting has been engaged by Momentum Collective to prepare a traffic engineering report investigating a proposed mixed used development which includes residential dwellings and related office space. It is understood that a Development Application will be lodged to Richmond Valley Council with referral to Transport for NSW (TfNSW).

## 1.2 Scope

This report investigates the transport aspects associated with the proposed development. The scope of the transport aspects investigated includes:

- Parking supply required to cater for development demand
- Parking layout to provide efficient and safe internal manoeuvring
- Identification of likely traffic volumes and traffic distribution from the future development
- Identification of likely traffic impact of development on the public road network
- Access configuration to provide efficient and safe manoeuvring between the site and the public road network
- Internal road layout to provide efficient and safe internal manoeuvring for service vehicles
- Suitability of access and internal facilities to provide for pedestrian and cyclist operation
- Access to suitable level of public transport

To assess the proposed transport arrangements, the development plans have been assessed against the following guidelines and planning documents:

- Richmond Valley Council Development Control Plans
- Richmond Valley Council Building and Construction Guidelines
- Australian Standard 2890

### 1.3 Site Location

The site is located at 146-152 Johnston Street in Casino near the intersection of Johnston Street and Clark Street, as shown in Figure 1.1. The property description is Lot 155-158 on DP 834821. The site has road frontages to Johnston Street and Clark Street and is currently a vacant land.



Figure 1.1: Site location



Figure 1.2: Site area

## 1.4 Development Profile

The proposed land uses for Johnston Street Core & Cluster Housing development and Clark Street Chiff Housing development are summarised in Table 1.1 and Table 1.2 respectively.

Table 1.1: Proposed land uses for Johnston Street Core & Cluster Housing

Use	Area/Qty
Cluster 1: Residential units	
– 1 bedroom unit	1
– 2 bedroom unit	2
Core Building (Ground Floor): Commercial	
– Ancillary office (3-4 staff)	96m <sup>2</sup>
Others:	
Core Building (Ground Floor):	
– For residential use (for residents on the First Floor)	160 m <sup>2</sup>
Core Building (First Floor): Residential units	
– 1 bedroom unit	2
– 2 bedroom unit	2



Table 1.2: Proposed land uses for Chiff Housing

Use	Area/Qty
Cluster 2: Residential dwelling – 2 bedrooms	3
Cluster 3: Residential dwelling – 2 bedrooms	3

## 1.5 Access

The development plan includes the following access arrangements:

- Johnston Street Access located at the southern side of the subject site. The characteristics of this access include:
  - Servicing Cluster 1’s residential dwellings and Core Building’s office and residential units.
  - 6.2m wide at the property boundary
  - Priority control
  - All turns permitted
  - 55m from the Johnston Street / Clark Street intersection tangent point.
- Clark Street Access located at the eastern side of the subject site. The characteristics of this access include:
  - Servicing Chiff Housing residential dwellings
  - 6.5m wide at the property boundary
  - All turns permitted
  - 30m from the Johnston Street / Clark Street intersection tangent point.

## 1.6 Parking

The development proposal includes the following parking supply:

Core Building and Cluster 1 development:

- 10 standard carparking spaces including a PWD carparking bay, located at ground level. This carparking restricts the entry by a secured gate.
- 1 parking bay for the service vehicle, located outside the access gate.

Cluster 2-3 development:

- 6 standard carparking spaces including a PWD carparking bay, located at ground level. This carparking restricts the entry by a secured gate.

## 2 Existing Transport Infrastructure

### 2.1 The Road Network

The majority of roads in the immediate vicinity of the site are administered by Richmond Valley Council, the exception being Johnston Street (Bruxner Highway). The hierarchy and characteristics of roads in the immediate vicinity of the site are shown below in Table 2.1.

Table 2.1: Local Road Hierarchy

Road	Speed Limit	Lanes	Classification	Road Authority
Johnston Street (Bruxner Highway)	50kph	2 (undivided)	Arterial (Classified Road)	Transport for NSW (TfNSW)
Clark Street	50kph	2 (undivided and no centre line)	Collector	Richmond Valley Council

Johnston Street and Clark Street have a 7m wide carriageway at the site frontage. The intersection of Johnston Street and Clark Street is a priority-controlled intersection with a left and a right turning lanes on the eastbound and westbound Johnston Street respectively.

### 2.2 Road Planning

TTM have reviewed the Local Strategic Planning Statement (LSPS 2020) for the planning of the future road network upgrade in the vicinity of the subject site with Richmond Valley Council. There are no formalised/committed planned upgrade works in the vicinity of the site.

### 2.3 Public Transport and Pedestrian Facilities

#### Train

Casino railway station, on the North Coast NSW line, is located approximately 3km to the west of the development site. These services run between Sydney (Central) and Brisbane (Roma Street) with a stop in Casino.

#### Buses

Casino Bus Service 673 Line utilise Clark Street connecting Casino Shopping Plaza, with the nearest bus stop being located approximately 60m to the north of the site, on Clark Street near Frances Street East (Stop ID:247046). This Bus runs at a frequency of 26min from 7:13am to 4:40 pm on Monday to Friday. However, this bus service does not operate during weekend.

### Pedestrians

Formal pedestrian footpaths are located on both sides of Johnston Street. A refuge island pedestrian crossing facility across Johnston Street is located 70m east of the proposed development. No formal pedestrian footpath is available on either side of Clark Street.

### Cyclists

No dedicated on-road cycleway is available on Johnston Street or Clark Street. Pedestrian footpaths located in the proximity to the development site allow shared path provision for cyclists. The 6.5km long Casino Hotham Street Shared Path Route and 3.9km long Casino Johnston Street Shared Path Route runs in front of the development.

The cyclists network surrounding the proposed development is shown in Richmond Valley Active Bike Plan below.



Figure 2.1: Cycle route in Casino (Richmond Valley Active Bike Plan)

## 3 Car Parking Arrangements

### 3.1 Council Parking Supply Requirement

Council parking requirements for Johnston Street Core & Cluster 1 development are identified in Table 3.1, based on the Development Control Plan 2021.

Table 3.1: Parking Supply Requirement for Johnston Street Core & Cluster Housing development

Land Use	Council Requirement	Extent	Requirement	Provision
Shop-top housing (Core building)				
– Resident	1 space per dwelling	4 Units	4	4 1 (on-street parking space on Johnston St)
– Visitor	1 space per 10 dwellings	4 Units	1	
Group home (Cluster 1)				
	1 space per 10 beds	5 beds	1	1
	1 space per 2 supervisors or carers	2 supervisors/carers	1	1
Office Space at Core building (3-4 staff)	1 space per 30m <sup>2</sup>	96m <sup>2</sup> GFA	4	4
<b>Total</b>			<b>11</b>	<b>11</b>

Due to social housing development, parking requirements for Clark Street Chiff Housing development are identified in Table 3.2, based on State Environmental Planning Policy (Housing) 2021) - Division 1 In-fill affordable housing.

Table 3.2: Parking Supply Requirement for Clark Street Chiff Housing development

Land Use	State Environmental Planning Policy Requirement	Extent	Requirement	Provision
Multi-dwelling housing – Social Housing	0.5 space/dwelling (2 bed)	6 Units (2 bed)	3	6
<b>Total</b>			<b>3</b>	<b>6</b>

### 3.2 Site Car Parking Supply

The proposed car parking supply includes one PWD space in the parking area of each development. The visitor parking bays are not allocated in the gated parking area of each development by considering that the number of visitors would not be significant. It is also expected that the parking availability is high on the on-street carparking facility along the frontage road (Johnston St). Visitors can utilise the on-street carparking spaces on Johnston St without impacting on external supply or road safety and network operations.

### 3.3 Car Park Layout

Table 3.3: Parking Design Requirements for Johnston Street Core & Cluster Housing development and Table 3.4 identify the characteristics of the proposed parking area for Johnston Street Core & Cluster Housing development and Clark Street Chiff Housing development with respect to the Council requirements (as referred to AS2890). The last column identifies the compliance of each design aspect. Where compliance with Council is not achieved, further information is provided below.

Table 3.3: Parking Design Requirements for Johnston Street Core & Cluster Housing development

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
Parking space length: <ul style="list-style-type: none"> <li>– Resident and staff</li> <li>– PWD bay</li> <li>– PWD shared area</li> </ul>	5.4m 5.4m 5.4m	5.4m 5.4m 5.4m	Compliant Compliant Compliant
Parking space width: <ul style="list-style-type: none"> <li>– Resident and staff</li> <li>– PWD bay</li> <li>– PWD shared area</li> </ul>	2.4m 2.4m 2.4m	2.4m 2.4m 2.4m	Compliant Compliant Compliant
Aisle Width: <ul style="list-style-type: none"> <li>– Parking aisle</li> </ul>	5.8m	6.2m	Compliant
Parking envelope clearance – space adjacent to wall/fence	Space 0.3m clear of wall/fence	Space is more than 0.3m clear of fence	Compliant
Maximum Gradient: <ul style="list-style-type: none"> <li>– Parking bay (resident and staff)</li> <li>– Parking bay (PWD)</li> </ul>	1:20 (5.0%) 1:40 (2.5%)	<1:20 (5.0%) 1:40 (2.5%)	Compliant Compliant
Maximum Gradient: <ul style="list-style-type: none"> <li>– Parking aisle</li> <li>– Ramp</li> </ul>	1:16 (6.25%) 1:6 (16.7%)	1:20 (5.0%) 1:20 (5.0%)	Compliant Compliant
Height Clearance: <ul style="list-style-type: none"> <li>– Car</li> <li>– PWD car</li> <li>– Service Van</li> </ul>	2.2m 2.5m 3.5m	>3.5m >3.5m >3.5m	Compliant Compliant Compliant
End of Aisle Extension	1.0m	2.0m	Compliant
Queueing area at the entry gate	The greater of a minimum of 2 cars or 3% of capacity (or more specific guidance to determine queueing area)	2 standard car space	Compliant.

Table 3.4: Parking Design Requirements for Clark Street Chiff Housing development

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
Parking space length: <ul style="list-style-type: none"> <li>– Resident and staff</li> <li>– PWD bay</li> <li>– PWD shared area</li> </ul>	5.4m 5.4m 5.4m	5.4m 5.4m 5.4m	Compliant Compliant Compliant
Parking space width: <ul style="list-style-type: none"> <li>– Resident and staff</li> <li>– PWD bay</li> <li>– PWD shared area</li> </ul>	2.4m 2.4m 2.4m	2.4m 2.4m 2.4m	Compliant Compliant Compliant
Aisle Width: <ul style="list-style-type: none"> <li>– Parking aisle</li> </ul>	5.8m	6m (plus additional trafficable landscape area)	Compliant
Parking envelope clearance – space adjacent to wall/fence	Space 0.3m clear of wall/fence	Space is more than 0.3m clear of fence	Compliant
Maximum Gradient: <ul style="list-style-type: none"> <li>– Parking bay (resident and staff)</li> <li>– Parking bay (PWD)</li> </ul>	1:20 (5.0%) 1:40 (2.5%)	<1:20 (5.0%) 1:40 (2.5%)	Compliant Compliant
Maximum Gradient: <ul style="list-style-type: none"> <li>– Parking aisle</li> <li>– Ramp</li> </ul>	1:16 (6.25%) 1:6 (16.7%)	1:20 (5.0%) 1:20 (5.0%)	Compliant Compliant
Height Clearance: <ul style="list-style-type: none"> <li>– Car</li> <li>– PWD car</li> <li>– Service Van</li> </ul>	2.2m 2.5m 3.5m	>3.5m >3.5m >3.5m	Compliant Compliant Compliant
Queueing area at the entry gate	The greater of a minimum of 2 cars or 3% of capacity (or more specific guidance to determine queueing area)	1 car queue space considered due to only 6 car parking bays inside the gate and local street frontage with low traffic volume.  Due to residential area and low parking turnover, peak hour entry vehicle volume would be less than 6 veh/h in PM peak and approximately none in AM peak.  Therefore, it will not be common scenario that two vehicles are queueing to access through the entry gate.	Considered as performance/operational basis compliant.

Design Aspect	Minimum AS2890.1 Standard	Proposed Provision	Compliance
		In case of two vehicles queuing for accessing the entry gate at a time, the second car can wait on the crossover section between the kerb and property boundary. As this space is 6m long, it can accommodate the second car without blocking the traffic on Clark St.	

### 3.4 Cyclist Access

Cyclists access to the sites are provided via the driveways. Cyclist has access to Casino cycling routes (as shown on Figure 2.1) via the Johnston Street shared path runs through the front of the site. No shared path is available or planned in front of the Clark Street Chiff Housing. Similar to existing condition, cyclists would have to share the Clark Street with the traffic on Clark Street

### 3.5 Pedestrian Access

Pedestrian access to Johnston Street Core & Cluster Housing is provided via pedestrian access point (Pedestrian entry gate) beside the driveway (shared zone). Two other accesses are available from the existing pedestrian footpath along Johnston Street.

Pedestrian access to Clark Street Chiff Housing is provided via pedestrian entry gate located beside the driveway (shared zone).



## 4 Existing Traffic Volumes

### 4.1 Peak Hour Traffic

Traffic data for the intersection of Johnston Street and Clark Street has been obtained from a prior Traffic Impact Assessment (TIA) conducted for the proposed Child Care Centre development at 146-152 Johnston Street, Casino. This traffic data includes the total volume on each movement of the intersection; however, distribution of light vehicle and heavy vehicle is unknown from this data. It's worth noting that this data collection occurred during the Covid pandemic on July 29, 2020, potentially leading to a lower recorded traffic volume compared to the actual volume.

Another set of traffic data of 2018 utilised in a TIA for the proposed development of 2740 Bruxner Highway, Casino is obtained for comparison. The traffic data of 2018 was gathered from traffic counts at the Bruxner Highway (Johnston Street)/Casino Drive intersection on January 31, 2018. Notably, there are slight discrepancies in the peak hour timing between these two data sources –

- i) 2020 data: AM Peak (8:00am-9:00am), PM peak (3:15pm -4:15pm) and
- ii) 2018 data: AM Peak (7:30am-8:30am), PM peak (3:45pm -4:45pm).

Despite these differences, the comparison reveals that the traffic volume data for Johnston Street doesn't exhibit significant variance (with 2020 data surpassing that of 2018). Thus, it can be reasonably deduced that the obtained peak hour traffic volume data for Johnston Street was not greatly impacted by the Covid situation and remains usable for the present report.

The traffic data for the Johnston Street/Clark Street intersection in 2023 is depicted in Figure 4.2 with a representation of obtained background data in 2020 in Figure 4.1.

A growth rate of 1% is assumed to project peak hour volume of 2023 based on the data from 2020 as there is not much development observed in the vicinity of the intersection since the 2020 surveys.

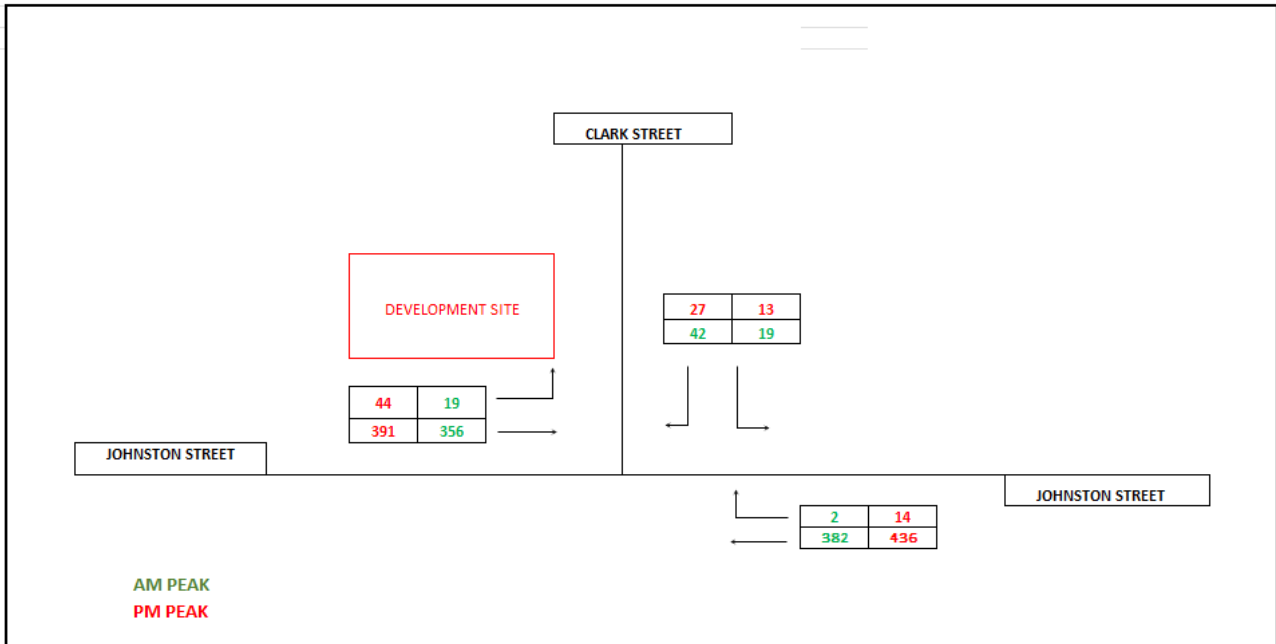


Figure 4.1: Background Peak Hour Traffic Volumes in 2020

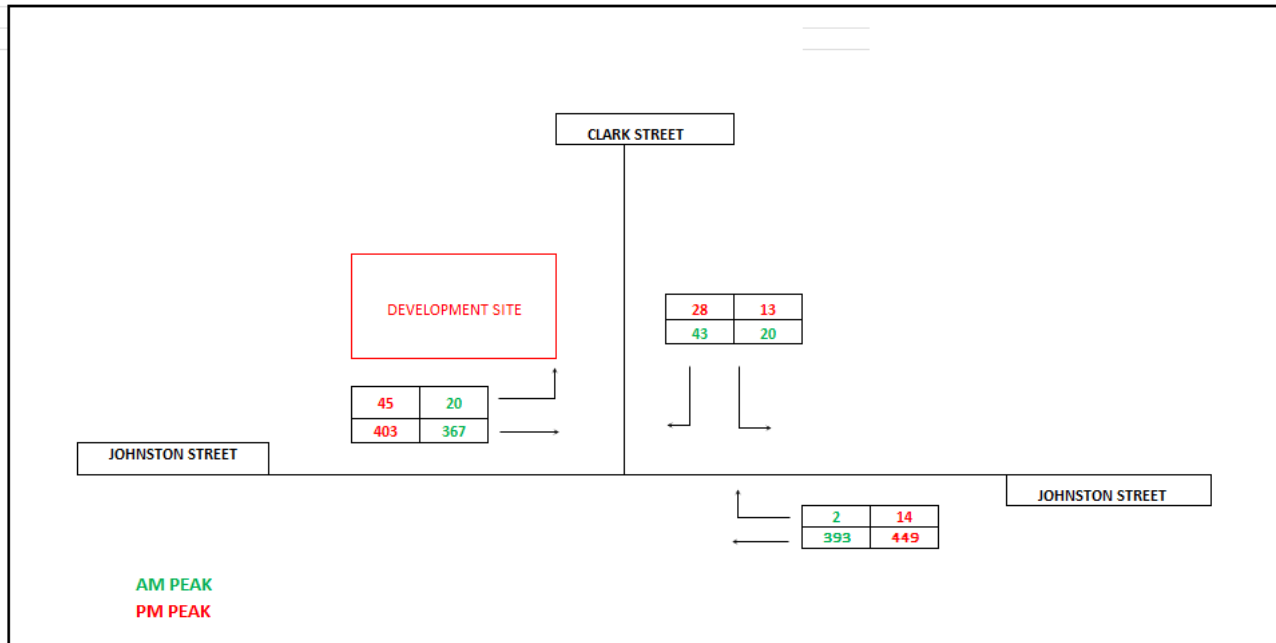


Figure 4.2: Existing Peak Hour Traffic Volumes 2023

## 4.2 Daily Traffic

From the above peak hour data TTM has estimated the daily traffic volume as the average peak hour volume on the route multiplied by 10. A growth rate of 1% is assumed to project the daily traffic volume of 2023. As such, the two-way daily traffic volumes on existing roads are taken as per Table 4.1.

Table 4.1: Existing Daily Traffic Volumes in 2020

Road	Segment	Estimated Daily Volume (2020)	Estimated Daily Volume (2023)
Johnston Street (Eastbound)	West of Clark Street	4,350vpd	4,481vpd
Johnston Street (Westbound)	East of Clark Street	4,500vpd	4,635vpd
Clark Street	North of Johnston Street	610vpd	629vpd

## 5 Estimated Future Transport Demands

### 5.1 Estimated Development Traffic Generation

TfNSW's Guide to Traffic Generation Developments' (2002) and 'Guide to Traffic Generation Developments Updated traffic surveys' (2013) recommend using specific generation rates, for planning purposes, for different development types. Application of these rates to the proposed development, results in the estimate of development site traffic generation, as shown in Table 5.2.

A trip generation of 0.5 trip/unit during AM and 0.5 trip/unit during PM peak hour has been used for residential units, which is based on the TfNSW's trip generation for medium density residential units and flats (up to two bedrooms).

In/Out splits for the residential units are likely to be the majority of traffic departing in the AM and arriving in the PM peak hour.

A trip generation of 1.6 trips/100m<sup>2</sup> GFA office space during AM and 1.2 trips/100m<sup>2</sup> GFA office space during PM peak hour has been used for residential units, which is based on the TfNSW's trip generation for office spaces of 100m<sup>2</sup> GFA.

In/Out splits for the office are likely to be the majority of traffic arriving in the AM and departing in the PM peak hour.

Table 5.1: Proposed Development Peak hour Trip Generation Rates for Chiff Housing development

Land Use	TfNSW Peak Hour Trip Rate	Extent	Trip Generation
Residential unit (2 bedrooms)	Weekday peak hour vehicle trips 0.4-0.5 per unit (up to 2 bedrooms)	6 Units	3 trips in AM 3 trips in PM

Table 5.2: Proposed Development Peak hour Trip Generation Rates for Core & Cluster 1 Housing development

Land Use	TfNSW Peak Hour Trip Rate	Extent	Trip Generation
Residential units (1 bed and 2 bed unit)	Weekday peak hour vehicle trips 0.4-0.5 per unit (up to 2 bedrooms)	Cluster 1: 3 Units (2x2 bed unit and 1x1 bed unit)	2 trips in AM 2 trips in PM
		Core (1 <sup>st</sup> floor): 4 units (2x2 bed unit and 2x1 bed unit)	2 trips in AM 2 trips in PM
Commercial: Office space	AM peak hour vehicle trips 1.6 per 100m <sup>2</sup> GFA PM peak hour vehicle trips 1.2 per 100m <sup>2</sup> GFA	Core (Ground floor): office space (96m <sup>2</sup> GFA)	2 trips in AM 2 trips in PM
		<b>Total</b>	<b>6 trips in AM and 6 trips in PM</b>

## 5.2 Estimated Development Traffic Distribution

A summary of the trip distribution associated with the proposed developments during the development peak are presented in Table 5.3 and Table 5.4.

- In/Out splits for the residential units are likely to be 10%/90% in the AM and 90%/10% in the PM peak hour.
- In/Out splits for the office are likely to be the 90%/10% in the AM and 10%/90% in the PM peak hour.
- For Core & Cluster 1 Housing development, a total of 2vph would be inbound traffic and 4vph would be outbound traffic of the development during AM and a total of 4vph would be inbound traffic and 2vph would be outbound traffic of the development during PM peak hours.
- A total of 0 vph would be inbound traffic and 3vph would be outbound traffic of the proposed development during AM and a total of 3vph would be inbound traffic and 0 vph would be outbound traffic of the proposed development during PM peak hours.

Table 5.3: Proposed Development Peak Hour Trip distribution for Core & Cluster 1 Housing development

Development	Land Use	Trip Rate (hourly)	Trip Generation			
			AM Peak		PM Peak	
			IN	OUT	IN	OUT
Core and Cluster Housing	Residential Units (Cluster 1)	2vph	0vph	2vph	2vph	0vph
	Residential Units (Core)	2vph	0vph	2vph	2vph	0vph
	Office Space	2vph	2vph	0vph	0vph	2vph
<b>Total</b>			<b>2vph</b>	<b>4vph</b>	<b>4vph</b>	<b>2vph</b>

Table 5.4: Proposed Development Peak Hour Trip distribution for Chiff Housing development

Development	Land Use	Trip Rate (hourly)	Trip Generation			
			AM Peak		PM Peak	
			IN	OUT	IN	OUT
Chiff Housing	Residential Units (Cluster 2-3)	3vph	0vph	3vph	3vph	0vph
<b>Total</b>			<b>0vph</b>	<b>3vph</b>	<b>3vph</b>	<b>0vph</b>

The following Figures represents the trip distribution from the proposed developments to the nearest intersection (Johnston Street/Clark Street Intersection). It is assumed that 75% of the generated trips by the development will head towards the west, specifically the business centre area of the Casino and approximately 25% of the generated trips will travel to the east (e.g., Lismore or further east).

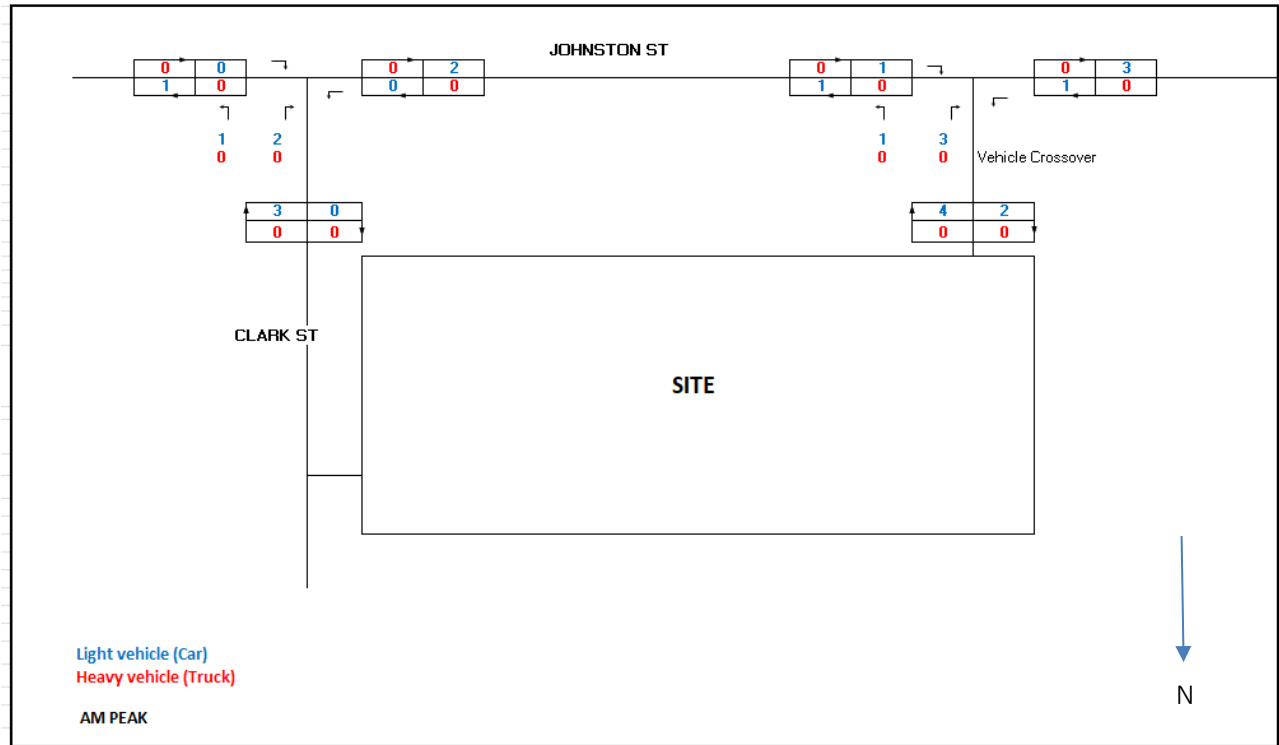


Figure 5.1: Traffic distribution from the proposed development to road network in AM peak hour

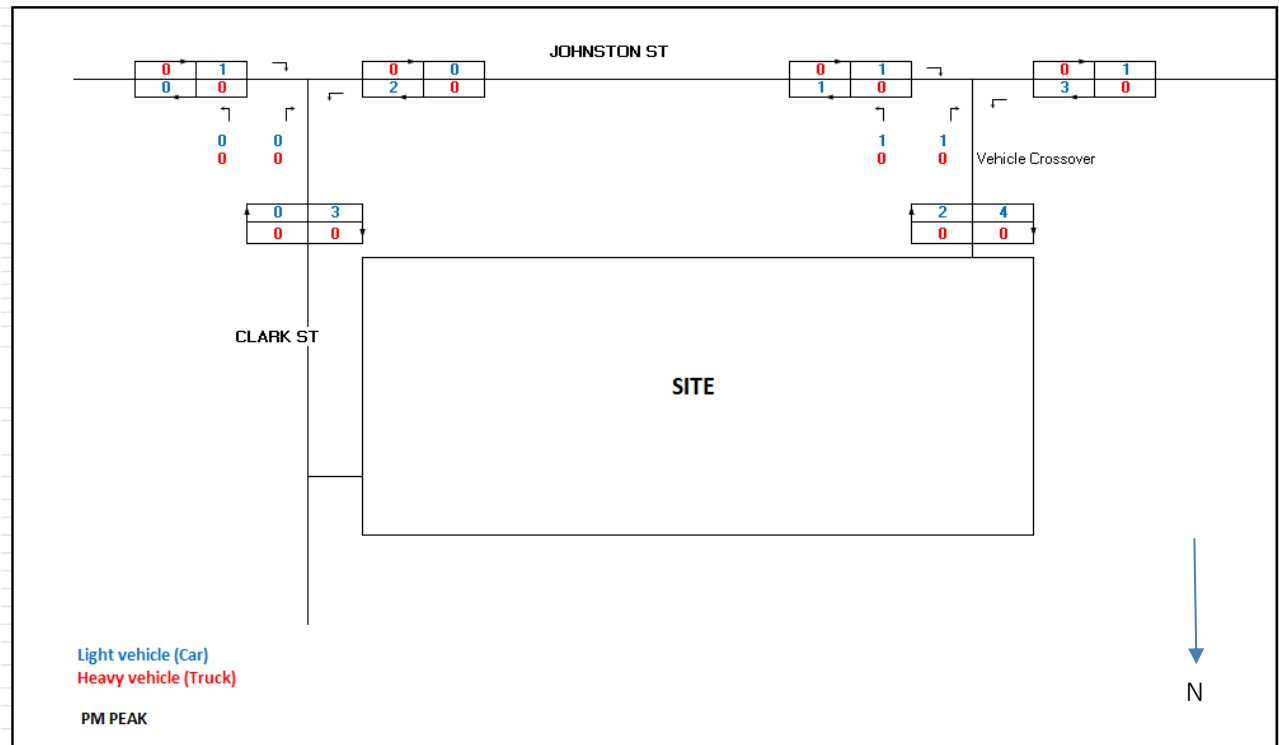


Figure 5.2: Traffic distribution from the proposed development to road network in PM peak hour

## 6 Traffic Impact Assessment

### 6.1 Development Scenarios

TTM has identified two assessment periods for analysis the impact of the developments on the road network (i.e., to the nearest intersection) as follows:

#### Base Year (2023) Traffic Scenario

For the base case scenario includes the 2023 traffic volumes modelled over the existing road network with and without development. The existing road intersection has been analysed for two scenarios namely: i) Opening Year Traffic Scenario with the proposed developments ii) Opening Year Traffic Scenario without the proposed developments. A growth rate of 1% is considered to project the background traffic volume of 2020 into the traffic volume of 2023 since no extensive development near to the site can be observed during this time. This analysis has been performed for both the AM and PM Peaks.

#### Design Year (2033) Traffic Scenario

This analysis incorporates a 2% per annum increase in the background traffic volume for a period of (10 years past opening year). It is assumed that some development works would be undertaken near to the site in future years. This analysis has been performed for both the AM and PM Peaks.

### 6.2 Impact on Road Network

#### 6.2.1 Johnston St Core & Cluster Housing

The impact of the proposed development on Johnston Street relates to the extent of new trips on the network adjacent to the site.

Traffic volume of new trips at the proposed access arrangements shown below:

- Traffic volume of Johnston Street eastbound is 387vph and westbound volume is 437vph during AM peak hour. The maximum number of new trips from the proposed development to the Johnston Street would travel to westbound direction during AM peak hour. The trips travelling to westbound Johnston Street would be 3vph, which is less than 1% of the existing westbound traffic volume of Johnston Street.
- Traffic volume of Johnston Street eastbound is 448vph and westbound volume is 477vph during PM peak hour. The maximum number of new trips to the proposed development to the Johnston Street eastbound would be 3vph during PM peak hour. The maximum number of new trips into the proposed development from the Johnston Street would travel from eastbound direction during AM peak hour. The trips travelling from eastbound Johnston Street would be 3vph, which is less than 1% of the existing eastbound traffic volume of Johnston Street.



The desired outcome is to ensure that the development does not significantly worsen (that is, does not increase road link traffic in either direction by more than 5% in aggregate). As demonstrated above, development impact on Johnston Street is significantly less than 5% in all cases, thereby the development that does not have adverse impacts on Johnston Street.

### 6.2.2 Clark St Chiff Housing

The impact of the proposed development on Clark Street relates to the extent of new trips on the network adjacent to the site.

The volume of new trips at the proposed access arrangements shown below:

- Traffic volume of Clark Street northbound is 22vph and southbound volume is 63vph during AM peak hour. The maximum number of new trips from the proposed development to the Clark Street southbound would be 3vph during AM peak hour, which is less than 5% of the existing southbound traffic of Clark Street. The majority (assumed 75%) of the new trips on Clark Street Southbound would travel to westbound of Johnston Street. This new trip volume would be less than 1% of the existing westbound traffic of Johnston Street.
- Traffic volume of Clark Street northbound is 60vph and southbound volume is 42vph during PM peak hour. The maximum number of new trips accessing the proposed development from the Clark Street northbound would be 3vph during PM peak hour, which is not higher than 5% of the existing northbound traffic volume of Clark Street. The majority (assumed 75%) of the new trips on Clark Street northbound would travel from eastbound of Johnston Street. This new trip volume would be less than 1% of the existing eastbound traffic volume of Johnston Street.

The desired outcome is to ensure that the development does not significantly worsen (that is, does not increase road link traffic in either direction by more than 5% in aggregate). As demonstrated above, the development impact on Clark Street and Johnston Street is not greater than 5% in all cases, thereby the development that does not have adverse impacts on Clark Street and Johnston Street.

### 6.3 Impact on Safety

Road crashes in proximity to the site has been assessed based on the crash data for five years (2017-2021) obtained from TfNSW Interactive crash statistics. The following Figure shows that two crashes occurred (in 2018 and 2019) near to the site during last five years which involved moderate injuries. However, the crash data do not include types and reasons of crashes. No crash occurred at the intersection between Johnston Street and Clark Street or nearest accesses.

Table 6.1: Crash history adjacent to the proposed development

Year	Road	Distance from the development	Type of casualty
2018	Johnston Street	270m east of the proposed development	Moderately Injury
2019	Johnston Street	250m west of the proposed development	Moderately Injury

**Degree of casualty** ● Killed ● Seriously Injured ● Moderately Injured ● Minor/Other Injured

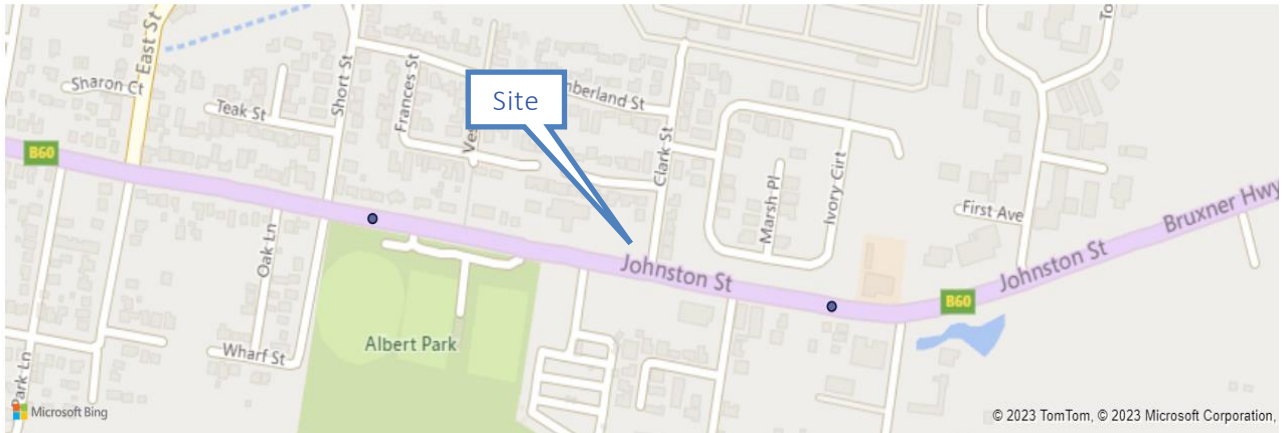


Figure 6.1: Crash history adjacent to the proposed development

Traffic in the proposed development will use the crossover on Johnston Street and Clark Street for accessing and egressing to the developments. The proposed access and egress achieve required sight distances. For Core & Cluster development, the sight line could be affected occasionally due to the parked vehicle (especially heavy vehicle) at on-street carparking facility in front of the commercial area located to the eastern side of the access crossover. In this situation, the vehicle from the development could move forward from the crossover into the available shoulder (available space between the crossover and the eastbound carriageway) and check the vehicle on Johnston Street before left or right turning onto Johnston Street safely.



Figure 6.2: Existing on-street parking facility effect on the sight line

Two car queuing space has been provided between the property line and the entry gate of the Core & Cluster development which ensures that the vehicle entering to the development would not disrupt the traffic movement on Johnston Street and not queueing on Johnston Street.

It is expected that most of the access and egress traffic into the Core & Cluster development are from/to the Business Centre of Casino (eastern side of the development). Accessing traffic to the development are to be left turning from the eastbound Johnston Street during peak hours. As such, accessing traffic would not disrupt the traffic on the westbound Johnston Street, potentially no (a few occasionally) right turning from westbound Johnston Street to the development during peak hours.

## 7 Site Access Arrangements

### 7.1 Proposed Access Arrangements and their Adequacy

The proposed access arrangements on Johnston Street and Clark Street comply with Australian Standards 2890 and Council Requirements and are, therefore, considered suitable.

The proposed Johnston Street access crossover requirements are specified in Table 7.1.

Table 7.1: Typical Vehicle crossover Requirements for the Johnston Street Access

Design Aspect	Requirement	Proposed Provision	Standards/Guidelines	Compliance/Non-compliant
Crossover Width	6-9m for car movement	6.2m	AS 2890	Compliant
Minimum separation from Intersection	Minimum 6m from tangent point of kerb of the intersection	55m	AS 2890	Compliant
Pedestrian Visibility Splays	2m x 2.5m	2m x 2.5m	AS 2890	Compliant
Sight Distance	Desirable 69m (for 50km/h posted speed)	More than 69m on both directions (eastbound and westbound) unless parked cars restrict sight lines.	AS 2890	Compliant
Gradient of first 6m	1:20 (5%)	<5%	AS 2890	Compliant
Queuing Area (At a controlled entry point, queuing area to be provided between vehicle control point and the property boundary.	The greater of a minimum of 2 cars or 3% of capacity for carparking space not more than 100 cars.	2 standard car length is provided.	AS 2890	Compliant
Minimum Gap Sight distance	69m (for 50km/h posted speed)	More than 69m on both directions unless parked cars restrict sight lines.	Richmond Valley Council	Compliant
Maximum change of grade	12% for a crest and 14% for a sag	<5%	Richmond Valley Council	Compliant
Direction of travel	Direction of travel should desirably be 90° to the centreline of the road (absolute minimum is 70°)	Direction of travel should desirably be 90° to the centreline of the road	Richmond Valley Council	Compliant
	Vehicles should preferably travel in a forward direction	Vehicles will travel in a forward direction	Richmond Valley Council	Compliant

Design Aspect	Requirement	Proposed Provision	Standards/Guidelines	Compliance/Non-compliant
	when entering or leaving the property	when entering or leaving the property		
Clearance from adjacent Power pole	1-3m from any pole or structure	5m	Essential Energy	Compliant
Distance from nearest vehicle crossover	Generally, minimum of 2m (as per other council reference)	7m	General consideration	Compliant

The proposed Clark Street access crossover requirements are specified in Table 7.2.

Table 7.2: Typical Driveway Requirements for the Clark Street Access

Design Aspect	Requirement	Proposed Provision	Standards/Guidelines	Compliance/Non-compliant
Crossover Width	5.5m for car movement	6.5m	AS 2890	Compliant
Minimum separation from Intersection	Minimum 6m from tangent point of kerb of the intersection	30m	AS 2890	Compliant
Pedestrian Visibility Splays	2m x 2.5m	2m x 2.5m	AS 2890	Compliant
Sight Distance	Desirable 69m (for 50km/h posted speed)	More than 69m on both directions (eastbound and westbound) unless parked cars restrict sight lines.	AS 2890	Compliant
Gradient of first 6m	1:20 (5%)	<5%	AS 2890	Compliant
Queuing Area (At a controlled entry point, queuing area to be provided between vehicle control point and the property boundary.	The greater of a minimum of 2 cars or 3% of capacity for carparking space not more than 100 cars.	1 car queue length is provided.	AS 2890	Considered as performance/operational basis compliant. (Refer Table 3.4)
Minimum Gap Sight distance	69m (for 50km/h posted speed)	More than 69m on both directions unless parked cars restrict sight lines.	Richmond Valley Council	Compliant
Maximum change of grade	12% for a crest and 14% for a sag	<5%	Richmond Valley Council	Compliant

Design Aspect	Requirement	Proposed Provision	Standards/Guidelines	Compliance/Non-compliant
Direction of travel	Direction of travel should desirably be 90° to the centreline of the road (absolute minimum is 70°)	Direction of travel should desirably be 90° to the centreline of the road	Richmond Valley Council	Compliant
	Vehicles should preferably travel in a forward direction when entering or leaving the property	Vehicles will travel in a forward direction when entering or leaving the property	Richmond Valley Council	Compliant
Clearance from adjacent Power pole	1-3m from any pole or structure	6m An existing tension cable of the pole is adjacent to the proposed driveway which required to be re-configured.	Essential Energy	Compliant in context of the distance from the power pole.
Distance from nearest vehicle crossover	Generally, minimum of 2m (as per other council reference)	9m	General consideration	Compliant

## 8 Service Vehicle Arrangements

To assess the required number of service bays for the development, TTM has referred to the Richmond Valley Council requirements for service vehicles. However, no specific requirements for the size of the service vehicle that the site is required to accommodate have been observed from Council' Development Control Plan. TTM considered the service vehicle requirement based on the operation of the proposed development.

### 8.1 Proposed Service Vehicle Arrangements and their Adequacy

Due to the relatively small ancillary office and small size of residential units (2 bed units) in Johnston St Core & Cluster housing and small size of residential units (2 bed) in Clark St Chiff Housing, typical servicing of the site is undertaken by the service van for delivering supplies and grocery orders. Thus, it is reasonable to expect that a service van would require to be occasionally accommodated in this site and is not traveling into/from the development during peak hours. Development proposal includes one service vehicle bay area located adjacent to the vehicle crossover at Core & Cluster housing, suitable to cater for a service van. Service vehicle does not require the access through the secured gate. The dimension of the service vehicle parking bay complies with AS2890.

No service bay is provided in the Clark Street Chiff Housing carpark. It is expected that the servicing in the Chiff Housing is occasionally occurred and will be undertaken by utilising the service bay at the Core & Cluster Housing.

TTM undertake a swept path analysis for the access/egress and manoeuvring of a service vehicle into parking bay. A service van can access to the site in a forward gearing, reverse back to the service parking bay and egress the site in a forward gearing. The critical turn vehicle movements for the service vehicle bays are shown in Appendix B. Swept path analysis allows a minimum 300mm lateral clearance from the body/wheel of the service van.

TTM considers that the proposed servicing arrangement is suitable and is consistent with the community's reasonable expectations for the intended use.

### 8.2 Refuse Collection

Refuse collection will be on-street with bin storage in the south-western corner of the site (adjacent to the entry gate).

## 9 Summary and Conclusions

### 9.1 Development Access

The accesses to the development into the Johnston Street and Clark Street are compliant in accordance with Council requirements and Australian Standards. A 2-car queue space is provided for the Johnston Street crossover and a 1-car queue space is provided for the Clark Street crossover.

### 9.2 Car Parking Arrangements

The proposed parking supply for the site is generally consistent with Richmond Valley Council accepted parking requirements and Australian Standards. Overall, TTM considers the proposed car parking arrangements for this development are adequate.

### 9.3 Impact on Surrounding Road Network

Assessment of the proposed development indicates that the development will not have a significant impact on the future road network. As such, no further mitigating road works are required.

### 9.4 Service Vehicle Arrangements

Servicing for this development will be facilitated in the designated service bay between entry gate and the property line of Core & Cluster Housing. The largest design vehicle, a service van, can manoeuvre on site in order to enter and exit in a forward gear. Overall, the proposed service vehicle arrangements are considered adequate to meet the needs of the proposed development.

### 9.5 Active Transport Facilities

The current public transport infrastructure and proposed site provisions for pedestrian/bicycle facilities is considered adequate for the development.

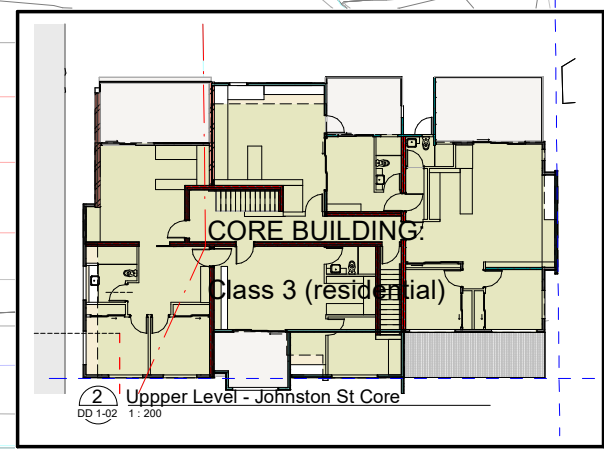
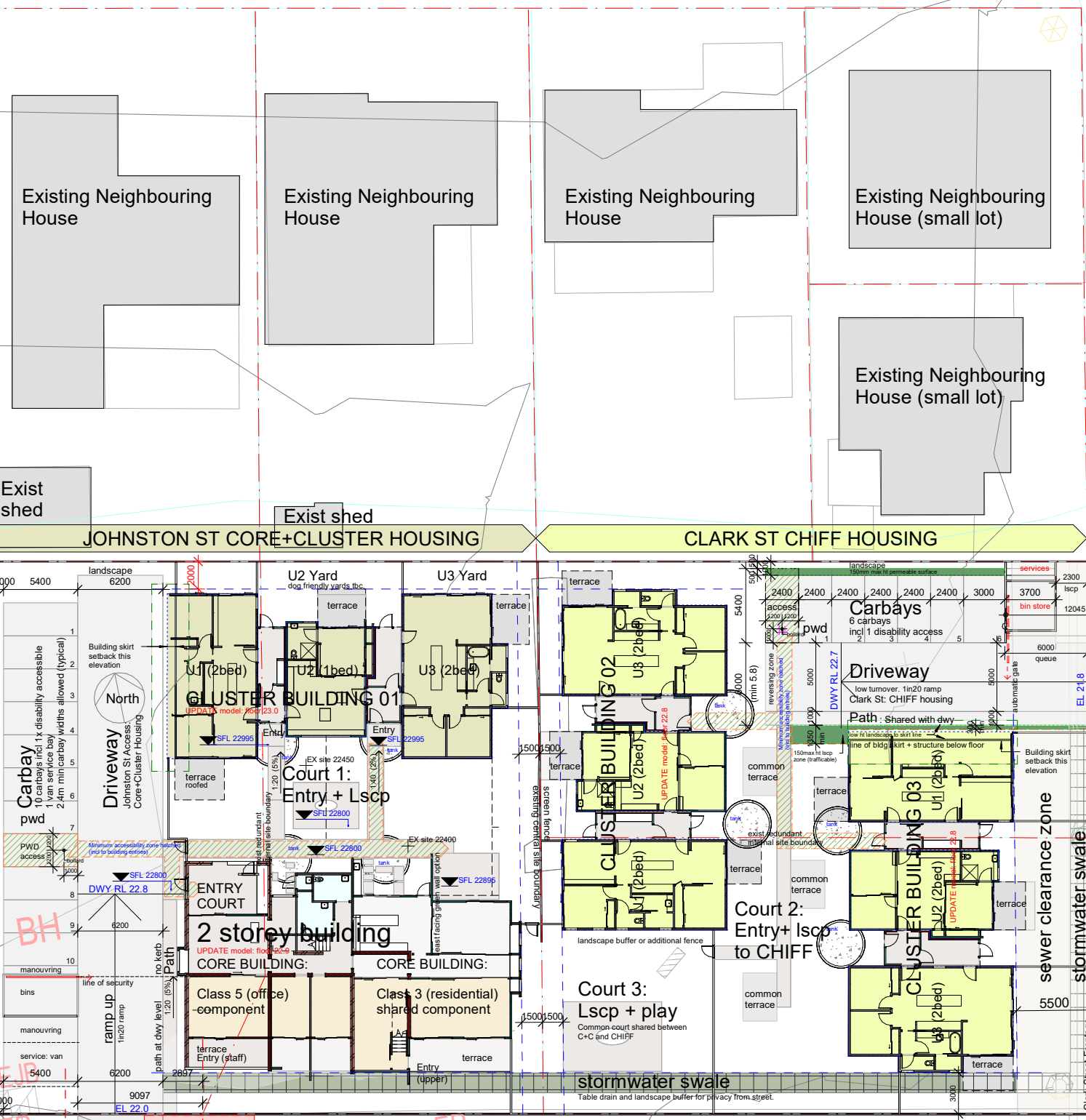
### 9.6 Conclusion

Based on the assessment contained within this report, TTM see no traffic engineering reason why the relevant approvals should not be granted.

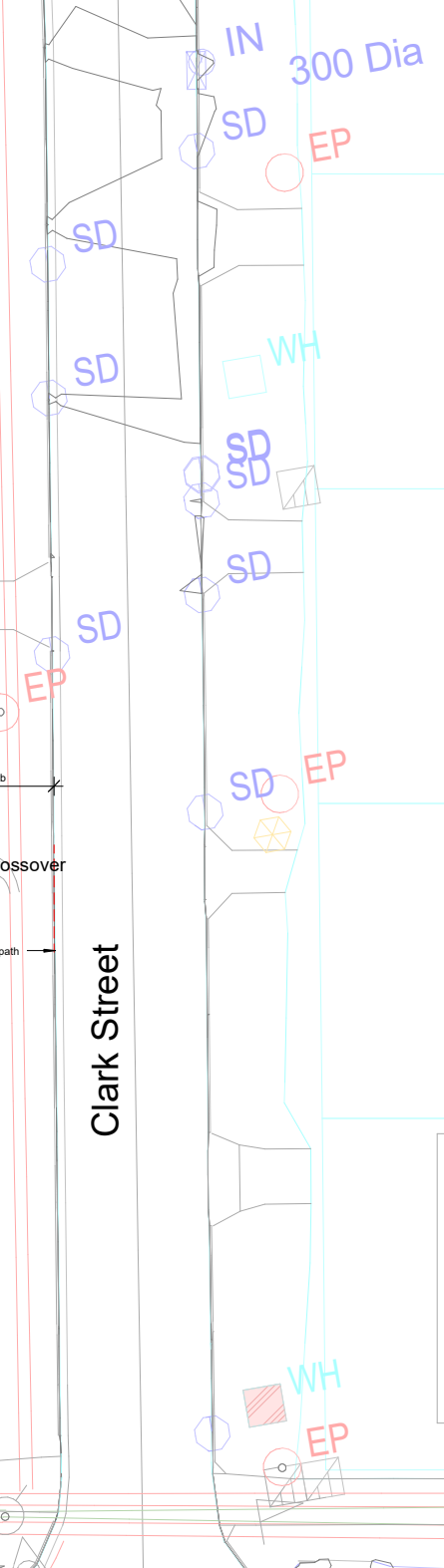


# Appendix A Proposed Site Plan

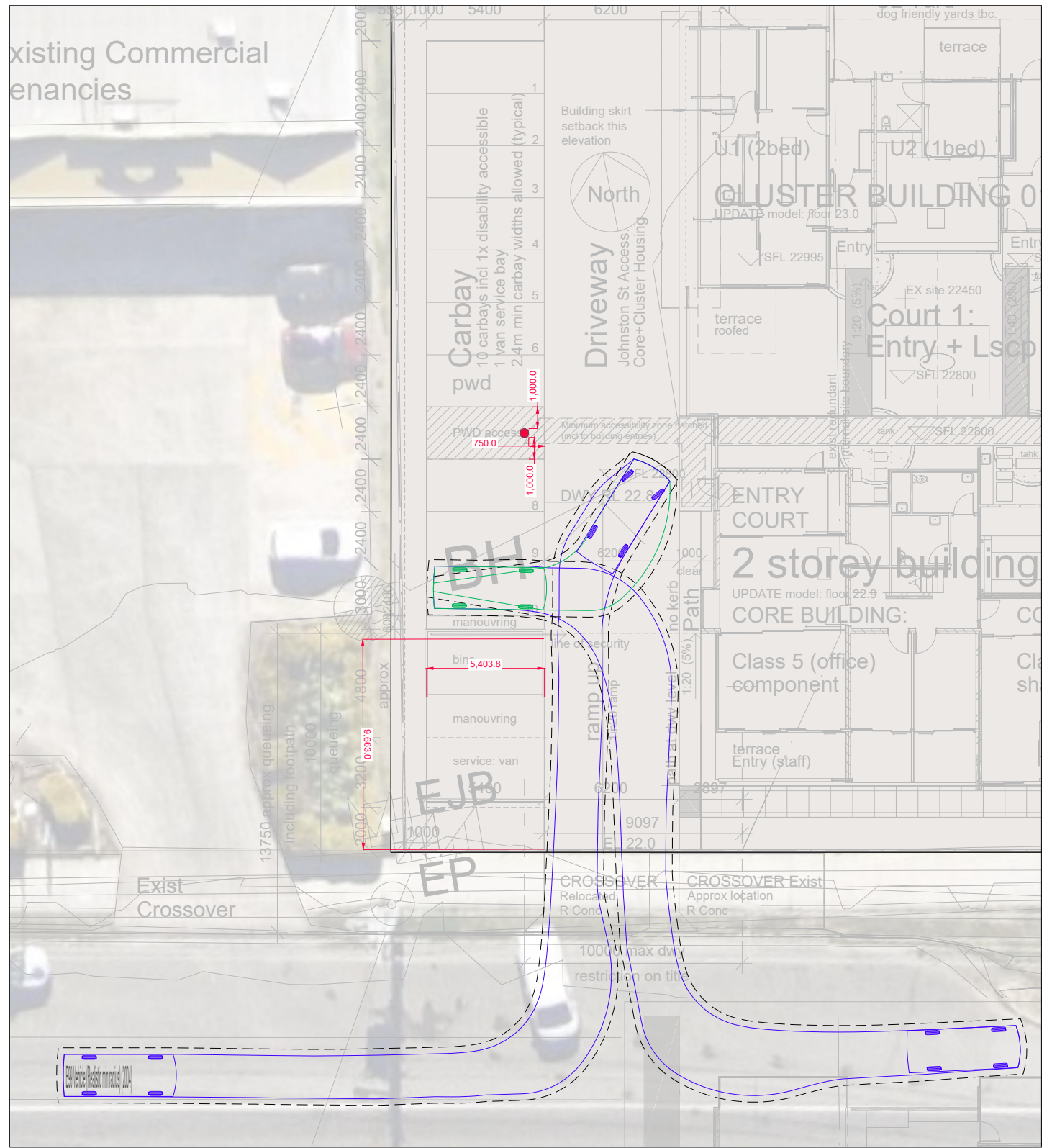
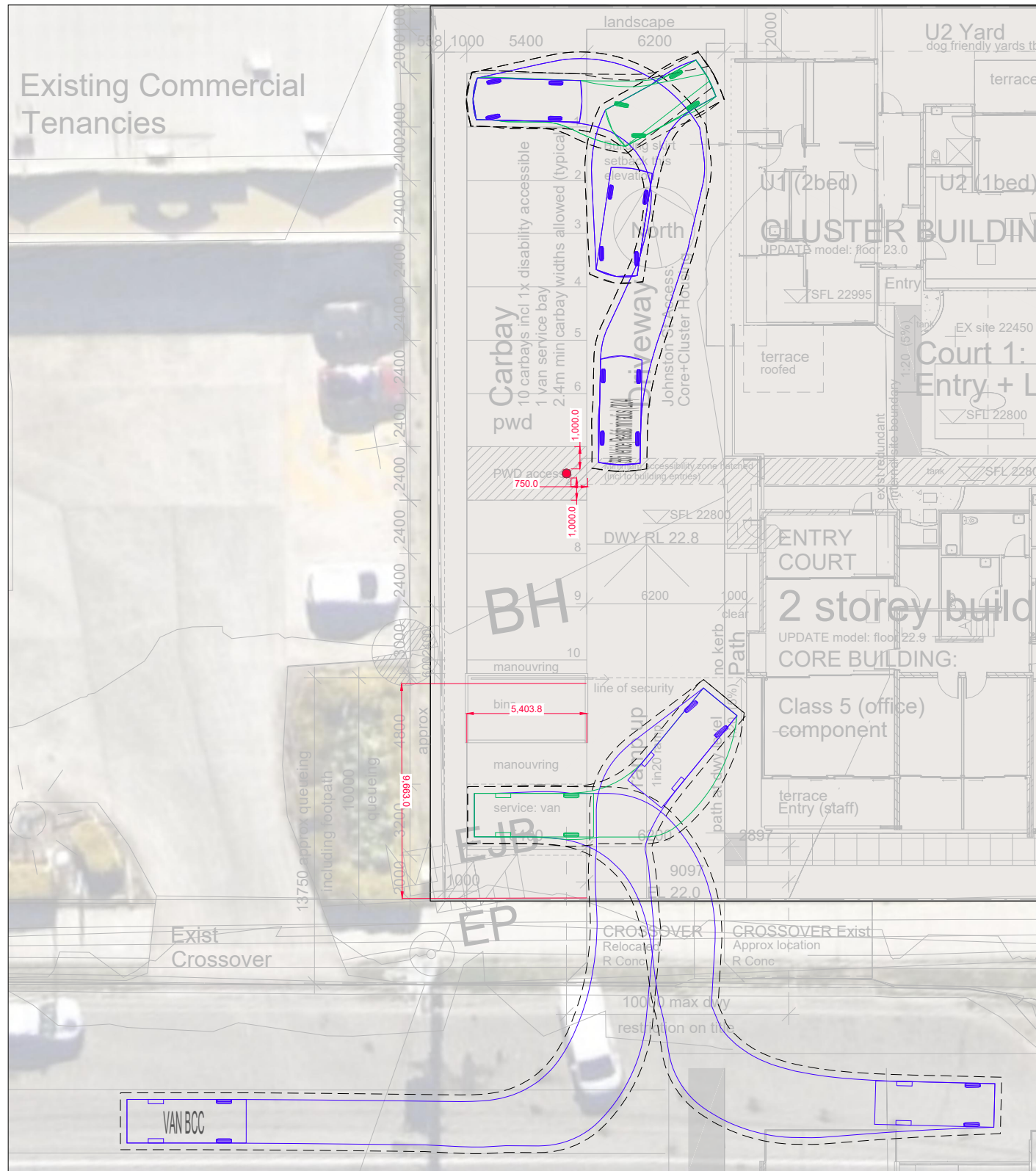
9 Sept 23 - BASIX P1  
11 Sept 23



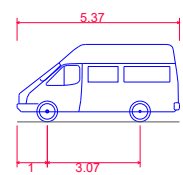
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## Appendix B Swept Paths

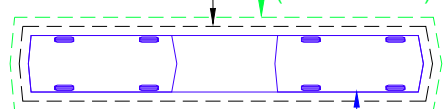


**VEHICLE PROFILES**

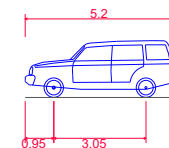


**VAN BCC**  
 Overall Length 5.370m  
 Overall Width 1.960m  
 Overall Body Height 2.560m  
 Min Body Ground Clearance 0.333m  
 Track Width 1.960m  
 Lock-to-lock time 4.00s  
 Curb to Curb Turning Radius 7.000m  
 Design Speed Forward 5.0km/h  
 Clearance Envelope 0.300m

VEHICLE CLEARANCE  
 300mm (DASHED LINE)  
 GREEN - 600mm CLEARANCE TO BE APPLIED WITHIN THE HIGHLIGHTED CURVED SECTIONS (DASHED LINE).

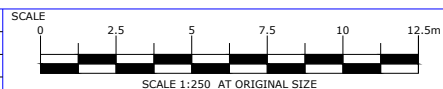


BLUE - VEHICLE BODY



**VEHICLE PROFILES**

**B99 Vehicle (Realistic min radius) (2004)**  
 Overall Length 5.200m  
 Overall Width 1.940m  
 Overall Body Height 1.878m  
 Min Body Ground Clearance 0.272m  
 Track Width 1.840m  
 Lock-to-lock time 4.00s  
 Curb to Curb Turning Radius 6.250m  
 Design Speed Forward 5.0km/h  
 Clearance Envelope 0.300m



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PROJECT

**146-152 JOHNSTON STREET, CASINO, NSW**

DRAWING TITLE

**SWEPT PATH ANALYSIS  
 DESIGN CAR B99 & VAN**

PROJECT NUMBER

**23GCT0147**

ORIGINAL SIZE

**A3**

DRAWING NUMBER

**21GCT0147-01**

REVISION

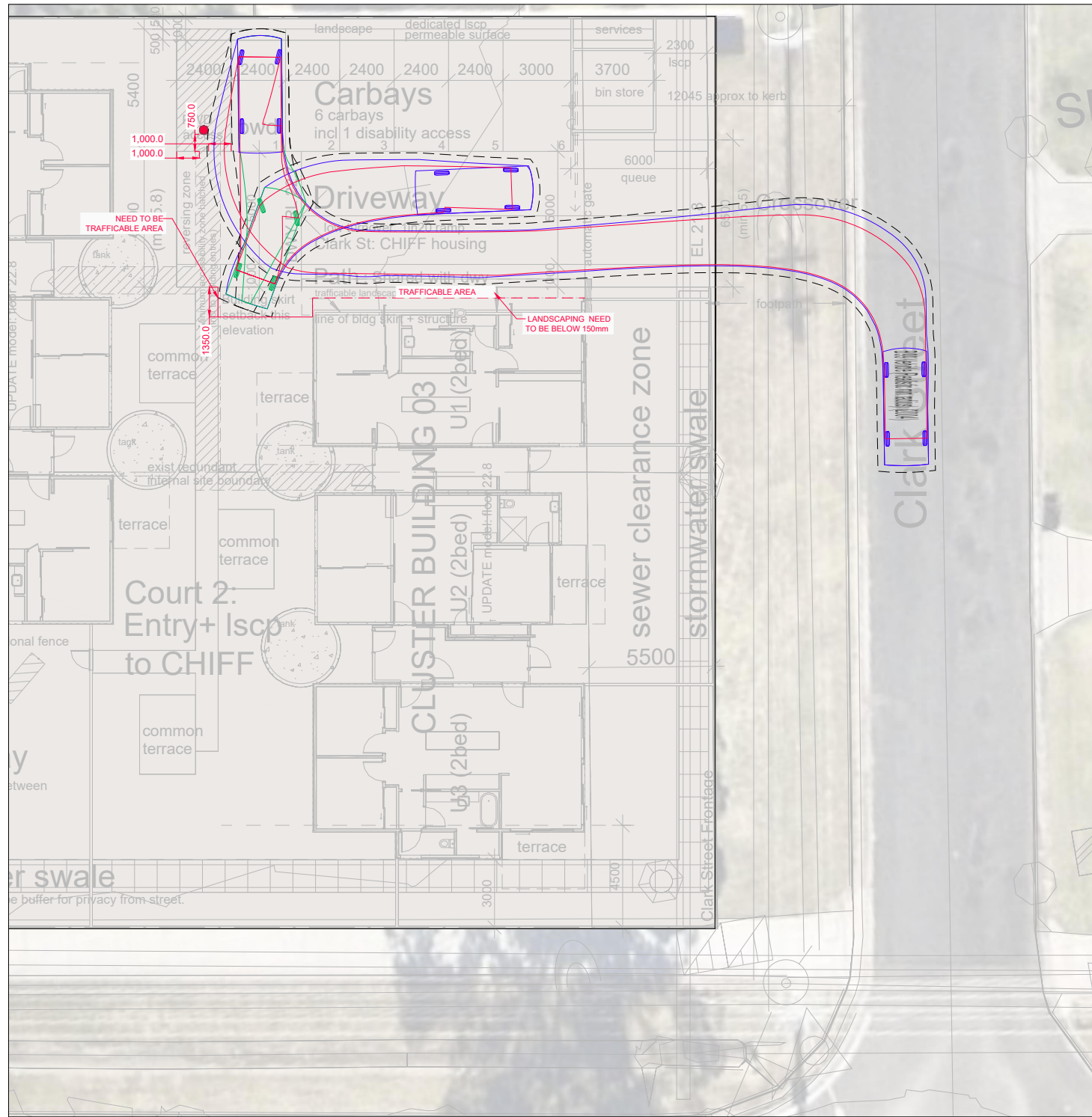
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DATE

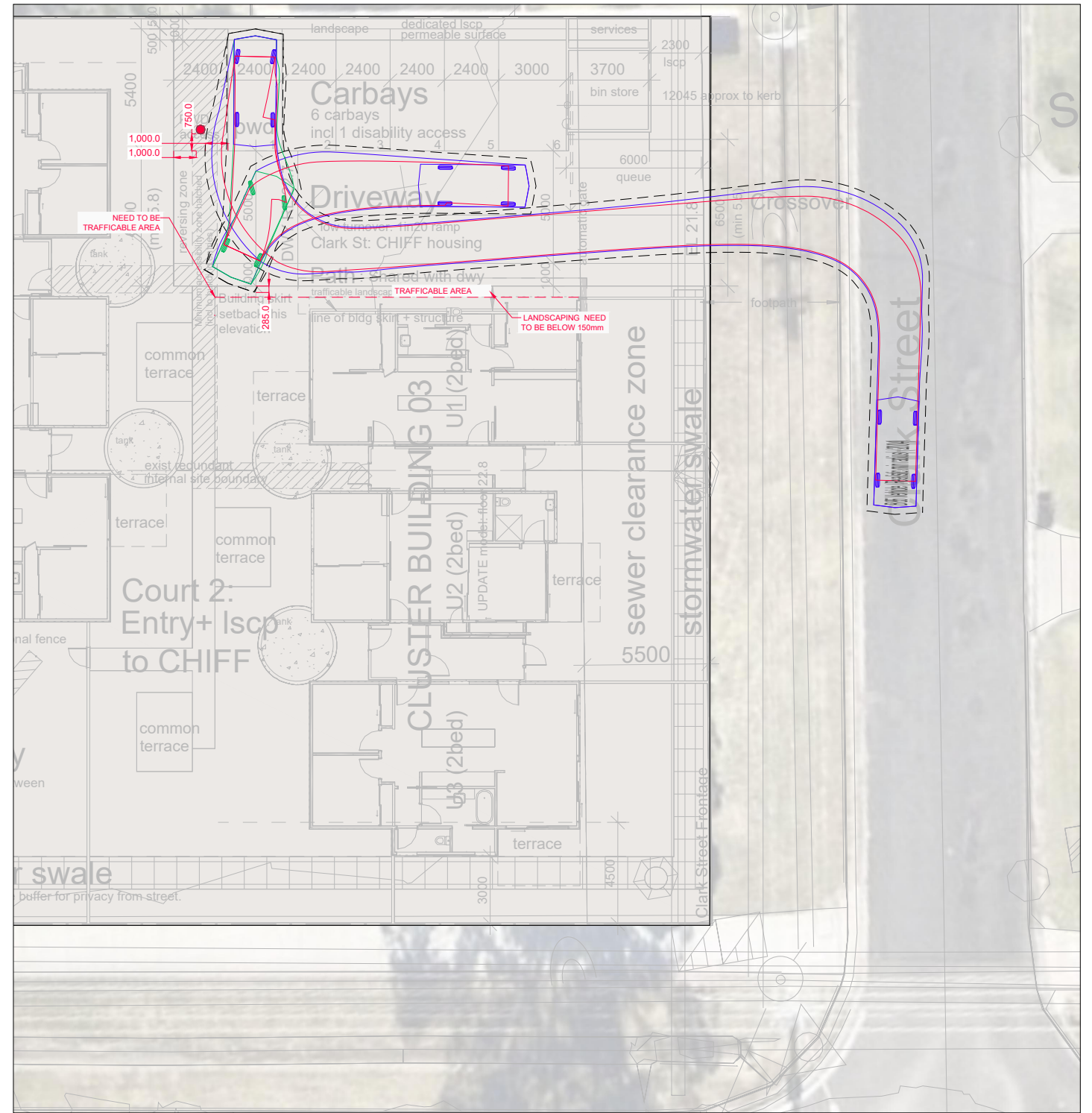
**8 Sep 2023**

SHEET

**1 OF 1**

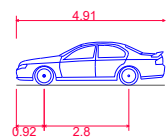


B99 CAR ACCESSING THE PWD BAY



B85 CAR ACCESSING THE PWD BAY

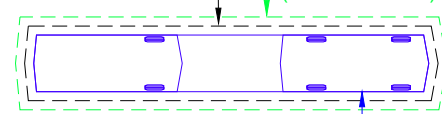
**VEHICLE PROFILES**



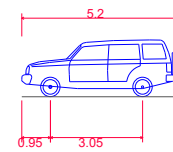
**B85 Vehicle (Realistic min radius) (2004)**  
 Overall Length 4.910m  
 Overall Width 1.870m  
 Overall Body Height 1.421m  
 Min Body Ground Clearance 0.159m  
 Track Width 1.770m  
 Lock-to-lock time 4.00s  
 Curb to Curb Turning Radius 5.750m  
 Design Speed Forward 5.0km/h  
 Clearance Envelope 0.300m

VEHICLE CLEARANCE  
 300mm (DASHED LINE)

GREEN - 600mm CLEARANCE TO BE APPLIED  
 WITHIN THE HIGHLIGHTED CURVED SECTIONS  
 (DASHED LINE).



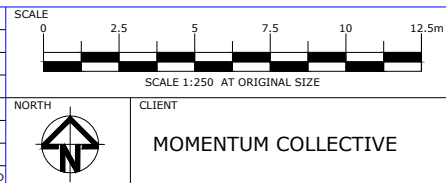
BLUE - VEHICLE BODY



**VEHICLE PROFILES**

**B99 Vehicle (Realistic min radius) (2004)**  
 Overall Length 5.200m  
 Overall Width 1.940m  
 Overall Body Height 1.878m  
 Min Body Ground Clearance 0.272m  
 Track Width 1.840m  
 Lock-to-lock time 4.00s  
 Curb to Curb Turning Radius 6.250m  
 Design Speed Forward 5.0km/h  
 Clearance Envelope 0.300m

REV.	DATE	ORIGINAL ISSUE	AMENDMENT DESCRIPTION	DRAWN	CHECKED	APPROVED
A	08-09-23	ORIGINAL ISSUE		HY	MH	IB



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**PROJECT**  
 146-152 JOHNSTON STREET, CASINO, NSW

**DRAWING TITLE**  
 SWEEP PATH ANALYSIS  
 DESIGN CAR B99 & VAN

PROJECT NUMBER	ORIGINAL SIZE
23GCT0147	A3
DRAWING NUMBER	REVISION
21GCT0147-02	A
DATE	SHEET
8 Sep 2023	1 OF 1