STANBURY
TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

TRAFFIC & PARKING IMPACT ASSESSMENT

PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT
22 – 24 RODLEY AVENUE
PENRITH

PREPARED FOR OLSSON PROPERTY GROUP
OUR REF: 20-212

JUNE 2021

302/166 glebe point road
glebe nsw 2037
morgan@stanburytraffic.com.au
www.stanburytraffic.com.au
ph : 0410 561 848
abn : 23 613 111 916

TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

1.1 Scope of Assessment

Stanbury Traffic Planning has been commissioned by Olsson Property Group to prepare a Traffic & Parking Impact Assessment to accompany a Development Application to be lodged with Penrith City Council. The Development Application seeks consent for the demolition of two detached residential dwellings and the construction of a residential flat building development containing 12 dwellings at 22 – 24 Rodley Avenue, Penrith (hereafter referred to as the 'subject site').

This aim of this assessment is to investigate and report upon the potential traffic and parking consequences of the development application and to recommend appropriate ameliorative measures where required. This report provides the following scope of assessment:

- Section 1 provides a summary of the site location, details, existing and surrounding land-uses;
- Section 2 describes the proposed development;
- Section 3 assesses the adequacy of the proposed site access arrangements, parking provision, internal circulation and servicing arrangements with reference to relevant Council, Transport for NSW (TfNSW, formally Roads & Maritime Services) and Australian Standard specifications;
- Section 4 assesses the existing traffic, parking and transport conditions surrounding and servicing the subject development site including a description of the surrounding road network, traffic demands, operational performance and available public transport infrastructure; and
- Section 5 estimates the projected traffic generating ability of the proposed development and assesses the ability or otherwise of the surrounding road network to be capable of accommodating the altered demand in a safe and efficient manner.

The report has been prepared pursuant to State Environmental Planning Policy (Infrastructure) 2007. The application is not of sufficient scale to be referred to TfNSW under this Instrument.

1.2 Reference Documents

Reference is made to the following documents throughout this report:

- TfNSW's *Guide to Traffic Generating Developments* and the more recently released *Technical Direction TDT 203/04a*;
- Penrith City Council's *Penrith Development Control Plan 2014* (DCP 2014);

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

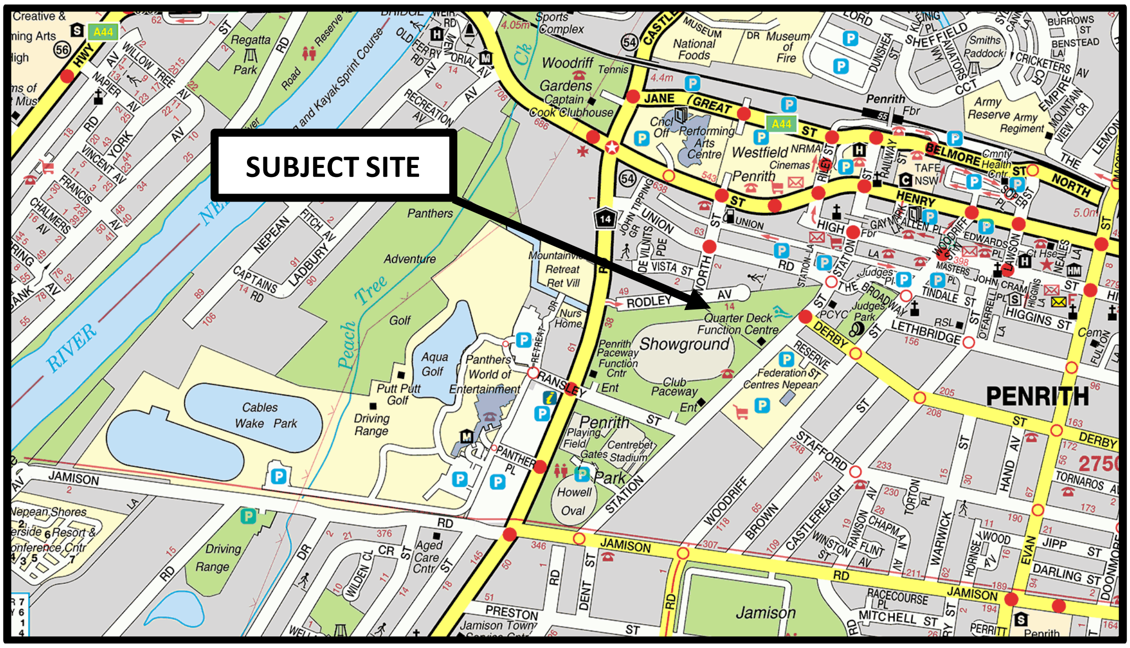
Architectural plans have been prepared by Morson Group and should be read in conjunction with this report, reduced copies of a selection of which are included as **Appendix 1** for reference.

1.3 Site Details

1.3.1 Site Location

The subject site is situated on the southern side of Rodley Avenue, approximately 20m to the east of Worth Street, Penrith. The site location is illustrated below and overleaf within a local and aerial context by **Figure 1** and **Figure 2**, respectively.

FIGURE 1
SITE LOCATION WITHIN A LOCAL CONTEXT



Source: UBD's Australian City Streets – Version 8

FIGURE 2
SITE LOCATION WITHIN AN AERIAL CONTEXT

Source: Nearmap (image date 26/3/21)

1.3.2 Site Description

The subject site provides a real property description of Lots 51 and 52 within DP 32844 and a street address of 22 – 24 Rodley Avenue, Penrith. Collectively, the allotments form a predominantly rectangular shaped parcel of land, providing an approximate frontage of 31m to Rodley Avenue. The site extends to the south away from Rodley Avenue some 37m, providing a total area of approximately 1,113m^2.

1.3.3 Existing Site Use

The subject site currently accommodates two detached residential dwellings. Each dwelling Is serviced by a vehicular access driveway connecting separately with Rodley Avenue, situated withinin the north-eastern corner of each lot.

1.3.4 Surrounding Uses

The site is directly adjoined to the east and west by detached residential dwellings similar to that currently contained within the subject site, also fronting and being serviced by Rodley Avenue.

Land to the north of the site, on the opposite side of Rodley Avenue, is also occupied by similar detached residential dwellings with the exception of a single medium density residential development situated to the north-east.

Penrith Paceway adjoins the site to the south.

2. PROPOSED DEVELOPMENT

2.1 Built Form

The subject application seeks Council's approval to demolish the existing dwellings and for the construction of a residential apartment development comprising a total of 12 dwellings, made up of the following:

- 8 two-bedroom dwellings (including two adaptable);
- 3 three-bedroom dwellings; and
- 1 four-bedroom dwelling.

The dwellings are proposed to be contained within a five-storey building located approximately central to the site.

The development is to be serviced by a single level of basement parking accommodating 20 passenger vehicle spaces. Access between this parking area and Rodley Avenue is proposed via combined ingress / egress driveway located within the north-western corner of the site.

Pedestrian connectivity is proposed between the development and the southern Rodley Avenue footway to the east and separate from the abovementioned vehicular access driveway.

2.2 Public Domain Works

In conjunction with the on-site works, the proposal involves the following public domain works:

- The removal of two redundant driveway connections to Rodley Avenue, servicing the existing two dwellings situated within the site;
- The construction of an indented bay within the southern Rodley Avenue footway providing approximate dimensions of 28m x 3.4m, partially encompassing the development passenger vehicle driveway but primarily being located to the east, to accommodate waste collection activities associated with the proposed development; and
- The implementation of parking restrictions along the southern side of Rodley Avenue, in order to ensure refuse collection vehicles are able to access / vacate the proposed new site access driveway (see Section 3.4 of this report), resulting in the potential removal of four on-street parking spaces adjacent to the site.

Appendix 2 provides graphical representations of the existing and proposed modified on-street parking arrangements / capacities within Rodley Avenue.

3. SITE ACCESS & INTERNAL CIRCULATION

3.1 Vehicular Access

3.1.1 Passenger Vehicle Access

Vehicular access between the development site and Rodley Avenue is proposed to be provided via a single combined ingress / egress driveway provided within the north-eastern corner of the site. The access driveway is proposed to provide a width of 7.4m.

The driveway is proposed to provide direct connectivity to an internal roadway which provides direct connectivity to separated but adjacent 3.1m wide ingress and egress travel lanes, divided by a 0.6m wide median.

AS2890.1:2004 provides driveway design specifications based on the proposed primary land use, the functional order of the access road and the number of spaces the driveway is to serve. Tables 3.1 and 3.2 of AS2890.1:2004 specify that a Category 1 type driveway is required, providing a combined ingress / egress driveway width of between 3m and 5.5m based on the local (non-arterial) nature of Rodley Avenue, the residential land-use and the on-site passenger vehicle parking provision of less than 25 spaces. The proposed 7.4m wide combined ingress / egress driveway therefore exceeds the minimum AS2890.1-2004 specifications and is accordingly considered to be satisfactory.

Swept path plans have been prepared in order to demonstrate the ability of passenger vehicles to enter and exit the site, copies of which are included as **Appendix 3**. These swept paths also indicate that all vehicles are able to enter and exit the site in a forward direction.

The safety and efficiency of access / egress movements are also proposed to be assisted by the following:

- The provision of a relatively level (less than 1:20) grade within the first 6m inside the property boundary;
- The consistent horizontal and vertical alignment of Rodley Avenue in the vicinity of the subject site resulting in satisfactory sight distance between the frontage road and the proposed site driveway, based on the prevailing 50km/h speed limit; and
- No obstructions to visibility adjacent to the driveway facilitating appropriate sight distance between exiting motorists and pedestrians along the southern Rodley Avenue footway.

3.1.2 Basement Access Ramp

Connectivity between the site access driveway and the basement car parking area is proposed via a roadway / ramp running along the western site boundary. This ramp is to provide a minimum width of 7.4m for the first 6m inside the property prior to reducing in width to a minimum of 3m prior to linking with the basement parking level.

It is acknowledged that the narrow section of the access ramp is not capable of accommodating two-way traffic movements simultaneously. This roadway however suitably accords with Clause 3.2.2 of AS2890.1:2004, which allows for a two-way driveway and connecting roadway width of 3m, where the two directional traffic volume is less than 30 movements per hour.

Section 5.1 of this report presents that the access ramp / driveway could be expected to accommodate up to seven peak hour vehicle movements based on the development yield, being significantly less than the abovementioned maximum of 30 movements. Accordingly, the width of the access driveway and connecting roadway is only required to accord with the one-way traffic requirements as specified within Clause 2.5.2 (a) (i) of AS2890.1:2004, which requires a minimum roadway width of 3m. Compliance with this Clause is achieved.

Notwithstanding the above, it is noted that the access driveway and immediately connecting internal roadway has been designed to be capable of accommodating an entering and exiting vehicle simultaneously. Entering vehicles are therefore able to wait wholly within the property in the event of a vehicle exiting the development at the same time.

3.1.3 Basement Access Ramp Management

Notwithstanding the findings of Section 3.1.2 of this report, it is proposed to provide for an internal traffic signal system to limit the direction of traffic flow within the basement access ramp to one-way at any given time. The traffic signal system is to utilise red / green traffic lanterns located at the access driveway and within the basement level. The lantern within the access driveway are to be supplemented with 'Stop Here on Red' signage and a stop line located clear of the access ramp and roadway thereby allowing vehicles to safely manoeuvre to / from the roadway / ramp clear of queued vehicles.

The default position will display a green to the movement for entering vehicles from Rodley Avenue and a red display for vehicles exiting the parking area. Under this arrangement, when vehicles approach the site, they will be provided with a green display and move towards the parking areas in an unimpeded fashion. An input is to be received by the operating system from radar direction units as the vehicle travels towards the parking areas.

Motorists wishing to exit the basement parking levels will activate the internal traffic signals via in-vehicle remotes (similar to a roller door remote) or a push button situated within the within the basement lift lobby. Visitors exiting the designed parking spaces within the upper basement parking area (whom will not

hold an in-vehicle remote) will be required to utilise this push button system to activate the traffic signals and thence exit the site. Signage will be provided within the basement specifying that vehicles are not to exit car spaces until a green lantern is displayed within the basement to ensure there is no undesirable conflict within the basement circulation aisles.

Upon activation of the remote / push button, the operating system will then display a red to the site entrance lantern while the vehicle/s wishing to exit the parking area will remain red. The operating system will have recorded any vehicles already in internal access roadway / ramp via radar detection units and commenced a timer to allow a vehicle to complete its journey into the parking area. The display for the activated traffic signal within the specific parking area will then change from red to green thereby allowing vehicles to safely exit the parking space within the basement parking level and travel unimpeded towards the site access driveway. When the directional sensitive radar unit located at the driveway is activated by the exiting vehicle/s, the system returns to the default position.

The indicative location of the entrance stop line, vehicle detector, lanterns and push button are illustrated on the amended architectural plans. Notwithstanding this, the specific details of the internal traffic signal system are typically specified by traffic signal contractors at construction certificate stage, complete with a management plan, including measures to be implemented during malfunctions or blackouts.

In regard to the above, traffic signal systems such as that described above are typically fitted with a battery powered back up system to ensure that they continue to operate during power black outs. It is further understood that traffic signal systems such as that proposed tend to be very reliable and rarely malfunction. However, in the event of a malfunction occurring, the manufacturer provides a maintenance crew which is on call 24 hours per day, which will be dispatched to the site immediately. Further, the system incorporates a computer which in most cases can self-diagnose a problem and inform service personnel who can often fix the issue remotely via the internet.

The requirement for detailed design of the traffic signal system, including operational management measures to be implemented, could reasonably be imposed by Council as a condition of development consent.

This Practice notes that internal development traffic signal systems have been successfully implemented within numerous similarly sized residential developments throughout the Sydney metropolitan area, the closest of known example of which is situated at 8 John Tipping Grove, Penrith.

Incorporating such an internal traffic signal system, the proposed single lane vehicular ramp servicing the development is envisaged to be satisfactory.

3.1.4 Potential for Queuing

The proposed site access arrangements allow for up to one vehicle to enter the site and queue to allow a vehicle to exit, without impacting adjoining public road users. Up to two vehicles can be in the system without resulting in queuing extending into the public road.

In order to undertake an assessment of the suitability or otherwise of the proposed internal queuing capacity, reference is made to AS2890.1:2004. Clause 3.5 of this Standard specifies that '*when determining the amount of vehicle storage required, queue lengths shall be calculated by applying conventional queuing theory to estimated mean arrival rates during normal peak periods, and mean service rates under continuous demand, determined as closely as possible from observing the operation of similar facilities. The storage area shall be designed to accommodate the 98th percentile queue under such conditions.*'

The potential for queueing has accordingly been investigated incorporating the following critical operational characteristics of the proposed development and the parking arrangements:

- The development is projected to generate up to seven peak hour movements;
- It is expected to take approximately 30 seconds to travel between the access driveway and any internal parking space; and
- The service rate is therefore calculated to be 120 vehicle entry / exit movements per hour (3,600/30).

On the basis of the above critical system characteristics, the following queueing analysis is provided in accordance with standard (M/M/1) procedures, a first-in-first-out basis (FIFO) and a Poisson process for the arrival and service rates:

$$a = arrival\,rate$$

$$s = service\,rate$$

$$p = utilisation\,rate\,(\frac{a}{s})$$

$$E(m) = Mean\,number\,of\,vehicles\,in\,queue\,\left(\frac{p}{1-p}\right) - p$$

$$P(n) = \;Discrete\,probability\,of\,n\,vehicles\,within\,the\,system\,(1-p)p^n$$

On this basis, the following analysis is provided:

- The average arrival rate is seven vehicles every hour;
- The average service rate is 120 vehicles per hour;
- The utilisation rate is the arrival rate divided by the service rate is (7/120) or p = 0.0583;

- The average number of vehicles in the queue is 0.004 vehicles [$E(m) = \frac{\mathrm{p}}{(1-\mathrm{p})} - p$];
- The probability of zero vehicles in the system: $(1-p)p^0$ = 0.942 (94.2%);
- The probability of one vehicle in the system: $(1-p)p^1$ = 0.055 (5.5%); and
- The probability of two vehicles in the system: $(1-p)p^2$ = 0.003 (0.3%).

The provided capacity of the system of two vehicles is accordingly expected to accommodate the internal queuing requirements 99.7% of the time.

The queueing capacity of the development ingress, egress and parking arrangements therefore exceeds the minimum requirements of Clause 3.5 of AS2890.1:2004, which requires the 98th percentile queue to be contained within the subject site. It is accordingly most unlikely that vehicle queuing from the site will extend into the southern Rodley Avenue footpath or indeed, the adjoining public roadway pavement. On this basis, the proposed internal queueing capacity is considered to be appropriate.

3.2 Pedestrian Access Arrangements

Pedestrian connectivity between the building and the southern Rodley Avenue footway is proposed via pathway separate and to the east of the abovementioned access driveway. Further to this access, pedestrian connectivity between all parking spaces within the basement parking levels and the building is proposed via lift and stairs located approximately central to the subject site.

3.3 Parking Provision

3.3.1 Vehicular Parking Provision

The development is serviced by a total of 20 off-street passenger vehicle parking spaces, provided as follows:

Visitor spaces	2
Visitor / wash / service space	1
Resident spaces	17 (including 2 adaptable)
Total	20 spaces

Penrith City Council provides the following locally sensitive parking requirements for residential flat building with DCP 2014:

1 space per 1 or 2 bedrooms
2 spaces per 3 or more bedrooms
1 space per 40 units for service vehicles

1 space per every 5 dwellings, or part thereof for visitors

1 space for car washing for every 50 units, up to a maximum of 4 spaces per building

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

TABLE 1
OFF-STREET PARKING REQUIREMENTS
PENRITH DCP 2014

Item	Rate	No.	Spaces Required
1 or 2 bedroom dwellings	1 space per dwelling	8	8
3+ bedroom dwellings	2 spaces per dwelling	4	8
Visitor Parking	1 space per 5 dwellings	12	2.4 (adopt 3)
Service vehicles	1 space per 40 dwellings	12	0.3 (adopt 1)
Car Washing	1 space per 50 units	12	0.2 (adopt 1)
		Total	21

Table 1 indicates that DCP 2014 requires the development provide a total of 21 passenger vehicle parking spaces, comprising 16 resident, three visitor, one service and one car wash space.

The proposed total passenger vehicle parking provision complies with Council's requirements for residents and residential visitors.

Notwithstanding the above, it is acknowledged that the service vehicle, car washing bay and a single visitor space have been combined in a single parking space. The combining of the service bay and car washing bay is considered to be satisfactory given the sporadic nature of the use of such bays and the fact that a further dedicated heavy vehicle servicing area is also proposed within the upper basement level. In consideration of this and the demonstrated compliance of the total passenger parking provision with DCP 2014, the proposed passenger vehicle parking provision and allocation is considered to be satisfactory.

3.3.2 Bicycle Parking

The subject development is to provide four bicycle storage racks capable of accommodating up to four within the ground floor level.

Penrith Council refers to NSW Government's *Planning Guidelines for Walking and Cycling* 2004 with respect to the provision of bicycle parking. This publication provides the following recommendations relevant to the subject proposal:

Resident
20% of units should provide a space

Visitors
5% of units should provide a space

Based on 12 dwellings, the NSW Government's *Planning Guidelines for Walking and Cycling* recommends resident and visitor bicycle parking provision of 2.4 (adopt three) resident and 0.6 (adopt one) visitor parking spaces or a total of three spaces.

The proposed provision of four on-site bicycle parking spaces therefore complies with the requirement specified in the NSW Government's guidelines and accordingly, is considered to be satisfactory.

3.3.3 On-Street Parking Provision

It has previously been presented that the site access arrangement and the movement of waste collection vehicles to and from the proposed site access driveway is expected to result in the reduction of up to four existing parallel parking spaces along the southern side of Rodley Avenue (see **Appendices 2** and **3**).

The following is noted in respect of the above:

- Site observations by staff of this Practice both prior to and during the COVID-19 situation have indicated that whilst demand for parking within Rodley Avenue is notable, capacity exists within the immediate vicinity of the subject site to accommodate additional demand (or loss of supply) if required;

- All development abutting Rodley Avenue provides off-street parking to accommodate demand generated by those uses; and

- The proposed development complies with Council's off-street resident and visitor parking requirements, thereby ensuring that it is not expected to result in additional on-street parking demand.

In consideration of the above, the proposed nett reduction in on-street parking provision of four spaces is not envisaged to result in unreasonable impacts on surrounding residential amenity. Conversely, it should be acknowledged that the removal of localised kerb-side parking along the southern kerb alignment will provide additional effective roadway carriageway width to assist in accommodating two-way traffic flow within Rodley Avenue.

3.5 Internal Circulation and Manoeuvrability

3.5.1 Basement Access Ramp

Connectivity between the site access driveway and the basement car parking area is proposed via a roadway / ramp running along the northern site boundary. This ramp is to provide a minimum width of 6.3m for the first 6m inside the property prior to reducing in width to a minimum of 3m prior to linking with the upper basement parking area.

It is acknowledged that the narrow section of the access ramp is not capable of accommodating two-way traffic movements simultaneously. The access ramps and their connections to the access driveway and the basement parking levels are therefore proposed to be governed by traffic signal control to ensure that only one direction of traffic is accommodated at any one time, the suitability of which has been discussed in previous sections of this report.

The site and basement access ramp grades have been designed to accord with the relevant requirements of AS2890.1:2004, providing the following characteristics:

- Maximum ramp grade = 1 in 4;
- Maximum change in grade = 1 in 8; and
- Maximum ramp grade for the first 6m inside the site = 1 in 20.

In consideration of this and the above discussions, the site and basement access ramp is considered to be satisfactory.

3.5.2 Basement Car Park

Passenger vehicles, upon entry to the site, will travel in a forward direction via a ramp running along the eastern site boundary to access Basement Level 1. Basement Level 1 is proposed to contain a series of standard 90-degree angled parking spaces serviced by an adjoining parking / circulation aisle, with spaces being allocated to residents and visitors.

The basement parking areas have been designed with the following minimum dimensions in accordance with the requirements of AS2890.1:2004 and AS2890.6:2009:

- Standard vehicular parking space width = 2.5m;
- Disabled vehicular parking space width = 2.4m (with adjoining 2.4m wide shared area);
- Additional vehicular space width where parking spaces adjoins an obstruction = 0.3m;
- Standard and disabled vehicular parking space length = 5.4m;
- Vehicular parking aisle width adjoining parking spaces = 5.8m;
- Headroom = 2.2m; and
- Headroom above disabled parking spaces and adjoining shared areas = 2.5m.

Safe and efficient internal manoeuvring and parking space accessibility is anticipated to result, taking into consideration the above compliance with the relevant AS2890.1:2004 and AS2890.6:2009 specifications.

In order to demonstrate the internal passenger vehicle manoeuvrability within the vicinity of these areas and generally throughout the overall parking areas, this Practice has prepared a number of swept path plans which are included as **Appendix 3**. The turning paths provided on the plans have been generated using Autoturn software and derived from B85 and B99 vehicle specifications provided within AS2890.1-2004.

Section B4.4 of AS2890.1-2004 states the following with regard to the use of templates to assess vehicle manoeuvring:

'Constant radius swept turning paths, based on the design vehicle's minimum turning circle are not suitable for determining the aisle width needed for manoeuvring into and out of parking spaces. Drivers can manoeuvre vehicles within smaller spaces than swept turning paths would suggest.'

It would therefore appear that whilst the turning paths provided within AS 2890.1 - 2004 can be utilised to provide a 'general indication' of the suitability or otherwise of internal parking and manoeuvring areas, vehicles can generally manoeuvre more efficiently than the paths indicate. Notwithstanding this, the swept path plans illustrate that passenger vehicles can manoeuvre throughout and enter and exit the most difficult passenger vehicle parking spaces within the parking areas.

It is further noted that the basement parking area forms a dead end aisle. The alignment of the internal circulation aisle is however such that vehicles are able to turnaround in order to ensure that vehicles can exit the site in a forward direction in the event that all parking spaces are occupied. The proposed basement parking area layout as it relates to passenger vehicle manoeuvrability is therefore considered to be satisfactory.

3.5.3 Bicycle Parking

The subject development is to provide four bicycle storage racks capable of accommodating up to four within the ground floor level. These racks are provided as double-sided racks, comprising the following minimum dimensions in accordance with AS2890.3:2015:

- Rail spacing = 1.0m;
- Parking space length = 1.8m;
- Adjacent circulation and access pathway = 1.5m.

3.5.4 Site Servicing

The subject site is anticipated to generate the requirement for regular waste collection vehicle servicing. Waste collection vehicles are proposed to service the site via an indented bay provided within the southern Rodley Avenue footway, situated to the immediate east of the development vehicular access driveway.

Garbage bins are proposed to be contained within a storage room located within basement parking level. These bins are to be transferred to a holding room located approximately central to the site frontage to Rodley Avenue, which can efficiently be wheeled to the proposed indented collection bay within the southern public road footway.

The proposed indented bay provides the following design criteria:

- A width of 3.4m, measured from the existing kerb line to the new kerb line, for a length of 22m;

- A 6m ingress splay / manoeuvring space at the rear of the bay, measured along the existing kerb line (and partially encompassing the development access driveway);

- A 1.2m wide footpath within the southern Rodley Avenue footway between and providing a minimum separation of 0.8m to the northern site boundary and the indented bay; and

- A 1.8m wide kerb ramp to facilitate wheeled bin access to the rear of the indented bay.

It is acknowledged that detailed design of the above arrangements, and any supplementary signage and line marking arrangements, will need to be submitted to and approved by Council through a Section 138 Application, including the payment of application and inspection fees. The requirement for this can reasonably be imposed by Council as a condition of consent.

It is further acknowledged that Council's PDCP 2014 specifies that it is desirable that development design facilitate the provision of on-site collection of waste by Council's 10.5m long collection vehicle and facilitate forward entry and exit movements between the site and the adjoining public road network. The DCP however also specify that on-site collection may not be practicable for all development sites due to site dimensions, topography or the resultant associated undesirable planning outcome achieved.

Swept path plans which have been prepared by this Practice, copies of which are attached as **Appendix 3**, demonstrate that Council's 10.5m long collection vehicle is capable of manoeuvring to and from the proposed indented bay without unreasonable encroachment on public road traffic flow and parking areas, also being clear of the development access driveway servicing the basement parking areas.

Whilst it is acknowledged that the proposed development access driveway and indented bay will result in the loss of approximately four on-street parallel parking spaces, a greater loss of approximately six on-street parking spaces would eventuate from the excessively wide driveways and manoeuvring which would be required in the event that collection vehicles were required to enter and exit the site. Graphical representations of the abovementioned existing and proposed modified on-street parking arrangements within Rodley Avenue are attached as **Appendix 2**.

It should further be acknowledged that any on-street reduction in parking would be limited to that immediately adjacent to the subject site. All adjoining properties provide formal off-street parking infrastructure and additional adjacent on-street kerb-side if so required. Indeed, recent observations have indicated that whilst demand for on-street parking within Rodley Avenue is notable, capacity exists to accommodate the minor reduction in supply. It is accordingly not expected that the minor loss of on-street parking supply will

unreasonably impact adjoining residential amenity. In fact, it could be argued that the provision of the indented bay will provide for additional roadway capacity by providing additional pavement width to allow oncoming vehicles to pass.

Importantly, it should be noted that the proposed off-site collection arrangements and design are consistent with that recently approved and constructed residential apartment development at 50 – 54 Rodley Avenue via DA16/0262 and 36 – 38 Rodley Avenue via DA18/0890.

Whilst it is acknowledged that the proposed indented bay provides for a reduction in footway width, the 6m width of footway facilitates the retention of 2.8m of usable footway in conjunction with the bay, which is considered to be readily capable of accommodating a formalised pedestrian footpath in conjunction with street trees as necessary.

It is further acknowledged that proposed indented bay will necessitate the alterations to existing unrestricted on-street parking, which requires approval by TfNSW given the proximity of the site to a railway station. Such a requirement could reasonably be imposed by Council through the implementation of a condition of consent in a similar manner to that applied to other recently approved and constructed developments providing indented waste collection bays.

In consideration of the above and the previous discussion, the proposed waste collection arrangements are therefore considered to be satisfactory and consistent with that previously approved within Rodley Avenue.

4. EXISTING TRAFFIC CONDITIONS

4.1 Surrounding Road Network

The following provides a description of the road network surrounding the subject site:

- **Rodley Avenue** performs a local access road function under the care and control of Penrith City Council. It provides an east-west alignment connecting the southbound Mulgoa Road carriageway in the west with Worth Street approximately 115m to the east of the site. Rodley Avenue extends a further 160m to the east of Worth Street, at which point it forms a terminating cul-de-sac.

  Rodley Avenue provides an approximate pavement width of 7m providing one through lane of traffic in each direction in conjunction with parallel parking along both kerb alignments. Traffic flow is governed by a sign posted speed limit of 50km/h.

  Rodley Avenue provides a half road closure to the west on immediate approach to the Mulgoa Road southbound carriageway, from which left turn entry movements only are facilitated.

  Rodley Avenue forms a T-junction with Worth Street to the east, operating under major / minor priority control with Rodley Avenue performing the through route.

  Further to the east, Rodley Avenue forms a terminating cul-de-sac.

- **Worth Street** provides a north-south collector function, also under the care and control of Penrith City Council. It provides a connection between High Street and Penrith Plaza in the north, intersecting with which under traffic signal control, and Rodley Avenue in the south. Worth Street also intersects with Union Road under traffic signal control, some 150m to the north of Rodley Avenue.

  Worth Street, between Rodley Avenue and Union Road, provides a 7m wide pavement providing one through lane of traffic in each direction, in conjunction with indented parallel passenger vehicle parking bays. To the north of Union Road, Worth Street forms a 13m wide pavement providing two though lanes of traffic in each direction.

- **Union Road** provides an east-west collector function, linking Station Street in the east with Mulgoa Road in the west. Union Road provides a 13m wide pavement, primarily providing one through lane of traffic in each direction in conjunction with parallel parking along both kerb alignments. Parking restrictions apply on immediate approach to and departure from Worth Street, facilitating two through lanes on approach and departure from the signalised intersection.

Union Road intersects with Station Street (and The Broadway) under single lane circulating roundabout control to the east. To the west, Union Road intersects with Mulgoa Road under major / minor priority control with Mulgoa Road performing the priority route. Whilst a dedicated right turn lane and break is provided within the Mulgoa Road central median, facilitating right turn movements to Union Road, right turn egress movements from Union Road are prohibited.

4.2 Existing Traffic Volumes

Staff of Stanbury Traffic Planning have undertaken surveys of the intersection of Union Road and Worth Street in order to accurately ascertain the traffic demands. Surveys were undertaken between 7:00am – 9:00am and 4:00pm – 6:00pm on the 28th of May 2018. Whilst it is acknowledged that these surveys are now three years old, observations undertaken in early 2021 indicate notably reduced traffic demands, most likely a result of the ongoing COVID-19 situation. On this basis, the 2018 traffic survey data has been utilised for the purposes of this analysis.

Figure 3 below provides a summary of the surveyed commuter peak hour (8:00am – 9:00am and 4:00pm – 5:00pm) traffic flows at the intersections whilst full details are contained within **Appendix 4** for reference.

FIGURE 3
EXISTING WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
INTERSECTION OF UNION ROAD & WORTH STREET

Legend: AM Peak / PM Peak

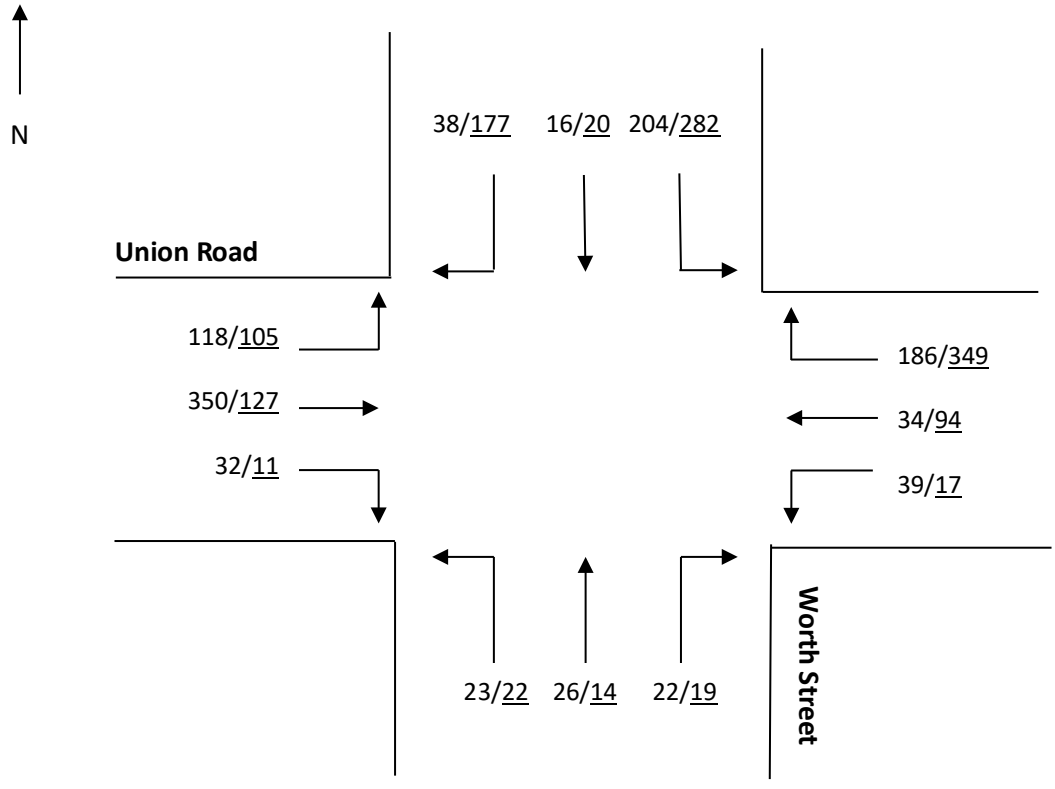


Figure 3 illustrates the following:

- Worth Street, to the south of Union Road, accommodates directional traffic demands of less than 100 vehicles per hour;
- Worth Street, to the north of Union Road, accommodates directional traffic demands of 300 – 500 vehicles per hour; and
- Union Road accommodates directional traffic demands of 300 – 500 vehicles per hour.

4.3 Existing Road Network Operation

4.3.1 Intersection Operation

The surveyed intersection of Union Road and Worth Street has been analysed utilising the SIDRA computer intersection analysis program in order to objectively assess the operation of the surveyed intersections. SIDRA is a computerised traffic arrangement program which, when volume and geometrical configurations of an intersection are imputed, provides an objective assessment of the operation efficiency under varying types of control (i.e. signs, signal and roundabouts). Key indicators of SIDRA include level of service where results are placed on a continuum from A to F, with A providing the greatest intersection efficiency and therefore being the most desirable by the Roads and Maritime Services.

SIDRA uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by SIDRA are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Degree of saturation is a useful and professionally accepted measure of intersection performance.

SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 2** (being the TfNSW NSW method of calculation of Level of Service).

TABLE 2
LEVEL OF SERVICE CRITERIA FOR INTERSECTIONS
SIGNALISED INTERSECTIONS

Level of Service	Average Delay per Vehicle (secs/veh)	Expected Delay
SIGNALISED INTERSECTIONS AND ROUNDABOUTS		
A	Less than 14	Little or no delay
B	15 to 28	Minimal delay and spare capacity
C	29 to 42	Satisfactory delays with spare capacity
D	43 to 56	Satisfactory but near capacity
E	57 to 70	At capacity, incidents will cause excessive delays
F	> 70	Extreme delay, unsatisfactory

The existing conditions have been modelled utilising the peak hour traffic volumes presented within **Figure 3**. **Table 3** provides a summary of the SIDRA output data whilst more detailed summaries are included as **Appendix 4**.

TABLE 3 SIDRA OUTPUT – EXISTING WEEKDAY PEAK HOUR PERFORMANCE INTERSECTION OF UNION ROAD & WORTH STREET		
	AM	**PM**
Average Vehicular Delay (seconds)	26.7	29.9
Degree of Saturation	0.54	0.71
Level of Service	B	C

Table 4 indicates that the intersection of Union Road and Worth Street currently operates with a satisfactory level of service with spare capacity.

4.3.2 Rodley Avenue Performance

Rodley Avenue accommodates low traffic demands commensurate with its access function within the local road hierarchy. In this regard, directional traffic demands have been observed to be less than one vehicle every minute. TfNSW's *Guide to Traffic Generating Developments* specifies that a two-way two-lane roadway accommodating directional traffic demands of less than 200 vehicles per hour provides a level of service 'A' during peak periods, representing free flow where drivers are virtually unaffected by others in the traffic stream.

Notwithstanding the above, the 7m width of the Rodley Avenue pavement in conjunction with the prevalence of kerb side parking along both alignments results in one direction of traffic flow being permitted at any one time. Opposing traffic flow therefore has been observed to occur under courtesy conditions whereby a vehicle will utilise a break in kerb side parking, generally associated with a driveway, to stop and allow a vehicle travelling in the opposite direction to pass. The low traffic demands combined with general diligence displayed by motorists has been observed to ensure that two-way traffic flow within Rodley Avenue occurs in a reasonably safe and efficient manner.

4.3.3 Abutting Site Access Movements

Traffic movements from abutting development sites and Rodley Avenue have been observed to occur in a safe and efficient manner. These movements are assisted by the low traffic demands within Rodley Avenue resulting in regular and extended gaps in traffic flow, allowing motorists to undertake turning movements from abutting development driveways without unreasonable delay.

The proliferation of driveways servicing abutting development sites in the immediate vicinity result in trailing through traffic movements within Rodley Avenue being aware of the potential for vehicles to decelerate to access private properties. This situation, combined with the consistent vertical and horizontal alignment of Rodley Avenue in the immediate vicinity, results in vehicles being able to undertaken entry and egress movements between private abutting development sites and the public road in a safe and efficient manner.

4.3.4 Arterial Road Network Connectivity

The local road network provides connectivity to the surrounding regional road network as follows:

- Worth Street intersects with High Street to the north under traffic signal control with all movements being facilitated;
- High Street intersects with Mulgoa Road to the north-west under traffic signal control with all movements being facilitated;
- High Street intersects with The Northern Road and Great Western Highway to the east under traffic signal control with all movements being facilitated;
- Both Ransley Street and Jamison Road (accessed via Station Street) intersect with Mulgoa Road, to the south-west under traffic signal with all movements being facilitated;
- Union Road intersects with Mulgoa Road under major / minor control to the north-west, albeit with right turn movements from Union Road being prohibited; and
- Rodley Avenue intersects with the southbound Mulgoa Road carriageway under major / minor priority control to the west, whereby left turn movements to the local road are facilitated.

Whilst traffic demands within the surrounding state road network (High Street, Mulgoa Road, The Northern Road and Great Western Highway) are considerable, commensurate with their functional hierarchy in the road network, the abovementioned precinct access controls provide motorists with safe and efficient connectivity to the surrounding regional and state road network.

4.4 Public Transport

4.4.1 Heavy Rail

The site is located approximately 1km walking distance to the south-west of Penrith Railway Station. Penrith Railway Station provides access to train services which operate along the T1 (North Shore, Northern & Western) Line.

The T1 Line provides regular services between Penrith and the remainder of the Sydney Trains network, servicing The Blue Mountains to the west and Blacktown, Parramatta and The City to the east.

4.4.2 Buses

The following bus routes operate along High Street, with the closest stop being located approximately 500m walking distance from the site:

- Route 688 between Penrith and Emu Heights;

- Route 689 between Penrith and Leonay;
- Route 691 between Penrith and Mount Riverview; and
- Route 690P between Penrith and Springwood.

Further, the following bus routes operate along Station Street, with the closest stop being located approximately 600m walking distance from the site:

- Route 770 between Penrith and Mount Druitt;
- Route 774 between Penrith ad Mount Druitt via Nepean Hospital;
- Route 775 between Penrith and Mount Druitt via Erskine Park;
- Route 776 between Penrith and Mount Druitt via St Clair;
- Route 781 between Penrith and St Marys via Glenmore Park;
- Route 791 between Penrith and Jamisontown via South Penrith;
- Route 793 between Penrith and Jamisontown;
- Route 794 between Penrith and Glenmore via The Northern Road;
- Route 795 between Penrith and Warragamba;
- Route 797 between Penrith and Glenmore Park;
- Route 799 between Penrith and Glenmore Park via Regentville; and
- Route S13 between Penrith and Mountainview Village.

It is acknowledged that at the time of writing this report, bus services and hours may be affected due to COVID-19.

4.4.3 Pedestrians / Cyclists

Pedestrians and cyclists are provided with the following access and mobility infrastructure within the immediate vicinity of the subject site:

- A footpath is provided along the northern side of Rodley Avenue;
- A footpath is provided along the western side of Worth Street between Rodley Avenue and Union Road;
- Signalised pedestrian crossings are provided over all approaches of the intersection of Union Road and Worth Street;
- Footpaths are provided along both sides of Worth Street to the north of Union Road and along both sides of Union Road;

- A shared path is provided along the eastern side of Mulgoa Road; and
- Signalised pedestrian crossings are provided over all approaches of the intersection of High Street and Worth Street.

5. PROJECTED TRAFFIC CONDITIONS

5.1 Traffic Generation

Traffic generation rates for various land-uses have been established through extensive surveys undertaken throughout NSW and published within TfNSW's *Guide to Traffic Generating Developments* and the more recently released *Technical Direction TDT 203/04a*. The following sub-sections provide a summary of the traffic generating potential of the previous and proposed site uses with respect to those rates established by TfNSW.

5.1.1 Existing Site Uses

Section 1.3.3 of this report presented that the subject site currently contains two detached residential dwellings.

TfNSW's *Technical Direction TDT 203/04a* specifies average traffic generation rates of 0.95 peak hour vehicle movements per dwelling during the morning peak and 0.99 peak hour vehicle movements per dwelling during the evening peak.

For the purposes of this assessment and for reasons of simplicity, a traffic generation rate of 1 peak hour vehicle trip per dwelling has been applied to detached residential dwellings. The current site development is therefore capable of generating up to two vehicle trips to and from the site during weekday commuter peaks periods.

5.1.2 Proposed Development

The proposed development involves the provision of a medium density residential apartment building, accommodating 12 dwellings. The *Guide to Traffic Generating Developments* provides the following peak hour generation rates for medium density residential development:

Medium Density Residential Dwellings
0.5 trips per one and two bedroom dwelling
0.65 trips per three bedroom dwelling.

The peak hour traffic generating ability of the proposed development is accordingly estimated to be in the order of 6.6 (adopt 7) trips.

5.2 Traffic Impacts

The proposed development has been projected to generate up to 7 peak hour trips to and from the site, or 5 peak hour trips over and above that currently capable of being generated by the existing two detached dwellings provided on-site. This equates to approximately one vehicle movements every 9 minutes during commuter peaks, or one additional vehicle movement every 12 minutes over and above that capable of being generated by existing site uses. Such a level of additional traffic is not projected to, in itself, result in any unreasonable impacts on the existing operational performance of the surrounding local road

network. The previous assessment contained within this report has revealed that traffic demands within the surrounding local road network are reasonably low and accordingly motorists are provided with a good level of service with space capacity.

Whilst it is acknowledged that traffic demands within the surrounding arterial road network are considerable, the positive intersection control servicing connection to / from the surrounding regional and state road network allows motorist to access and egress the local precinct in a safe and efficient manner.

In consideration of the above, the impact of the development is most likely to be a result of the safety and efficiency with which motorists are capable of entering and exiting the development. The low traffic demands within Rodley Avenue combined with the good sight distance provisions is such that it is envisaged that motorists will be capable of entering and exiting the site in a safe and efficient manner.

5.3 Transport Impacts

The subject site is located within reasonably close walking distance to a number of bus services and a 10-minute walk to train services. It is accordingly expected that a proportion of the future residents within the subject development will utilise the surrounding public transport infrastructure to access destinations throughout the Sydney metropolitan area. The capacity of the existing public transport system is however not envisaged to be measurably affected by any additional demand associated with the development, given its limited scale.

6. CONCLUSION

This report assesses the potential traffic and parking implications associated with a residential development containing 12 dwellings at 22 - 24 Rodley Avenue, Penrith. Based on this assessment, the following conclusions are now made:

- The proposed site access arrangements are projected to result in motorists being capable of entering and exiting the subject site in a safe and efficient manner;

- The proposed off-street vehicular parking provision is considered to be satisfactory, given the requirements of DCP 2014;

- The internal passenger vehicle circulation arrangements are capable of providing for safe and efficient internal manoeuvring;

- The proposed indented bay within Rodley Avenue adjacent to the site is projected to safely and efficiently accommodate refuse servicing of the site and is consistent with that previously approved within the immediate precinct;

- The surrounding road network operates with a satisfactory level of service during peak periods;

- The subject development has been projected to generate up to five additional peak hour vehicle trips to and from the subject site over and above that capable of being generated by the existing site dwellings; and

- It is considered that the adjoining road network is capable of accommodating the traffic projected to be generated by the subject development.

It is considered, based on the contents of this report and the conclusions contained herein, there are no traffic or parking related issues that should prevent approval of the subject application. This action is therefore recommended to Council.

APPENDIX 1

20023 - PROPOSED RESIDENTIAL DEVELOPMENT

22-24 RODLEY AVENUE, PENRITH 2750

3D PERSPECTIVE

Development Details		
Site Area		1115m²
Gross Floor Area (GFA)		1496m²
Zoning		R4 High Density Residential
	Allowable	Proposed
Floor Space Ratio (FSR)*	n/a	1.34:1
Height	18m	<18m

Parking Schedule	
bike	4
DISABLE CAR SPACE	2
STANDARD CAR SPACE	15
VISITOR CAR SPACE	2
VISITOR/WASHING CAR SPACE	1

Deep Soil

352.6 m²
24.5 m²
387.1 m²

Unit Schedule	
Name	Count
2B	6
2B Adaptable	2
3B	3
4B	1

TOTAL APARTMENTS: 12

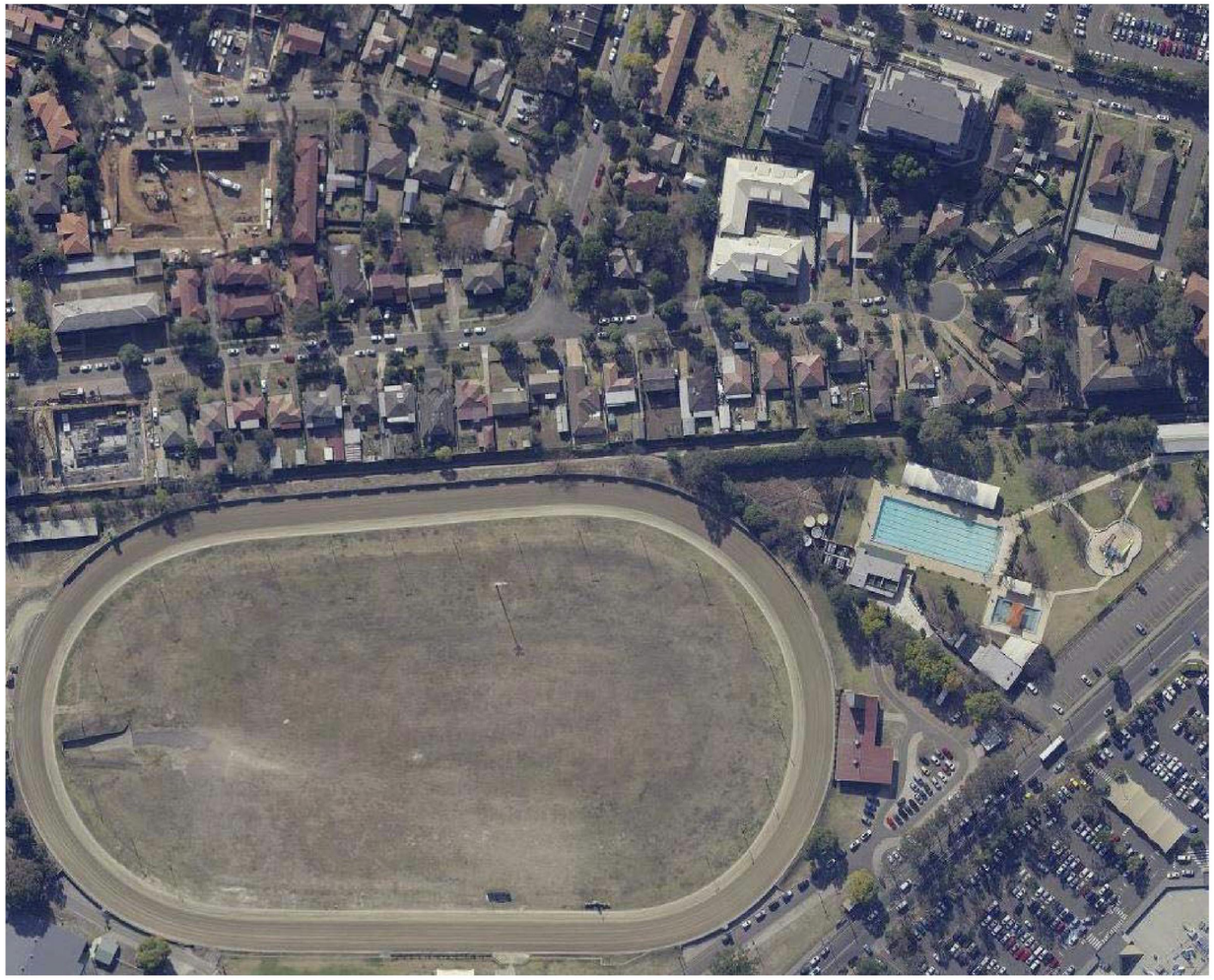
GROSS FLOOR AREA	
Level	Area
GROUND LEVEL	231.5 m²
LEVEL 1	352.0 m²
LEVEL 2	352.0 m²
LEVEL 3	352.0 m²
LEVEL 4	208.0 m²
Grand total: 5	1495.5 m²

Communal Open Space % of Site Area^	25%	308.8m² 28%
Deep Soil Zones % of Site Area^	7%	387.1m² 35%

*LEP REQUIREMENT
^SEPP 65 REQUIREMENT
REFER SHEET DA02 FOR DETAILS

[redacted]

C.O.S. Deep Soil



SITE LOCATION PLAN

AERIAL PHOTOGRAPH COURTESY OF SIX MAPS

ABN 41 159 480 056 NOMINATED ARCHITECT: P Morson(8100)

ISSUE	DATE	AMENDMENT
A	17-12-2020	CLIENT'S REVISION
B	21-01-2021	PRE DA and UDRP
C	21-05-04	DA SUBMISSION

GENERAL LEGEND:

BR	Bedroom	GAS	Gas Cupboard	RWO	Rainwater Outlet
COM	Comms Cupboard	GD	Grated Drain	SWP	Storm Water Pit
DP	Downpipe	GEX	Garbage Exhaust	TOH	Top Of Hob
E	Electrical Cupboard	MBX	Mailbox	TOW	Top Of Wall
FHR	Fire Hose Reel	RL	Relative Level	TTI	Tactile Indicators

TRUE NORTH SHOWN

PROJECT
20023 - PROPOSED RESIDENTIAL DEVELOPMENT
ADDRESS
22-24 RODLEY AVENUE, PENRITH 2750

PROJECT No. 20026
CLIENT
OLSSON PROPERTY GROUP

MORSON GROUP
NOMINATED ARCHITECT – P F MORSON REGISTRATION NUMBER 8100 ACN 159 480 056, ABN 41 159 480 056 www.morsongroup.com.au (02) 9380 4946 PO Box 170, Potts Point, NSW 1335

SHEET SIZE: A1
SCALE: 1 : 400

SHEET NAME: DEVELOPMENT DETAILS

DRAWING No. DA01
ISSUE No. C

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RODLEY AVE

10.5m REFUSE COLLECTION VEHICLE
Custom

10.5m REFUSE COLLECTION VEHICLE
Custom

BOOSTER

RL 27.310

RL 27.025

BOUNDARY 30.480 m

BOUNDARY 39.575 m

BOUNDARY 39.575 m

BOUNDARY 30.480 m

1 DA17

1 DA18

1 DA24

1 DA19

ABN 41 159 480 056 NOMINATED ARCHITECT: P Morson(8100)

ISSUE	DATE	AMENDMENT
A	17-12-2020	CLIENT'S REVISION
B	21-01-2021	PRE DA and UDRP
C	21-05-04	DA SUBMISSION

GENERAL LEGEND:

BR	Bedroom	GAS	Gas Cupboard	RWO	Rainwater Outlet
COM	Comms Cupboard	GD	Grated Drain	SWP	Storm Water Pit
DP	Downpipe	GEX	Garbage Exhaust	TOH	Top Of Hob
E	Electrical Cupboard	MBX	Mailbox	TOW	Top Of Well
FHR	Fire Hose Reel	RL	Relative Level	TTI	Tactile Indicators

PROJECT
20023 - PROPOSED RESIDENTIAL DEVELOPMENT
ADDRESS
22-24 RODLEY AVENUE, PENRITH 2750

PROJECT No. **20026**

CLIENT
OLSSON PROPERTY GROUP

MORSON GROUP
NOMINATED ARCHITECT - P F MORSON REGISTRATION NUMBER 8100
ACN 139 480 056, ABN 41 159 480 056
www.morsongroup.com.au
(02) 9380 4946
PO Box 170, Potts Point, NSW 1335

SHEET SIZE: A1

SCALE: 1 : 100

SHEET NAME: **FLOOR PLAN - GROUND LEVEL**

DRAWING No. **DA06**

ISSUE No. **C**

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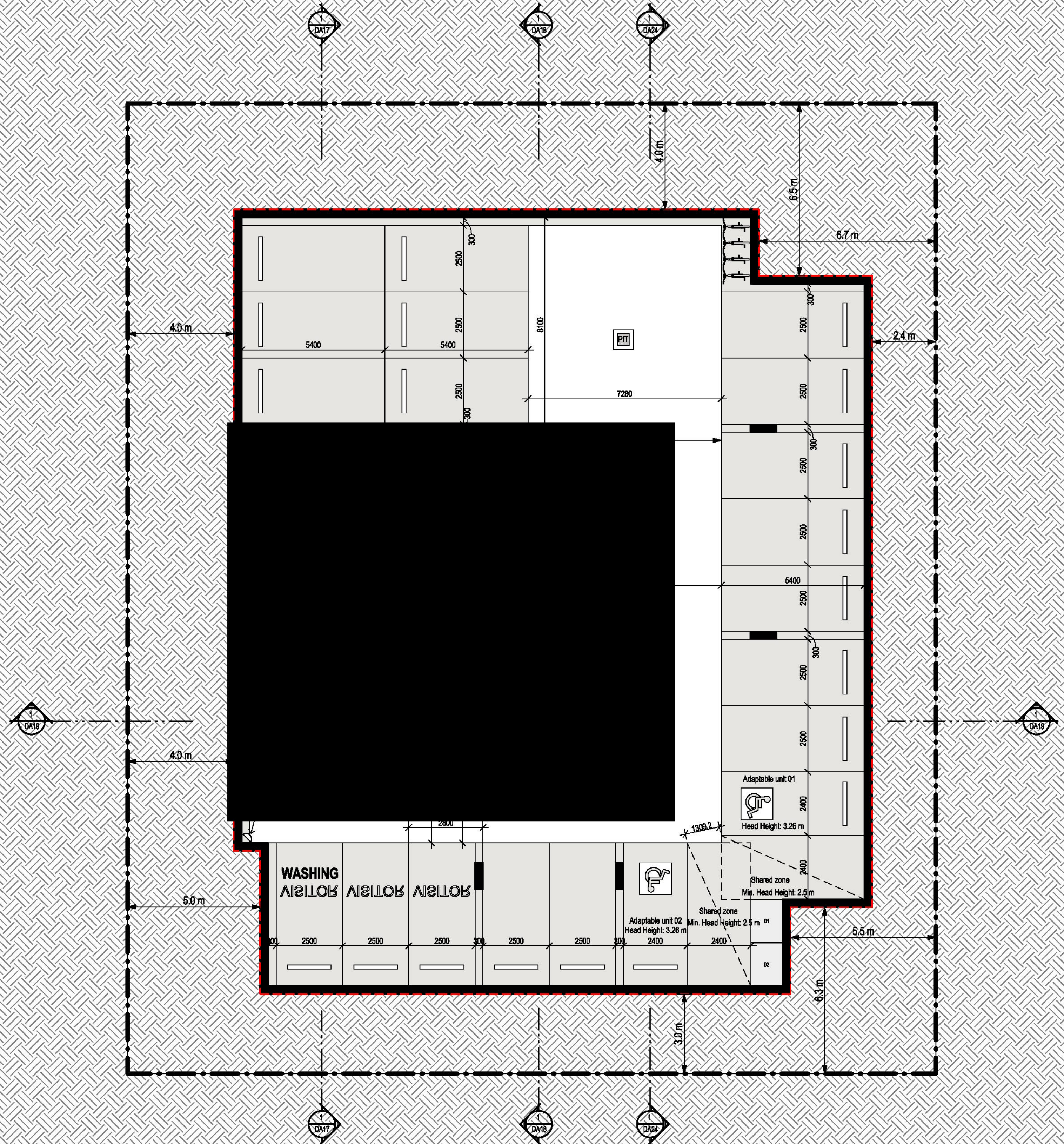

ISSUE	DATE	AMENDMENT
A	17-12-2020	CLIENT'S REVISION
B	21-01-2021	PRE DA and UDRP
C	21-05-04	DA SUBMISSION

GENERAL LEGEND:

BR Bedroom	GAS Gas Cupboard	RWO Rainwater Outlet
COM Comms Cupboard	GD Grated Drain	SWP Storm Water Pit
DP Downpipe	GEX Garbage Exhaust	TOH Top Of Hob
E Electrical Cupboard	MBX Mailbox	TOW Top Of Wall
FHR Fire Hose Reel	RL Relative Level	TTI Tactile Indicators

PROJECT
20023 - PROPOSED RESIDENTIAL DEVELOPMENT
ADDRESS
22-24 RODLEY AVENUE, PENRITH 2750

PROJECT No. **20026**
CLIENT
OLSSON PROPERTY GROUP

MORSON GROUP

SHEET SIZE: A1
SHEET NAME: **FLOOR PLAN - BASEMENT LEVEL -1**
SCALE: 1 : 100

DRAWING No. **DA12**
ISSUE No. **C**

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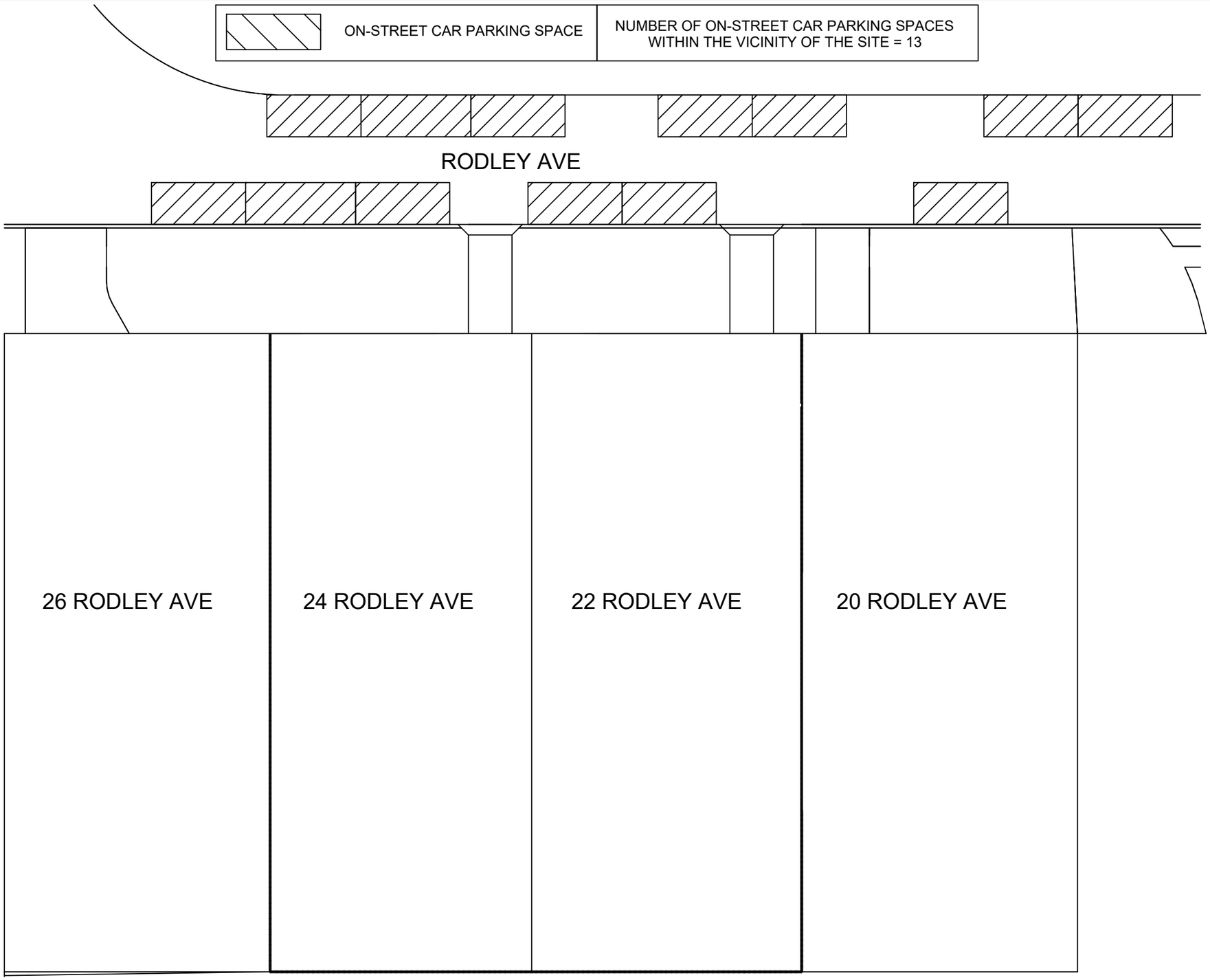
APPENDIX 2



STANBURY TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

STANBURY TRAFFIC PLANNING
ADDRESS: 302/166 GLEBE POINT RD, GLEBE
PH: (02) 8971 8314
MOB: 0410 561 848
EMAIL: info@stanburytraffic.com.au
WEBSITE: www.stanburytraffic.com.au

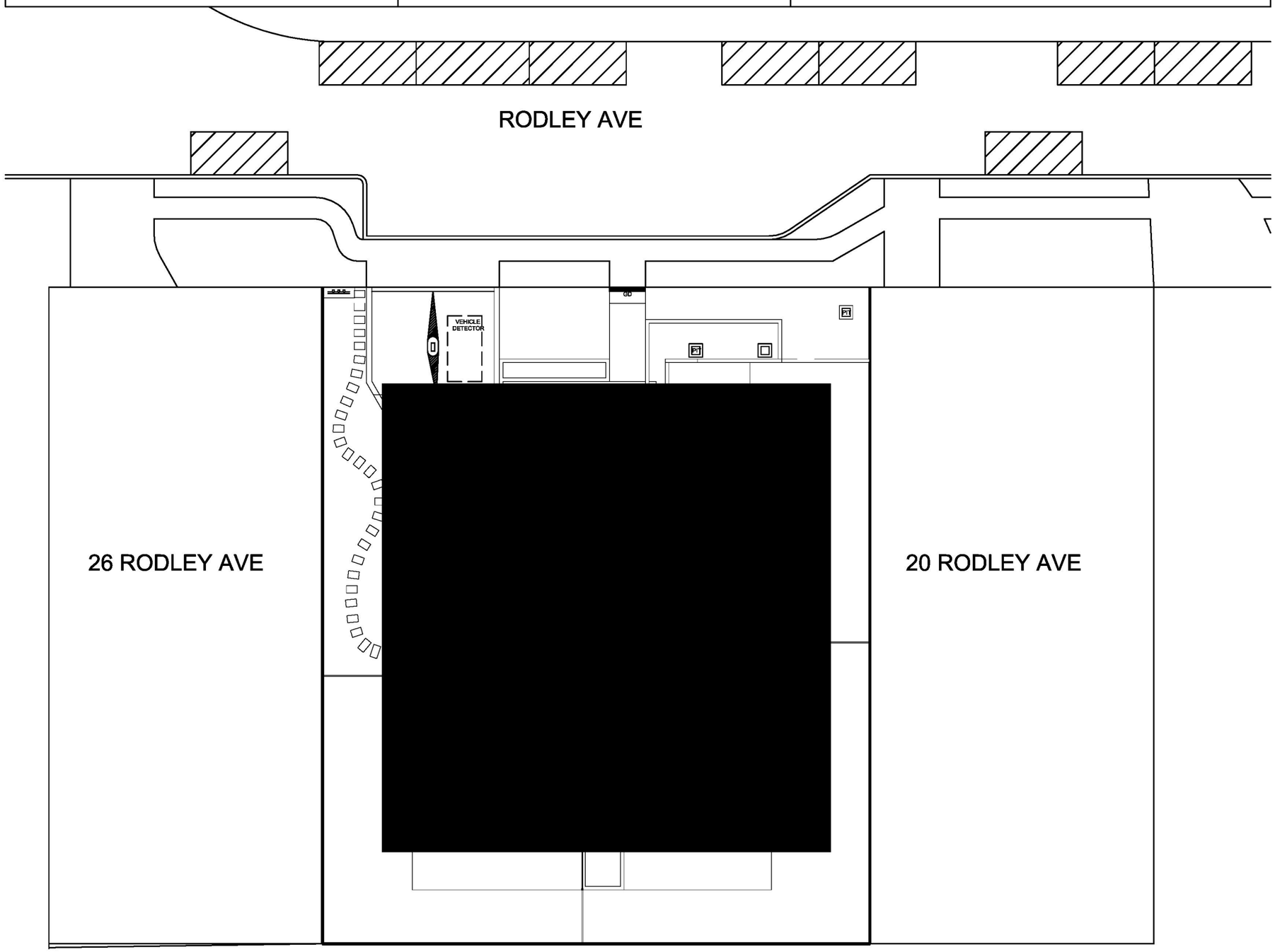
NOTES:
1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY MORSON GROUP.

STANBURY TRAFFIC PLANNING

EXISTING ON-STREET PARKING CONFIGURATION
PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT
22 - 24 RODLEY AVENUE
PENRITH

SCALE: 1:250 AT A3
FILE: 20-212
SUPERSEDES SHEET/ISSUE -
DATE: 3/06/2021
ISSUE A
SHEET 1

ON-STREET CAR PARKING SPACE	NUMBER OF ON-STREET CAR PARKING SPACES WITHIN THE VICINITY OF THE SITE = 9	REDUCTION IN ON-STREET CAR PARKING SPACES INCORPORATING ON-STREET REFUSE COLLECTION = 4



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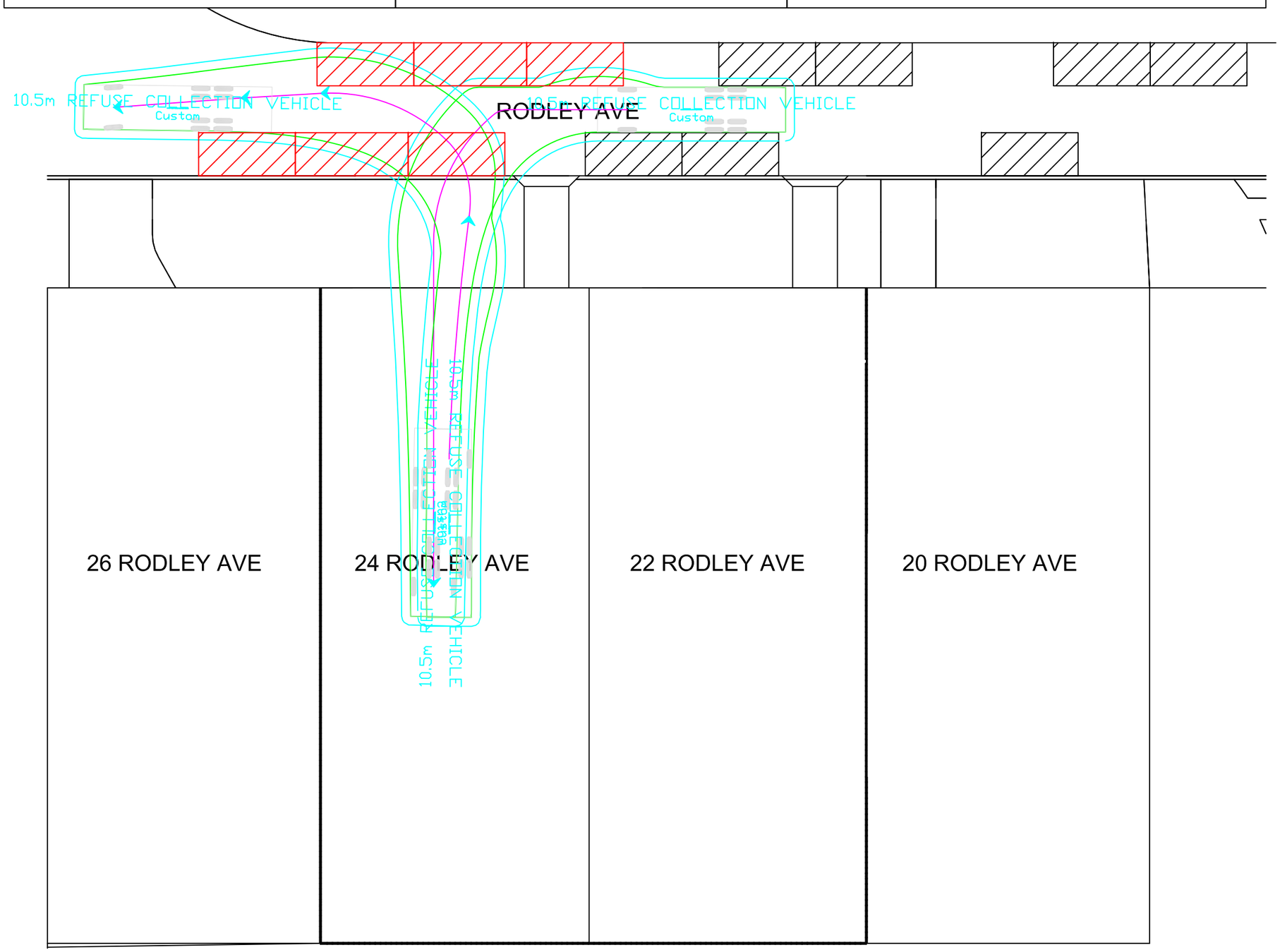
STANBURY TRAFFIC PLANNING

PROPOSED ON-STREET PARKING CONFIGURATION ASSOCIATED WITH PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT
22 - 24 RODLEY AVENUE
PENRITH

SCALE: 1:250 AT A3
FILE: 20-212
SUPERSEDES SHEET/ISSUE -
DATE: 3/06/2021
ISSUE A
SHEET 2

ON-STREET CAR PARKING SPACE	NUMBER OF ON-STREET CAR PARKING SPACES WITHIN THE VICINITY OF THE SITE = 13	REDUCTION IN ON-STREET CAR PARKING SPACES INCORPORATING ON-STREET REFUSE COLLECTION = 6



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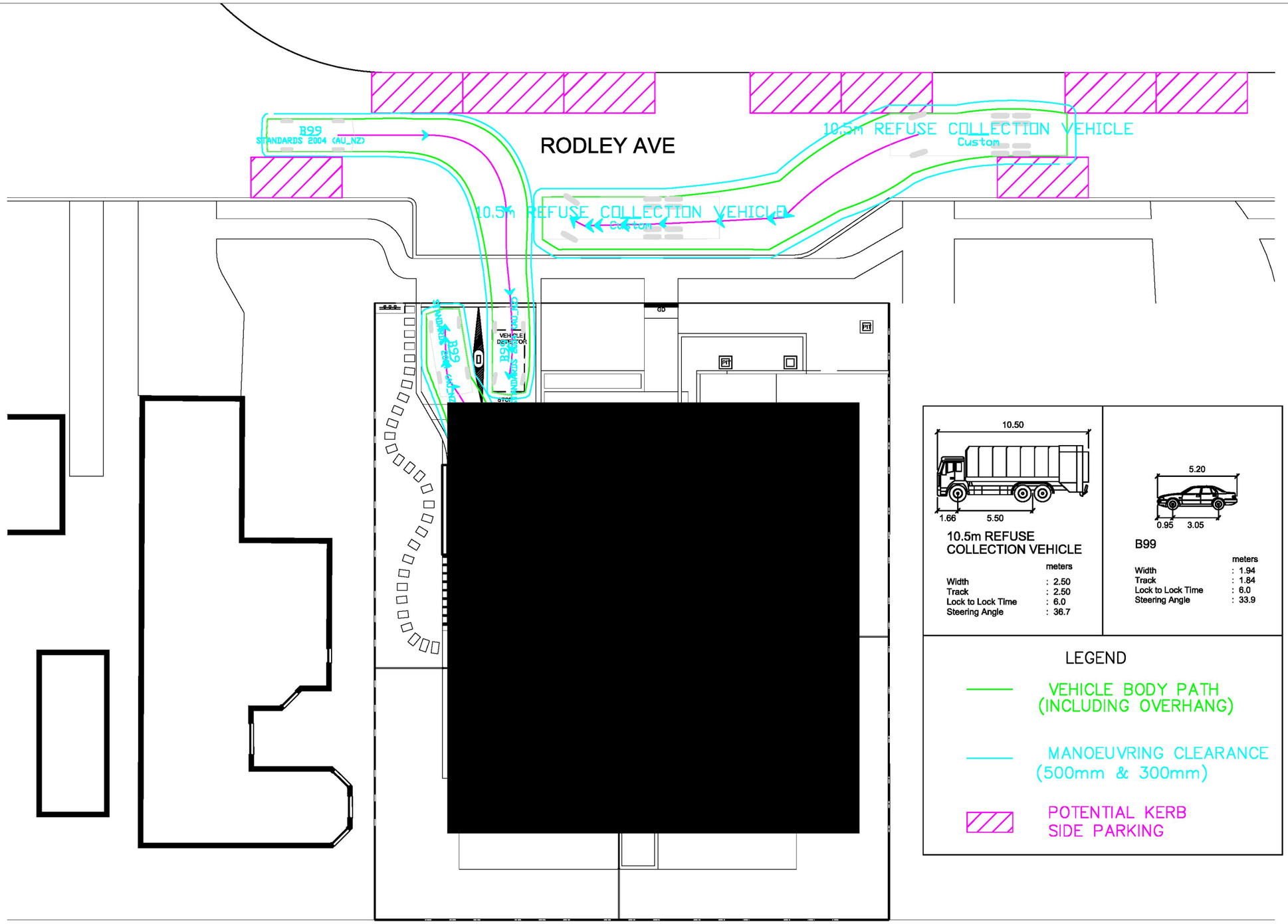
STANBURY TRAFFIC PLANNING

ALTERNATE ON-STREET PARKING CONFIGURATION INCORPORATING ON-SITE REFUSE COLLECTION ASSOCIATED WITH PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT
22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3
FILE: 20-212
SUPERSEDES SHEET/ISSUE -
DATE: 3/06/2021
ISSUE A
SHEET 3

APPENDIX 3



10.5m REFUSE COLLECTION VEHICLE

	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.7

B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

LEGEND

VEHICLE BODY PATH (INCLUDING OVERHANG)

MANOEUVRING CLEARANCE (500mm & 300mm)

POTENTIAL KERB SIDE PARKING

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ADDRESS: 302/166 GLEBE POINT RD, GLEBE
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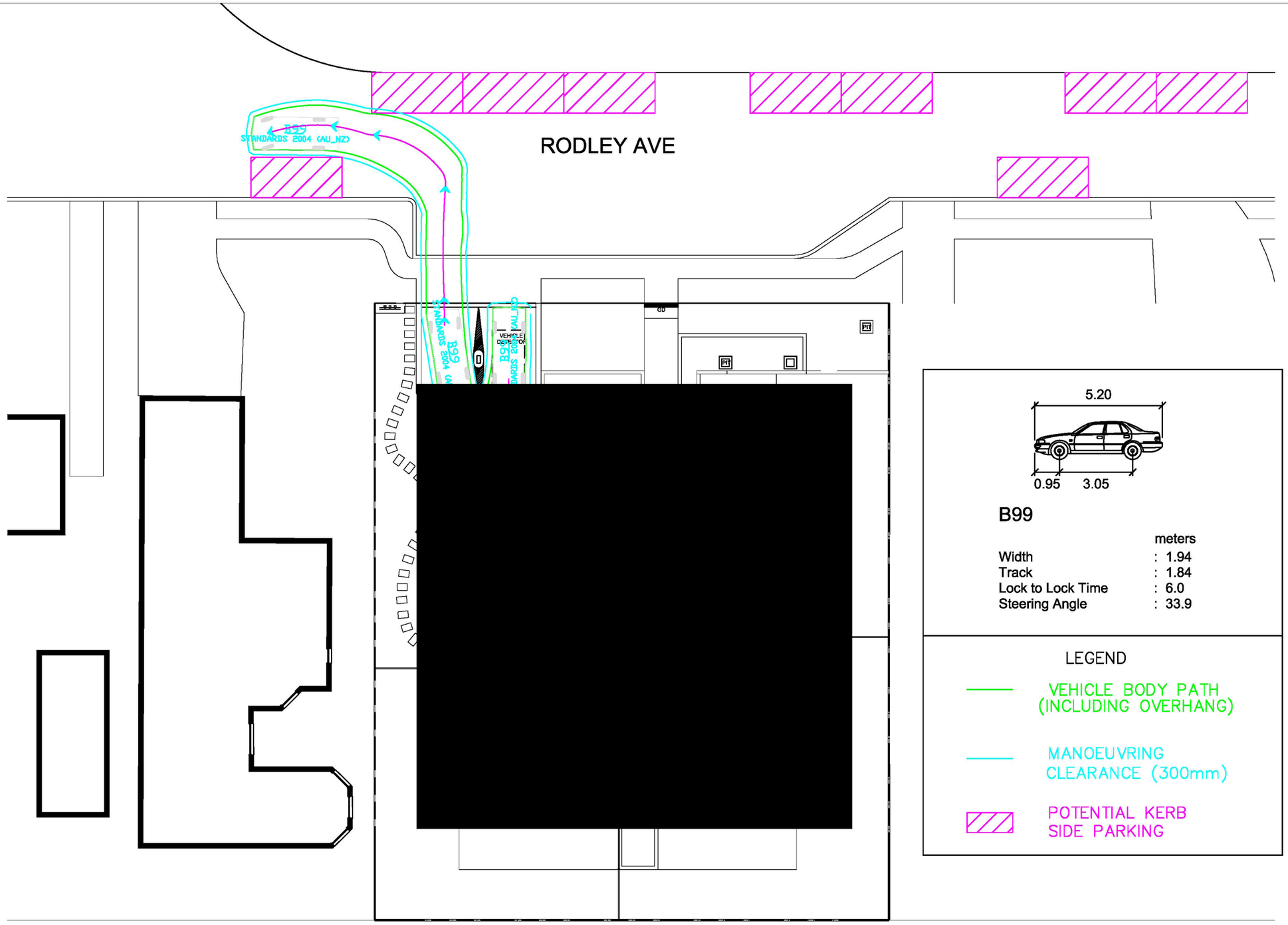
STANBURY TRAFFIC PLANNING

10.5m REFUSE COLLECTION TRUCK / PASSENGER VEHICLE SWEPT PATHS
SITE & ON-STREET LOADING BAY INGRESS MOVEMENTS
PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT
22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3
FILE: 20-212
SUPERSEDES SHEET/ISSUE -
DATE: 3/06/2021
ISSUE A
SHEET 1



B99

	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

LEGEND

VEHICLE BODY PATH (INCLUDING OVERHANG)

MANOEUVRING CLEARANCE (300mm)

POTENTIAL KERB SIDE PARKING

STANBURY TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

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STANBURY TRAFFIC PLANNING

PASSENGER VEHICLE SWEPT PATHS

SITE INGRESS / EGRESS MOVEMENTS

PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT

22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3

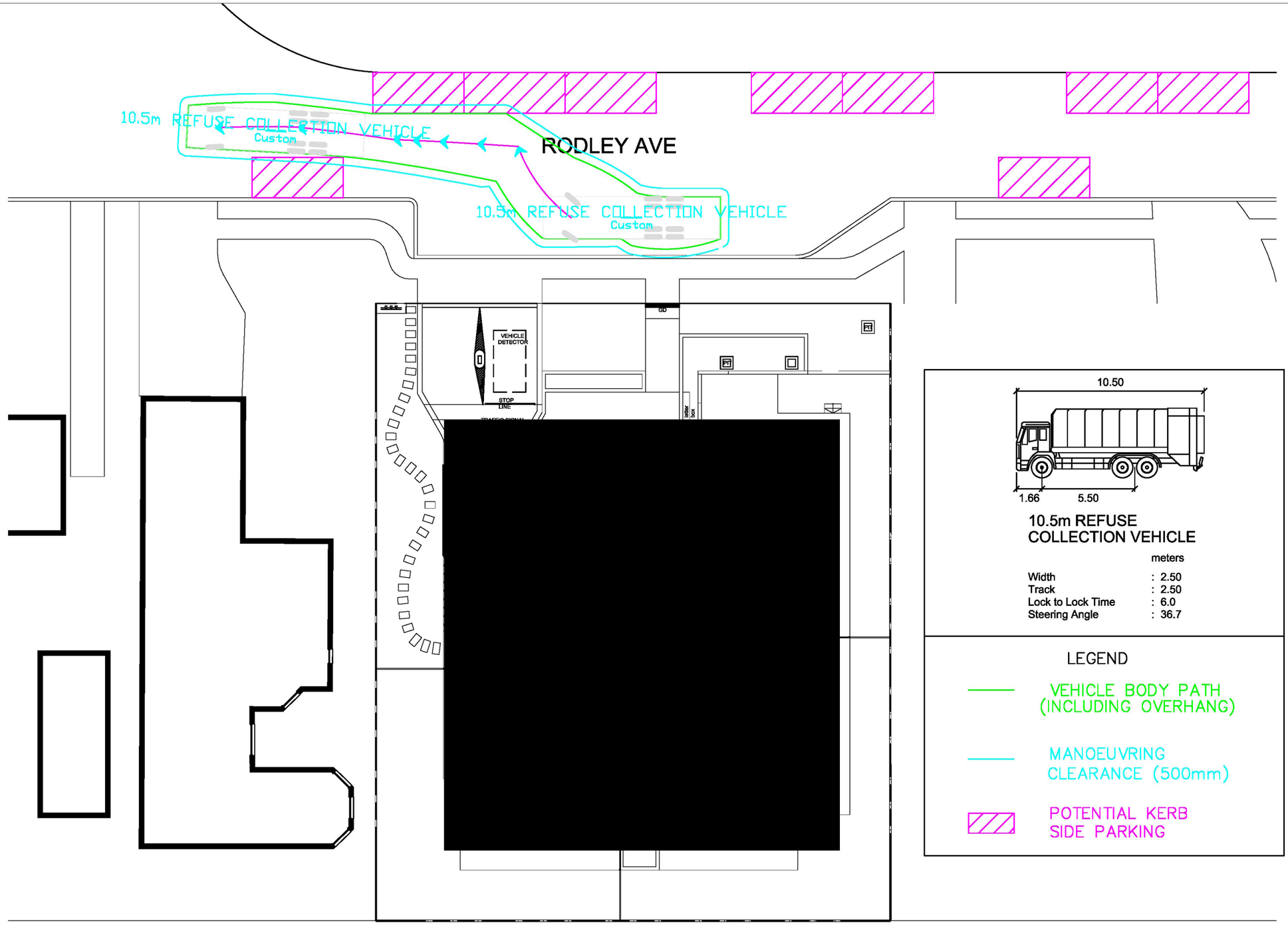
FILE: 20-212

SUPERSEDES SHEET/ISSUE -

DATE: 3/06/2021

ISSUE A

SHEET 2



STANBURY TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

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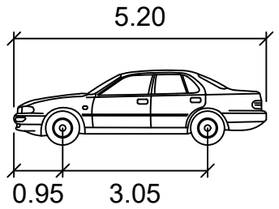
2. THE SWEPT PATHS PROVIDED ON THIS PLAN HAVE BEEN GENERATED UTILISING AUTOTURN PRO VERSION 11 IN CONJUNCTION WITH MANOEUVRING SPECIFICATIONS FOR COUNCIL'S 10.5m LONG REFUSE COLLECTION VEHICLE.

STANBURY TRAFFIC PLANNING

10.5m REFUSE COLLECTION TRUCK / PASSENGER VEHICLE SWEPT PATHS
ON-STREET LOADING BAY EGRESS MOVEMENT
PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT
22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3
FILE: 20-212
SUPERSEDES SHEET/ISSUE -
DATE: 3/06/2021
ISSUE A
SHEET 3



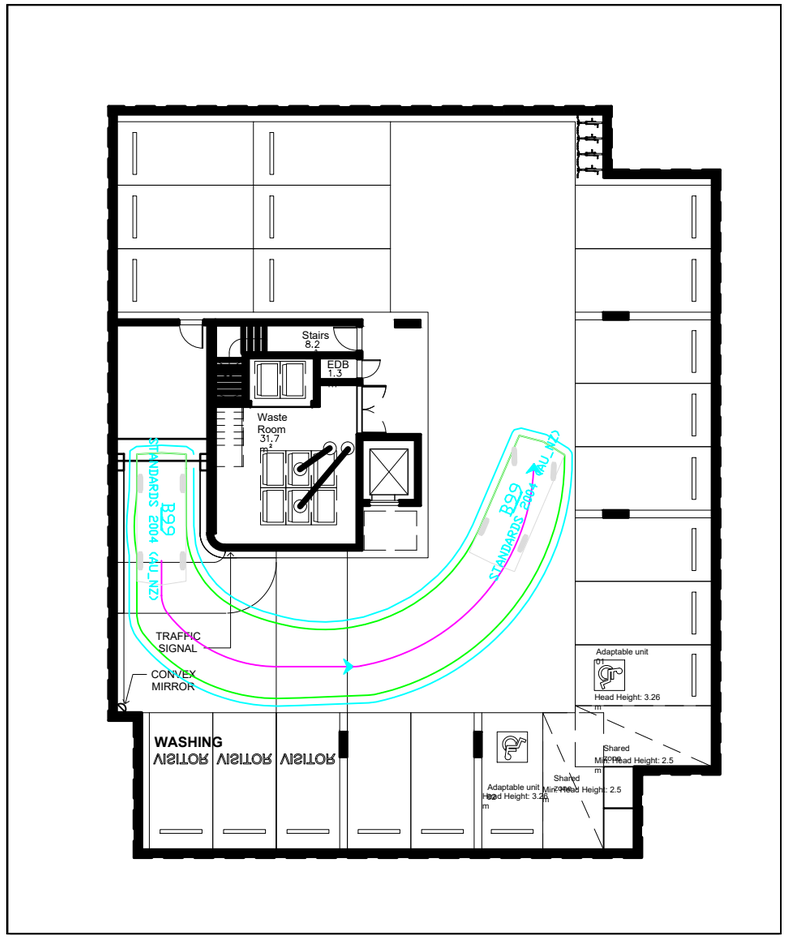
B99

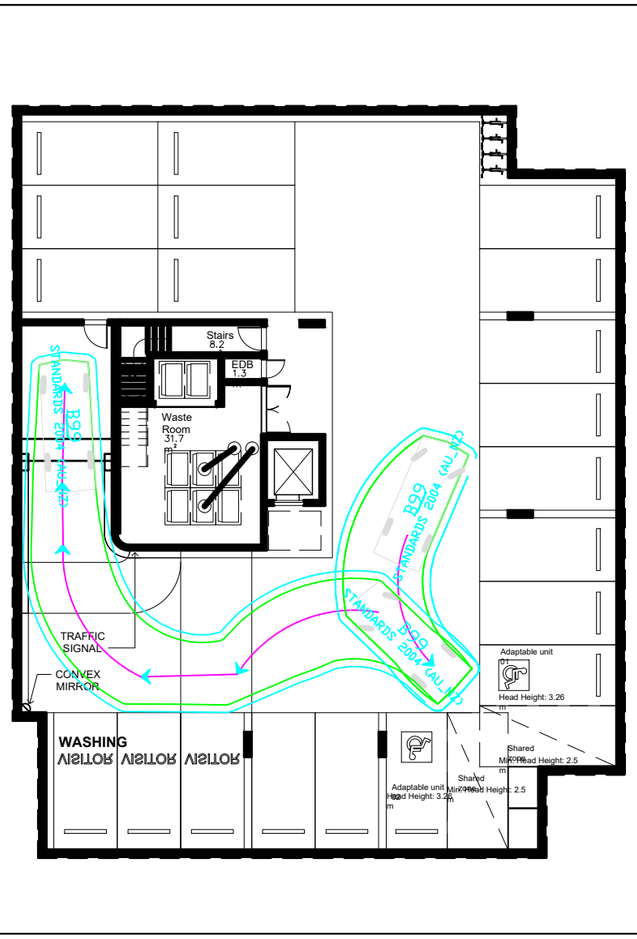
	meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.9

LEGEND

VEHICLE BODY PATH (INCLUDING OVERHANG)

MANOEUVRING CLEARANCE (300mm)





STANBURY TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

STANBURY TRAFFIC PLANNING
ADDRESS: 302/166 GLEBE POINT RD, GLEBE
PH: (02) 8971 8314
MOB: 0410 561 848
EMAIL: info@stanburytraffic.com.au
WEBSITE: www.stanburytraffic.com.au

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STANBURY TRAFFIC PLANNING

PASSENGER VEHICLE SWEPT PATHS

BASEMENT LEVEL TURN AROUND MOVEMENTS

PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT

22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3

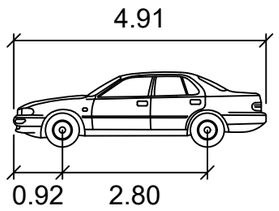
FILE: 20-212

SUPERSEDES SHEET/ISSUE -

DATE: 3/06/2021

ISSUE A

SHEET 4

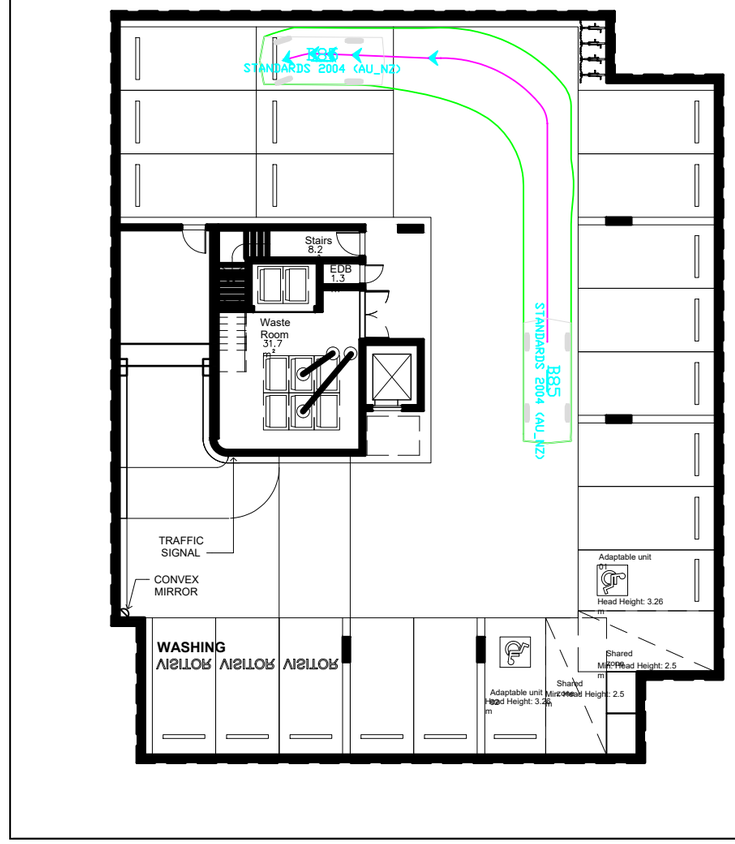


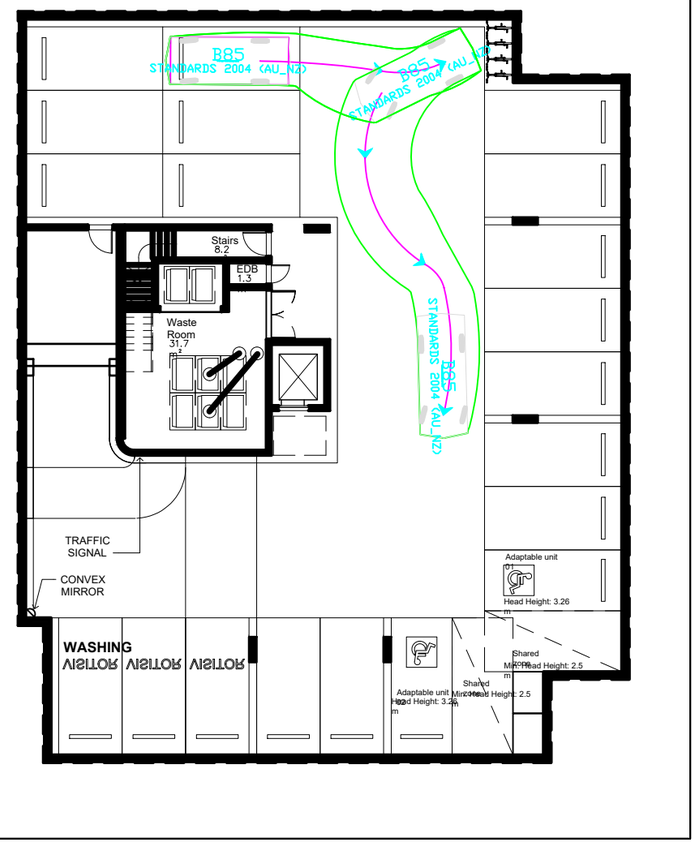
B85

		meters
Width	:	1.87
Track	:	1.77
Lock to Lock Time	:	6.0
Steering Angle	:	34.1

LEGEND

VEHICLE BODY PATH (INCLUDING OVERHANG)





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STANBURY TRAFFIC PLANNING

PASSENGER VEHICLE SWEPT PATHS

BASEMENT LEVEL PARKING SPACE INGRESS / EGRESS MOVEMENTS

PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT

22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3

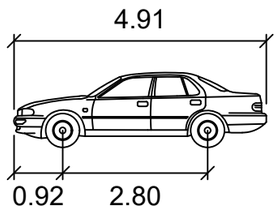
FILE: 20-212

SUPERSEDES SHEET/ISSUE -

DATE: 3/06/2021

ISSUE A

SHEET 5

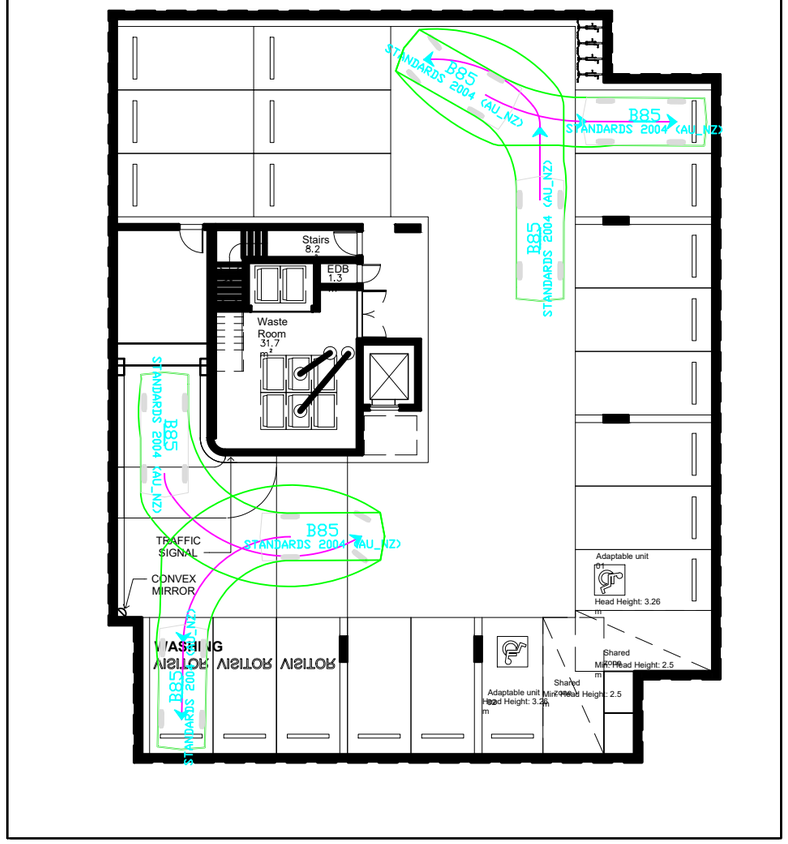


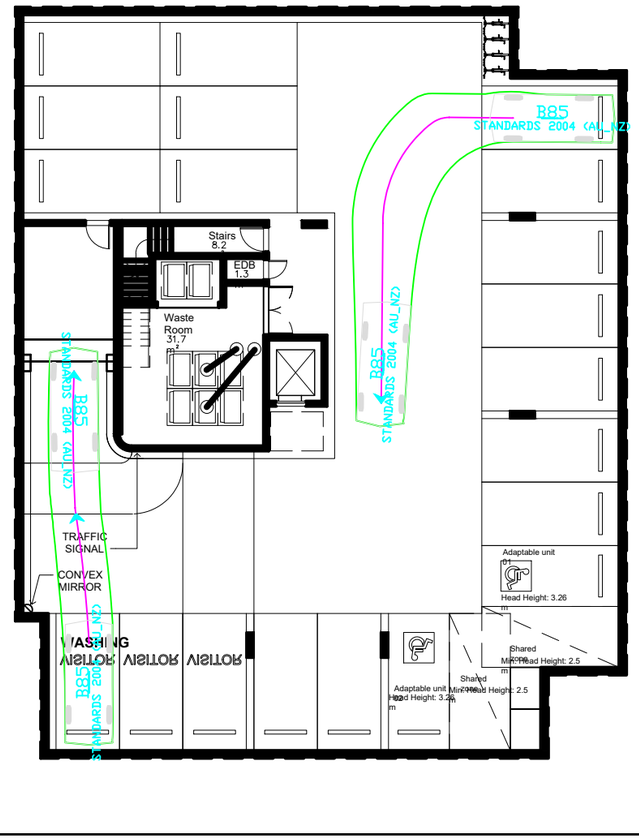
B85

	meters
Width	: 1.87
Track	: 1.77
Lock to Lock Time	: 6.0
Steering Angle	: 34.1

LEGEND

VEHICLE BODY PATH (INCLUDING OVERHANG)





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STANBURY TRAFFIC PLANNING

PASSENGER VEHICLE SWEPT PATHS

BASEMENT LEVEL PARKING SPACE INGRESS / EGRESS MOVEMENTS

PROPOSED RESIDENTIAL FLAT BUILDING DEVELOPMENT

22 - 24 RODLEY AVENUE, PENRITH

SCALE: 1:250 AT A3

FILE: 20-212

SUPERSEDES SHEET/ISSUE -

DATE: 3/06/2021

ISSUE A

SHEET 6

APPENDIX 4

MOVEMENT SUMMARY

Site: [Union Road & Worth Street]

Existing AM
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Worth Street South												
1	L2	23	5.0	0.350	47.3	LOS D	3.0	22.1	0.96	0.75	0.96	33.8
2	T1	26	5.0	0.350	41.7	LOS C	3.0	22.1	0.96	0.75	0.96	34.4
3	R2	22	5.0	0.350	47.3	LOS D	3.0	22.1	0.96	0.75	0.96	33.7
Approach		71	5.0	0.350	45.3	LOS D	3.0	22.1	0.96	0.75	0.96	34.0
East: Union Road East												
4	L2	39	5.0	0.079	17.5	LOS B	1.6	11.7	0.54	0.57	0.54	47.0
5	T1	34	5.0	0.079	11.9	LOS A	1.6	11.7	0.54	0.57	0.54	48.2
6	R2	186	5.0	0.529	30.6	LOS C	6.7	48.6	0.84	0.81	0.84	39.1
Approach		259	5.0	0.529	26.2	LOS B	6.7	48.6	0.75	0.74	0.75	41.2
North: Worth Street North												
7	L2	204	5.0	0.539	40.5	LOS C	8.2	59.7	0.94	0.81	0.94	35.4
8	T1	16	5.0	0.141	31.5	LOS C	2.0	14.3	0.85	0.71	0.85	38.0
9	R2	38	5.0	0.141	37.1	LOS C	2.0	14.3	0.85	0.71	0.85	37.2
Approach		258	5.0	0.539	39.4	LOS C	8.2	59.7	0.92	0.79	0.92	35.8
West: Union Road West												
10	L2	118	5.0	0.135	19.5	LOS B	2.9	21.2	0.59	0.71	0.59	44.5
11	T1	350	5.0	0.441	16.7	LOS B	11.0	80.3	0.71	0.63	0.71	46.8
12	R2	32	5.0	0.441	22.2	LOS B	11.0	80.3	0.71	0.63	0.71	45.5
Approach		500	5.0	0.441	17.7	LOS B	11.0	80.3	0.68	0.65	0.68	46.2
All Vehicles		1088	5.0	0.539	26.7	LOS B	11.0	80.3	0.77	0.71	0.77	41.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		211	39.3	LOS D			0.94	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: [Union Road & Worth Street]

Existing PM
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Worth Street South												
1	L2	22	5.0	0.272	46.9	LOS D	2.3	16.9	0.95	0.74	0.95	33.8
2	T1	14	5.0	0.272	41.3	LOS C	2.3	16.9	0.95	0.74	0.95	34.4
3	R2	19	5.0	0.272	46.8	LOS D	2.3	16.9	0.95	0.74	0.95	33.7
Approach		55	5.0	0.272	45.4	LOS D	2.3	16.9	0.95	0.74	0.95	33.9
East: Union Road East												
4	L2	17	5.0	0.126	19.5	LOS B	2.7	19.6	0.59	0.51	0.59	47.1
5	T1	94	5.0	0.126	13.9	LOS A	2.7	19.6	0.59	0.51	0.59	48.3
6	R2	349	5.0	0.704	29.4	LOS C	13.0	94.9	0.86	0.85	0.90	39.6
Approach		460	5.0	0.704	25.8	LOS B	13.0	94.9	0.80	0.77	0.82	41.4
North: Worth Street North												
7	L2	282	5.0	0.708	42.4	LOS C	12.0	87.7	0.98	0.86	1.04	34.7
8	T1	20	5.0	0.492	33.7	LOS C	7.7	56.4	0.92	0.80	0.92	36.7
9	R2	177	5.0	0.492	39.3	LOS C	7.7	56.4	0.92	0.80	0.92	36.0
Approach		479	5.0	0.708	40.9	LOS C	12.0	87.7	0.96	0.84	0.99	35.3
West: Union Road West												
10	L2	105	5.0	0.077	8.6	LOS A	1.2	8.5	0.27	0.64	0.27	51.2
11	T1	127	5.0	0.164	14.8	LOS B	3.5	25.3	0.61	0.52	0.61	48.0
12	R2	11	5.0	0.164	20.4	LOS B	3.5	25.3	0.61	0.52	0.61	46.6
Approach		243	5.0	0.164	12.4	LOS A	3.5	25.3	0.47	0.57	0.47	49.3
All Vehicles		1237	5.0	0.708	29.9	LOS C	13.0	94.9	0.80	0.76	0.82	39.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P2	East Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P3	North Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.94	0.94
All Pedestrians		211	39.3	LOS D			0.94	0.94

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.