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TRAFFIC & TRANSPORT IMPACT ASSESSMENT
PROPOSED MIXED USE DEVELOPMENT
21-25 WOODRIFF STREET,
PENRITH

Ref: 15-017

OCTOBER 2016

TABLE OF CONTENTS

PAGE NO.

1. INTRODUCTION 3

2. SITE DETAILS 4

2.1 SITE LOCATION 4
2.2 SITE DESCRIPTION 4
2.3 EXISTING USES 4
2.4 SURROUNDING USES 4

3. PROPOSED DEVELOPMENT 5

3.1 BUILT FORM 6

4. ACCESS & INTERNAL CONSIDERATIONS 7

4.1 VEHICULAR ACCESS 7
4.2 OFF-STREET CAR PARKING 7
4.2.1 Off-Street Car Parking Provision 7
4.2.2 Bicycle Parking 8
4.3 INTERNAL CIRCULATION AND MANOEUVRABILITY 9
4.4 SERVICING CONSIDERATIONS 10

5. EXISTING TRAFFIC CONDITIONS 11

5.1 SURROUNDING ROAD NETWORK 11
5.1.1 Woodriff Street 11
5.1.2 High Street 11
5.2 EXISTING TRAFFIC VOLUMES 12
5.3 EXISTING ROAD NETWORK OPERATION 12
4.3 PUBLIC TRANSPORT 13
4.3.1 Heavy Rail 13
4.3.2 Bus Services 13

6. PROJECTED TRANSPORT CONDITIONS 15

6.1 TRAFFIC GENERATION 15
5.2 TRIP DISTRIBUTION 16
6.2 GENERAL DISCUSSION ON TRAFFIC IMPACT 17
5.3.3 Public Transport 17

6. SUMMARY & CONCLUSION 18

1. INTRODUCTION

The Practice of Thompson Stanbury Associates has been commissioned by Morson Group Pty Limited, on behalf of Astina, to prepare a traffic and transport impact assessment accompanying a development application ('DA' or 'application') to be lodged with Penrith City Council. The subject DA proposes the demolition of existing site structures and the erection of a mixed used development comprising 58 apartments over six storeys, above 527m^2 of commercial/retail floor space within the ground floor level, on land situated at 21 - 25 Woodriff Street, Penrith.

The general purpose of this report is to undertake an assessment of the potential traffic and transport related implications resulting from the proposed development and, where necessary, recommend suitable mitigating measures. To this end, this report assesses the following issues:

1) The suitability of the proposed vehicular access arrangements based on the guidelines outlined within the relevant Australian Standards;

2) The compliance or otherwise of the proposed parking provision with respect to the parking rates specified Penrith City Council;

3) The proposed parking layout with respect to internal circulation and vehicle manoeuvrability; and

4) Reviews the existing traffic conditions within the vicinity of the site, including traffic volumes, traffic efficiency and general traffic safety; and

5) Determines the expected traffic generation from the proposed development based on Roads and Maritime Services generation rates, and assesses the impact of the net increase in traffic on the surrounding road network.

Throughout this report, reference is made to the following documents:

- The Roads & Maritime Services' *Guide to Traffic Generating Developments*;

- Penrith City Council's *Penrith Development Control Plan 2014* (DCP 2014); and

- Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1-2004) *Part 3: Bicycle Parking Facilities* (AS2890.3-2015) and *Parking Facilities Part 6: Off-Street Parking for People with Disabilities* (AS2890.6-2009).

Architectural plans have been prepared by Morson Group Pty Limited and should be reviewed in conjunction with this report.

2. SITE DETAILS

2.1 Site Location

The subject site is situated on the south-western corner of the intersection of Woodriff Street and Union Lane, Penrith. This exact location is illustrated in the neighbourhood context as **Figure 1** overleaf, being an extract of UBD's *Australian City Streets, Version 4*.

2.2 Site Description

The subject site has a street address of 21 – 25 Woodriff Street, Penrith, with a real property description of Lot 101 within Deposited Plan 1031340. The subject allotment form an irregularly shaped parcel of land, with frontages of approximately 72m along Woodriff Street, 47 m along Union Lane, a western boundary along Judges Car Park of 65m, and the southern boundary along driveway to the Judges Car park of 15m. The total area of the site is in the order of 2,732m^2.

2.3 Existing Uses

The subject site presently serves as a public at grade car park, with the capacity to accommodate approximately 40 car parking spaces.

The property has an ingress driveway off Woodriff Street, and a egress driveway off Union Lane. The existing car park and access driveways are proposed top be removed under the subject DA.

2.4 Surrounding Uses

The subject site is surrounded by the following land uses:

- Judges Car Park located on the western/southern side of the subject site;
- A mix of retail/commercial developments along the eastern side of Woodriff Street to the east of the site; and
- A retail/commercial strip along the north side of Union Lane to the north of the site.

The site is located within the south western portion of the Penrith City Centre.

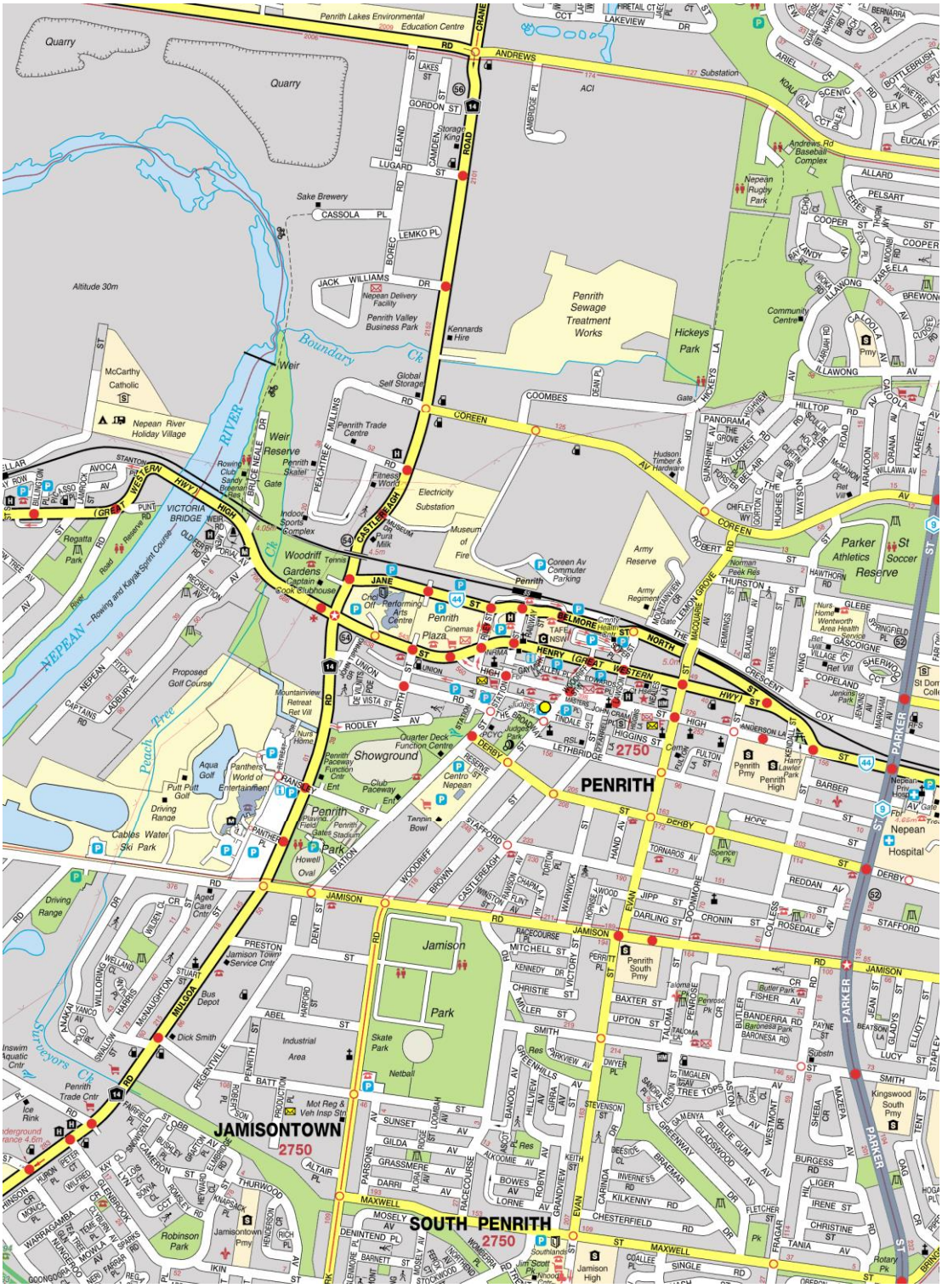

FIGURE 1 – SITE LOCATION

3. PROPOSED DEVELOPMENT

3.1 Built Form

The subject DA proposes the demolition of the existing informal car park to facilitate the construction of a mixed used development comprising the following:

- 1 x 1 bedroom apartment;
- 53 x 2 bedroom apartments;
- 4 x 3 bedroom apartments;
- Two retail tenancies, providing a combined total floor area of 223 m^2; and
- A commercial tenancy, providing an office floor space of 304m^2.

The retail and commercial tenancies are proposed to be situated on ground floor level, whilst the residential dwellings are proposed to be contained within levels 1 – 6.

The above development is proposed to be serviced by a total of 101 off-street parking spaces over two (2) basement parking levels.

Vehicular access to the site is proposed via a modified roundabout access driveway off Woodriff Street, which provides two through ingress lanes separated by a central island. Vehicles exiting the site are able to do so off Union lane, via an egress driveway proposed at the north-western corner of the site.

A loading space, and waste chute/collection room, capable of accommodating vehicles up to the size of 10.5m long waste collection vehicles is also proposed to be provided, off Union Lane, almost in the middle of the northern property boundary.

The loading dock and waste collection will require service and garbage trucks to reverse in Union Lane into the loading bay. Council has agreed to this arrangement, as only a short road section is proposed to be occupied which does not affect the existing on-street parking and Union Lane is one way eastbound, carrying a low traffic volume.

4. ACCESS & INTERNAL CONSIDERATIONS

4.1 Vehicular Access

Vehicular access to the off-street parking areas are proposed via separate 12.0m wide ingress and egress driveways, connecting with Woodriff Street and Union Lane, respectively, at the north-western and south-western corners of the site.

In order to assess the suitability of the design of the proposed access driveway with respect to accommodating passenger vehicles, reference is made to AS2890.1-2004 which provides driveway design specifications based on a number of site characteristics including the number of on-site parking spaces, the classification of vehicles proposed to be accommodated on-site and the functional hierarchy of the access road.

Based on the basement car parking areas accommodating up to 101 car parking spaces, the predominantly residential nature of the land use and the minor (non-arterial) functional order of the access driveways, AS2890.1-2004 specifies, as a minimum requirement, a category 2 type driveway with a combined 6.0m – 9.0m wide driveway.

The proposed widths of the ingress and egress driveways, therefore suitably complies with the minimum AS2890.1-2004 specifications and accordingly, is considered to be satisfactory.

Further to the above, the consistent vertical and horizontal alignment of the adjoining public roads in the immediate vicinity of the site results in good sight distance being provided between the approaching traffic and the access driveway. In consideration of this and the above discussion, the proposed access driveway design is considered to be satisfactory.

4.2 Off-Street Car Parking

4.2.1 Off-Street Car Parking Provision

Basement 1 Level	
Resident spaces	25
Residential Visitor	12
Commercial Staff	3
Retail Staff	4
Retail Visitors	4
Servicing Bay	1
Car Washing Bay	1
Subtotal	50
Basement 2 Level	
Resident spaces	48
Disabled spaces	3
Subtotal	51
Total	101

4.2.1.2 Council Parking Requirements & Assessment

Penrith City Council, as outlined in Section C10.5 of DCP 2014, specifies the following relevant off-street parking rates for the proposed development:

On-site resident parking for each dwelling:
1 space per 1 or 2 bedrooms
2 spaces per 3 or more bedrooms
1 space per 40 units for service vehicles
Visitor parking -1 space per every 5 dwellings, or part thereof.
1 space for car washing for every 50 units, up to a maximum of 4 spaces per building

Retail Tenancy:
1 space per 30m^2 GFA

Commercial Office Tenancy:
1 space per 100m^2 GFA within Penrith City Centre

Table 1 shows the off-street parking requirements based on the above Penrith City Council's car parking rate.

TABLE 1
PENRITH DCP 2014- OFF-STREET PARKING REQUIREMENTS

Description	DCP Parking Rate	No.	Spaces Required	Spaces Proposed
1 or 2 bedroom units	1 space per unit	54	54	76
3 bedroom units	2 spaces per unit	4	8	
Visitor Parking	0.2 space per unit	59	11.8 (adopt 12)	12
Commercial	1 space per 100m^2 GFA.	304 m^2	3.04 (adopt 3)	3
Retail	1 space per 30m^2	223 m^2	7.4 (adopt 7)	8
Service vehicles	1 space per 40 units	59	1.475 (adopt 1)	1
Car Washing	1 space per 50 units	**59**	1.18 (adopt 1)	1
		Total	**86**	**101**

From the calculation in **Table 1**, the proposed development requires a total of 85 off-street parking spaces comprising 62 resident spaces, 12 visitor spaces, 3 spaces for the commercial component, and 7 spaces for the retail component, as well as 1 space for service vehicles plus 1 car wash bay.

The development is proposing to provide 101 on-site car parking spaces with the allocation shown in **Table 1**, therefore exceeds Penrith City Council's DCP car parking requirement and accordingly is considered to be satisfactory.

4.2.2 Bicycle Parking

4.2.2.1 Bicycle Parking Provision

The proposed development includes a double sided bicycle rack capable of accommodating up to 4 bicycles within the ground floor area near the entrance to the eastern café. Further, bicycle provisions in the form of a horizontal rail capable of storing up to 12 bicycles is provided within basement level 1, to the south of the lift core.

4.2.2.2 Council Bicycle Parking Requirements & Assessment

Penrith Council refer to the NSW Government's *Planning Guidelines for Walking and Cycling* with respect to the provision of bicycle parking. The publication specifies the following bicycle parking for the subject development:

> ***Resident***
> *20% of units should provide a secure space*
>
> ***Visitors***
> *5% of units should provide a publically accessible space*

Based on 58 units, the NSW Government's Planning Guidelines for Walking and Cycling recommends a provision of 12 secure spaces for residents and 3 publically accessible bicycle parking spaces for visitors.

The dedicated bicycle storage areas within the ground floor and basement level 1 therefore satisfy the NSW Government's recommendations for both secure and public accessible bicycle spaces.

4.3 Internal Circulation and Manoeuvrability

Upon entering the site via the site access driveway, connectivity to the basement parking levels is proposed via a straight ramp adjoining the western site boundary. The internal basement parking area is proposed with parking spaces along the permitter of the development footprint services by circulating parking aisles.

The internal circulation of the parking areas have been designed to accord with the relevant requirements of AS2890.1-2004, AS2890.3-2015 and AS2890.6-2009, providing the following base dimensions:

- Resident/Residential visitor parking space width = 2.5m;
- Commercial/Retail staff parking space width = 2.5m;
- Retail visitor parking space width = 2.6m;
- Disabled 90 degree parking space width = 2.4m (with adjoining 2.4m wide shared area);
- Additional space width where parking spaces adjoins an obstruction = 0.3m;
- Bicycle parking rack spacing = 1.0m;

- Standard 90 degree parking space length = 5.4m;
- Horizontal bicycle parking rack length (depth) = 1.8m;
- Bicycle parking rack aisle width = 1.5m;
- Parking aisle width adjoining 90 degree parking spaces = 5.8m;
- Two-way straight roadway / ramp width = 5.8m;
- Headroom = 2.2m;
- Headroom above disabled parking spaces and adjoining shared areas = 2.5m;
- Maximum ramp grade = 1 in 4;
- Maximum ramp grade for the first 6m inside the site and within parking module = 1 in 20;
- Maximum change in grade = 1 in 8;
- Column set-back from parking space opening = 0.75m; and
- Parking aisle extension past the end space of a dead end aisle = 1.0m.

The above compliance with the relevant AS2890.1-2004, AS2890.3-2015 and AS2890.6-2009 specifications is anticipated to result in safe and efficient internal manoeuvring and parking space accessibility. The proposed internal circulation arrangements are therefore considered to be satisfactory.

4.4 Servicing Considerations

The subject site is anticipated to generate the requirement for regular waste collection vehicle servicing and irregular delivery servicing.

Waste generated by the future occupants will be stored within waste collection chute/storage area to be located on the ground floor. These waste compactors will he collected via Union Lane. 10.5m long waste collection truck, being the largest vehicle to access the loading bay will drive along Union Road and reverse into the loading bay. The bins will be lowered with a dock leveller and the truck will exit in a forward movement.

In order to assess the ability of the site design to service the manoeuvrability of refuse collection vehicles to/from the loading bay, a swept turning path assessment has been performed using turning templates of such vehicles on the architectural plans utilising Autoturn software. These swept paths indicate that such vehicles can access the site in a forward direction, manoeuvre into the loading area and thence exit the site in a forward direction. In consideration of this and the above discussion, the proposed development servicing arrangements with respect to garbage collection and deliveries are considered to be satisfactory.

5. EXISTING TRAFFIC CONDITIONS

5.1 Surrounding Road Network

Critical sections of the road network close to the development site, which could be affected by the proposed development are: Woodriff Street, High Street, Union Lane, and Tindale Street. The following subsections provide a description of these roads.

5.1.1 Woodriff Street

Woodriff Street is local road under the care and control of Penrith City Council. It is a collector road providing a north-south road connection between Jamison Road, to the south and High Street, to the north. It is one of the north-south road links into/out of the Penrith City Centre.

Woodriff Street has a typical 11.5m wide pavement, providing one through lane of traffic in each direction in conjunction with a kerbside parking lane along both sides of the road, between Jamison Road and Derby Street.

Close to the development site, Woodriff Street forms a signalised "T' intersection with High Street, approximately 130m to the north of the subject site, and a roundabout with the driveway to the Judges Car Park. Traffic flow is governed by a sign posted speed limit of 50km/h.

5.1.2 High Street

High Street is another local street, under the care and control of Penrith City Council. It is a collector road providing an east -west road connection between the Great Western Highway to the east, and Henry Street to the south.

High Street, used to be a section of the Great Western Highway, before the section through the Penrith City Centre was relocated west along Henry Street, and now along Jane Street.

Close to the subject site, High Street has a single traffic lane in each direction with kerbside side parking. It is an important street with shops along both sides. Pointing to its traditional function as the shopping strip.

Traffic signals at its intersections with Woodriff Street and Station Street, along with two raised pedestrian crossings across the section between the two traffic signal, provides a low speed environment though the City Centre. Traffic flow is governed by a sign posted speed limit of 50km/h.

5.1.3 Tindale Street

Tindale Street is another minor local street under the care and control of Penrith City Council. It provides an east/west road link between Woodriff Street to the west and Castlereagh Street to the east. It has T-junctions with both streets under major/minor priority control.

It is a commercial street facilitating direct vehicular access to the commercial properties along both sides of the street. It has a single traffic lane in each direction in conjunction with parallel kerb side parking along both sides. Traffic flow is governed by a 50km/h speed limit.

5.1.3 Union Lane

Union Lane is another minor local street, close to the subject site, under the care and control of Penrith City Council. It provides an east/west road link between Worth Street, to the west and Woodriff Street to the east.

It is a one-way, eastbound road, between Station Street and Woodriff Street, and a one-way westbound, between Worth Street and Street Station.

It provides a service road function to the developments north of the road, and access to public car parks, between Worth Street, Woodriff Street, Union Road, and Union Lane.

From its layout it attracts low through traffic and is observed to carry a low traffic volume of less than 30 veh/hr. Traffic flow is governed by 50km/h speed limit.

5.2 Existing Traffic Volumes

In order to obtain an accurate approximation of the existing traffic conditions adjoining the subject site, weekday morning and afternoon traffic volume surveys were undertaken by Staff of this Practice of the Woodriff Street eastbound and westbound carriageways, close to the subject site, between Union Lane and the access to Judges Car Park. The surveys were undertaken between 7.30am – 8.30am and 4.30pm – 5.30pm on 19 July 2016.

Table 2 provides a summary of the results of the traffic counts for both the AM and PM peak periods.

Table 2 – EXISTING TRAFFIC VOLUMES		
Traffic Volume	AM (veh\hr)	PM (Veh/hr)
Eastbound	354	296
Westbound	175	241
Total	529	537

Table 2 indicates that the section of Woodriff Street, close to the subject site, is currently carrying a two-way traffic volume in the order of 510 – 540 veh/hr (or 175 – 335 veh/hr one way) during the morning and afternoon peak hours. It is noted that through traffic movements along Woodriff Street during morning peak periods is tidal with eastbound volume dominating.

5.3 Existing Road Network Operation

The capacity of major streets within an urban area can be based on an assessment of their operating Level of Service. Level of service is defined as a qualitative measure of the effects of a number of features, which include speed and travel time, traffic

interruptions, freedom to manoeuvre, safety, driving comfort and convenience, and operating costs. AUSTROADS designates Levels of service from A to F from the best (free flow conditions) to worst (forced flow with stop start operation, long queues and delays) as follows:

- A - Free flor (almost no delays);
- B - Stable flow (slight delays);
- C - Stable flow (acceptable delays);
- D - Approaching unstable flow (tolerable delays);
- E – Unstable flow (congestion; intolerable delay); and
- F – Forced flow (jammed).

A service volume is the maximum number of vehicles that can pass over a given section of roadway in one direction during one hour while operating conditions are maintained at a specified level of service.

Table 2 indicates that Woodriff Street is carrying unidirectional traffic flows of around 360 vehicles per hour during peak periods. The Roads & Maritime Services' *Guide to Traffic Generating Developments*, specify for a two lane carriageway servicing between 200 – 380 vehicles per lane in each direction, the Level of Service (LoS) expected to be experienced by motorists is 'B'. Such a level of service represents a condition of stable flow where drivers have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream.

4.3 Public Transport

4.3.1 Heavy Rail

Penrith Station on Sydney Trains' western railway is located a distance of approximately 780m, along sections of High Street, Henry Street and Station Section, north of the subject site.

Pedestrians are provided with paved footpaths from the subject site to Penrith train station.

4.3.2 Bus Services

Busways operates a number of bus services in the Penrith region, including the following routes in the immediate vicinity of the subject site:

1) Route 774 between Mount Druitt and Penrith train station, via Oxley Park;
2) Route 775 between Mount Druitt and Penrith train station, via Erskine Park;
3) Route 776 between Mount Druitt and Penrith train station, via Colyton.

4) Routes 795, 797, 799, between Jamistown, and Glenmore Park, via Regentville.

Routes 774, 775 and 776 use Station Street located some 120m to the west of Woodriff Street, located in close proximity to the subject site.

6. PROJECTED TRANSPORT CONDITIONS

6.1 Traffic Generation

Traffic generation rates have been established by the Roads & Maritime Services (RMS) based on surveys of existing developments throughout the Sydney metropolitan area.

These rates have been published in the RMS *Guide to Traffic Generating Developments* and RMS *Guide to Traffic Generating Developments Updated Traffic Surveys Technical Direction TDT 2013/04*.

The Technical Direction TDT 2013/04 specifies a traffic generation rate of 0.19 trips per dwelling for high density residential dwellings over five storeys in height and within close proximity to public transport.

The RMS *Guide to Traffic Generating Developments* also specifies the following traffic rates for the remaining two retail and commercial components of the development –

- Retail – 4.6 veh/hr per 100m^2 GLFA
- Commercial – 2 veh/hr per 100m^2 GLFA

The RMS *Guide to Traffic Generating Developments* specified traffic generation rates, have been used to estimate the expected traffic generation from the proposed development. Based on these traffic generation rates, the proposed development, will be expected to generate the following traffic volumes:

	TABLE 3 - *PEAK HOUR TRAFFIC GENERATION*		
Development Component	**No/GLFA**	**Rate**	**Estimated Volume Veh/h**
Commercial	304 m^2	2 veh/hr per 100m^2 GLFA	6.08
Retail	223 m^2	5 veh/hr per 100m^2 GLFA	11.15
Residential	58 units	0.19 trips/dwelling	11.02
Total			28.25

As mentioned in Section 2.3 of this report, an existing at grade temporary car parking accommodating up to 50 car parking spaces, is to be removed to accommodate the proposed residential flat building.

It has been observed that up to 20% of the car park spaces is occupied during the morning peak hour (with the remaining 80% being occupied before the peak hour) and a similar number would be would to leave the car park during the evening period hour.

Hence the existing can parking is generation is forecast to be generating approximately 10 veh/hr, during the morning and evening perk hours.

Therefore, the proposed development is expected to generate a net increase of approximately 18 veh/hr vehicles per hour, during the AM and PM peak hours.

5.2 Trip Distribution

The purpose of this section is to assign the additional traffic generated from the proposed development to particular routes in the vicinity of the site so as to have some basis for the assessment of traffic impacts.

For the residential component of the proposed mixed use development, it is expected that the majority (say 85%) will comprise outbound (egress) movements in the morning peak hour period, with the remaining 15% comprising ingress movements. These proportions are reversed in the evening peak hour period, i.e. 85% inbound trips and 15% outbound trips, to reflect journeys to and from work.

For commercial and retail staff of the development, the trip assignment is expected to be the reverse of the resident component, with the majority of trips comprising inbound movements in the morning peak period and outbound movements during the evening peak period.

In any event, it is rarely possible to precisely forecast the route that motorists will elect to utilise. Perceived traffic safety, traffic efficiency and individual preferences are all variables that will influence the traffic route selected by motorists. Nevertheless, for the purpose of this traffic report, and to have some basis for the assessment of traffic impacts, following trip assignment has been adopted based on the observed traffic journeying patterns presented in **Table 2**:

- 45% of vehicles will arrive and depart the site from and to the north along Woodriff Street via High Street;
- 45 % of vehicles will arrive and depart the site from and to the south along Woodriff Street via Jamison Road; and
- The remaining 10% will arrive and depart the site from and to the adjunct east/west local roads (Lethbridge Street, Tindale Street, Union Lane, etc.)

6.2 General Discussion on Traffic Impact

Based on RMS traffic generation rates, the proposed development has been forecast to generate a net additional 18 veh/hr to and from the development site, during the morning and afternoon peak periods.

The forecasted additional traffic represents approximately one additional vehicle movement, on average, on the adjoining road network every 3.3 minutes during the peak hour periods.

This traffic increase would result in an increase of traffic flow along the section of Woodriff Street, close to the development site, by approximately 3.2%, which will not alter the existing LoS experienced by road users along this section of Woodriff Street. The proposed development is therefore not expected to have any significant impacts on the existing conditions on the adjoining road network.

The roundabout will continue to regulate traffic movements at the Woodriff Street and access driveway intersection, and provide appropriate gaps and control for turning movements in and out of the proposed development.

The potential traffic impact of the proposed development is therefore solely focused on the safety and efficiency afforded by the proposed site access arrangements. As previously mentioned in Section 4 of this report, the alignment of the access driveway/internal roadway to the frontage road is such that motorists exiting the site are afforded good sight distance to enable them to turn out of site in a safe and efficient manner.

5.3.3 Public Transport

The subject site is within a walking distance of the Penrith train station and it is expected that a proportion of the future residents and visitors to the retail/commercial components, will use the railway network. In addition, some of the future residents and visitors will be expected to use the existing bus services.

This will result in marginal increase in public transport patronage. However, the existing public transport system has spare capacity, and increase in patronage will not be expected to have noticeably impact.

6. SUMMARY & CONCLUSION

This Report has undertaken a traffic and transport assessment for a proposed mixed used development comprising 58 dwellings, a retail component with a total floor area of 223 m^2 and a commercial component with a total floor area of 304m^2 on land situated at 21 - 25 Woodriff Street, Penrith. Based on this assessment, the following conclusions are now made:

- The proposed access, internal circulation and manoeuvring arrangements are capable of providing for safe and efficient vehicular movements;

- The proposed parking provision meets the requirements of Penrith DCP 2014;

- The proposed development has been assessed to generate approximately 18 peak hour vehicle trips. The majority of the additional peak hour vehicle trips will comprise outbound movements in the morning peak and inbound movements in the evening peak, associated with journeys to/from work and return;

- The 18 veh/hr peak movements between the driveway to the development and driveway to the Judges Car Park are expected to occur safely and efficiently, given the consistent vertical and horizontal alignment, and the existing roundabout where the driveway is proposed to connect. The roundabout will provide frequent gaps for traffic in/out of the proposed development;

- The additional 18 peak hour vehicle trips from the proposed development is not significant, represents less than one vehicle movement 3.3 every minute. This additional traffic will not have any measurable impact on the operation of nearby intersections along Woodriff Street (particularly since the traffic will be dispersed between east and west along the street to the intersections of High Street/Woodriff and Woodriff Street/Tindale Street intersection; and

- The proposed development could be expected to result in a marginal increase in demand for heavy rail and bus services, however, no noticeable impact on existing capacity is likely.

Based on the contents of this Report and the conclusions reached herein, we are of the opinion that there are no traffic related issues with the proposed development that prevent the granting of development consent. Accordingly, we recommend that action to Council.