

# ATTACHMENT 13 – TRAFFIC AND TRANSPORT ASSESSMENT REPORT

**Planning Proposal – SP20018 – Croft Developments (November 2021)**

# Traffic and Transport Assessment Report

University Park, Wagga Wagga

V180855



Prepared for  
Croft Developments Pty Ltd

1 November 2021

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# 1 Introduction

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## 1.1 General

Cardno was retained by Croft Developments Pty Ltd to prepare a Traffic and Transport Assessment report of the proposed residential subdivision, University Park, located at 20 Hely Avenue, Turvey Park, Wagga Wagga.

Cardno has previously prepared a Traffic and Transport Assessment report of the adjacent Residential Aged Care Facility (RACF) development on the same lot title.

In the process of preparing this assessment, plans of the development have been examined and relevant background information has been reviewed.

## 1.2 Facts and Matters Relied Upon

In preparing this assessment, Cardno has relied upon the following facts, matters and information:

- > Wagga Wagga Local Environmental Plan 2010 (Local Environmental Plan);
- > Wagga Wagga Development Control Plan 2010 (Development Control Plan);
- > Wagga Wagga Spatial Plan 2013-2043 (Spatial Plan);
- > Wagga Wagga Integrated Transport Strategy 2040 (Transport Strategy);
- > NSW Roads and Transport Authority, guide to Delineation;
- > NSW Roads and Transport Authority, Guide to Traffic Generating Developments (RTA Guide);
- > Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings (Austroads);
- > Austroads Guide to Traffic Management Part 11: Parking (Austroads);
- > Australian / New Zealand Standard for Off-street Car Parking Facilities (AS/NZS2890.1:2004);
- > Plans of the proposed aged care development and proposed overall masterplan development prepared by Croft Developments Pty Ltd;
- > Concept Functional Layout Plan V180855-TR-SK-0007 dated 12/10/2018 prepared by Cardno; and

Other technical data and documentation as required.

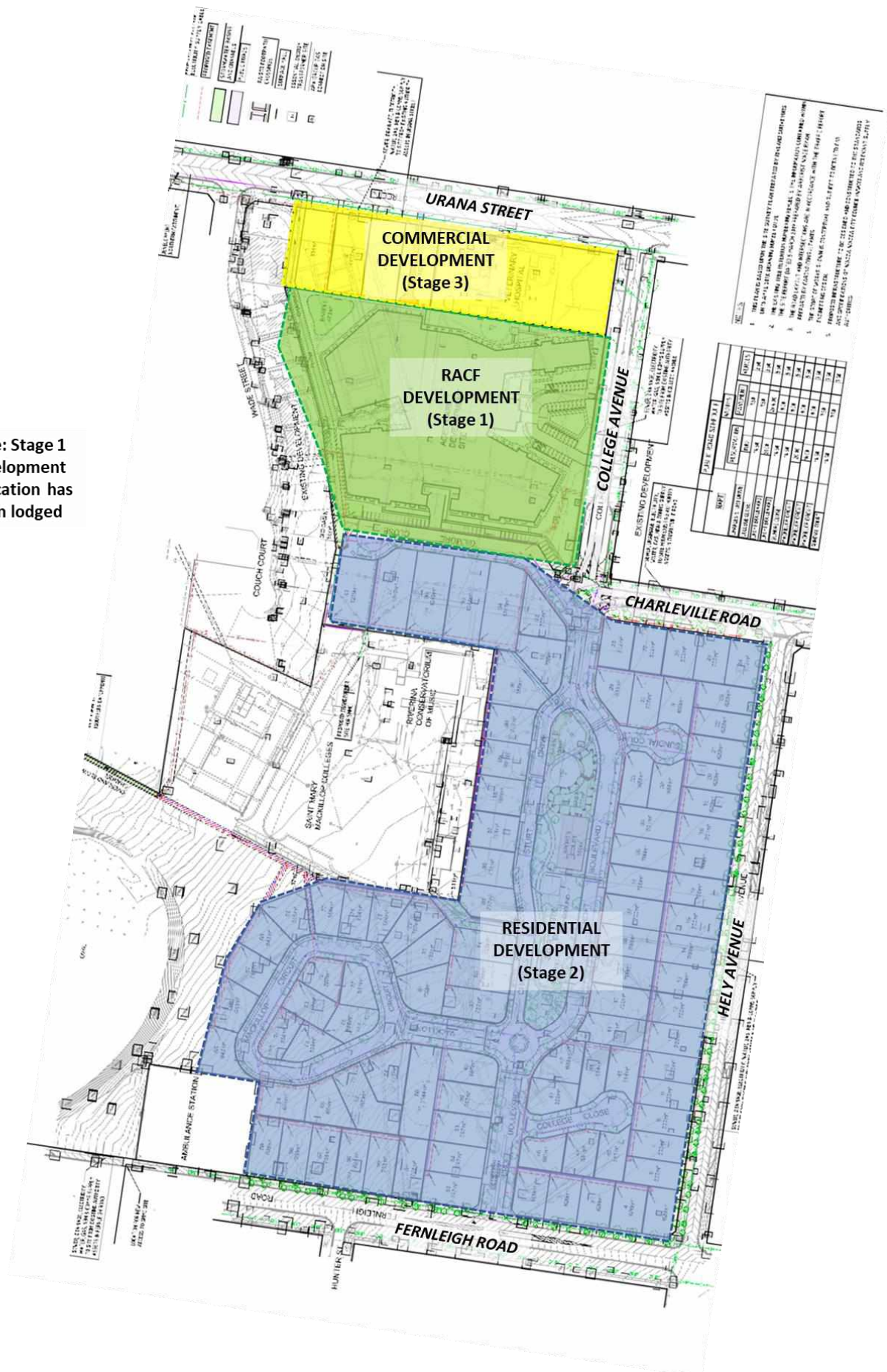
## 1.3 Proposed Masterplan

The proposed residential subdivision falls under the masterplan development of University Park. On the northern section, the Masterplan proposes a commercial development and an independent Residential Aged Care Facility (RACF). The remainder of the land will be developed into a retirement village comprising independent living units (ILU) and an assisted living building to service residents of the retirement village as required.

It is noted that the proposed masterplan area is referred to as the 'overall site' or 'University Park' throughout this assessment.



**Note: Stage 1 development application has been lodged**

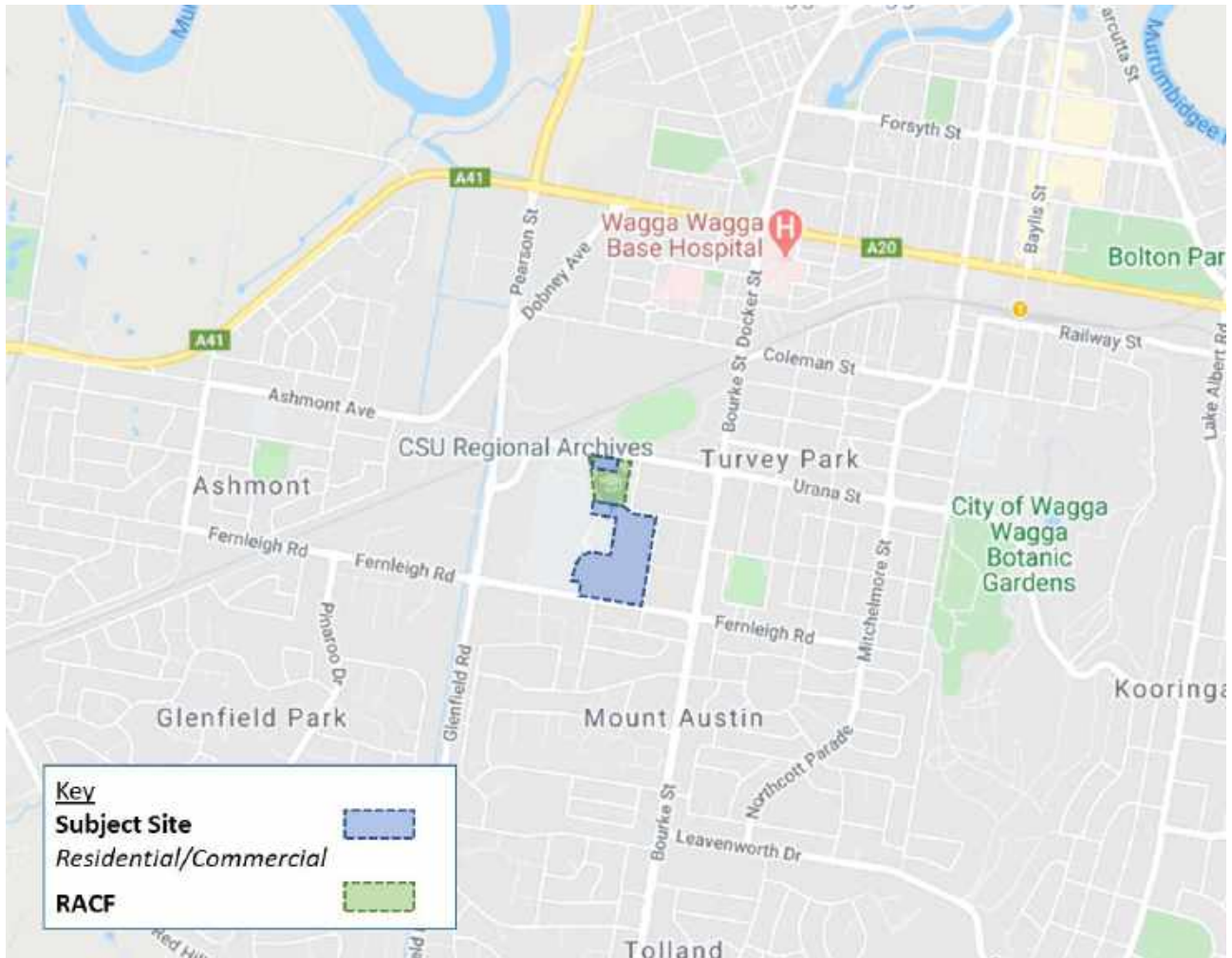


## 2 Background and Existing Conditions

### 2.1 Location and Land Use

The subject site forms part of the wider masterplan site which is located at 20 Hely Avenue, Turvey Park, as shown in Figure 2-1.

Figure 2-1 Site Location



The site is located on the western side of Hely Avenue and is approximately 9.5 hectares in size. The subject site is irregular in shape with a frontage of approximately 400 metres to Hely Avenue and approximately 250 metres to Fernleigh Road. It is noted that existing vehicular access to the site is provided via the College Street / Charleville Road intersection and via Hely Avenue.

The southern area of the site is currently occupied by several buildings, which are understood to have been vacated to make way for the upcoming development.

Of note, the Wagga Wagga Veterinary Hospital is located adjacent to the north boundary of the site on the corner of Urana Street and College Avenue; the Wagga Wagga Harness Racing Club is immediately north of Urana Street; the Wagga Town Centre is located approximately 3 kilometres northeast of the subject site.

Land uses surrounding the site are predominantly residential and special purpose in nature.

An aerial photo of the subject site is shown in Figure 2-2.



Figure 2-2 Site Aerial (nearmap.com, November 2019)





## 2.2 Planning Controls

Figure 2-3 shows the location of the site and the surrounding Planning Controls contained in the Wagga Wagga Local Environmental Plan 2010.

Figure 2-3 Wagga Wagga Planning Controls (Land Zoning Map - Sheet LZN\_004D)

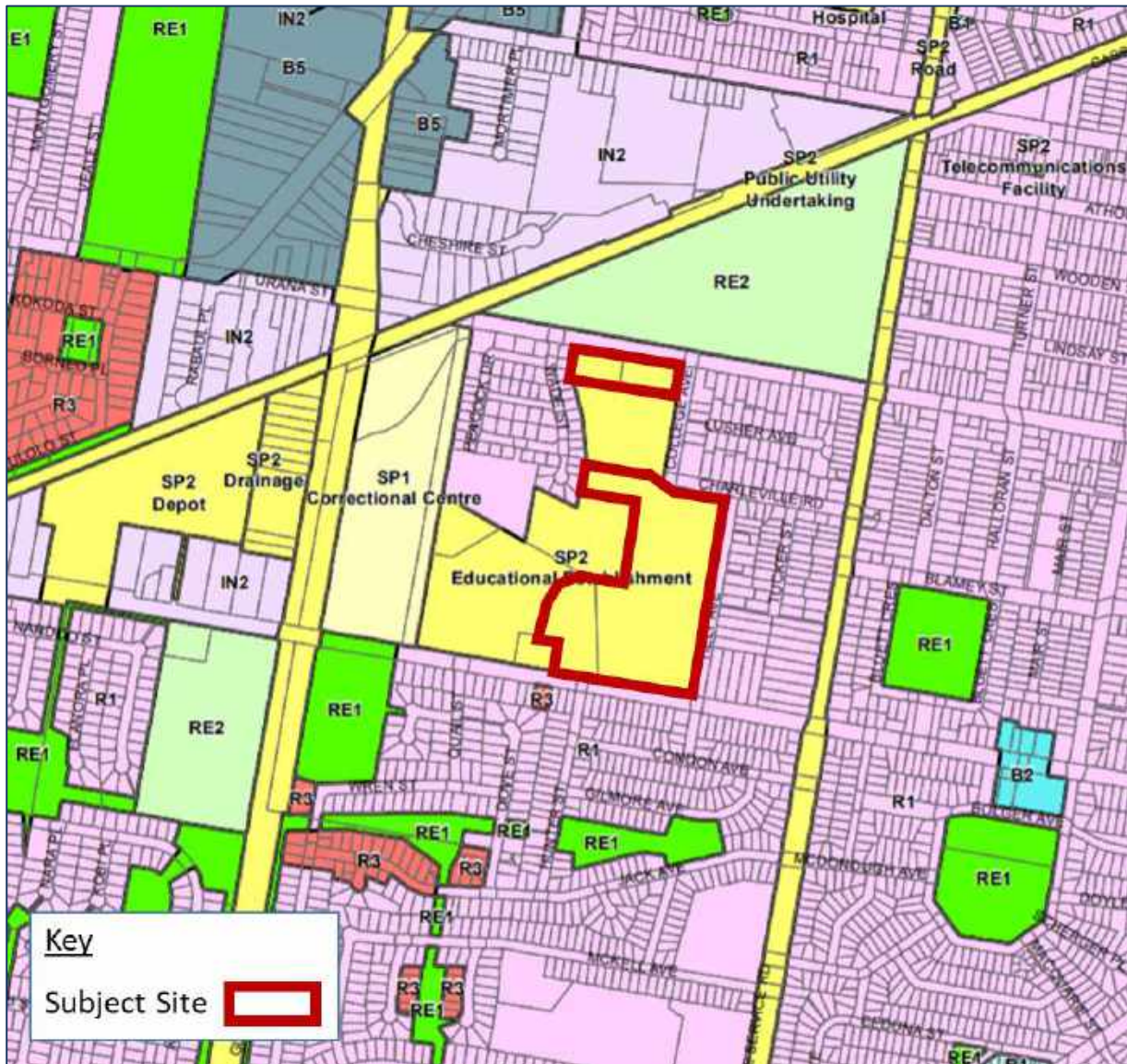


Figure 2-3 indicates that the subject site is located within the Special Purpose Zone (SP2). The permitted uses for the SP2 Zone are listed in Part 2 of the Wagga Wagga Local Environmental Plan 2010.

## **2.3 Road Network**

### **2.3.1 Fernleigh Road**

Fernleigh Road is a mid-order collector, generally aligned in an east-west direction, forming the southern site boundary. Fernleigh Road runs between the two high-order collector roads, Glenfield Road and Bourke Street, to the west and east respectively.

In the vicinity of the site, Fernleigh Road provides for traffic flow in each direction within an approximate 14m-wide, two-way carriageway. Unrestricted kerbside parallel parking is afforded along both sides of the carriageway.

A posted speed limit of 50km/h applies to Fernleigh Road in the vicinity of the subject site.

### **2.3.2 Charleville Road**

Charleville Road is a local road generally aligned in an east-west direction, forming the northern site boundary. Charleville Road runs from College Avenue in the west, to Bourke Street in the east.

Charleville Road provides two-way traffic flow on an approximately 8.7-metre-wide carriageway with unrestricted parking on both sides.

School zone restrictions (40km/h) are in place adjacent to the subject site. The school zone restriction is in effect between 8:00am-9:30am and 2:30pm-4:00pm on school days. A posted speed limit of 50km/h applies to Charleville Road outside of school zone hours.

### **2.3.3 Urana Street**

Urana Street is a mid-order collector generally aligned in an east-west direction. Urana Street is located to the north of the site, meeting the north end of College Avenue. It runs between the two high-order collectors, Bourke Street and Glenfield Road.

Urana Street provides for two-way traffic flow, with an approximate width of 15.5 metres. Kerbside parking is afforded along much of Urana Street, on both sides.

A sign-posted speed limit of 50 kilometres per hour applies to Urana Street in the vicinity of the subject site.

### **2.3.4 Hely Avenue**

Hely Avenue is a local road aligned in a north-south direction and generally forming the eastern site boundary. Hely Avenue commences at Charleville Road to the north and terminates at Fernleigh Road to the south.

Hely Avenue provides for traffic flow in both directions within an approximate 8.7-metre-wide carriageway in the vicinity of the site. Unrestricted kerbside parallel parking is otherwise afforded along both sides of the carriageway.

School zone restrictions (40km/h) are in effect on Hely Avenue from approximately 100m from Charleville Road. The school zone restriction is in effect between 8:00am-9:30am and 2:30pm-4:00pm on school days. A posted speed limit of 50km/h applies to Hely Avenue outside of school zone hours.

## 2.4 Sustainable Transport

### 2.4.1 Public Transport

The site has good access to public transport services, with bus routes 961 and 963 operating between Wagga Wagga and Bourkelands and Glenfield park respectively. The nearest bus stops associated with these routes are located within approximately 100m of the southeast corner of the subject site, on the east side of the Fernleigh Road / Hely Avenue intersection.

Figure 2-4 shows the proximity of the various bus services to the site. Overall it is considered that the public transport connectivity is suitable for the proposed residential use.

Figure 2-4 Public Transport Map





## 2.5 Existing Traffic Volumes

In order to understand existing traffic volumes in the locality of the subject site, pneumatic tubes were installed to record data over the course of a week, from Wednesday 27<sup>th</sup> June 2018 to Tuesday 3<sup>rd</sup> July 2018 (inclusive).

Tube counts were conducted on the following roads:

- > Bourke Street, south of Urana Street;
- > Charleville Road, west of Bourke Street;
- > Hely Avenue, north of Fernleigh Road;
- > College Avenue, south of Urana Street; and
- > Urana Street, West of Bourke Street.

A data sheet showing the full results of the traffic survey is included as Appendix A to this report.

### 2.5.1 Bourke Street

Average weekday traffic conditions for Bourke Street, south of Urana Street have been summarised in Table 2-1.

Table 2-1 Existing traffic volumes – Bourke Street (27/06/2018 to 03/07/2018)

Weekday Average		Northbound (Average)	Southbound (Average)	Total (Average)
AM Peak Period	Time	8:00am – 9:00am	11:00am – 12:00pm	8:00am – 9:00am
	Volume (vph)	614	312	921
PM Peak Period	Time	3:00pm – 4:00pm	5:00pm – 6:00pm	3:00pm – 4:00pm
	Volume (vph)	481	633	1050

Total weekday vehicles per day (vpd) is 5,429 northbound, 5,335 southbound and 10,764 combined.

AM peak period distribution is 75% northbound and 25% southbound.

PM peak period distribution is 46% northbound and 54% southbound.

### 2.5.2 Charleville Road

Average weekday traffic conditions for Charleville Road, west of Bourke Street have been summarised in Table 2-3.

Table 2-2 Existing traffic volumes – Charleville Road (27/06/2018 to 03/07/2018)

Weekday Average		Eastbound (Average)	Westbound (Average)	Total (Average)
AM Peak Period	Time	8:00am – 9:00am	8:00am – 9:00am	8:00am – 9:00am
	Volume (vph)	59	69	128
PM Peak Period	Time	3:00pm – 4:00pm	3:00pm – 4:00pm	3:00pm – 4:00pm
	Volume (vph)	66	107	173

Total weekday vehicles per day (vpd) is 462 eastbound, 477 westbound and 939 combined.

AM peak period distribution is 46% eastbound and 54% westbound.

PM peak period distribution is 38% eastbound and 62% westbound.

### 2.5.3 Hely Avenue

Average weekday traffic conditions for Hely Avenue, north of Fernleigh Road have been summarised in Table 2-3.

Table 2-3 Existing traffic volumes – Hely Avenue (27/06/2018 to 03/07/2018)

Weekday Average		Northbound (Average)	Southbound (Average)	Total (Average)
<b>AM Peak Period</b>	Time	8:00am – 9:00am	8:00am – 9:00am	<b>8:00am – 9:00am</b>
	Volume (vph)	42	58	<b>100</b>
<b>PM Peak Period</b>	Time	3:00pm – 4:00pm	3:00pm – 4:00pm	<b>3:00pm – 4:00pm</b>
	Volume (vph)	47	83	<b>130</b>

Total weekday vehicles per day (vpd) is 354 northbound, 415 southbound and 768 combined.

AM peak period distribution is 42% northbound and 58% southbound.

PM peak period distribution is 36% northbound and 64% southbound.

#### 2.5.4 College Avenue

Average weekday traffic conditions for College Avenue, south of Urana Street have been summarised in Table 2-4.

Table 2-4 Existing traffic volumes – College Avenue (27/06/2018 to 03/07/2018)

Weekday Average		Northbound (Average)	Southbound (Average)	Total (Average)
<b>AM Peak Period</b>	Time	8:00am – 9:00am	8:00am – 9:00am	<b>8:00am – 9:00am</b>
	Volume (vph)	28	39	<b>77</b>
<b>PM Peak Period</b>	Time	3:00pm – 4:00pm	3:00pm – 4:00pm	<b>3:00pm – 4:00pm</b>
	Volume (vph)	42	55	<b>97</b>

Total weekday vehicles per day (vpd) is 266 northbound, 316 southbound and 582 combined.

AM peak period distribution is 36% northbound and 64% southbound.

PM peak period distribution is 43% northbound and 57% southbound.

#### 2.5.5 Urana Street

Average weekday traffic conditions for Urana Street, west of Bourke Street have been summarised in Table 2-5.

Table 2-5 Existing traffic volumes – Urana Street (27/06/2018 to 03/07/2018)

Weekday Average		Eastbound (Average)	Westbound (Average)	Total (Average)
<b>AM Peak Period</b>	Time	8:00am – 9:00am	8:00am – 9:00am	<b>8:00am – 9:00am</b>
	Volume (vph)	368	275	<b>642</b>
<b>PM Peak Period</b>	Time	3:00pm – 4:00pm	3:00pm – 4:00pm	<b>3:00pm – 4:00pm</b>
	Volume (vph)	332	329	<b>660</b>

Total weekday vehicles per day (vpd) is 3,509 eastbound, 2,985 westbound and 6,495 combined.

AM peak period distribution is 57% eastbound and 43% westbound.

PM peak period distribution is 50% eastbound and 50% westbound.



### 3 Proposed Development

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The proposed development incorporates three (3) stages as follows:

#### **Stage 1 – Residential Aged Care Facility**

The development application for the Stage 1 Residential Aged Care Facility has previously been lodged, with accompanying Traffic and Transport Assessment Report prepared by Cardno. Minor changes to the proposal have been outlined in the following section.

#### **Stage 2 – Residential Development**

The development of the southern portion of the site for a 98-lot subdivision is proposed to provide residential living in the form of predominantly Independent Living Units (ILUs) in line with the RACF development and environs. A traffic and transport assessment of the Residential Development follows in Section 5.

#### **Stage 3 – Commercial Development**

A commercial development is proposed in the northwest sector of the subject site, comprising office space and parking area. The Commercial development will be distinct from the adjacent residential and RACF developments, with an independent vehicle access onto Urana Street. A traffic and transport assessment of the Commercial Development follows in Section 7.

## 4 Residential Aged Care Facility (Stage 1)

Cardno has undertaken a Traffic and Transport Assessment report of the proposed Residential Aged Care Facility (RACF), document titled V180855\_REP001F01 (RACF Transport Assessment). The Assessment has been submitted to the Wagga Wagga City Council as part of a planning application.

As part of the overall masterplan for University Park, the development seeks to make minor changes to the previous RACF design, as described in the RACF Transport Assessment. The changes include the reassignment of the southern accessway from a private car park to a public road with amenity for access to eight (8) private lots. The change is illustrated in Figure 4-1.

Figure 4-1 Proposed Changes to University Park Residential Aged Care Facility



### 4.2 Car Parking and Access

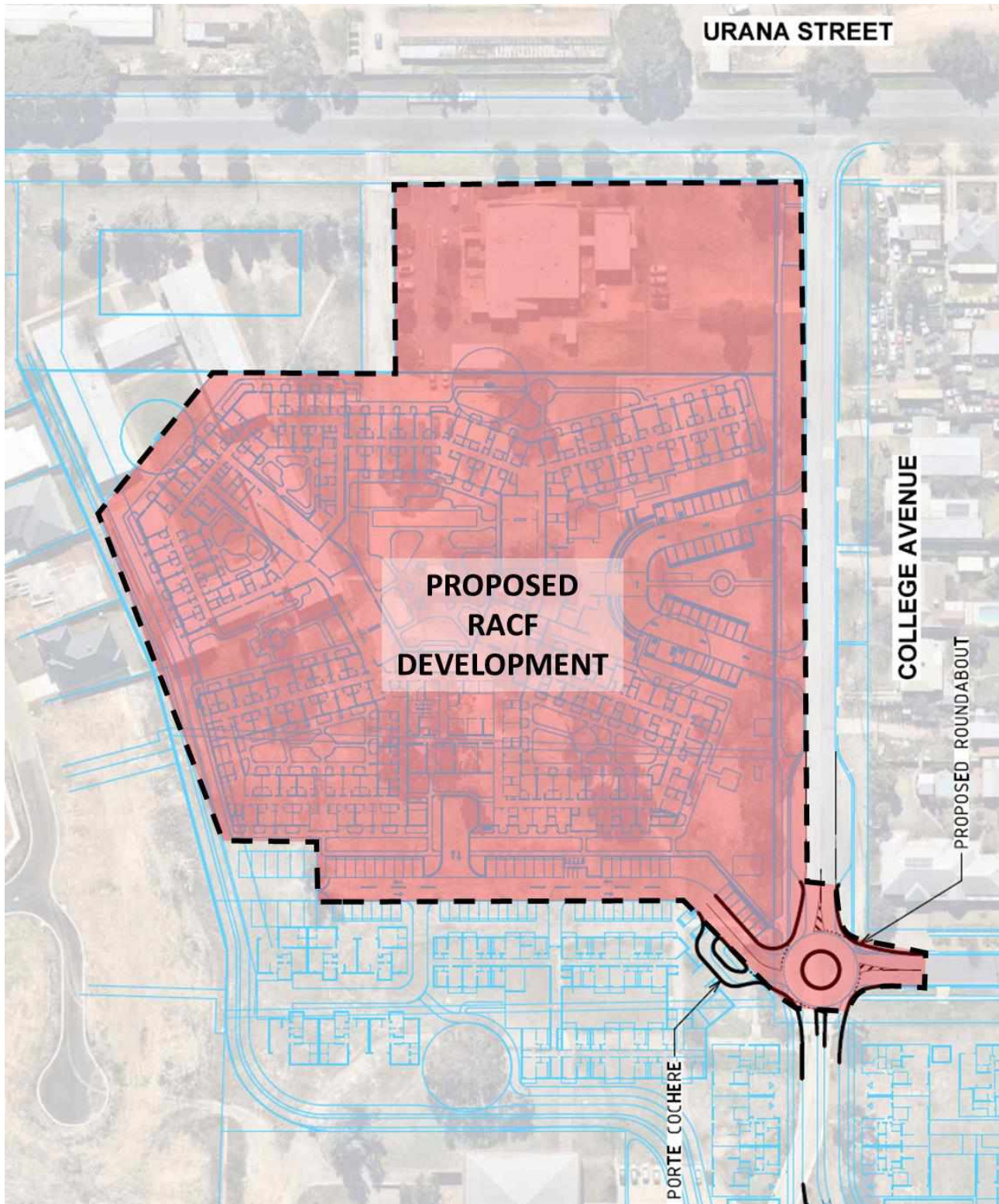
In general, the proposed change under the University Park masterplan will have little-to-no impact on the access and car parking arrangement of the RACF.

Vehicular access to the car parks remains via a proposed roundabout adjoining College Avenue, Charleville Road, Croft Boulevard and the modified 'Road A,' public street.

As detailed in this report, the roundabout design is expected to sufficiently accommodate all traffic movements including those generated from the RACF, the residential development and existing movements. The provision of the roundabout allowing for development of the residential housing was addressed and allowed for in the RACF Transport Assessment, as follows:

*"The roundabout has been designed to facilitate access to the southern car park and allow for concurrent ingress and egress movements for cars. Furthermore, the provision of this roundabout intends to allow for future development to the south of the site in later stages of the masterplan. The proposed access to the site including the proposed roundabout is outlined within Figure 4-2."*

Figure 4-2 Except from the RACF Transport Assessment



There are no changes proposed to the northern access arrangements of the RACF. A porte cochere is proposed at the main entrance to the building providing direct access to a short-term drop-off area accessed from the northern car park.

As proposed, the RACF incorporates at-grade car parking with a total of 61 car parking spaces (including four (4) disabled spaces), in the northern car parking area. There are no intended changes to the number, location or layout of the car parking spaces.

- > Northern car park – **36** car spaces, including four (4) disabled spaces; and
- > Southern car park – **25** car spaces, including three (3) motorcycle spaces.

The southern car parking spaces will retain the same access arrangements as proposed in the RACF Transport Assessment, with the change that the access point will be a public road, shared with eight (8) dwellings. Additional signage and line marking will be implemented to ensure the parking is clearly RACF staff and visitor parking only.

As there are no changes to the supply of car parking, there are no issues foreseen with the proposed change.

### 4.3 Bicycle Parking

There are no changes to the bicycle parking arrangements as previously proposed in the RACF Transport Assessment.

Bicycle rails are provided within the Northern car park area, with a total of five (5) ground-mounted horizontal rails proposed, capable of storing up to ten (10) bicycles.

### 4.4 Loading and Waste Collection

The RACF Transport Assessment designates an on-site loading area central to the southern car park for delivery vehicles and waste collection, accessed via the proposed roundabout on College Avenue.

The loading area is capable of servicing vehicles up to a 10.7m heavy rigid truck in size. It is noted that Signature Care representatives have advised Cardno that this is the *largest* sized loading / waste collection anticipated to require access to the designated loading bay.

A bin storage area is proposed adjacent the designated loading bay. It is understood a private contractor will carry out garbage collection for the development on-site, with collection staff to have access to the bin store, transferring bins to the truck and back to the store. Swept path diagrams attached indicate a loading / waste collection vehicles ability to enter and exit the site in a forward direction.

All loading and waste collection procedures able to be undertaken off-street, and therefore will not impede or interfere with other traffic flows on Road A.

### 4.5 Traffic Impact

Traffic generation from the RACF is detailed in the RACF Transport Assessment, with the proposed designed concluded to be adequate to accommodate expected traffic volumes.

The southern car park accounts for 40% of the total car parking capacity, and is therefore expected to account for the same portion of the total traffic generation, which is in the order of 12 vehicles in the peak hour.

The residential lots adjoining Road A are expected to have a traffic generation in the order of 0.9 vehicles in the peak hour, as is generally accepted for residential developments. Therefore, Road A s expected to have seven (7) vehicle movements across the per peak hour due to the residential lots.

Typical traffic generation is outlined in Figure 4-1.

Table 4-1 Traffic Generation from RACF Southern Car Parking and Residential Lots Adjoining Road A

	Peak Hour Traffic Volume AM/PM (vph)	Daily Traffic Volume (vpd)
RACF Southern Car Park	12	100
Residential Lots Adjoining Road A	7	70
<b>Total</b>	<b>19</b>	<b>170</b>

In traffic engineering terms, the level of traffic expected to be generated by the proposed residential lots and RACF is considered to be low. Nineteen (19) vehicle movements per hour in the PM peak, including both arrivals and departures, is equivalent to an average of approximately 1 vehicle movement per 3-minute interval. This level of traffic generation is considered low and is not expected to have any discernible effect of the operations of College Avenue, Charleville Road, and the surrounding road network.



## 4.6 Conclusions

Based on the foregoing Residential Aged Care Facility analysis, it is concluded that:

- > It is proposed to continue with the previous application to develop a portion of the site located at 20 Hely Avenue, Turvey Park for the purposes of a 144-bed aged care facility. A Traffic and Transport Assessment was completed regarding this site and the development;
- > The University Park Masterplan proposal intends to modify the use of the RACF southern car park access to form a private road with access to eight (8) new residential lots;
- > The southern car park total of 25 car parking spaces dedicated to the RACF will retain access from the roundabout, and are deemed adequate in supply for the RACF, meeting the statutory requirement for parking;
- > The car park and access design is generally in accordance with the Australian Standard for off-street car parking (AS/NZS 2890.1);
- > The reassignment to a public road does not create any access arrangement issues for the residential lots, not the car parking arrangement for the RACF;
- > Up to 19 traffic movements in the peak hour are anticipated to be generated by the proposed aged care development and residential lots along Road A. It is concluded that these movements are able to be adequately accommodated within the proposed and existing road infrastructure; and
- > The level of traffic expected to be generated by the proposed development is expected to have minimal impact upon College Avenue and the surrounding road network.

These conclusions are to be read in conjunction with Cardno Traffic and Transport Assessment for the Wagga Wagga RACF, titled V180855\_REP001F01.

## 5 Proposed Residential Development (Stage 2)

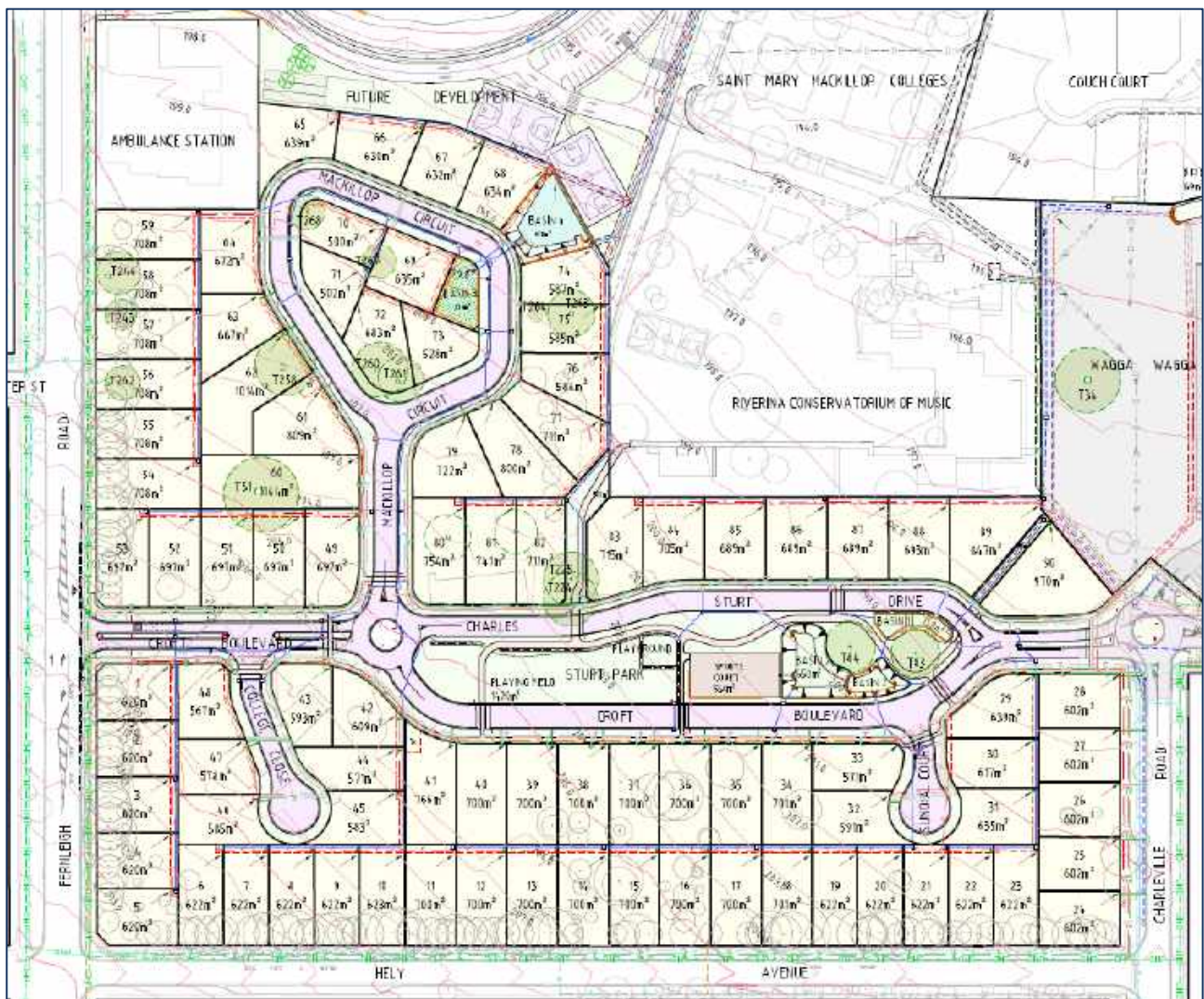
### 5.1 General

Based on plans of the development prepared by Croft Developments Pty Ltd, it is proposed to develop the southern portion of the site for the purposes of a 98-lot subdivision, as illustrated in Figure 5-1.

The internal road network comprises the primary local road, Croft Boulevard, which services connections to four secondary local roads and lanes; of which two are cul-de-sacs and two are closed loops back onto Croft Boulevard.

The development is proposed to be constructed as a single stage.

Figure 5-1 Proposed Development

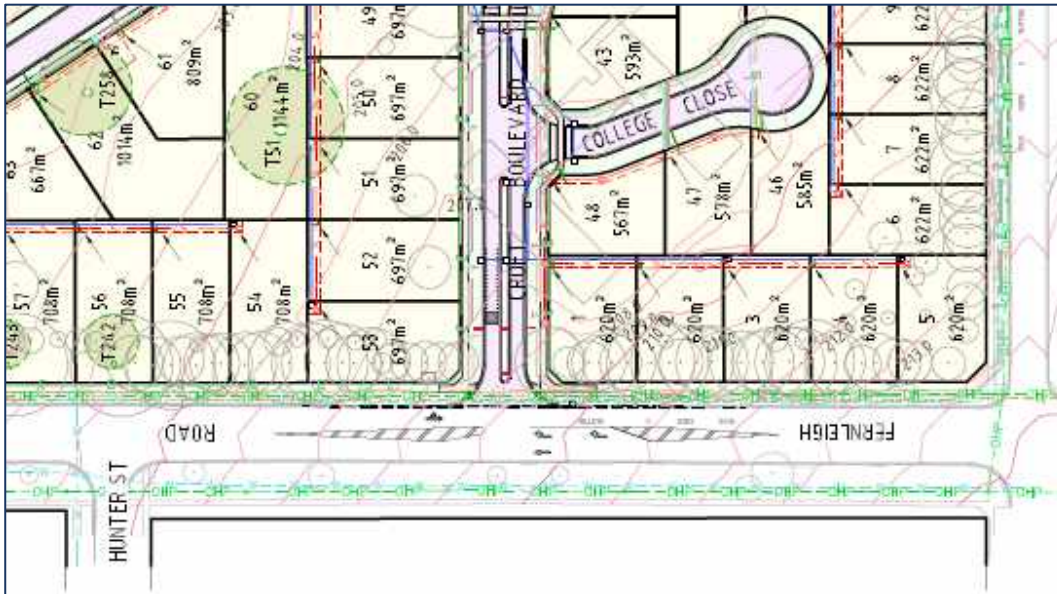


### 5.2 Access

The proposed development makes use of connectivity from Fernleigh Road from the south, with the construction of a new T-intersection onto the proposed Croft Boulevard. The intersection is proposed with a channelised right turn lane from Fernleigh Road into the separated boulevard. The south access arrangement is shown in Figure 5-2.



Figure 5-2 South Access from Fernleigh Boulevard



From the north, a proposed a roundabout intersection with the existing Charleville Road and College Avenue will provide connectivity onto Croft Boulevard. The north access arrangement is shown in Figure 5-3.

All internal local road connections within the site are from Croft Boulevard.

Figure 5-3 North Access from Charleville Road and College Avenue



### 5.3 Proposed Road Cross Sections

The proposed development intends to provide internal circulation and connectivity through the subject site through the construction of a series of local access roads.

The road cross sections are determined from Wagga Wagga City Council, Engineering Guidelines for Subdivisions and Development Standards, Table 2.5.1: Road Standards for the Urban Street Network specific to Wagga Wagga City, replicated in

Table 5-1 Road Standards for the Urban Street Network specific to Wagga Wagga City

Classification of Road	Target Design Speed	Max. No. of Lots	Minimum Width (metres)			Footpath	Cycleways	Kerb Type	Indicative Design ESAs
			Road Reserve	Carriageway	Verge				
Lane	25	10	14.5	7.5	2 x 3.5	None	On road shared	As discussed with council staff	1 x 10 <sup>5</sup>
Access Street	25	10	14.5	7.5	2 x 3.5	None	On road shared	Barrier or fully mountable	1 x 10 <sup>5</sup>
Cul-de-sac	50	10	14.5	7.5	2 x 3.5	None	On road shared	Barrier or fully mountable	1 x 10 <sup>5</sup>
Local Access	50	100	20	9	2 x 5.5	1.5m one side	On road shared	Barrier	2 x 10 <sup>5</sup>

The road hierarchy is shown overlaid on the development plan Figure 5-4.

Figure 5-4 Proposed Road Hierarchy



The road hierarchy is as follows, from highest order to lowest order:

#### 5.3.2 Local Access 1 - Croft Boulevard & Mackillop Lane

Croft Boulevard is the highest order local access road, facilitating direct access into the surrounding road network for the residential subdivision.

The entry road reserve is 21.0 metres wide with dual carriageway with a single 3.2 metre lane in each direction and 1.5 metre central median.

Mackillop Lane meets Croft Boulevard at the southern roundabout and allows for a 20-metre road reserve and 9-metre wide carriageway.

### 5.3.3 Access Street – Charles Stuart Drive & Road D

Each of the Access Street level roads features a 14.5-metre road reserve and 7.5-metre wide road carriageway.

Charles Stuart Drive forms a local access street connecting between the north and south roundabouts on Croft Boulevard. Charles Stuart Drive provides access to 10 lots.

Road D forms a loop on the western end of Mackillop Lane. Due to the looped nature of Road D, it is acceptable for it to provide access to 20 lots as driver behaviour will equally disperse vehicle trips over each side of the loop.

### 5.3.4 Cul-de-sac – Road A, Road B & Road C

Each of the Cul-de-sac level roads feature a court-bowl at the end of a 14.5-metre road reserve and 7.5-metre wide road carriageway. Each cul-de-sac provides access to no more than 10 lots.

## 5.4 Residential Traffic Management

### 5.4.1 Signage and Line Marking

Signage and line marking throughout the subdivision should be in accordance with the NSW Roads and Transport Authority's guide to Delineation, with signage to be in accordance with the Australian Standard Manual of Uniform Traffic Control Devices, AS1742.

### 5.4.2 Road Design Speeds

All internal roads within the subdivision will adopt the default speed limit of 50km/h and will operate at a speed limit of 50km/h or lower. Target speeds for the access streets, however, is 25km/h.

The target speeds for all roads will be achieved through various traffic management treatments.

## 5.5 General LATM Treatments

In general, LATM treatments should only be considered as part of the road network functional/detailed design in locations where there is an identified risk of higher than target vehicle speeds and it is not possible or practical to manage this through the planning of the subdivision street network.

Post development LATM treatments may also be required to manage isolated identified traffic issues. LATM treatments should only be contemplated on bus routes and other high order access routes as a last resort.

When necessary, LATM's should be incorporated into intersection treatments subject to approval by the responsible authority.

Croft Boulevard and the parallel Charles Stuart Drive feature flat-top speed humps that improve road-crossing safety and connectivity for pedestrians. The flat-top speed humps lower vehicle speeds, improving safety and ensuring vehicles travel at the target design speed for the road.

Speed humps also play a role in ensuring that the roads are not used as a rat-run. As the development proposes a new north-south connection from Urana Street to Fernleigh Road, it is necessary that speed humps are used to lower the amenity of the new access as a thoroughfare.

Flat-top speed humps have been circled in red in



Figure 5-5 Flat-top Speed Humps



## 6 Residential Development (Stage 2) Traffic Impact Considerations

### 6.1 Traffic Generation

It is generally accepted that residential lots in outer suburban areas generate vehicular traffic at a rate of nine (9) vehicle movements per day, with the assumption that 10% of vehicle movements occur in the peak hour.

Application of this rate to the proposed 98-lots equates to a daily traffic volume of 1,062 vehicle movements, with 106 of those occurring in each peak hour. Values are summarised in Table 6-1.

Table 6-1 Site Traffic Generation

Lots	Vehicle Trips Per Day Per Lot	Vehicles Per Day (vpd)	Peak Hour Vehicles (10%)
98	9	882	88

Based on the proposed development composition, it is assumed that all vehicle trips will have an external origin or destination. No allowance has been made for trips internal to the development.

### 6.2 Traffic Distribution

#### 6.2.1 Peak Hour Distribution

The following traffic distribution assumptions are held for trips between the subdivision and external origin/destination points:

- > AM peak hour distribution:
  - Ingress trips: 10%
  - Egress trips: 90%
- > PM peak hour distribution:
  - Ingress trips: 60%
  - Egress trips: 40%

A summary of the trip generation is outlined in Table 6-2

Table 6-2 Peak Hour Traffic Distribution

	Ingress	Egress	Total Trips
AM Peak	9	79	88
PM Peak	53	35	88

#### 6.2.2 Origin-Destinations Distribution

Traffic generation directional split is based on traffic survey data from the immediate road network. Bourke Street, running north-south, and Urana Street, running east-west, were chosen as key indicators for origin-destination trip distribution. Movement splits for the two streets are listed:

Bourke Street:

- > AM peak period distribution is 75% northbound and 25% southbound.
- > PM peak period distribution is 46% northbound and 54% southbound.

Urana Street:

- > AM peak period distribution is 57% eastbound and 43% westbound.
- > PM peak period distribution is 50% eastbound and 50% westbound.

Following the above distributions, the following directional splits have been calculated to each origin/destination shown in Table 6-3 with corresponding map, Figure 6-1.

Table 6-3 Origin-Destination Trip Distribution

Origin-Destination	Total	AM		Total	PM	
		Ingress (10%)	Egress (90%)		Ingress (60%)	Egress (40%)
<b>OD1</b>	<b>61</b>	<b>2</b>	<b>60</b>	<b>45</b>	<b>28</b>	<b>17</b>
OD1a	27	2	26	22	14	8
OD1b	35	1	34	22	14	8
<b>OD2</b>	<b>27</b>	<b>7</b>	<b>20</b>	<b>43</b>	<b>24</b>	<b>19</b>
OD2a	12	4	8	22	12	9
OD2b	14	2	12	22	12	9

Figure 6-1 Origin Destination Map



## 6.3 Traffic Impact

### 6.3.1 Charleville Road / College Avenue Intersection

The new intersection of Charleville Road / College Avenue and the proposed Croft Boulevard is intended to be constructed as a four-legged, single-lane roundabout, with the fourth leg as Road 'A' which connects to the Residential Aged Care Facility on the north of the subject site.



The existing peak hour traffic volumes on Charleville Road are 128 vehicles per hour (vph) and 173 vph in the AM and PM respectively. The existing peak hour traffic volumes on College Avenue are 77vph and 97vph in the AM and PM peak, respectively. The expected traffic volumes from the RACF on Road A are expected to be in the order of 30vph in the AM and PM peaks.

The proposed residential development intends to add 61 vehicle movements in the AM peak hour, and 45 vehicle movements in the PM peak hour. With the upgrade of this road to a roundabout intersection, it is expected that the intersection and connecting road will be more than adequate to accommodate the traffic demand calculated. A SIDRA analysis was carried out by Cardno traffic engineers to determine the adequacy of the roundabout. Input vehicle movements are shown in Figure 6-2 with the results of the SIDRA analysis are shown in Table 6-4.

*Note that the SIDRA analysis is based on a residential development of 118 lots. The actual lot yield will be 98 lots, which would result in a further reduced impact on the road network and intersection outputs.*

Figure 6-2 Croft Boulevard Roundabout Input Volumes (left: AM Peak, right: PM Peak)

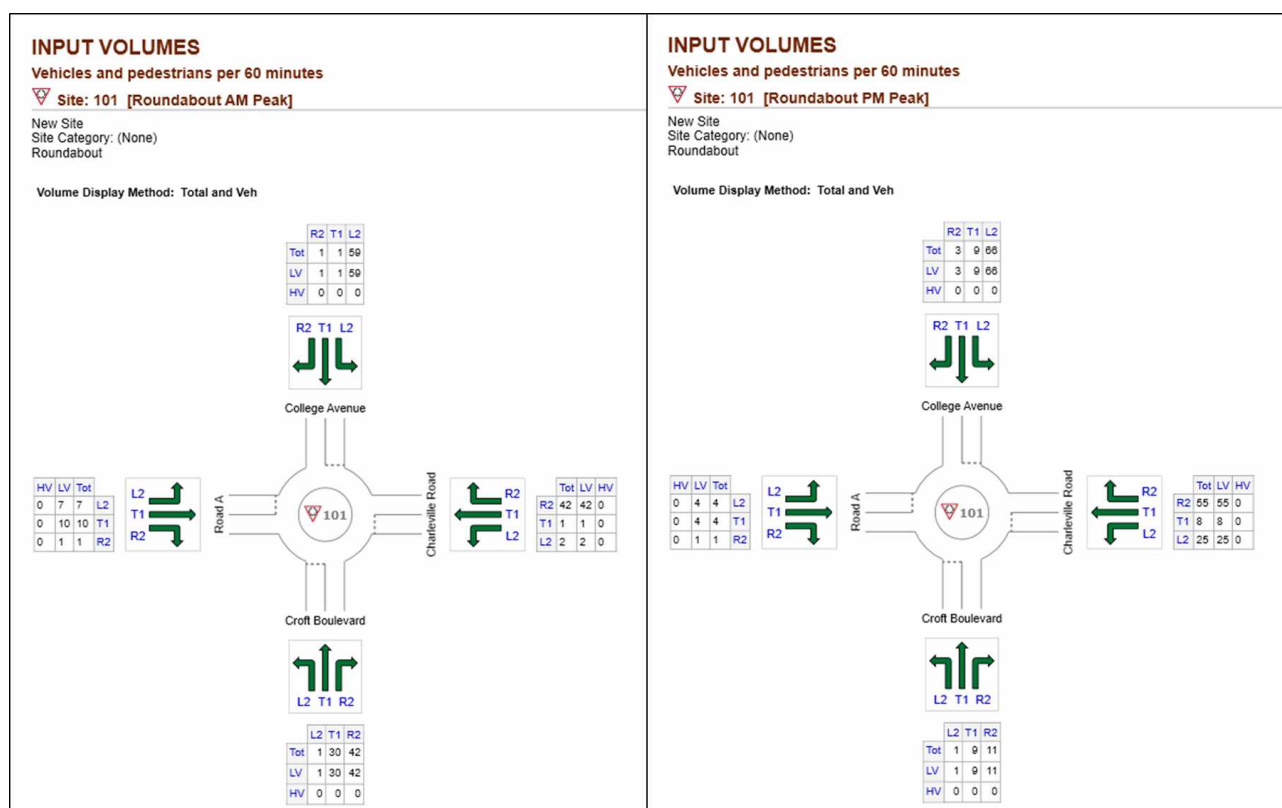


Table 6-4 Croft Boulevard Roundabout Movement Summary

	Intersection Degree of Saturation	Intersection Level of Service	Average Intersection Delay (s)	Average Intersection Back of Queue (m)
AM Peak	0.059	A	6.3 s	1.9 m
PM Peak	0.064	A	5.8 s	2.1 m

The SIDRA results show that the roundabout intersection is adequate to sufficiently accommodate existing and future traffic demand while operating at an *excellent* level of service, with minimal delays and queuing.

### 6.3.2 College Avenue / Urana Street

The existing intersection of Urana Street / College Avenue accommodates an existing turning movement volume of 77 vehicles in the AM peak and 97 vehicles in the PM peak from College Avenue. The data does not distinguish between left- and right-turning movements.

The proposed development is expected to generate 27 vehicle movements in the AM peak, and 43 vehicle movements in the PM peak. Of these movements, it is expected that the majority will be left-turn-out and



### **6.3.5 Wider Road Network**

The traffic generated as a result of the University Park development will be in accordance with the planning provisions for the area, and therefore are anticipated to be accommodated within the capacity of the wider road network.

## **6.4 Residential Development (Stage 2) Waste Considerations**

It is envisaged that waste will be collected via Council's kerbside collection service. Given that the University Park subdivision has been designed to comply with road treatments that accommodate medium rigid vehicles (MRV), it is therefore considered that waste collection vehicles are able to access kerbside waste bins as required.

As such, the proposed waste collection arrangement is considered to be appropriate to cater for the requirements of the development.

## 7 Stage 3 Development

### 7.1 Proposed Commercial Development

#### 7.1.1 General

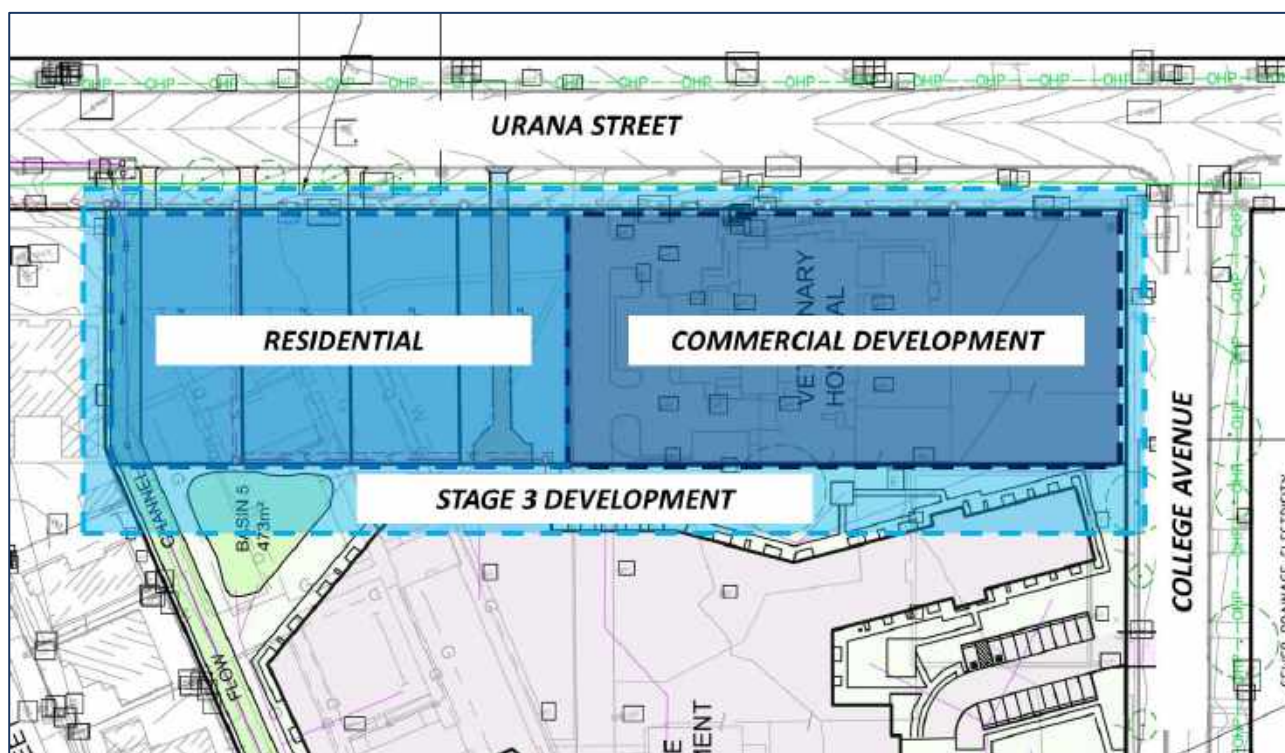
As part of the proposed University Park Masterplan, a commercial area is planned in the northwest corner. The Stage 3 development comprises a commercial development and residential lots.

The commercial development covers a total area of approximately 5,500m<sup>2</sup>, containing all provisions including access, parking, and building(s). Access to the commercial development is intended from Urana Street, distinct from the residential and RACF developments of University Park.

The residential development, as part of Stage 3, comprises four lots ranging between 1,105m<sup>2</sup> and 1,384m<sup>2</sup>. All lots have frontage directly onto Urana Street.

The Stage 3 development area is illustrated in Figure 7-1.

Figure 7-1 Proposed Stage 3



#### 7.1.2 Car Parking and Access

The commercial area is proposed to have an internal car parking area, accessible via Urana Street, with two separate, one-way crossovers. It is assumed that the parking provided will be in accordance with the relevant standards as set out by local council.

The vehicle crossovers and car parking will be designed as per AS/NZ 2890.1. The off-street car park and access design has been assessed against the requirements of the Australian Standard for off-street car parking (AS/NZS 2890.1). All standard off-street car spaces meet or exceed the minimum dimension requirement of the Australian Standard, being 2.6 metres wide and 5.4 metres long, with an aisle width of no less than 5.8 metres.

The site is also accessible via pedestrian walkways from Urana Street in the north and from the RACF in the south.

#### 7.1.3 Bicycle Parking

Bicycle parking will be provided in accordance with the requirements of the Australian Standard for Bicycle Parking Facilities (AS 2890.3:2015), with bicycle rails separated at 1000mm intervals, offset no less than

500mm from permanent obstructions or circulation aisles and are provided a 1800mm storage envelope in accordance with the Australian Standard guidelines.

#### 7.1.4 Statutory Car Parking Requirements

##### 7.1.4.1 Wagga Wagga Development Control Plan

Section 2.2. *Off-street parking* within the *Wagga Wagga Development Control Plan 2010* specifies car parking provision requirements with regards to a number of different land uses.

Section 2.2 specifies the car parking requirements for the proposed commercial development, noting car parking is required to be provided, for developments in 'all other areas', 1 space per 33m<sup>2</sup> of gross floor area, as reproduced in Figure 7-1.

Table 7-1 Car Parking requirements – Wagga Development Control Plan 2010

	Area / No.	Car Parking Measure
Health and professional consulting rooms, medical centres and veterinary hospitals	To be determined	3 spaces/ surgery or health care professional practising at any one time plus 1 space/receptionist/ support staff

It is considered that the parking requirements will be met for the proposed development.

#### 7.1.5 Accessible Car Parking Requirements

Section D3.5 of the Building Code of Australia lists the following requirement for the provision of accessible parking for the proposed commercial area use being contemplated:

*Class 5, office use: 1 space for every 100 car parking spaces or part thereof.*

Based on the intended car parking provision for the proposed development, this equates to a total requirement for one (1) accessible space, which is met within the proposed on-site car parking provision of one accessible parking space.

#### 7.2 Commercial Area Bicycle Parking Requirements

##### 7.2.1 Bicycle Parking Spaces

*Austroads Guide to Traffic Management Part 11: Parking* specifies the bicycle parking provision requirements with regards to the proposed development's commercial use.

Specifically, '*Bicycle Parking Provision Rates*' within *Clause 3.2.1* notes:

*'...These bicycle parking provision rates may be used to provide guidance if local standards or data are not available.'*

*Table C2.6: Bicycle parking provisions* specifies the bicycle parking requirements for the proposed commercial development, reproduced in Table 7-2.

Table 7-2 Bicycle parking requirements – Austroads Guide to Traffic Management Part 11: Parking

Use	Area	Employee Requirement	Short-stay spaces ( <i>i.e. visitor parking</i> )
Office	To be determined	1 per 400m <sup>2</sup> GFA <b>Class 1 or 2</b>	1 per 200m <sup>2</sup> <b>Class 1 or 2</b>

It is understood that the relevant end of trip facilities will be provided for by the commercial development.

#### 7.3 Commercial Area Traffic Considerations

##### 7.3.1 Traffic Generation

In determining the traffic generation from the proposed commercial area, direction from the Roads and Transport Authority Guide to Traffic Generating Developments (RTA Guide) is sought.

The RTA Guide provides unclear data as to the traffic generation of a veterinary clinic. The closest similar use is determined to be a profession consulting room, under the health and community services category.

The RTA guide provides no guidance on the traffic generation rate at this type of development.

It is considered that given the size of the development and parking area, the traffic generation would be accommodated for within the surrounding road network. It is further assumed that traffic generation from patrons would be spread across appointments throughout the day, avoiding heavy peak hour flows.

The current evening peak hour traffic on Urana Street is 332 eastbound and 329 westbound, for a total of 660 vehicles per hour with a 50:50 east/west split. It is noted that the Urana Street peak hour is 3:00pm-4:00pm, which is likely to be earlier than the commercial development peak hour, expected to be later in the afternoon with veterinary staff closing the clinic at 5:00pm or thereafter.

Following the above, the expected level of traffic generation is low and is not anticipated to have any discernible effect of the operations of Urana Street and the surrounding road network. It is expected that the vehicle access treatments are suitable to facilitate the level of traffic generation at the development.



## 8 Conclusions

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Based on the preceding analysis, it is concluded that:

- > The development of the University Park site at 20 Hely Road will comprise a total of 98 residential dwellings, a 5,500m<sup>2</sup> commercial development and 4-lot residential development in Stage 3, and a 144-bed aged care facility (with previous traffic report and related planning submission);
- > Access to the external road network will be provided via a proposed north-south road, Croft Boulevard. At the north, Croft Boulevard will connect into College Avenue/Charleville Avenue via a proposed roundabout. At the south Croft Boulevard will form a new T-intersection with Fernleigh Street with a short channelised right-turn lane;
- > The residential development is anticipated to generate approximately 88 peak hour vehicle movements; the RACF is anticipated to generate 30 peak hour vehicle movements;
- > Residential development generated traffic is expected to be distributed north-south similarly to the traffic distribution recorded on Bourke Street, a north-south arterial within the vicinity of the site. East-west traffic distribution is expected to be similar to the distribution of vehicles on Urana Street. Key origin-destination points have been determined based on likely attractors and the most probable journey;
- > Given the traffic generation rates and anticipated traffic distribution, it is expected that all trips to/from the proposed development will be accommodated within the existing capacity of the surrounding road network. It is not expected that the development will have a discernible impact on the operation of the road network or nearby intersections;
- > All proposed road reservations are generally consistent with their anticipated function based on planning provisions and projected daily traffic volumes; and
- > To manage traffic impact and amenity in local streets, Local Area Traffic Management (LATM) treatments have been considered throughout the subdivision.

Our Ref: FILE NUMBER:V180855 JP  
Contact: Jamie Popovski

1 November 2021

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Dear Peter,

**UNIVERSITY PARK AGED CARE AND RESIDENTIAL DEVELOPMENT  
20 HELY AVENUE, TURVEY PARK, WAGGA WAGGA  
ROUNDAABOUT DESIGN/CHECKING VEHICLE SWEPT PATH**

The following letter has been prepared in response to a query from the City of Wagga Wagga regarding ability for a 19m semi trailer to move through the internal roundabouts documented as part of the abovementioned development.

The two roundabouts in question are:

- > A four-leg roundabout, located at the intersection of College Avenue and Charleville Road on the northern end of the development (College Avenue Roundabout); and
- > A four-leg roundabout located within the development, connecting Croft Boulevard, Charles Sturt Drive, and Mackillop Circuit (Croft Boulevard Roundabout).

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***Road Hierarchy***

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The surrounding road network and road hierarchy is clearly defined by the *Wagga Wagga Integrated Transport Strategy And Implementation Plan 2040*, and this is reflected in the nature of each road. Excerpt from the Integrated Transport Strategy, Section 3.4 Road Network:

*Collector road (definition)*

*Collector roads link local roads to the arterial and sub-arterial roads. The route of collector roads discourages through traffic so that the cell formed by the grid only carries traffic belonging to or serving the cell. These roads carry between 5,000 and 10,000 vehicles each day and a 50 km/h speed limit will normally apply. While heavy vehicles are discouraged, bus services are permitted on these roads.*

*Local road (definition)*

*Local or access roads provide access to individual properties. An upper speed limit of 50 km/h will normally apply. These roads usually carry less than 1,500 to 2,000 vehicles each day.*

The Integrated Transport Strategy provides the following diagram that is described below in Figure 1:



**Figure 1**

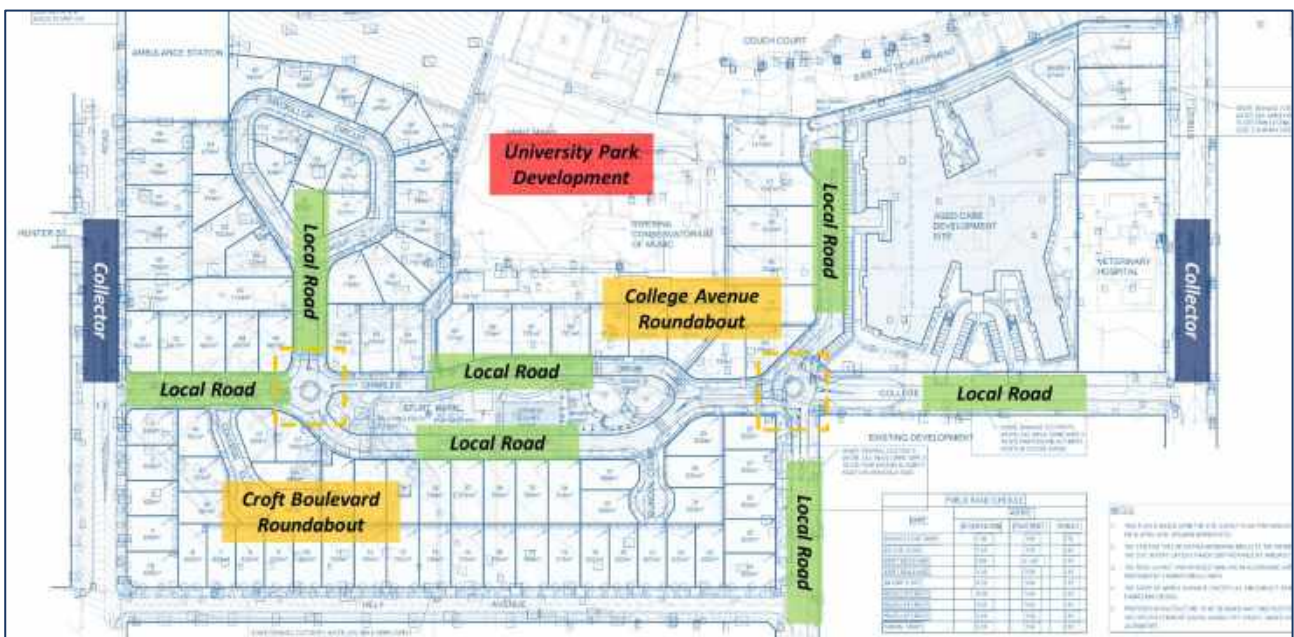
Sturt Highway, north of the site, feeds into two high-order roads nearby to the site, namely:

- > Bourke Street, defined as a Regional Road; and
- > Glenfield Road, defined as a sub-arterial.

These two collector streets join into collectors that are adjacent to the site:

- > Fernleigh Road, defined as a collector; and
- > Urana Street, defined as a collector.

From Urana Street and Fernleigh Road, each of the connecting roads are defined as local roads and this is reflected in the road width and volume of traffic. Local roads associated with the site and roundabouts include: College Avenue, Charleville Road, Hely Avenue, Croft Boulevard, Charles Sturt Drive, and Mackillop Circuit (local access street).



**Figure 2**

### *AustRoads Guide to Road Design*

The AustRoads Guide to Road Design Part 4, Table 5.1 defines the requirements for swept paths at intersections between two roads on the road hierarchy ladder. The table provides guidance for 'checking vehicles' and 'design vehicles' as follows:

**Table 5.1: Selection of design vehicle and checking vehicles and typical turning radii in Australia**

Australia		
Intersecting road types	Typical Austroads standard vehicle for design	Typical Austroads standard vehicle for checking design
Collector/Collector (residential)	Single unit truck/bus (12.5 m) Radius 12.5 m	Single articulated (19.0 m) <sup>(1)</sup> Radius 15 m
Collector/Local (residential)	Service vehicle (8.8 m) Radius 9 m	Single unit truck/bus (12.5 m) Radius 12.5 m
Local/Local (industrial) <sup>(4)</sup>	Single articulated (19.0 m) <sup>(1)</sup> Radius 12.5 m <sup>(5)</sup>	Appropriate restricted access vehicle e.g. B-double (25 m) <sup>(2)</sup> Long single articulated (25 m) Road train <sup>(3)</sup>
Local/Local (residential)	Service vehicle (8.8 m) Radius 9 m	Single unit truck/bus (12.5 m) Radius 12.5 m

The AustRoads Guide indicates that for an intersection between Local Roads, the following vehicles should be used:

- > Design Vehicle: 8.8m service vehicle; and
- > Checking vehicle: 12.5m single unit truck or bus.

Therefore, the AustRoads Guide suggests an 8.8m design vehicle and a 12.5m rigid checking vehicle is appropriate to be used at both roundabouts.

The characteristics of a "checking vehicle" in design is discussed in section 5.3 of the guide as follows "...The checking vehicle may be permitted to run over kerbs and encroach on adjacent lanes...".

### *Engineering Guidelines for Subdivisions and Development Standards*

The City of Wagga Wagga Engineering Guidelines for Subdivisions and Development Standards provides some guidance on the geometric design of intersections and roads. In particular, for 90-degree turning movements for roads with an operational speed below 60km/h, Section 2.14 Geometric Standards, suggests that the road geometry be based upon:

*"...the size of the horizontal curve is to be related to the turning requirements of vehicles such as single unit trucks (removalist vans and garbage trucks)."*

In general, removalist vans and garbage trucks are no larger than a standard 8.8m medium rigid vehicle, which aligns with the AustRoads guide. The Wagga Wagga guide does not address a 'checking vehicle', thus the vehicle reference is interpreted as the maximum design vehicle.

Therefore, the Engineering Guidelines suggest an 8.8m design vehicle and with reference to AGRD Part 4a 12.5m rigid checking vehicle is appropriate to be used at both roundabouts.



The aforementioned standards indicate that the following minimum vehicles should be used at each intersection:

- > College Avenue Roundabout:
  - 8.8m rigid design vehicle; and
  - 12.5m checking vehicle
- > Croft Boulevard Roundabout:
  - 8.8m rigid design vehicle; and
  - 12.5m rigid checking vehicle.

Beyond these requirements we understand that Council have expressed a desire that each roundabout accommodate the movement of a 19m semi trailer.

As defined in AGRD Part 4, this vehicle would be considered a 'checking vehicle' and well above the standard design standard for local & collector roads in a residential context.

The characteristics of a "checking vehicle" in design is discussed in section 5.3 of the AGRD which states *".. The checking vehicle may be permitted to run over kerbs and encroach on adjacent lanes..."*.

We offer the enclosed swept path diagrams for each intersection demonstrating that the design vehicle and a 19m semi trailer can perform relevant movements to move through the site, within the standard characteristics of a 'checking vehicle'.

As per the attached swept paths, the two roundabouts in question meet the standard design requirements and councils desire for a 19m semi trailer to move through the site.(McKillop r'about still under review)

Councils desire could prompt the need for each roundabout to comprise a fully mountable central median removing opportunity for planting / entry / place making statements.

Our review indicates that the College Ave Roundabout (Ref V180855-TR-DG-2502-1) retains allowance for a 2m radius landscape island at the centre of the roundabout, subject to the introduction of a minor concrete apron on the south west corner of the intersection (Swept path diagrams SK0029 & 0033 illustrates the critical 19m semi trailer movement that would influence the viability for a landscape island.)

It is noted that the following existing intersections are not designed for a 19m semi trailer, in each instance a semi trailer would be required to occupy the opposing lane to enter the local street. This is reflective / consistent with their nature as local residential streets off more significant roads.

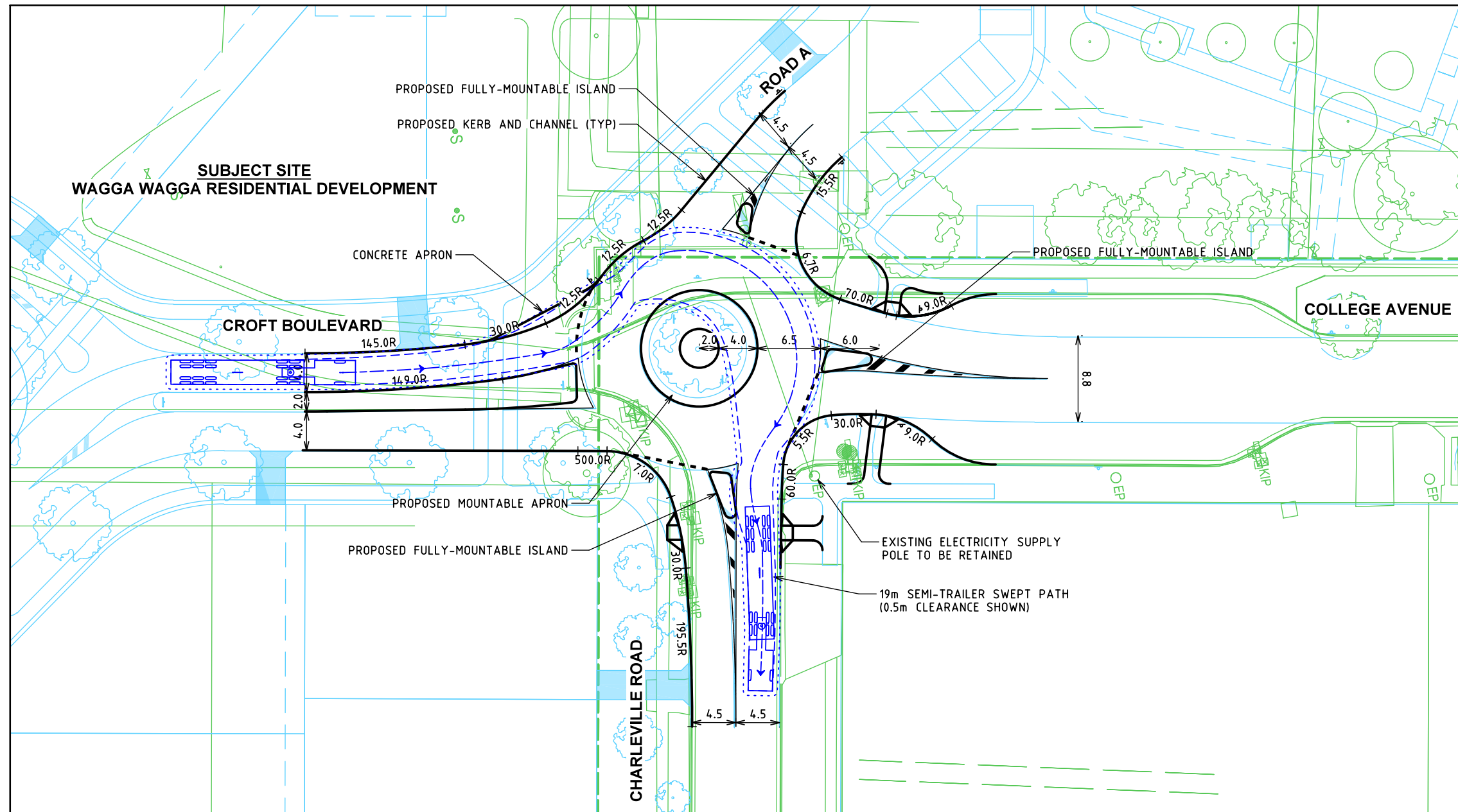
- **College Ave** / Urana St
- **Charleville Rd** / Bourke St

Yours sincerely,



Jamie Popovski  
Design Engineer - Traffic Transport & Parking  
for Cardno  
Email: jamie.popovski@cardno.com.au

Enc: V180855-TR-SK0029  
V180855-TR-SK0033

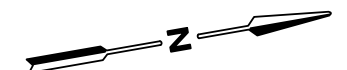


Technical drawing of a truck with dimensions in meters:

- Overall length: 13.70
- Overall width: 4.20
- Height of the cargo box: 1.40
- Length of the cargo box: 9.50
- Height of the cargo box from the ground: 0.20
- Distance from the front axle to the front of the cargo box: 1.60
- Distance from the front of the cargo box to the rear axle: 5.30

19m SEMI-TRAILER

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

NEW SOUTH WALES ROAD DIRECTORY  
MAP REF 324 E9

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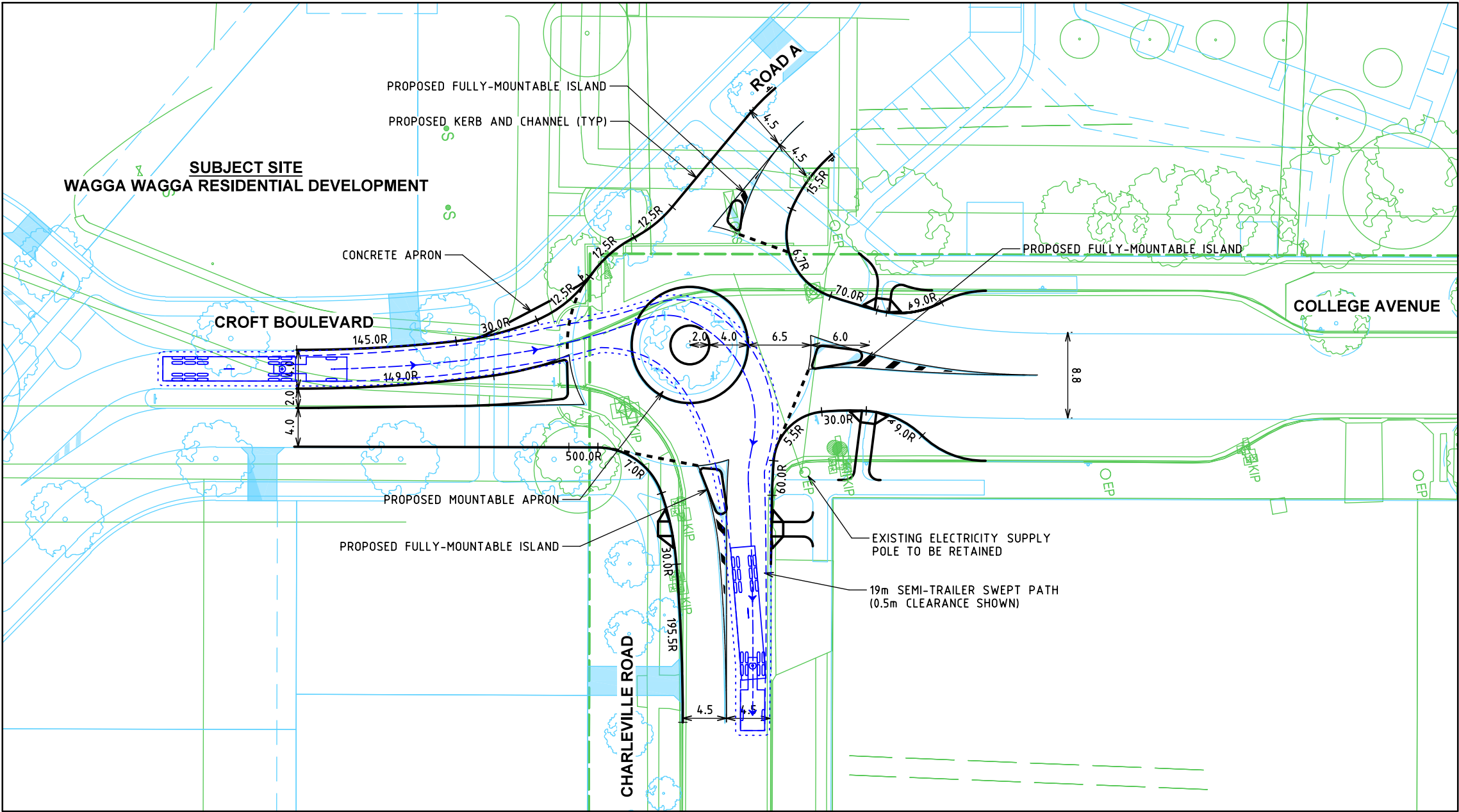
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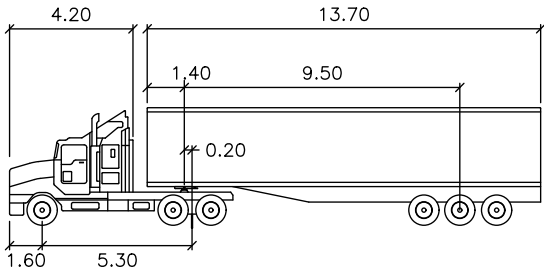


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CROFT DEVELOPMENTS PTY LTD			
WAGGA WAGGA RESIDENTIAL DEVELOPMENT			
20 HELY AVENUE, TURVEY PARK			
SWEPT PATH MOVEMENTS			
19m SEMI-TRAILER			
Drawn/Check MB / ML	Date 24.06.2021	Scale 1:500	Size A3
Drawing Number V180855-TR-SK-0029			Revisor 1

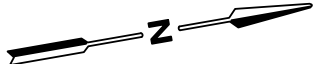


CHECKING VEHICLE



19m SEMI-TRAILER

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



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CROFT DEVELOPMENTS PTY LTD WAGGA WAGGA RESIDENTIAL DEVELOPMENT 20 HELY AVENUE, TURVEY PARK SWEEP PATH MOVEMENTS 19m SEMI-TRAILER			
Drawn/Check	Date	Scale	Size
MB / ML	24.06.2021	1:500	A3
Drawing Number			Revision
V180855-TR-SK-0033			1