STANBURY
TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

PARKING & TRAFFIC IMPACT ASSESSMENT

PROPOSED CHILD CARE CENTRE DEVELOPMENT
118 MAITLAND STREET
MUSWELLBROOK

PREPARED FOR JACKY ANGELOVSKA
OUR REF: 23-100-rep-2

13 MARCH 2024

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1. INTRODUCTION

1.1 Scope of Assessment

Stanbury Traffic Planning has been commissioned by Jacky Angelovska to prepare a Parking & Traffic Impact Assessment to accompany a Development Application to be lodged with Muswellbrook Shire Council. The Development Application seeks consent for the construction of a purpose-built child care centre at 118 Maitland Street, Muswellbrook (hereafter referred to as the 'subject site').

The child care centre is proposed to be capable of accommodating up to 92 children and be provided within a two-storey building serviced by a single level of basement parking providing a total of 20 off-street parking spaces. Vehicular connectivity between Maitland Street and the basement parking area is proposed via a combined ingress / egress driveway in the south-western portion of the site.

The aim of this assessment is to investigate and report upon the potential parking and traffic 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, internal circulation and servicing arrangements with reference to relevant Council, Transport for New South Wales (TfNSW) 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 Environment Planning Policy (Transport & Infrastructure) 2021.

The development design has been formulated in consultation with TfNSW, from whom Pre-DA advice has been sought and received via email correspondence, a copy of which has been attached as **Appendix 1**.

1.2 Reference Documents

Reference is made to the following documents throughout this report:

- Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1:2004);
- Australian Standard for *Parking Facilities Part 6: Off-Street Parking for People with Disabilities* (AS2890.6:2020);
- NSW Government's *Children (Education and Care Services) Supplementary Provisions Regulation 2012*;
- NSW Government's *Child Care Planning Guideline*;
- Muswellbrook Shire Council's *Development Control Plan 2009* (DCP 2009); and
- TfNSW's *Guide to Traffic Generating Developments*.

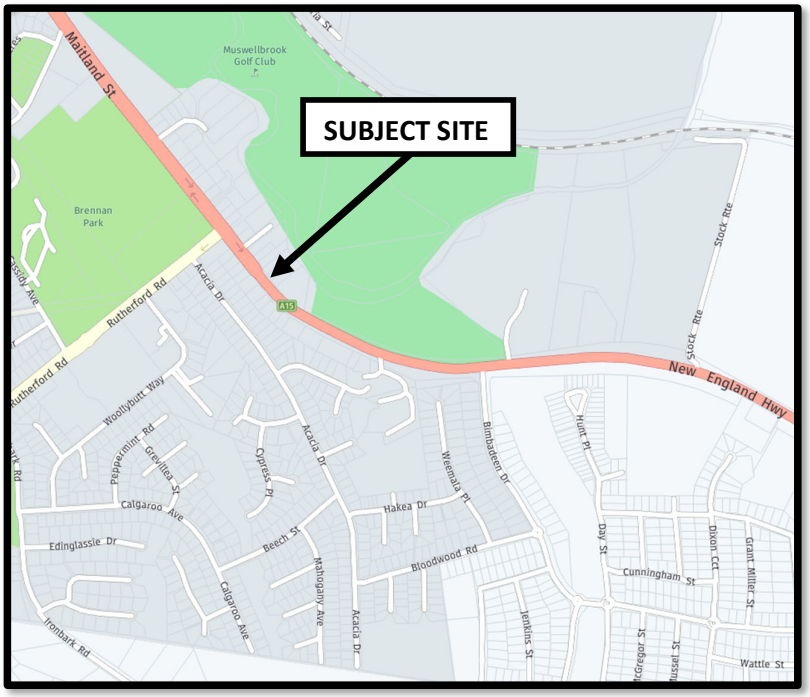
Architectural plans have been prepared by ArtMade Architects and should be read in conjunction with this report, reduced copies of which are included as **Appendix 2** for reference.

1.3 Site Details

1.3.1 Site Location

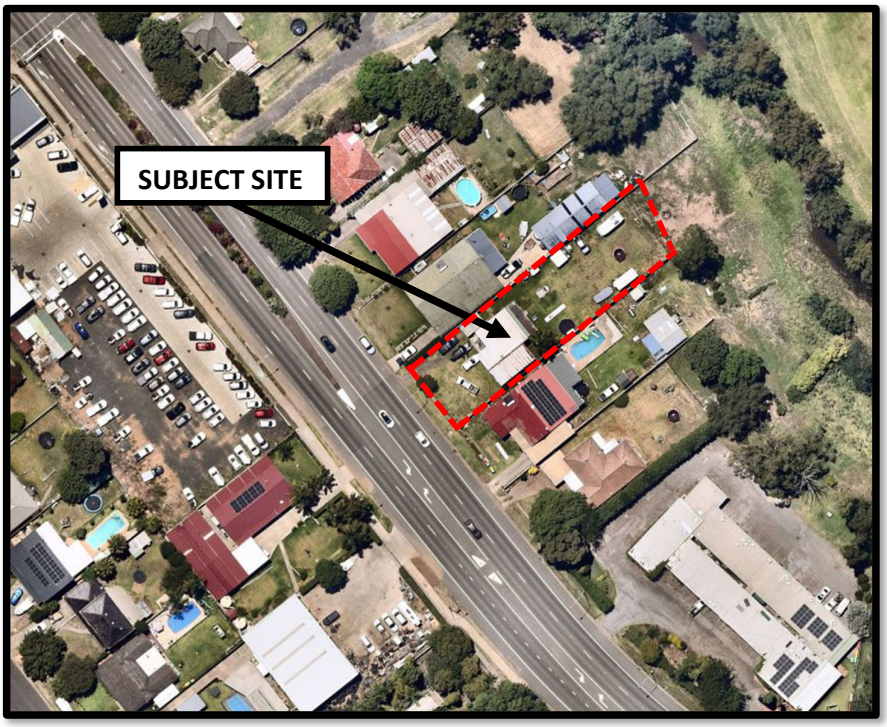
The subject site is located on the north-eastern side of Maitland Street, approximately 120m to the south-east of the signalised intersection of Maitland Street and Rutherford Road, Muswellbrook. The site location is illustrated overleaf within a local and aerial context by **Figure 1** and **Figure 2**, respectively.

FIGURE 1
SITE LOCATION WITHIN A LOCAL CONTEXT



Source: Nearmap (accessed: 16/08/2023)

FIGURE 2
SITE LOCATION WITHIN AN AERIAL CONTEXT



Source: Nearmap (image date: 12/02/2023)

1.3.2 Site Description

The subject site provides a real property description of Lot 34 within DP229637, providing a street address of 118 Maitland Street, Muswellbrook. The site forms a rectangular shaped parcel of land providing an approximate frontage of 18m to Maitland Street. The site provides a total site area in the order of 1,402.8m^2.

1.3.3 Existing Site Use

The subject site currently contains a detached residential dwelling. An existing vehicular driveway crossover is provided in the western corner of the site connecting to Maitland Street.

1.3.4 Existing Site Use

The subject site is surrounded by the following land-uses:

- Land to the north-west, south and south-east of the site contains detached residential dwellings similar to that which currently occupies the subject site;
- Land directly to the east of the site contains the Muswellbrook Gold Club course;
- Land to the west of the site on the opposite side of Maitland Street contains commercial uses including car dealerships;
- A BP Truckstop is situated to the south of the site on the opposite side of Maitland Street; and
- The Wayfarer Motel is situated approximately 50m to the south-east of the site.

2. PROPOSED DEVELOPMENT

2.1 Built Form

The Development Application seeks consent for the construction of a purpose-built child care centre capable of accommodating up to 92 children.

The child care centre is proposed to be contained within a two-storey building situated centrally within the site. A basement parking area is proposed to be provided containing a total of 20 passenger vehicle parking spaces.

The child care centre building is proposed to contain six separate indoor playrooms, three large outdoor play areas, an entrance foyer / office reception area, a kitchen, an office and ancillary amenities.

Vehicular access between Maitland Street and the basement parking area is provided via a combined ingress / egress driveway situated within the south-western portion of the site.

Pedestrian access is proposed via a pedestrian path connecting the child care centre building and the northern Maitland Street footpath separate and to the north of the vehicular access driveway.

2.2 Proposed Operation

The child care centre is proposed to accommodate up to 92 children as follows:

- 12 children aged between zero and two years of age;
- 20 children aged between two and three years of age; and
- 60 children aged between three and five years of age.

The centre is required to employ a minimum of 13 teaching staff in accordance with the current NSW Government's *Children (Education and Care Services) Supplementary Provisions Regulation 2012* requirements, as follows:

- Three staff associated with the children aged between zero and two years of age;
- Four staff associated with the children aged between two and three years of age; and
- Six staff associated with the children aged between three and five years of age.

The centre is proposed to operate between 7:00am and 6:00pm Monday to Friday.

3. SITE ACCESS, PARKING & INTERNAL CIRCULATION

3.1 Access Arrangements

3.1.1 Vehicular Access

Vehicular access to the at-grade parking area is proposed to be facilitated via 6.1m wide combined ingress / egress driveway connecting with Maitland Street approximately within the north-western corner of the site.

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, at minimum, a Category 2 type driveway is required, providing a combined ingress / egress driveway width of between 6m and 9m based on the arterial functional order of Maitland Street, the proposed child care centre land-use and the passenger vehicle parking provision the driveway is to service of less than 25 spaces. The proposed 6.1m wide separated ingress and egress driveways therefore comply with the minimum AS2890.1:2004 specifications and accordingly, are 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 of the egress driveway inside the property boundary; and

- No obstructions to visibility adjacent to the egress (southern) side of the driveway facilitating appropriate sight distance between exiting motorists and potential pedestrians travelling along the eastern Maitland Street footway.

Whilst observations have indicated that pedestrian demands within the eastern Maitland Street footpath are low, a stop line and stop sign has been provided at the property boundary in conjunction to the provision of an appropriate sight distance triangle for exiting vehicles to ensure pedestrian safety within the footpath. The indicative location of the stop line and stop sign has been provided on the architectural plans, copies of which are attached as **Appendix 2**.

3.1.2 Pedestrian Access

Pedestrian access is proposed via a pedestrian path connecting the child care centre building and the northern Maitland Street footpath separate and to the north of the vehicular access driveway.

3.2 Passenger Vehicle Parking

3.2.1 Parking Provision

The development is proposed to be serviced by 20 on-site passenger vehicle parking spaces, comprising 13 staff spaces and seven visitor parking spaces (including one disabled space).

NSW Government's *Child Care Planning Guideline* specifies that parking should be provided in accordance with DCP 2009, which provides the following minimum vehicular parking rates for child care centres:

*1 space per employee, **PLUS***
1 spacer per 15 children enrolled (if provision of 3 set down / pick up areas) or 1 per 10 children

Table 1 below indicates the application of the abovementioned DCP 2009 parking rates to the proposed maximum centre capacity of 92 children and 13 staff.

TABLE 1 MINIMUM OFF-STREET PARKIGN REQUIREMENTS MUSWELLBROOK SHIRE COUNCIL DCP 2009			
Type	**Measure**	**Rate**	**Minimum parking required**
Staff Parking	13 staff	1 space per employee	13
Visitor Parking (Option 1)	92 children	1 per 15 children (3 set down / pick up areas)	6.1 (adopt 7)
Visitor Parking (Option 2)	92 children	1 per 10 children	9.2 (adopt 10)
		Total (Option 1)	20
		Total (Option 2)	23

Table 1 indicates a minimum passenger vehicle parking requirement between 20 – 23 parking spaces, comprising a minimum of 13 staff spaces and between seven and ten visitor parking spaces.

The proposed parking provision of 20 spaces, comprising 13 staff parking spaces and seven visitor parking spaces, is therefore compliant with the minimum requirements of DCP 2009 and accordingly, is considered to be satisfactory.

3.2.2 Child Set-Down Area

Further to the above, it is acknowledged that DCP 2009 requires that a set-down / pick-up area be provided. The Objectives of Section 2.6 of DCP 2009 are accordingly as follows:

(i) To provide designated set down areas in close proximity to busy centres.
(ii) To provide safe and convenient designated set down areas for passengers to arrive close to their destination.

The provision of seven visitor spaces within the parking areas in close proximity of a pedestrian lift is considered to reasonably and safely accommodate the set-down of children. Children are required to be delivered into the child care centre building with the supervision of a parent and subsequently signed in / out by the parent. Therefore, the provision of dedicated visitor parking spaces as opposed to a set-down is considered to be more appropriate and convenient to cater to the requirements of a child care centre and therefore satisfies Part (ii).

On the basis of the above discussion, the requirement to provide a dedicated set-down / pick-up area in addition to the visitor / parent parking requirement, is considered not applicable in this instance given the provision of adequate visitor parking and the operational characteristics of the centre.

3.2.3 Projected Operational Requirements

Given the range of established parking requirements for child care centres, it is considered pertinent to undertake an assessment of the likely operational requirements of the proposed development. The following sub-sections of this report accordingly provide an analysis with respect to expected operational characteristics.

3.2.3.1 Staff Parking

It has been presented that the centre is understood to be required to accommodate a minimum of 13 teaching staff on-site any one time. The provision of 13 staff parking spaces, representing one space per teaching staff member is accordingly considered to be satisfactory.

3.2.3.2 Parent / Guardian Parking

To undertake an assessment of the suitability of the proposed visitor parking provision of seven visitor parking spaces, reference is made to the TfNSW's *Guide to Traffic Generating Developments*. This publication specifies that the average length of stay of parents / guardians when setting-down / picking-up children at child care centres is 6.8 minutes. On the basis of all children being set-down and picked-up with an even distribution over a period of two hours (say, 7:00am – 9:00am and 4:00pm – 6:00pm), the arrival rate of parents / guardians will be one parent / guardian every 1.3 minutes (120 minutes / 92 children).

The above length of stay and arrival rate results in an average of 5.2 (6.8/1.3) parents / guardians being on-site at any time during the peak set-down / pick-up periods (adopt five for a worst-case scenario). The average parent / guardian parking demand during peak pick-up / set-down periods is therefore projected to be between five and six spaces.

However, it should be noted that the above analysis represents an absolute worst-case scenario for the following reasons:

- It assumes that all parents / guardians will drive their children to and from the centre, when the TfNSW's surveys suggest 93% of children are driven to and from centres;

- It assumes a zero-sibling rate, when our experience suggests a sibling rate of at least 10% commonly prevails;

- It assumes a 100% attendance rate, when our experiences suggest a maximum of 90% is more likely; and

- It assumes that all children will be set-down and picked-up within a two-hour period, when children can be set-down / picked-up at any time during the operational hours.

The above analysis, indicating an instantaneous parent / guardian parking demand of six spaces has however been retained in order to account for variations in average demand associated with short term peak influxes of parents / guardians during set-down / pick-up periods. In consideration of this and the above discussion, the proposed parent / guardian parking allocation of seven spaces is considered to be appropriate.

The above analysis further supports the non-provision of an additional designated set-down / pick-up area as requirement by DCP 2009 for child care centres.

3.2.3.3 Disabled Parking

DCP 2009 specifies that at least 2% of all required parking should be allocated for disabled parking at retail / business / industry development. Therefore, on the basis of a total 20 parking spaces provided, the site is required to provide 0.4 (adopt 1) one disabled parking space. Therefore, the proposal to provide one disabled parking space in close proximity to the child care centre entrance is accordingly satisfactory.

3.2.3.4 Neighbourhood Parking Policy

The previous analysis concludes that the on-site parking provision and allocation is appropriate in accordance with the locally sensitive parking requirements and the projected operational characteristics of the site. In this regard, it is not expected that the proposed development will result in any unreasonable impacts on surrounding amenity.

Notwithstanding the above, it is desirable that the child care centre formulate and implement a Neighbourhood Parking Policy, which provides a series of operational initiatives with the objective of minimising the potential impacts of the development on the adjoining public parking infrastructure and thus the surrounding residential amenity. This Policy should include, but not be limited to, the following:

- Staff members who drive to the site are to occupy designated on-site staff parking spaces, in preference to parking on-street; and

- Parent / visitors who drive to the site are to occupy designated on-site visitor parking spaces, in preference to parking on-street.

The Neighbourhood Parking Policy should be provided to all staff and parents / guardians at the time of employment and enrolment, respectively.

If considered necessary, the requirement for a Neighbourhood Parking Policy could reasonably be imposed by Council as a condition of development consent.

3.3 Site Servicing

The child care centre is likely to necessitate regular servicing with respect to the collection of refuse. Refuse is proposed to be contained within bins accommodated within a waste storage area situated in the north-western corner of the basement car parking area.

Waste collection is proposed to occur informally within a visitor parking space within the northern parking row in close proximity to the waste storage room. Waste collection activities are proposed to occur outside peak child set-down / pick-up hours (between 10:00am and 2:00pm). It is accordingly considered that the temporary accommodation of the waste collection vehicle within a visitor parking space is considered appropriate.

This Practice has been advised that the development is proposed to be serviced by a private refuse collection contractor, which utilises the Waste Wise Mini Rear Loading vehicle, the specifications for which are contained within **Appendix 3**. These specifications indicate that the waste collection vehicle provides operational requirements similar to a Small Rigid Vehicle (SRV) specified by AS2890.2:2018, with the exception of the following characteristics:

- It can negotiate an internal clearance of 2.08m, thereby negating the Standard requirement to provide an internal clearance of 3.5m;
- It can negotiate a maximum ramp grade of 1:4.6, thereby negating the Standard requirement to limit grades to 1:6.5; and
- It can negotiate maximum changes in grade of 1:6.7 over 2m of travel, thereby negating the Standard requirement to limit grade changes to 1:12 over 4m of travel.

In order to demonstrate the ability of the waste collection vehicle to manoeuvre within the at-grade visitor parking area, a series of swept path and ground clearance assessment plans have been prepared by this Practice demonstrating the abovementioned vehicle entering the car park, manoeuvring to collect waste and exiting the site, copies of which are contained within **Appendix 4**. The turning paths provided on the plans have been generated utilising Autoturn software and the Waste-Wise Mini Rear Loader specifications.

The swept path plans illustrate the following:

- A waste collection vehicle is capable of entering the basement visitor parking area via a forward left turn movement from Maitland Street without encroachment driveway extents or internal development obstructions;

- The waste collection vehicle is thence capable of performing a single reverse movement into the visitor parking space without encroachment on internal development obstructions; and

- The waste collection vehicle is capable of exiting the visitor car park in a forward direction prior to performing a left turn movement onto Maitland Street without encroachment on internal development obstructions, driveway extents, or opposing public road traffic lanes.

The proposed site layout as it relates to waste collection vehicle manoeuvrability is considered satisfactory.

Whilst it is acknowledged that the waste collection activity is to briefly accommodate a visitor parking space, it is proposed that waste collection activity is to occur between 10:00am – 2:00pm, outside of peak pick-up / set-down periods. Therefore, waste collection activity is not envisaged to affect parking safety and amenity of the child care centre.

Minor deliveries associated with the centre operation are expected to be undertaken by vans and utilities. Such servicing activities are proposed to be accommodated within single visitor passenger vehicle parking spaces located within the on-site car park. These activities are also to be undertaken between 10:00am and 2:00pm, thereby being outside the peak child set-down / pick-up periods of the centre.

3.4 Internal Circulation and Manoeuvrability

The basement parking area contains a single standard 90-degree angled parking row along the northern side of the basement and five parallel parking spaces along the southern side of the basement, being serviced by an adjacent central parking aisle, forming an extension of the site access ramp / roadway.

The parking area has generally been designed to accord with the minimum requirements of AS2890.1:2004 and AS2890.6:2022 providing the following minimum dimensions:

- Standard 90-degree angled visitor parking space width = 2.6m;

- Disabled 90-degree angled visitor vehicle parking space width = 2.4m (with adjoining 2.4m wide shared area);

- 90-degree angled staff parking space width = 2.4m;

- Staff parallel parking space width= 2.1m;

- Additional width of parking space adjacent to obstruction = 300mm;

- 90-degree angled parking space length = 5.4m;

- Obstructed end parallel parking space length= 6.2m;

- Unobstructed end parallel parking space length = 5.4m;
- Minimum parking aisle width = 6.3m;
- Maximum grade within the parking module = 1:20;
- Maximum grade of parking module including a disabled parking space = 1:40;
- Maximum grade within 6m of the property boundary = 1:20;
- Width of blind aisle extension = 1.0m;
- Minimum clearance = 2.2m;
- Minimum clearance above disabled parking space = 2.5m;
- Maximum grade of 1:20 within 6m of the property boundary;
- Maximum grade = 1:4.6; and
- Maximum change in grade of 1:8.

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 AS2890.6:2022 specifications.

In order to demonstrate the internal passenger vehicle manoeuvrability within the vicinity of these areas and generally throughout the overall parking area, assuming that the above design recommendations have been incorporated, this Practice has prepared a number of swept path plans which are included as **Appendix 2**. The turning paths provided on the plans have been generated using Autoturn software and derived from B99 and B85 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 AS2890.1:2004 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 the parking area and enter and exit the most difficult passenger vehicle parking spaces.

It is acknowledged that the proposed parking area forms a dead-end parking aisle; however, a 3.4m wide turning bay is provided at the northern end of the parking aisle, allowing vehicles the ability to perform internal turnaround movements in the unlikely event that all parking spaces are occupied and exit the site in a forward direction.

In consideration of the abovementioned compliance of the development design with the relevant requirements of the Australian Standards, the proposed internal passenger vehicle circulation arrangements are considered to be satisfactory.

3.5 Internal Pedestrian Circulation

Pedestrian access is proposed via a pedestrian path connecting the child care centre building and the eastern Maitland Street footway separate and to the north of the vehicular access driveway.

Further to the above, pedestrian connectivity between the parking area and the building is proposed via pedestrian pathways provided adjacent to the on-site visitor parking spaces. This pedestrian path provides direct access from the parking spaces to the child care centre entrance foyer, clear of the vehicular circulation areas. Visiting pedestrians are not required to cross the parking circulation aisle at any time.

3.6 Child Care Planning Guideline Compliance

Tables 2, 3 and **4** on the following pages, with reference to the information contained within this report, describe the compliance of the proposed child care centre development with respect to Consideration 35, 36 and 37 of NSWs' *Child Care Planning Guideline*.

TABLE 2 CHILD CARE PLANNING GUIDELINE – CONSIDERATION 35	
Consideration 35. The following design solutions may be incorporated into a development to help provide a safe pedestrian environment:	
Consideration requirements	**Response / Section of Report**
• *Separate pedestrian access from the car park to the facility*	As shown in **Appendix 2**, separated pedestrian access is provided to the facility via a pedestrian path provided to the north and separate to the vehicular driveway connecting directly with the eastern Maitland Street pedestrian footway. Additionally, a pedestrian path is provided adjacent to each visitor parking space which provides safe access the child care centre building along the periphery of the parking area.
• *Defined pedestrian crossings included within large car parking areas*	As shown in **Appendix 2**, the parking area has been designed so that visiting pedestrians are not required to cross the parking aisle.
• *Separate pedestrian and vehicle entries from the street for parents, children and visitors*	As shown in **Appendix 2**, separated pedestrian access is provided to the facility, located to the north of the vehicular access driveway connecting to the eastern Maitland Street footway.
• *Pedestrian paths that enable two prams to pass each other*	A minimum 1.0m wide pedestrian walkway is provided between each visitor parking space and the pedestrian entrance to the building. Research and experience suggest that the average pram width is approximately 500mm. Therefore, in most instances the 1.0m wide pedestrian path will safely accommodate the passing of two prams. However, when this is not possible it is considered that courtesy conditions will prevail and there are localised areas of path widening allowing parents / visitors to negotiate the pedestrian walkways within the parking area safely and efficiently.
• *Delivery and loading areas located away from the main pedestrian access to the building and in clearly designated, separate facilities*	Section 3.3 describes that deliveries and loading is to occur from within visitor parking spaces. Deliveries are to occur outside of peak set-down / pick-up hours therefore not impacting pedestrian movements.
• *Minimise number of locations where pedestrians and vehicles cross each other*	Section 3.7 describes an internal pedestrian circulation system that minimises pedestrians and vehicles crossing each other.
• *In commercial or industrial zones and mixed-use developments the path of travel from the car parking to the centre entrance physically separated from any truck circulation or parking areas*	The subject site is situated in the R1 – general residential zone according to the Muswellbrook LEP 2009, therefore not applicable.
• *Vehicles can enter and leave the site in a forward direction*	As shown in the swept path assessment in **Appendix 3**, all vehicles are capable of entering and exiting the site in a forward direction and are to do so at all times.
• *Clear sightlines are maintained for drivers to child pedestrians, particularly at crossing locations*	Section 3.1.1 states that the vehicular ingress and egress point has clear sightlines for pedestrians and vehicles.

TABLE 3 CHILD CARE PLANNING GUIDELINE – CONSIDERATION 36	
Consideration 36. Mixed use developments should include:	
Consideration requirements	**Response / Section of Report**
• *Driveway access, manoeuvring areas and parking areas for the facility that are separate to parking and manoeuvring areas used by trucks*	Not applicable to the proposed development.
• *Drop off and pick up zones that are exclusively available for use during the facility's operating hours with spaces clearly marked accordingly, close to the main entrance and preferably at the same floor level. Alternatively, direct access should avoid crossing driveways or manoeuvring areas used by vehicles accessing other parts of the site*	Not applicable to the proposed development.
• *Parking that is separate from other uses, located and grouped together and conveniently located near the entrance or access point to the facility*	Not applicable to the proposed development.

TABLE 4 CHILD CARE PLANNING GUIDELINE – CONSIDERATION 37	
Consideration 37. Car parking design should:	
Consideration requirements	**Response / Section of Report**
• *Include a child safe fence to separate car parking areas from the building entrance and play areas*	As shown on the development plans in **Appendix 2**, all outdoor play areas are proposed to be contained within ground level areas protected by a child safe fence thereby being separate from the basement level car parking area.
• *Provide clearly marked accessible parking as close as possible to the primary entrance to the building in accordance with appropriate Australian Standards*	As shown on the development plans in **Appendix 2**, one disabled parking space is proposed within the basement parking area in accordance with AS2890.6:2022, positioned directly adjacent to the child care building entrance.
• *Include wheelchair and pram accessible parking*	As shown on the development plans in **Appendix 2**, one disabled parking space is proposed within the basement parking area directly adjacent to the building entry. All other visitor spaces are capable of being used by parents with prams.

4. PRE-DEVELOPMENT TRAFFIC CONDITIONS

4.1 Surrounding Road Network

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

- **Maitland Street** performs a State Road function forming a portion of the NSW Route A15 (New England Hwy) between Muswellbrook to Lower Belford under the care and control of TfNSW. In a local context, Maitland Street provides a north-west / south-east alignment between Sydney Street in the north-west and Bimbadeen Drive in the south-east.

  In the vicinity of the site, Maitland Street provides a dual carriageway facilitating two through traffic lanes in conjunction with a marked parallel parking lane in each direction, with the carriageways being separated by a median turning lane adjacent to and to the south-east of the subject site and a vegetated median immediately to the north-west of the site. Additional dedicated turning lanes are provided within Maitland Street on approach to major intersections. Traffic flow within Maitland Street is governed by a sign posted speed limit of 50km/h directly adjacent to the site, which increases to a 60km/h speed limit to the south-east of the site.

  To the north-west of the site, Maitland Street forms a junction with Rutherford Road operating under traffic signal control, allowing for all movements.

- **Rutherford Road** performs a collector road function operating under the care and control of Muswellbrook Shire Council, providing a north-east / south-west alignment between Maitland Street in the north-east and Ironbark Road in the south-west.

  Rutherford Road generally provides one through lane in each direction being separated by a vegetated central median. Traffic flow within Rutherford Road is governed by 50km/h.

4.2 Pre-Development Traffic Volumes (2023)

Staff of this Practice have undertaken peak hour traffic surveys of the junction of Maitland Street and Rutherford Road in order to accurately ascertain existing traffic demands within the immediate precinct.

Surveys were undertaken between 7:00am – 9:00am and 4:00pm – 6:00pm on Wednesday the 21st of June 2023.

Figure 3 provides a summary of the surveyed peak hour intervals of traffic flows at the subject intersections during the morning and evening peak hour, whilst full details are contained within **Appendix 4**.

FIGURE 3
PRE-DEVELOPMENT (2023) WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD

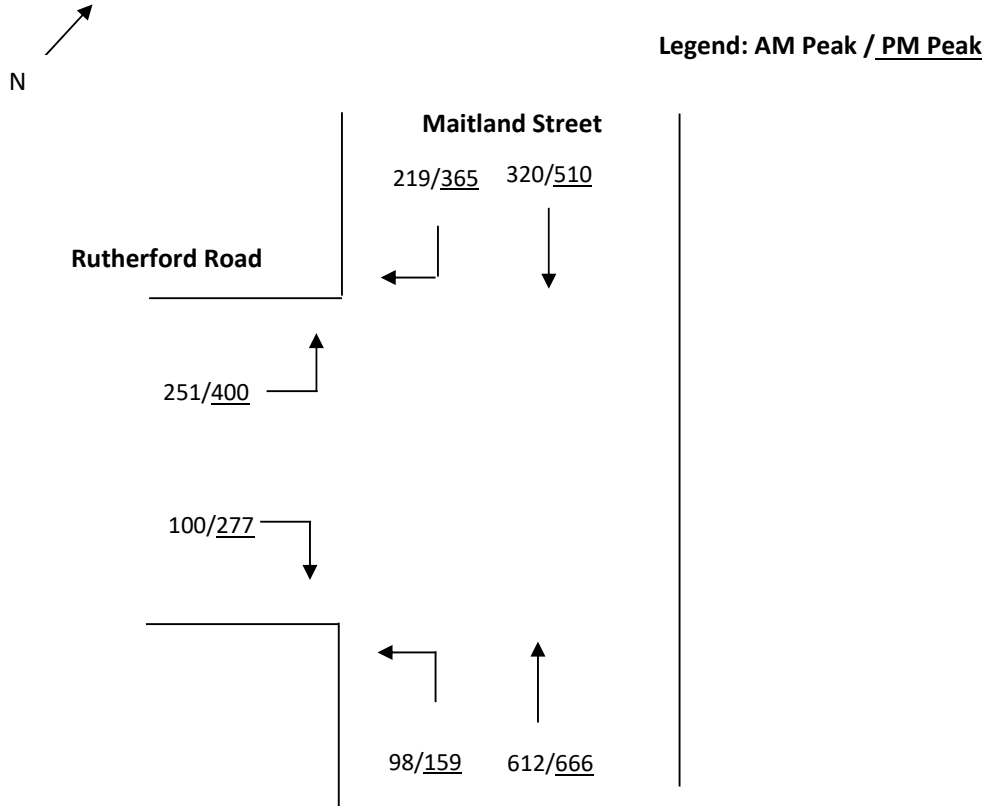


Figure 3 indicates the following:

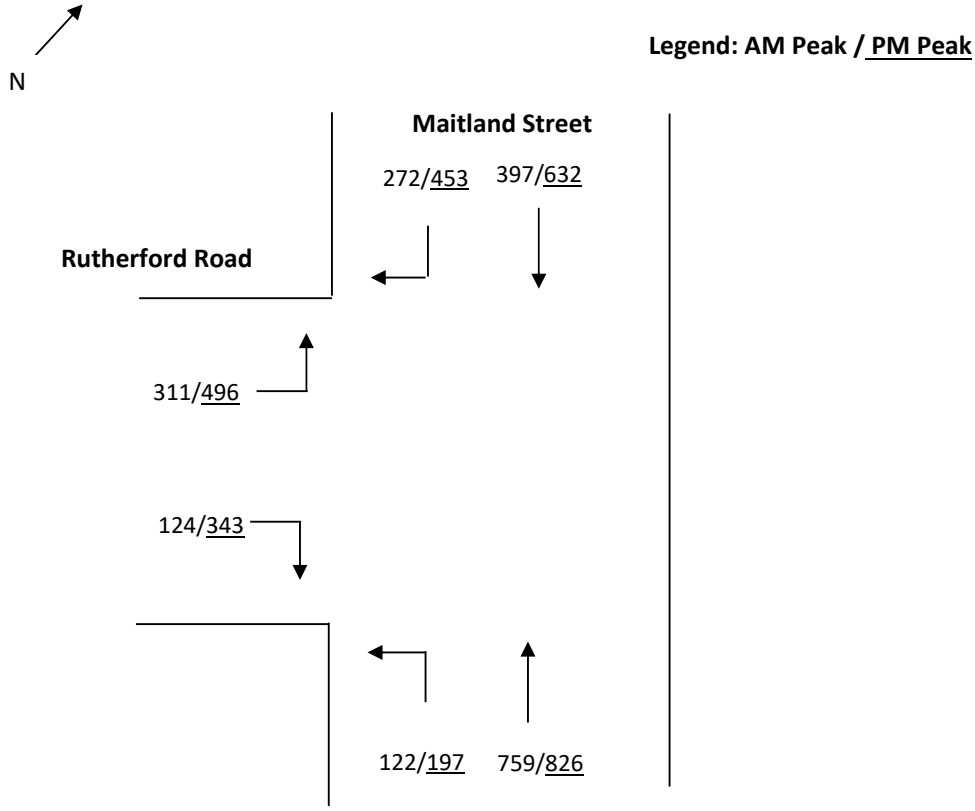
- Maitland Street accommodates directional traffic demands of between approximately 500 – 900 vehicles during weekday peak hours; and
- Rutherford Road accommodates directional traffic demands of between approximately 300 – 350 vehicles per hour during the weekday morning peak hour; and
- Rutherford Road accommodates directional traffic demands of between approximately 550 – 700 vehicles per hour during the weekday afternoon peak hour.

4.3 Pre-Development Traffic Volumes (2033)

In order to estimate projected 2033 traffic demands in the vicinity of the site, a conservative 2% annual growth rate was applied to the surveyed peak hour traffic volumes presented within **Figure 3**. Over a 10 year period, this equated to a total growth rate of 24% for all traffic movements.

Figure 4 overleaf illustrates the estimated (2033) traffic volumes.

FIGURE 4
ESTIMATED PRE-DEVELOPMENT (2033) TRAFFIC VOLUMES
WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD



4.4 Road Network Operation

4.4.1 Intersection Modelling

The surveyed intersection of Maitland Street and Rutherford Road has been analysed utilising the SIDRA computer intersection analysis program in order to objectively assess the operation of the nearby public road network.

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 TfNSW.

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.

The NSW modelling guidelines 2013 sets out the method which should be followed for Sidra modelling. The relevant criteria are listed in **Table 5** and the calibration procedures undertaken by this Practice.

TABLE 5 GETTING STARTED SIDRA MODELLING	
Detail	**Adopted Modelling Parameters and Assumptions**
Getting Started	• The latest version of Sidra Intersection 9.1 (version 9.1.3.210) was used.
Input	• Data was input for a 60-minute period with a maximum peak flow period of 30 minutes.
Geometry	• All intersection geometry was based on measurements taken on-site and measured through aerial photography from Nearmap.
Saturation Flow	• The default saturation flow was adopted for all lanes.
Volumes	• The volume of heavy vehicles was assumed to be 5% of the total volume for all roads that do not have applicable load limits. • The default 95% peak flow factor was adopted for all movements.
Movement Data	• Approach and exit speed data were updated as per the posted speed limits or where no signage exists, a 50km/h default speed was adopted.
Priorities	• Default priorities modelled.
Gap Acceptance	• The Sidra default gap acceptance values were adopted for all movements.
Pedestrians	• Pedestrian crossing distances were measured utilising aerial images via Nearmap and input into the model for all signalised pedestrian crossings. • Pedestrian volumes were approximated at 10 pedestrians per peak hour for all signalised pedestrian crossings based upon observed pedestrian activity.
Phasing and Timing	• A user-given cycle time of 70 seconds has been input based on observations of the intersection. • A three phase (A,B,C) intersection operation was input based on observations of the operation of the intersection.

SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 6** overleaf (being Transport for NSW method calculation of Level of Service).

TABLE 6 LEVEL OF SERVICE CRITERIA FOR SIGNALISED INTERSECTIONS		
Level of Service	**Average Delay per Vehicle (secs/veh)**	**Expected Delay**
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

4.4.2 Intersection Performance

The existing (2023) and the estimated (2033) conditions have been modelled utilising the peak hour traffic volumes presented within **Figures 3** and **4.**

Table 7 provided below provideS a summary of the SIDRA output data whilst more detailed summaries are included as **Appendix 5**.

TABLE 7 SIDRA OUTPUT – EXISTING (2023) AND PROJECTED (2033) WEEKDAY PEAK HOUR PERFORMANCE JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD				
	EXISTING (2023)		**ESTIMATED (2033)**	
	AM PEAK	**PM PEAK**	**AM PEAK**	**PM PEAK**
Maitland Street North Approach				
Delay (seconds / vehicle)	9.3	16.0	11.3	18.2
95th Percentile Queue (m)	37.6	72.1	53.3	101.3
Degree of Saturation	0.36	0.66	0.48	0.80
Level of Service	A	B	A	B
Maitland Street South Approach				
Delay (seconds / vehicle)	21.6	35.9	24.6	36.9
95th Percentile Queue (m)	66.4	101.4	90.4	133.6
Degree of Saturation	0.51	0.82	0.65	0.88
Level of Service	B	C	B	C
Rutherford Road Approach				
Delay (seconds / vehicle)	21.4	28.1	21.9	28.4
95th Percentile Queue (m)	39.6	90.2	51.1	117.3
Degree of Saturation	0.37	0.89	0.65	0.91
Level of Service	B	B	B	B
Total Intersection				
Delay (seconds / vehicle)	17.4	26.3	19.5	27.6
95th Percentile Queue (m)	66.4	101.4	90.4	133.6
Degree of Saturation	0.51	0.89	0.65	0.91
Level of Service	B	B	B	B

Table 7 indicates that the junction of Maitland Street and Rutherford Road provides the following:

- The existing (2023) traffic volumes result in an intersection level of service 'B' during the morning and afternoon peak hours, representing minimal delays and spare capacity; and

- The estimated (2033) traffic volumes result in some minor increases to the average vehicle delay and degree of saturation, however, the overall level of service for the total intersection is projected to remain a 'B', representing minimal delay and spare capacity.

4.4.3 Maitland Street

4.4.3.1 Level of Service

Reference is made to TfNSW's *Guide to Traffic Generating Developments* to undertake an assessment of the operational performance of Maitland Street in the immediate vicinity of the subject site. **Table 8** below provides the level of service assigned to peak hour directional traffic flow within Maitland Street (adjacent to the site) based on the abovementioned traffic surveys and criteria specified within the *Guide to Traffic Generating Developments*.

TABLE 8
MAITLAND STREET DIRECTIONAL TRAFFIC FLOW (ADJACENT TO THE SITE)
LEVEL OF SERVICE

	EXISTING (2023)		PROJECTED (2033)	
	AM PEAK	PM PEAK	AM PEAK	PM PEAK
Northbound Traffic Flow				
Total Volume	863	1066	1070	1322
Level of Service	A	B	B	B
Southbound Traffic Flow				
Total Volume	539	875	669	1085
Level of Service	A	A	B	B

TfNSW provides the following definitions for the level of service for urban road peak hour flows per direction as presented within **Table 8**:

Level of Service A
This, the top level is a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.

Level of Service B
This level is in the zone of stable flow and drivers still have reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is little less than that of the level of Service A.

Table 8 indicates that both northbound and southbound Maitland Street traffic flow is provided with a level of service between 'A' and 'B' during weekday commuter peak periods, representing a level of free to stable flow where motorists generally have freedom to select their desired speed and manoeuvre within the traffic stream unaffected.

4.5 Safety Assessment

This Practice has undertaken a review of the crash history for the last five available year-periods (2017 – 2021) at the site access driveways and the nearby surveyed intersections via the TfNSW website for the Centre of Road Safety (https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/index.html accessed 14/04/2023).

The review of the crash history has indicated that there has been one recorded crash in the general vicinity of the subject site occurring at approximately 150m to the south within the northbound carriageway of Maitland Street.

The crash occurred in 2020 and resulted in an injury with a description of a lane sideswipe.

4.6 Sustainable / Active Transport

4.6.1 Buses

The following bus routes operate in the vicinity of the subject site:

- Route 413 – Muswellbrook to Highbrook (Loop Service), operates along Maitland Street with the closest bus stop to the site situated on the southern side of Maitland Street at approximately 540m to the south-east of the site.

- Route 418 – Muswellbrook to Eastlinks (Loop Service), operates along Maitland Street and Rutherford Road with the clsoest bus stop tot eh site situated on Woollybutt Way at approximately 450m to the north-west of the site.

The above routes provide a collective service frequency of approximately 30 minutes on weekdays and an hourly service on weekends and public holidays.

4.6.2 Pedestrians

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

- A footpath is provided along the western side of Maitland Street;

- A footpath is provided along both sides of Rutherford Road;

- A pedestrian refuge is provided across Rutherford Road situated approximately 50m to the west of Maitland Street;

- Signalised pedestrian crossings are provided across all approaches of the junction of Maitland Street and Rutherford Road; and

- A pedestrian refuge is provided across Maitland Street approximately 30m south of the site.

4.7 Existing On-Street Parking Conditions

In order to obtain an indication of the existing parking demand of the on-street parking infrastructure adjacent to the site, parking demand surveys were undertaken by staff of this Practice between 7:00am – 9:00am and 4:00pm – 6:00pm on Wednesday the 21st of June 2023 at 15-minute increments.

A total of 16 unrestricted on-street parking spaces were surveyed along the eastern kerb alignment of Maitland Street between No. 114 Maitland Street and the ingress driveway of No. 124 Maitland Street.

Table 10 below provides an hourly summary of the parking demand survey results undertaken of the abovementioned parking spaces during the survey periods.

TABLE 10 ON-STREET PARKING DEMAND SURVEY EASTERN KERB ALIGNMENT OF MATILAND STREET (BETWEEN No. 114 and No. 124 MAITLAND STREET)	
Time	**Eastern Side of Maitland Street Capacity = 16 spaces**
MORNING PERIOD	
7:00am	1
8:00am	1
9:00am	2
AFTERNOON PERIOD	
4:00pm	2
5:00pm	1
6:00pm	1

Table 10 indicates that the peak instantaneous on-street parking demand during both survey periods was two vehicles during the hours of 9:00am and 4:00pm. During this time, 14 parking spaces remained available along the eastern kerb of Maitland Street directly adjacent and in close proximity of the subject site.

5. POST-DEVELOPMENT 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*. This publication specifies the following traffic generation rates for child care centres:

0.8 vehicle trips per child during the morning commuter peak hour
0.7 vehicle trips per child during the evening commuter peak hour

Application of the above traffic generation rates to the proposed capacity of 92 children, the child care centre results in an estimated development traffic generation of approximately 74 vehicle trips per hour during the morning peak and 65 vehicle trips per hour during the evening peak.

5.2 Traffic Distribution

The development-generated trips are likely to be evenly distributed between inbound and outbound movements associated with the setting down and picking up of children during the morning and evening peak periods, respectively. The development is therefore projected to generate 37 ingress and 37 egress movements during the morning peak hour and 32 ingress and 33 egress movements during the evening peak hour.

For the purposes of this assessment, it has been assumed that the ingress and egress trips have been assigned with a proportional distribution to the existing traffic volumes throughout the possible approaches to the site.

Therefore, development generated traffic has been assigned as follows:

- 40% to / from the north-west via Maitland Street;
- 40% to / from the south-east via Maitland Street; and
- 20% to / from the south-west via Rutherford Road.

Figure 4 provided overleaf indicates diagrammatically the above traffic distribution based on the possible approach and departed routes to the subject site and their impacts on the nearby junction of Maitland Street and Rutherford Road.

FIGURE 4
EXISTING WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD

On this basis, the projected peak hour traffic volumes at the surveyed intersections have been formulated by adding the abovementioned traffic generation and trip assignment to the existing demands presented within **Figures 3** and **4**. **Figures 5** and **6** provided below and overleaf provides an estimation of the future traffic demands at the nearby public road intersection.

FIGURE 5
POST-DEVELOPMENT (2023) WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD

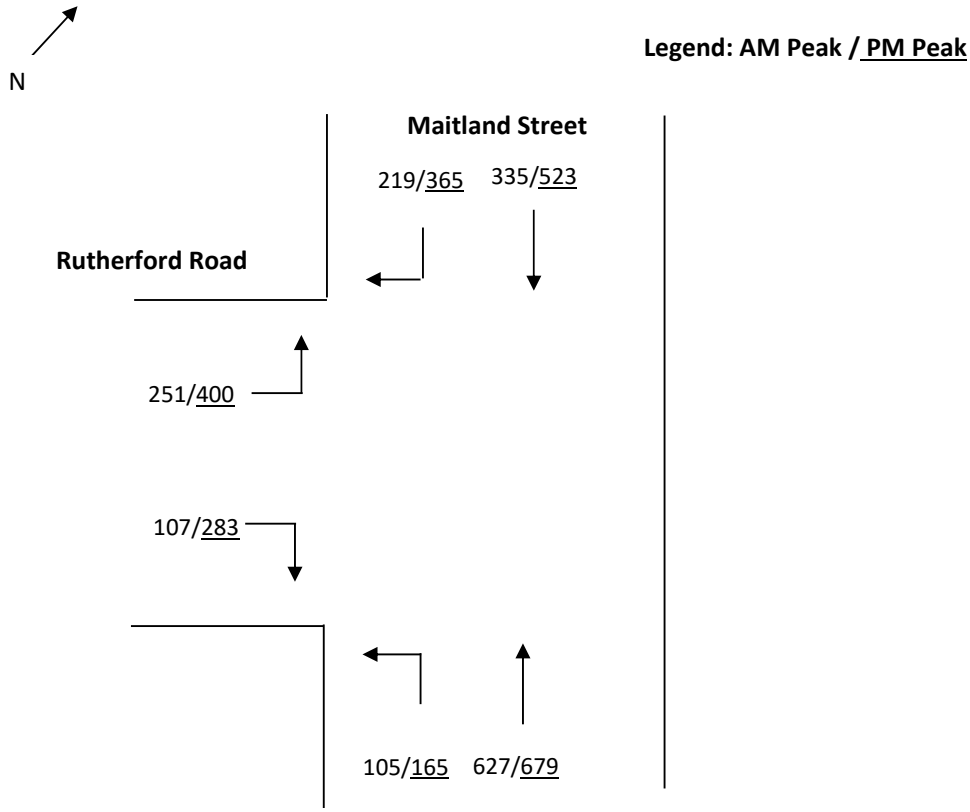
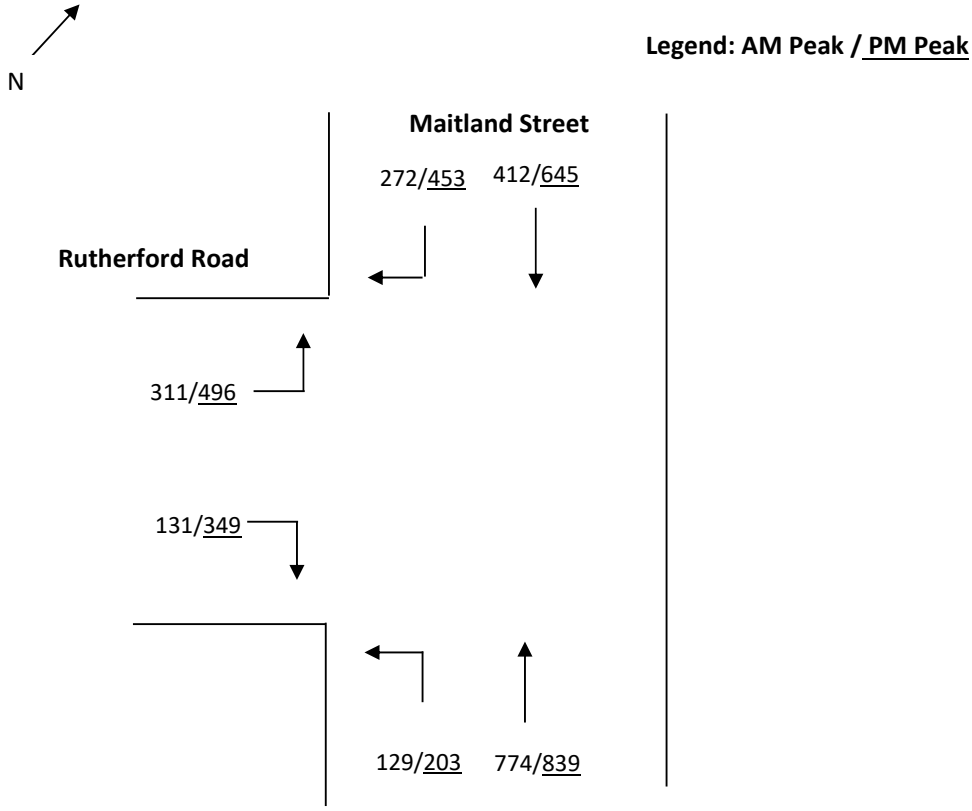


FIGURE 6
ESTIMATED POST DEVELOPMENT (2033) WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD



5.3 Traffic Impacts

5.3.1 Intersection Performance

The intersections have been modelled in order to estimate the likely impact on traffic safety and efficiency utilising the projected traffic volumes illustrated within **Figures 5** and **6**. A summary of the most pertinent results is provided overleaf Within **Tables 11** whilst more detailed summaries are provided within **Appendix 6**.

TABLE 11 SIDRA OUTPUT –WEEKDAY PEAK HOUR PERFORMANCE JUNCTION OF MAITLAND STREET AND RUTHERFORD ROAD								
	Pre-Development (2023)		Pre-Development (2033)		Post-Development (2023)		Post-Development (2033)	
	AM	PM	AM	PM	AM	PM	AM	PM
Maitland Street North Approach								
Delay (seconds / vehicle)	9.3	16.0	11.3	18.2	9.4	17.0	11.7	18.8
95th Percentile Queue (m)	37.6	72.1	53.3	101.3	38.3	75.4	54.6	104.1
Degree of Saturation	0.36	0.66	0.48	0.80	0.36	0.70	0.50	0.82
Level of Service	A	B	A	B	A	B	A	B
Maitland Street South Approach								
Delay (seconds / vehicle)	21.6	35.9	24.6	36.9	21.9	37.0	24.5	36.3
95th Percentile Queue (m)	66.4	101.4	90.4	133.6	68.5	105.7	97.3	133.6
Degree of Saturation	0.51	0.82	0.65	0.88	0.52	0.84	0.67	0.88
Level of Service	B	C	B	C	B	C	B	C
Rutherford Road Approach								
Delay (seconds / vehicle)	21.4	28.1	21.9	28.4	21.7	25.9	22.7	28.5
95th Percentile Queue (m)	39.6	90.2	51.1	117.3	39.6	85.2	52.6	117.9
Degree of Saturation	0.37	0.89	0.65	0.91	0.40	0.85	0.48	0.91
Level of Service	B	B	B	B	B	B	B	B
Total Intersection								
Delay (seconds / vehicle)	17.4	26.3	19.5	27.6	17.6	26.5	19.9	27.7
95th Percentile Queue (m)	66.4	101.4	90.4	133.6	68.5	105.7	97.3	133.6
Degree of Saturation	0.51	0.89	0.65	0.91	0.52	0.85	0.67	0.91
Level of Service	B	B	B	B	B	B	B	B

Table 11 indicates that the additional traffic generated by the development is not projected to result in significant impacts on the existing 2023 or estimated 2033 operational performance of the junction of Maitland Street and Rutherford Road. Whilst it is expected that the additional traffic will result in some minor increases to the average vehicle delay and the degree of saturation, the overall level of service for the total intersection is projected to remain a 'B', representing minimal delays and spare capacity.

5.3.2 Maitland Street

The development has been projected to generate up to 74 vehicle movements per hour during commuter peak periods. Such a peak hour traffic generation equates to approximately one additional vehicle movement every minute during peak periods, which is not projected to, in itself, result in any unreasonable impacts on the existing operational performance of the surrounding local road network.

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 good sight distance provisions between the frontage road and the driveway location is such that it is envisaged that motorists will be capable of entering and exiting the site in a safe manner.

Whilst through traffic demands within Maitland Street are notable, the previous analysis indicates that motorists are provided with a reasonable level of service with spare capacity. The previous SIDRA analysis indicates that turning movements to and from the site are projected to be capable of occurring without notable delay and with little or no impact on existing through traffic demands within Maitland Street, being considerably assisted by the prevalence of the median turning lane. There accordingly doesn't appear to be an operational warrant for the provision of any upgrade to the existing formalised turning treatment or public road infrastructure upgrade.

5.3.3 Infrastructure SEPP Clause 2.119

As the proposed development provides frontage to Maitland Street, being a classified road, the development is subject to the following objectives of Clause 2.119 of State Environmental Planning Policy (Transport and Infrastructure) 2021:

(a) to ensure that new development does not compromise the effective and ongoing operation and function of classified roads, and

(b) to prevent or reduce the potential impact of traffic noise and vehicle emission on development adjacent to classified roads.

With respect to Clause 2.119, it is acknowledged that the development has been projected to generate up to 66 vehicle movements per hour during commuter peak periods. Such a peak hour traffic generation, equating to approximately one additional vehicle movement every minute during commuter peaks, is not projected to, in itself, result in any unreasonable impacts on the existing operational performance of the surrounding local road network, as outlined within Section 5.3 of this report. In this regard, post development SIDRA modelling indicates that the extent of additional traffic is not projected to measurably impact the existing operational performance of the nearby public road intersections. Accordingly, this proportion of additional traffic is not envisaged to result in any unreasonable impacts on the existing operational performance of Maitland Street.

Further, as Maitland Street accommodates on-street parallel parking in proximity of the site it is considered that vehicles travelling within Maitland Street, are aware of the propensity for vehicles to lower speeds and perform parking movements into kerb-side parallel parking spaces. Therefore, as the proposed child care centre provides the required amount of on-site parking, it is considered that site access / egress movements into the child care centre are not envisaged to influence State Road traffic flow. In consideration of this and the above discussion, it is concluded that the nature, volume and frequency of vehicles utilising Maitland Street to obtain access to the subject site will not unreasonably compromise the effective and ongoing operation and function of the classified road.

Impacts of the above extent of additional traffic on vehicle noise and emissions as referenced in Clause 101(b) of State Environmental Planning Policy (Infrastructure) 2007 are addressed by others under separate cover.

5.4 Parking Impacts

The proposed development provides an off-street parking provision which complies with the requirements of DCP 2009. It is accordingly not expected that the development will result in unreasonable impacts on surrounding public road parking supply / capacity, particularly with the appropriate implementation of a Neighbourhood Parking Policy discussed within Section 3.2.2.4 of this report.

Notwithstanding the above, in the unlikely event that the subject site results in the requirement for site users to utilise on-street parking, Section 4.7 of this report demonstrates that there is capacity for additional parking demand during peak periods within the northern kerb alignment of Maitland Street, adjacent to the subject site.

5.5 Pedestrian Impacts

Whilst pedestrian demands within the eastern Maitland Street footway have been observed to be particularly low, it is expected that the development may generate some additional demand for pedestrian movements linking with both the signalised pedestrian crossings over the southern Maitland Street approach to Rutherford Road and the pedestrian refuge situated 30m to the south of the site. It is accordingly recommended that consideration be given to the construction of a footpath along the eastern Maitland Street footway between Rutherford Road and the abovementioned refuge 30m to the south of the site.

5.6 Transport Impacts

The subject site is located within reasonably close walking distance to a bus service operating along Maitland Street and rail services operating out of Muswellbrook Railway Station. It is accordingly expected that a portion of the future site visitors and staff will utilise the surrounding public transport infrastructure to access destinations throughout the surrounding Muswellbrook 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.

5.7 Construction Traffic Volumes

Construction traffic to and from the site will be detailed within a Construction Traffic Management Plan (CTMP) prior to the issue of a Construction Certificate, the requirement for which is expected to form a condition of consent. However, from previous experience, a child care centre of this scale is projected to generate up to two heavy vehicle movements per hour; that is two ingress movements and two egress movements during all construction stages. Traffic generated during the construction stage of the development is greatly reduced in comparison to traffic generated during the operation stage of the development. On this basis, construction impacts are expected to be negligible.

6. CONCLUSION

This report assesses the potential parking and traffic implications associated with a proposed child care centre at 118 Maitland Street, Muswellbrook. Based on this assessment, the following conclusions are now made:

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

- The 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 parking provision complies with the minimum requirements of DCP 2009;

- Notwithstanding the above, surveys have demonstrated that there is some supply to accommodate additional on-street parking demand in the unlikely event that it is generated by the proposed development (or other surrounding land-uses);

- The internal passenger vehicle circulation arrangements are envisaged to provide for safe and efficient internal manoeuvring;

- The subject development has been projected to generate up to 74 vehicle movements to and from the site during weekday peak hours; and

- The surrounding road network is considered to be capable of accommodating the additional traffic projected to be generated by the subject development.

Notwithstanding the above findings, the following measure is recommended for consideration to assist in the accommodation of the subject development in a safe and efficient manner:

- The construction of a pedestrian footpath along the eastern Maitland Street footway between Rutherford Road and the existing refuge within Maitland Street approximately 30m to the south of the site.

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

APPENDIX 1

From: Development North <Development.North@transport.nsw.gov.au>
Sent: Thursday, June 8, 2023 2:17 PM
To: morgan@stanburytraffic.com.au
Cc: mina@artmade.com.au; alok@artmade.com.au
Subject: RE: 118 Maitland Street, Muswellbrook: Request for Pre-DA Advice

Hi Morgan,

I refer to your email seeking TfNSW advice about the proposed child care centre at 118 Maitland Street, Muswellbrook.

TfNSW have reviewed the information supplied and offer the below preliminary advice/comments to assist your future DA lodgement:

A Traffic Impact Assessment (TIA) be prepared by suitably qualified person/s in accordance with the Austroads Guide to Traffic Management Part 12, the complementary TfNSW Supplement and RTA Guide to Traffic Generating Developments.

The TIA is to identify the impacts of the development and the proposed on-site and off-site measures proposed to mitigate the impacts of the development on any road or rail related infrastructure. The TIA must explain and justify all inputs informing the proposed mitigation measures and TIA conclusions.

The TIA should be tailored to the scope of the proposed development and include, but not necessarily be limited to, consideration of the following;

- A map of the surrounding road network identifying the site access, nearby accesses, intersections and transport related facilities.
- Assessment of all relevant vehicular traffic routes and intersections for access to / from the subject properties.
- Current traffic counts for all relevant traffic routes and relevant intersections, including connections to the classified (State) road network.
- The anticipated additional vehicular traffic generated from both the construction and operational stages of the project.
- The distribution on the road network of the trips generated by the proposed development. It is requested that the predicted traffic flows are shown diagrammatically to a level of detail sufficient for easy interpretation.
- An assessment of turn treatment warrants in accordance with the Austroads Guide to Traffic Management Part 6 and Austroads Guide to Road Design Part 4A for relevant intersections along the identified transport route/s, including connections to the classified (State) road network.
- Consideration of the parking and storage of drop off and pick up and the impacts that will have on Maitland Street.
- Consideration of the traffic impacts on relevant intersections. Consideration shall also include access to the site, and the capacity of the local and classified road network to safely and efficiently cater for the additional vehicular traffic generated by the proposed development, during both the construction and operational stages. The traffic impact shall also include the cumulative traffic impact of other approved developments in the area.
- Traffic analysis of any major / relevant intersections impacted, using SIDRA or similar traffic model, including:
    - Current traffic counts and 10 year traffic growth projections
    - With and without development scenarios

    - 95th percentile back of queue lengths
    - Delays and level of service on all legs for the relevant intersections
    - Electronic data/file for TfNSW review.
- Identify the necessary road network infrastructure upgrades that are required to maintain existing levels of service on both the local and classified road network for the development. In this regard, Strategic design drawings should be submitted with the SEE for any identified road infrastructure upgrades. It should be noted that any identified road infrastructure upgrades must be appropriately designed for the existing posted speed limit and will need to be to the satisfaction of Transport for NSW and Council.
- A review of crash data along the identified transport route/s for the most recent 5 year reporting period and an assessment of road safety along the proposed transport route/s considering the safe systems principles adopted under Future Transport 2056.
- Relevant swept path analysis for the largest design vehicle accessing the site.
- Any other impacts to the road network including consideration of active transport and public transport facilities.

TfNSW would like to highlight that these comments are preliminary and based on the information available to us at the time of investigation. They are not to be interpreted as binding upon TfNSW and may change following formal assessment of a submitted development application from the appropriate consent authority.

Regards,

Shengxi Lin
Development Services Case Officer
Development Services
Regional and Outer Metropolitan
Transport for NSW

T 1300 207 783 **M** 0476 505 715 **E** development.north@transport.nsw.gov.au

W transport.nsw.gov.au

Newcastle Regional Office, Region North
6 Stewart Avenue, Newcastle NSW 2302
Locked Bag 2030, Newcastle NSW 2302

NSW GOVERNMENT Transport for NSW

From: Morgan Stanbury <morgan@stanburytraffic.com.au>
Sent: Wednesday, 31 May 2023 1:18 PM
To: Development hunter <Development.Hunter@transport.nsw.gov.au>
Cc: Mina Saad <mina@artmade.com.au>; Alok Sabne <alok@artmade.com.au>
Subject: 118 Maitland Street, Muswellbrook: Request for Pre-DA Advice

You don't often get email from morgan@stanburytraffic.com.au. Learn why this is important

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To Whom It May Concern,

Stanbury Traffic Planning, a Sydney-based traffic engineering consultancy, is currently assisting in the formulation of a Development Application seeking consent for the demolition of an existing detached residence at 118 Maitland Street, Muswellbrook, and the construction of a purpose built child care centre, capable of accommodating 82 children.

Below is a snip of a Six Maps aerial of the site and adjacent Maitland Street:

The centre is proposed to be contained within a single building situated approximately within the south-western portion of the subject site, being serviced by a single basement level of car parking containing 19 passenger vehicle parking spaces.

Vehicular access is proposed via a driveway connecting with Maitland Street in the south-western corner of the site.

Unrestricted site access / egress movements are proposed, being facilitated by the prevailing median turning lane separating north and southbound Maitland Street travel lanes adjacent to the site.

To assist in the understanding of the Application, please see attached a preliminary floor and section plan prepared by ArtMade Architects.

It is intended that this Practice will prepare a detailed parking and traffic impact assessment to analyse the site access, internal circulation, parking and servicing arrangement in conjunction with the operational performance of the adjacent public road network and the

ability or otherwise of the road network to accommodate the additional traffic projected to be generated by the development. This assessment will be formulated following feedback from TfNSW.

A formal pre-DA meeting has been scheduled with Muswellbrook Shire Council on Friday the 9th of June.

It would be appreciated if the attached preliminary documentation could be forwarded to the relevant TfNSW officers with a view to obtaining pre-DA comments on the Application. If practicable, it would be most appreciated if TfNSW could provide any pre-DA feedback prior to the scheduled pre-DA meeting with Council.

Don't hesitate to call to discuss as required.

Kind Regards

Morgan Stanbury
Director

Stanbury Traffic Planning
401/380 Harris Street
Pyrmont NSW 2009

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e morgan@stanburytraffic.com.au
w www.stanburytraffic.com.au

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APPENDIX 2

ARTIST'S IMPRESSION ONLY

ARCHITECTURAL DRAWING LIST - DA			
SHETT NUMBER	SHEET NAME	CURRENT REVISION	REVISION DATE
DA00.00	COVER PAGE	A	12.03.2024
DA02.01	SITE PLAN / DEMOLITION	A	12.03.2024
DA03.01	BASEMENT FLOOR PLAN	A	12.03.2024
DA03.02	GROUND FLOOR PLAN	A	12.03.2024
DA03.03	FIRST FLOOR PLAN	A	12.03.2024
DA03.04	AREA CALCULATIONS	A	12.03.2024
DA04.01	EXTERNAL ELEVATIONS	A	12.03.2024
DA05.01	SECTIONS & EXTERNAL FINISHES	A	12.03.2024
DA06.01	SHADOW DIAGRAMS	A	12.03.2024
DA06.02	VIEW FROM THE SUN	A	12.03.2024
DA06.03	OUTDOOR SOLAR ACCESS	A	12.03.2024

118 MAITLAND STREET MUSWELLBROOK 2333

CHILDCARE CENTRE

DEVELOPMENT APPLICATION

ISSUE	DATE	DESCRIPTION
A	12.03.2024	FOR DEVELOPMENT APPLICATION

ASSOCIATED CONSULTANTS

PLANNING	AVENUE PLANNING
TRAFFIC	STANBURY TRAFFIC
QS	QPC&C
ACOUSTICS	DAY DESIGN
LANDSCAPE	GREENSCAPE DESIGN
GEOTECH & PSI	BROADCREST CONSULTING PTY LTD
CIVIL AND FLOOD	ACOR CONSULTING

NOTES

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J. ANGELOVSKA AND L ABAUNADER

ARCHITECT

ArtMade Architects

|507/50 Holt St, Surry Hills NSW 2010
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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

COVER PAGE

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA00.00	A	DA

Sheet Size	Scale	L.G.A.
A1		MUSWELLBROOK

Drawn By	Checked By	Date
TA/MS1	MS/SS	12.03.2024

NOT FOR CONSTRUCTION

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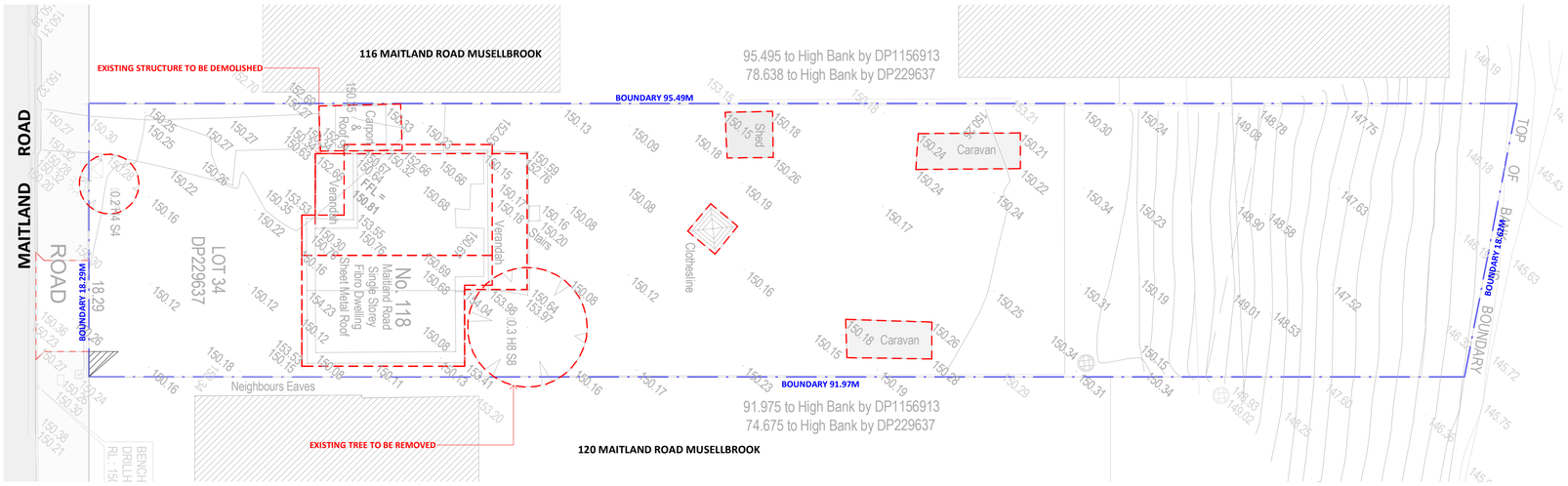
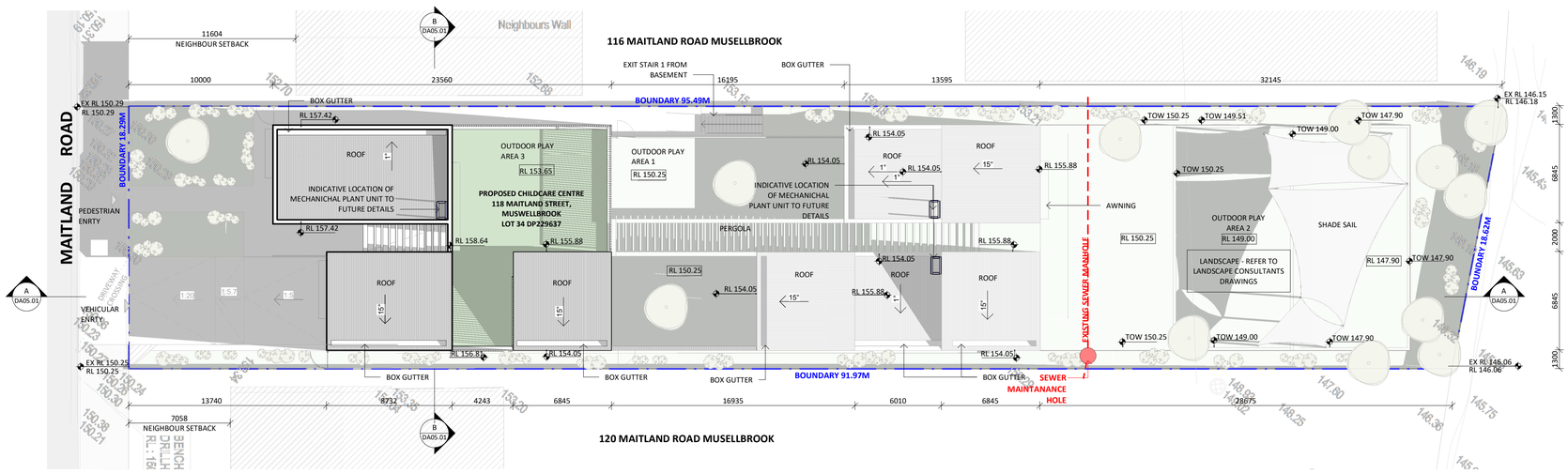


1 DEMOLITION PLAN
1 : 200



2 SITE PLAN
1 : 200

0 1 2 4 6 8 10
1 : 200

ABBREVIATIONS

ENG.	- ENGINEER
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XX.XX	- SPOT LEVEL (PLAN)
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LANDSCAPE LEGEND

- EXISTING TREE / TREE TO BE RETAINED
- TREE TO BE REMOVED
- NEW TREE
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- TURF/ ARTIFICIAL TURF
- EXTERNAL FLOOR FINISH
- LINE OF STRUCTURAL ROOT ZONE (SRZ)
- LINE OF TREE EXCLUSION ZONE (TEZ)
- LINE OF TREE PROTECTION ZONE (TPZ)

NOTE: REFER TO ARBORIST REPORT FOR FURTHER DETAILS

GENERAL NOTES

- ALL EXISTING BUILDING ELEMENTS TO BE CHECKED ON SITE U.N.O
- DEMOLITION TO BE IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND TO BE CARRIED OUT BY A LICENCED CONTRACTOR U. N.O
- REFER TO SW DRAWINGS FOR DRAINAGE DESIGN.
- REFER TO LANDSCAPE DRAWINGS FOR LANDSCAPE DESIGN.
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QS	QPC&C
ACOUSTICS	DAY DESIGN
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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

SITE PLAN / DEMOLITION

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA02.01	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

Drawn By	Checked By	Date
TA/MS1	MS/SS	12.03.2024

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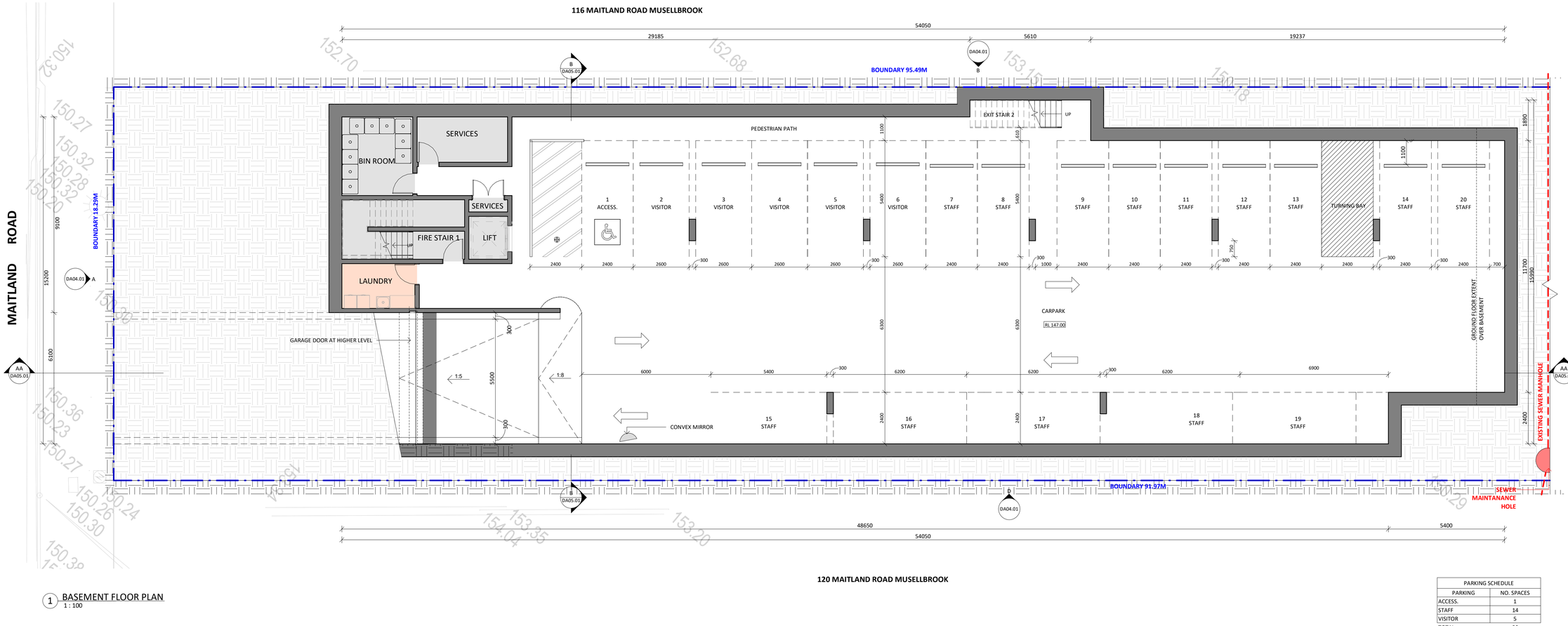

1 : 100

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1 BASEMENT FLOOR PLAN
1 : 100

PARKING SCHEDULE	
PARKING	NO. SPACES
ACCESS.	1
STAFF	14
VISITOR	5
TOTAL	20

ISSUE	DATE	DESCRIPTION
A	12.03.2024	FOR DEVELOPMENT APPLICATION

ASSOCIATED CONSULTANTS

PLANNING	AVENUE PLANNING
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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

BASEMENT FLOOR PLAN

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA03.01	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

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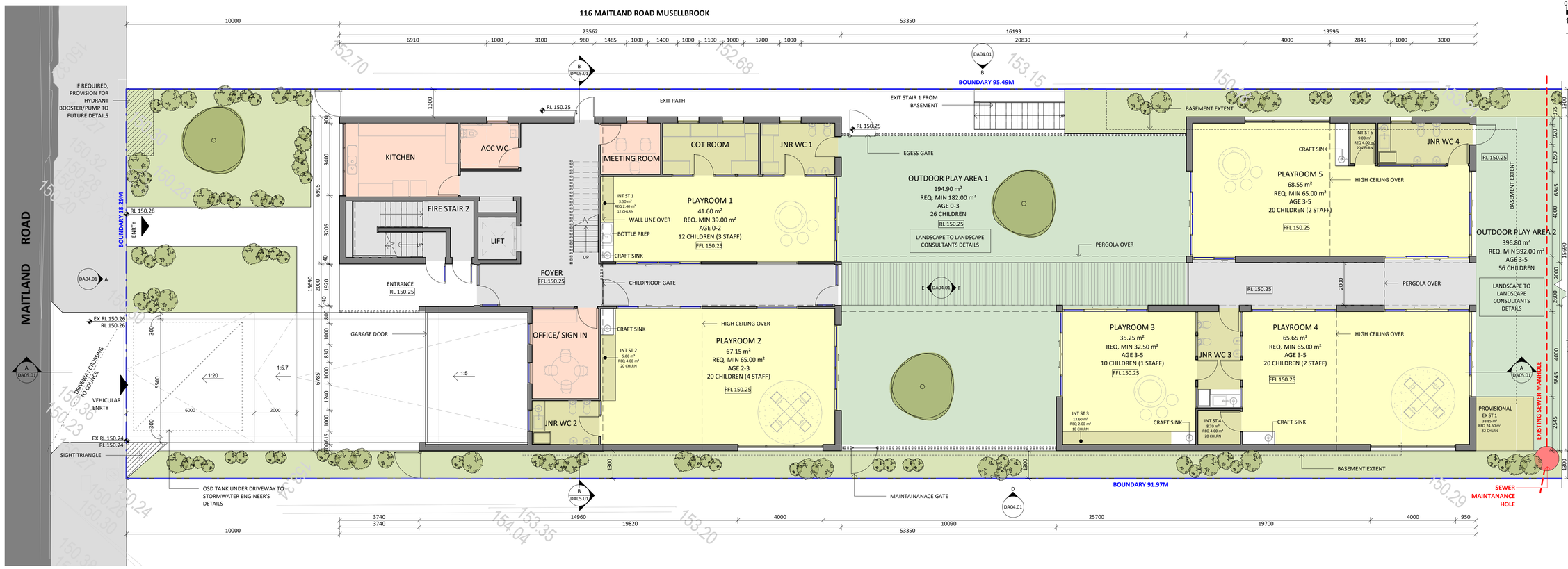

1 GROUND FLOOR PLAN
1 : 100

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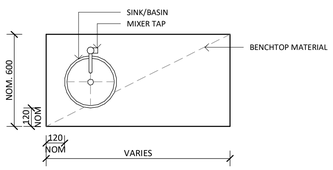
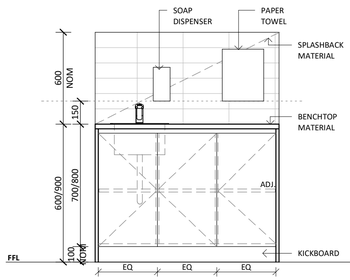
NOTE: REFER TO ARBORIST REPORT FOR FURTHER DETAILS



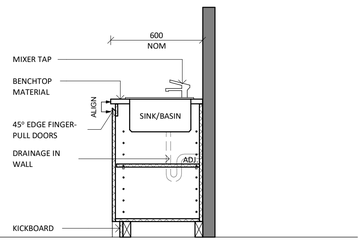
TYPICAL CRAFT SINK - PLAN

NOTE: SIMILAR CRAFT SINK. IMAGE FOR JOINERY REFERENCE ONLY



TYPICAL CRAFT SINK - ELEVATION

NOTE: PROVIDE MAGNETIC CHILDPROOF LOCKS TO ALL CABINETS IN INDOOR PLAY AREA (CRAFT SINKS & BOTTLE PREP.)



TYPICAL CRAFT SINK - SECTION

2 TYP CRAFT SINK DETAILS
1 : 20

OUTDOOR PLAY AREA SCHEDULE				
AREA	AGE	NO. CHLDRN	UNENCUMBERED	
			REQ AREA	AREA
OUTDOOR PLAY AREA 1	AGE 0-3	26	182 m²	194.90 m²
OUTDOOR PLAY AREA 2	AGE 3-5	56	392 m²	396.80 m²
OUTDOOR PLAY AREA 3	AGE 3-5	10	70 m²	117.30 m²
TOTAL		92	644 m²	709.00 m²

EXTERNAL STORAGE SCHEDULE			
NAME	NO. CHLDRN	REQ VOL	VOL
EX ST 1	82	24.60 m³	38.85 m³
EX ST 2	10	3.00 m³	10.65 m³
TOTAL	92	27.60 m³	49.50 m³

INDOOR PLAYROOM SCHEDULE					
ROOM	AGE	NO. CHLDRN	NO. STAFF	UNENCUMBERED	
				REQ AREA	AREA
PLAYROOM 1	AGE 0-2	12	3	39 m²	41.60 m²
PLAYROOM 2	AGE 2-3	20	4	65 m²	67.15 m²
PLAYROOM 3	AGE 3-5	10	1	32.5 m²	35.25 m²
PLAYROOM 4	AGE 3-5	20	2	65 m²	65.65 m²
PLAYROOM 5	AGE 3-5	20	2	65 m²	68.55 m²
PLAYROOM 6	AGE 3-5	10	1	32.5 m²	37.65 m²
TOTAL		92	13	299 m²	315.90 m²

INTERNAL STORAGE SCHEDULE			
NAME	NO. CHLDRN	REQ VOL	VOL
INT ST 1	12	2.40 m³	3.50 m³
INT ST 2	20	4.00 m³	5.80 m³
INT ST 3	10	2.00 m³	13.60 m³
INT ST 4	20	4.00 m³	8.70 m³
INT ST 5	20	4.00 m³	9.00 m³
INT ST 6	10	2.00 m³	7.05 m³
TOTAL	92	18.40 m³	47.60 m³

ISSUE	DATE	DESCRIPTION
A	12.03.2024	FOR DEVELOPMENT APPLICATION

ASSOCIATED CONSULTANTS

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

GROUND FLOOR PLAN

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA03.02	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

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TA/MS1	MS/SS	12.03.2024

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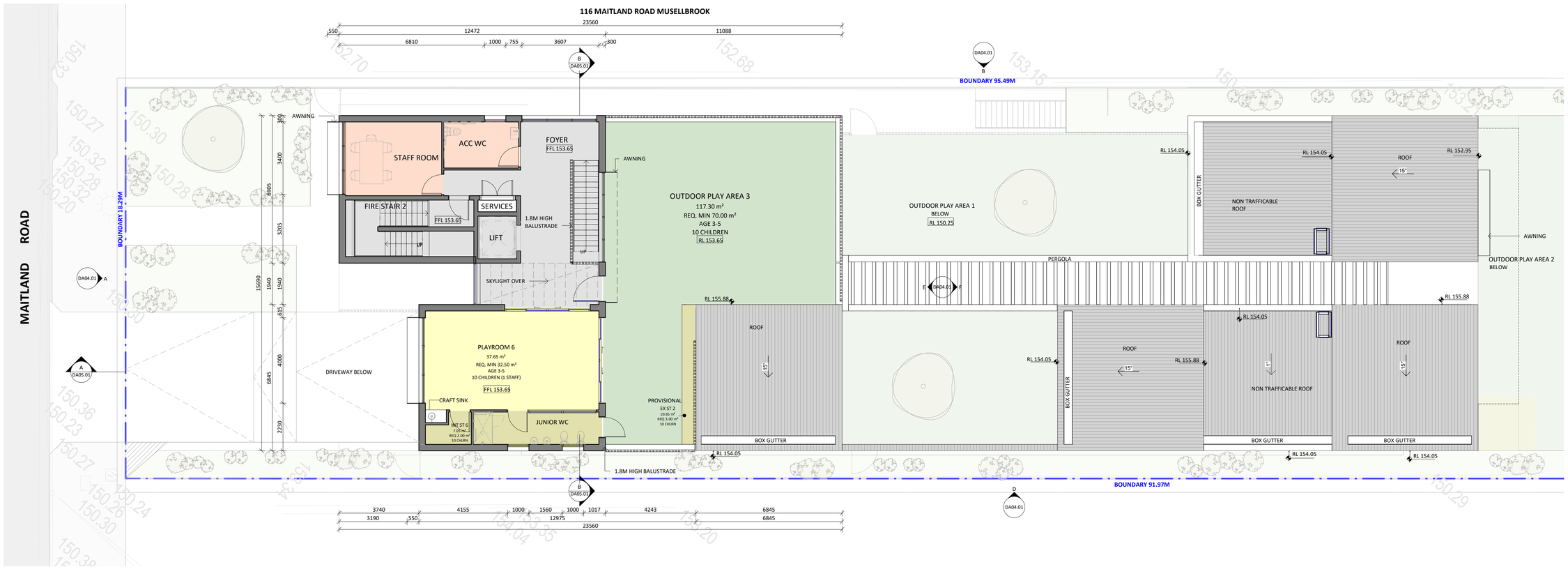

1 : 100

ABBREVIATIONS

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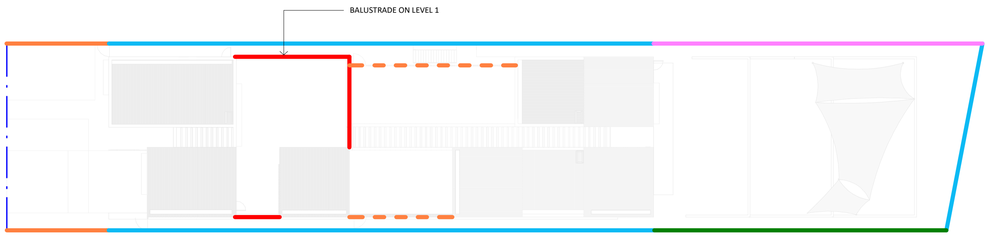
1 FIRST FLOOR PLAN
1 : 100



2 FENCE DIAGRAM
1 : 300

FENCE LEGEND

- 1.2M HIGH ACOUSTIC BOUNDARY FENCE REFERT TO TYPE 1
- 1.8M HT COLORBOND BOUNDARY FENCE REFER TO TYPE 2
- 2.1 M HT ACOUSTIC FENCE REFER TO TYPE 3
- 2.3 M HT ACOUSTIC FENCE REFER TO TYPE 4
- 1.8M HT BARRIERFROM FFL - REFER TO TYPE 5
- 1.8M HT BALUSTRADE FROM FFL - REFER TO TYPE 6

NOTE:
- ALL ACOUSTIC BARRIERS IN ACCORDANCE WITH ACOUSTIC REPORT.
- REFER TO SHEET A05.01 FOR FENCE DETAILS.

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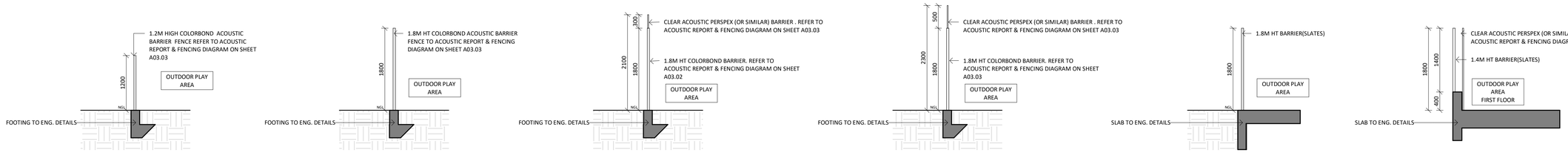
INT ST 6	10	2.00 m³	7.05 m³
TOTAL	92	18.40 m³	47.60 m³



1 1.2M HT TYP ACOUSTIC BARRIER
2 1.8M HT TYP ACOUSTIC BARRIER
3 2.1 M HT TYP ACOUSTIC BARRIER
4 2.3 M HT TYP ACOUSTIC BARRIER
5 1.8M HT TYP BARRIER
6 1.8M HT TYP ACOUSTIC BARRIER

FENCE DETAILS

NOT FOR CONSTRUCTION

ISSUE	DATE	DESCRIPTION
A	12.03.2024	FOR DEVELOPMENT APPLICATION

ASSOCIATED CONSULTANTS

PLANNING	AVENUE PLANNING
TRAFFIC	STANBURY TRAFFIC
QS	QPC&C
ACOUSTICS	DAY DESIGN
LANDSCAPE	GREENSCAPE DESIGN
GEOTECH & PSI	BROADCREST CONSULTING PTY LTD
CIVIL AND FLOOD	ACOR CONSULTING

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J. ANGELOVSKA AND L ABAUNADER

ARCHITECT

ArtMade Architects
|507/50 Holt St, Surry Hills NSW 2010
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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

FIRST FLOOR PLAN

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA03.03	A	DA

Sheet Size	Scale	L.G.A.
A1	As indicated	MUSWELLBROOK

Drawn By	Checked By	Date
TA/MS1	MS/SS	12.03.2024

ISSUED FOR DEVELOPMENT APPLICATION
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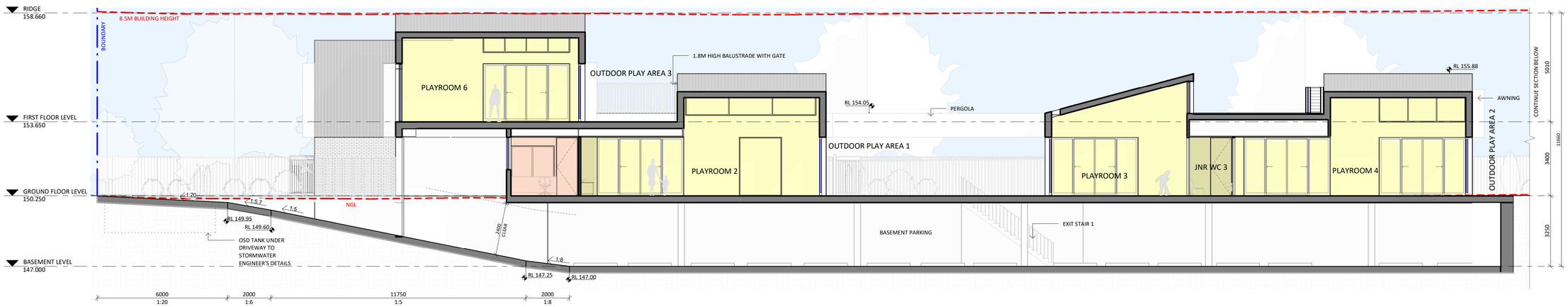
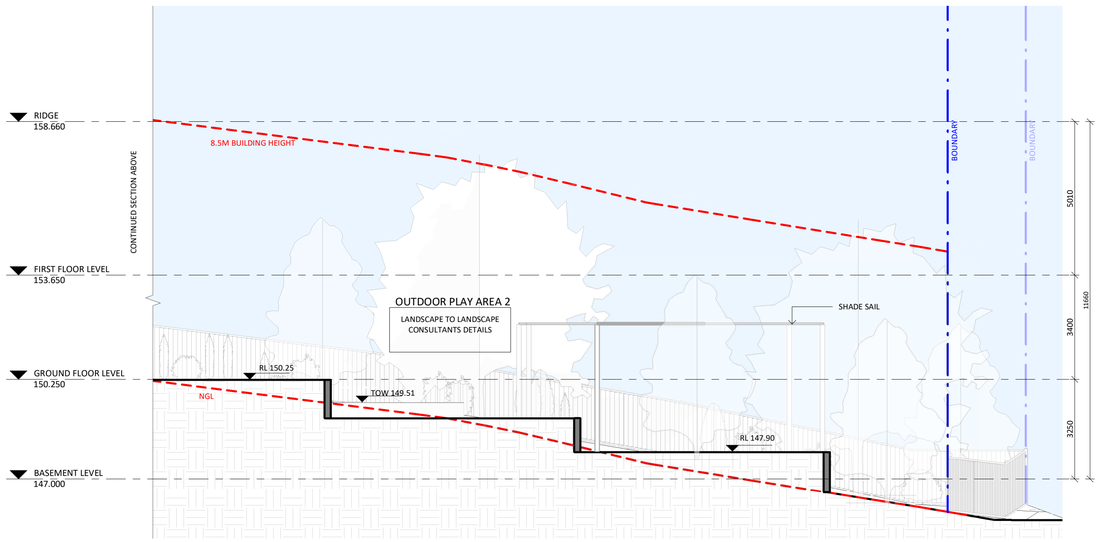


A SECTION A-A
1 : 100

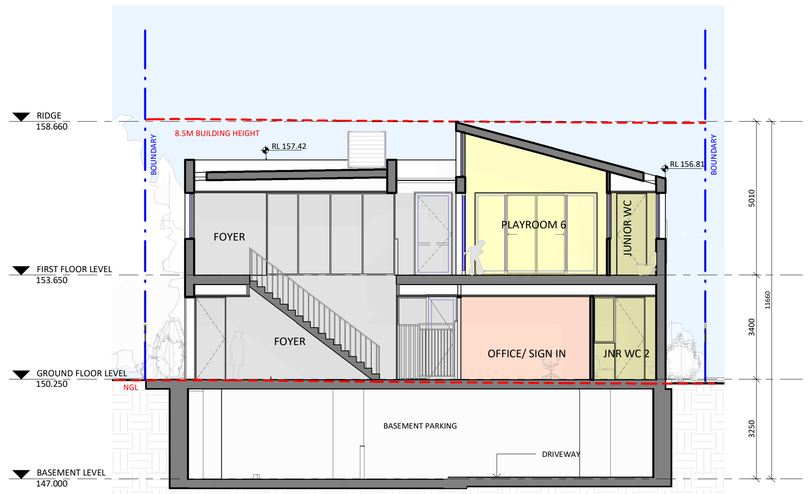
0 1 2 3 4 5
1 : 100

EXTERNAL FINISHES

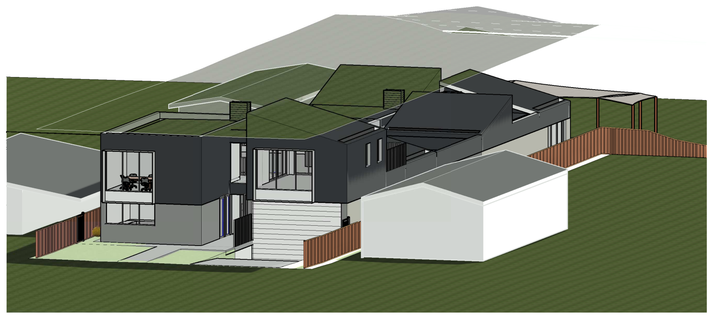
BK-01	BRICK BAGGED DULUX COLOUR: NATURAL WHITE OR SIMILAR	
CL-01	WALL, ROOF COLORBOND LONG LINE COLOUR: SHALE GREY OR SIMILAR	
PC-01	ALUMINIUM WINDOW & DOOR FRAMES,PERGOLA DURALLOY POWDERCOAT COLOUR: SHALE GREY OR SIMILAR	
XP1	EXTERNAL WALLS DULUX COLOUR: SHALE GREY OR SIMILAR	



SECTION A-A - CONT



B SECTION B-B
1 : 100



4 8.5M HEIGHT DIAGRAM

ISSUE	DATE	DESCRIPTION
A	12.03.2024	FOR DEVELOPMENT APPLICATION

ASSOCIATED CONSULTANTS

PLANNING	AVENUE PLANNING
TRAFFIC	STANBURY TRAFFIC
QS	QPC&C
ACOUSTICS	DAY DESIGN
LANDSCAPE	GREENSCAPE DESIGN
GEOTECH & PSI	BROADCREST CONSULTING PTY LTD
CIVIL AND FLOOD	ACOR CONSULTING

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PROJECT

CHILDCARE CENTRE

PROJECT ADDRESS

118 MAITLAND STREET
MUSWELLBROOK 2333

SHEET NAME

SECTIONS & EXTERNAL FINISHES

ISSUED FOR DEVELOPMENT APPLICATION

Project number	Sheet No.	Issue	Phase
23714	DA05.01	A	DA

Sheet Size	Scale	L.G.A.
A1	1 : 100	MUSWELLBROOK

Drawn By	Checked By	Date
TA/MS1	MS/SS	12.03.2024

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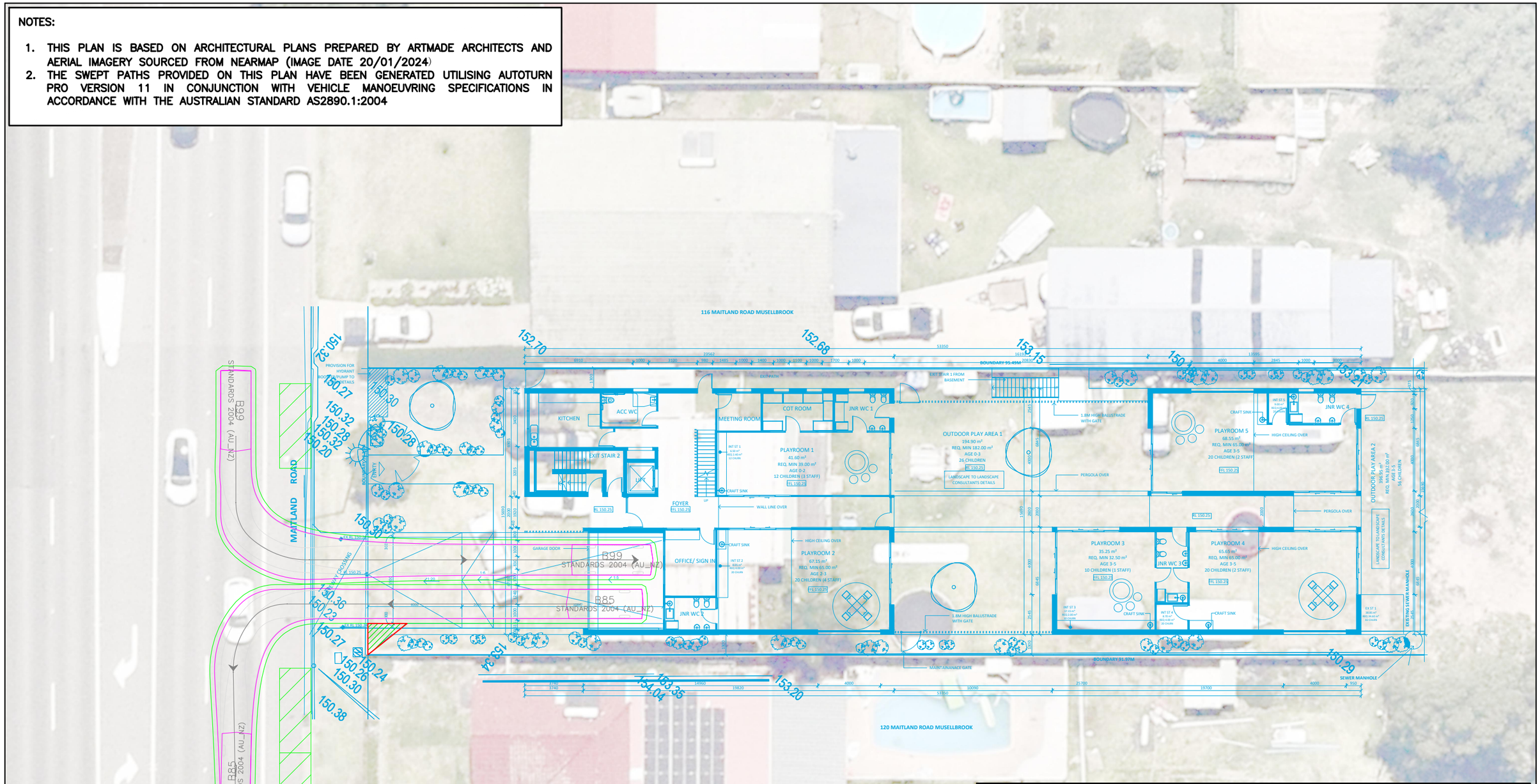
APPENDIX 3

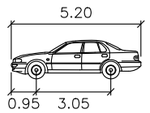
NOTES:

1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY ARTMADE ARCHITECTS AND AERIAL IMAGERY SOURCED FROM NEARMAP (IMAGE DATE 20/01/2024)
2. THE SWEPT PATHS PROVIDED ON THIS PLAN HAVE BEEN GENERATED UTILISING AUTOTURN PRO VERSION 11 IN CONJUNCTION WITH VEHICLE MANOEUVRING SPECIFICATIONS IN ACCORDANCE WITH THE AUSTRALIAN STANDARD AS2890.1:2004



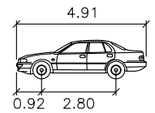
SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY



B99

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



B85

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

STANBURY TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

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WEBSITE: www.stanburytraffic.com.au

STANBURY TRAFFIC PLANNING

118 MAITLAND STREET, MUSWELLBROOK
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
GROUND

SCALE	0 2.5 5.0 1:250@A3	CREATED BY	Y.H
DRAWING NO.	23-100-02-V2	APPROVED BY	M.S
DATE	13 March 2024	SHEET	03 / 10

NOTES:

1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY ARTMADE ARCHITECTS AND AERIAL IMAGERY SOURCED FROM NEARMAP (IMAGE DATE 20/01/2024)
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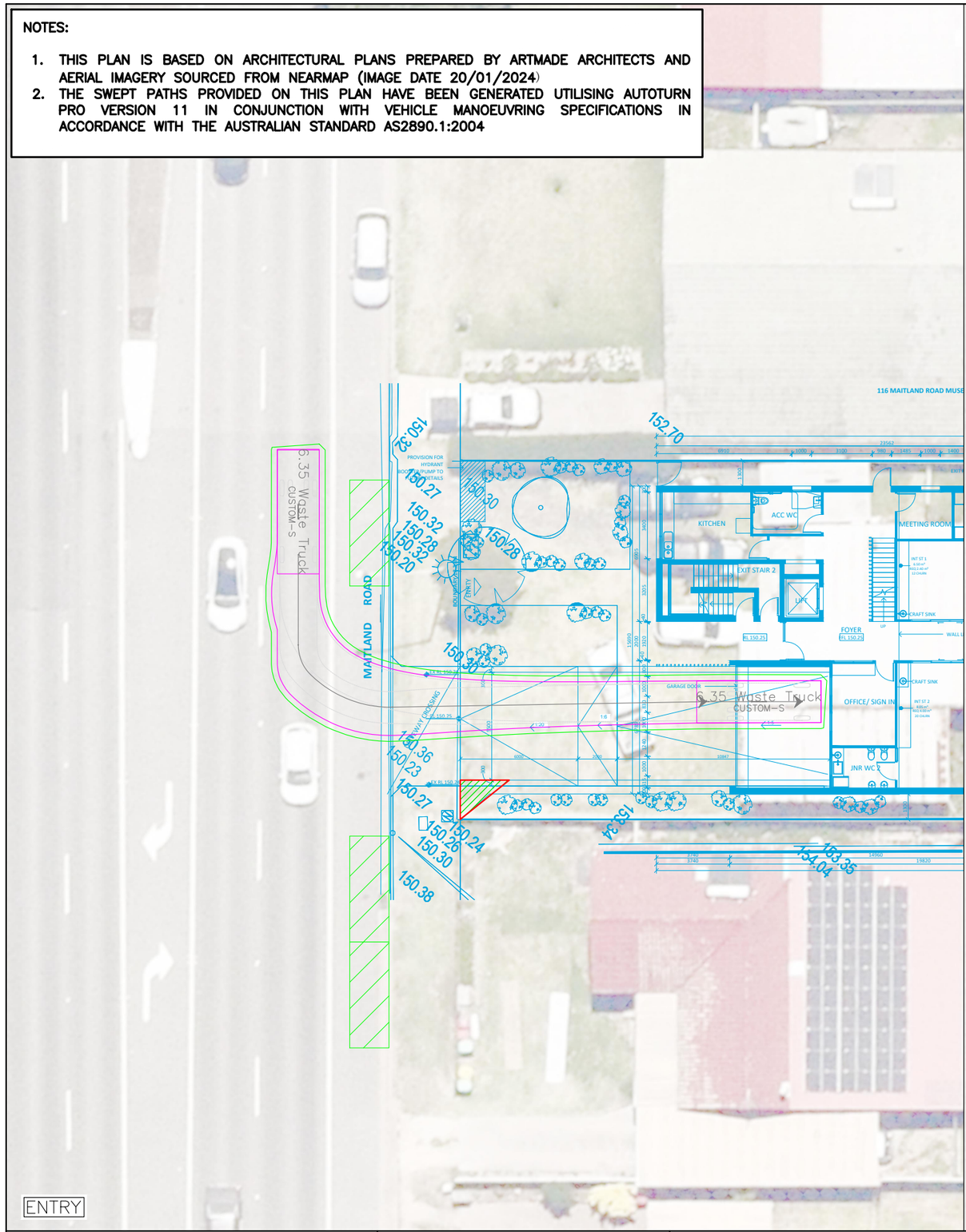

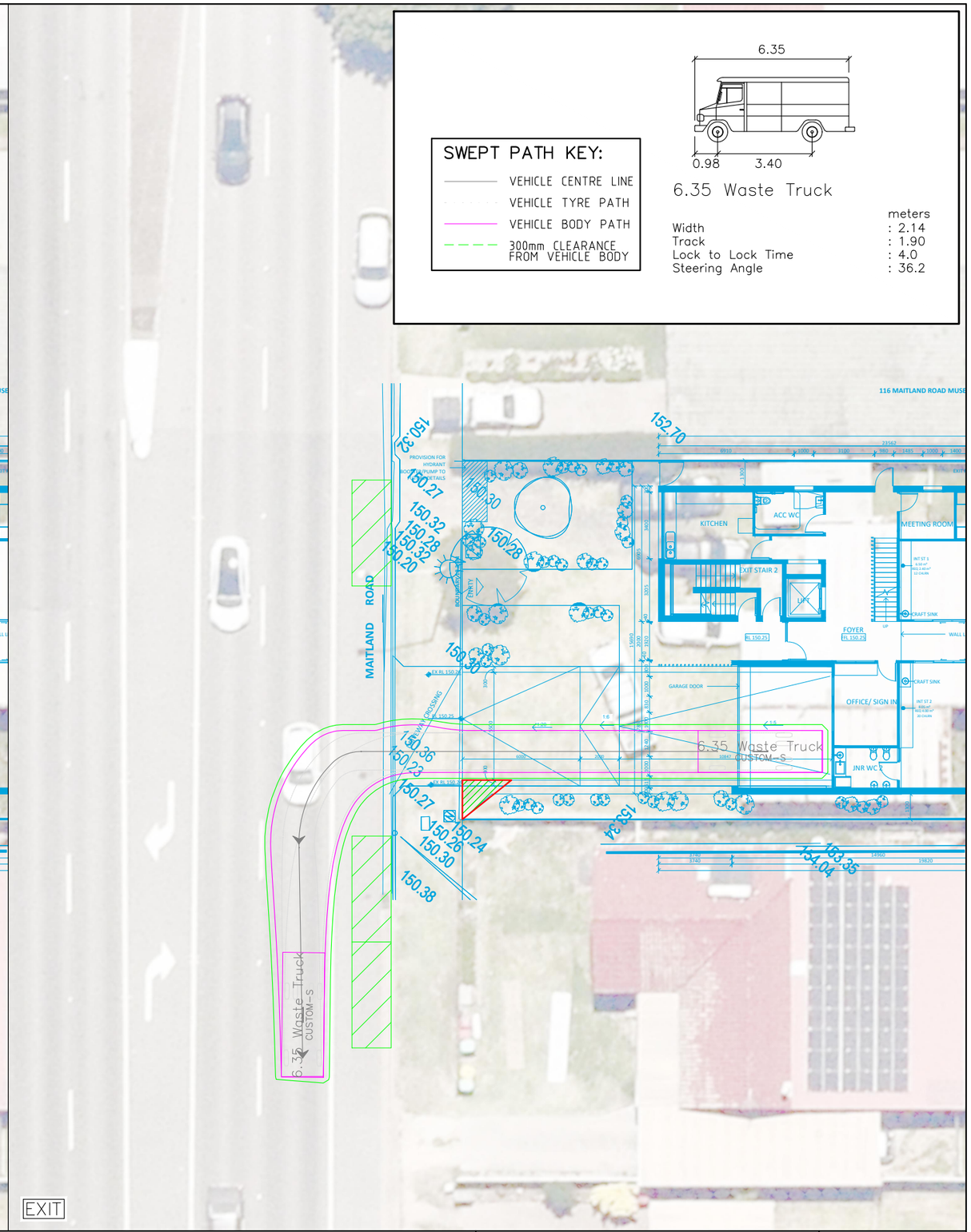

SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

6.35 Waste Truck

	meters
Width	: 2.14
Track	: 1.90
Lock to Lock Time	: 4.0
Steering Angle	: 36.2

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STANBURY TRAFFIC PLANNING

118 MAITLAND STREET, MUSWELLBROOK
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
GROUND

SCALE	0 2.5 5.0 1:250@A3	CREATED BY	Y.H
DRAWING NO.	23-100-02-V2	APPROVED BY	M.S
DATE	13 March 2024	SHEET	04 / 10

NOTES:

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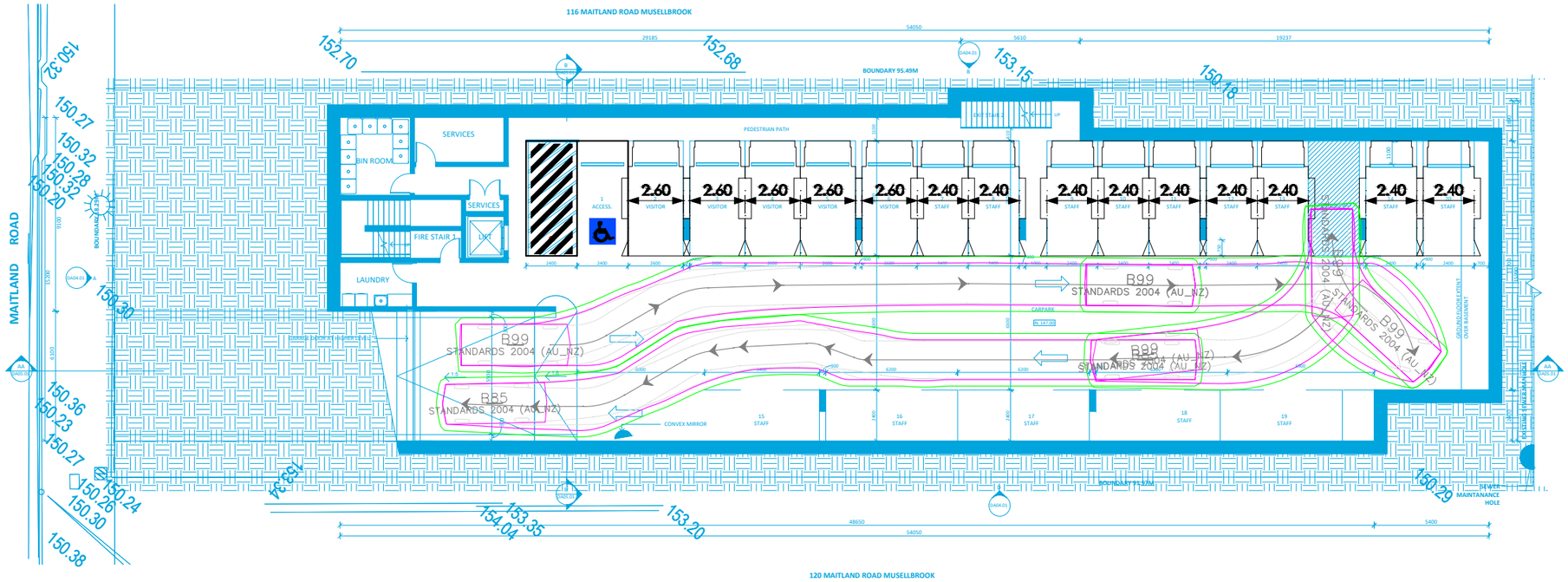
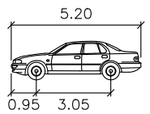


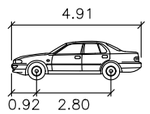
SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY



B99

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



B85

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

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118 MAITLAND STREET, MUSWELLBROOK
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
BASEMENT

SCALE	0 2.5 5.0 1:250@A3	CREATED BY	Y.H
DRAWING NO.	23–100–02–V2	APPROVED BY	M.S
DATE	13 March 2024	SHEET	05 / 10

NOTES:

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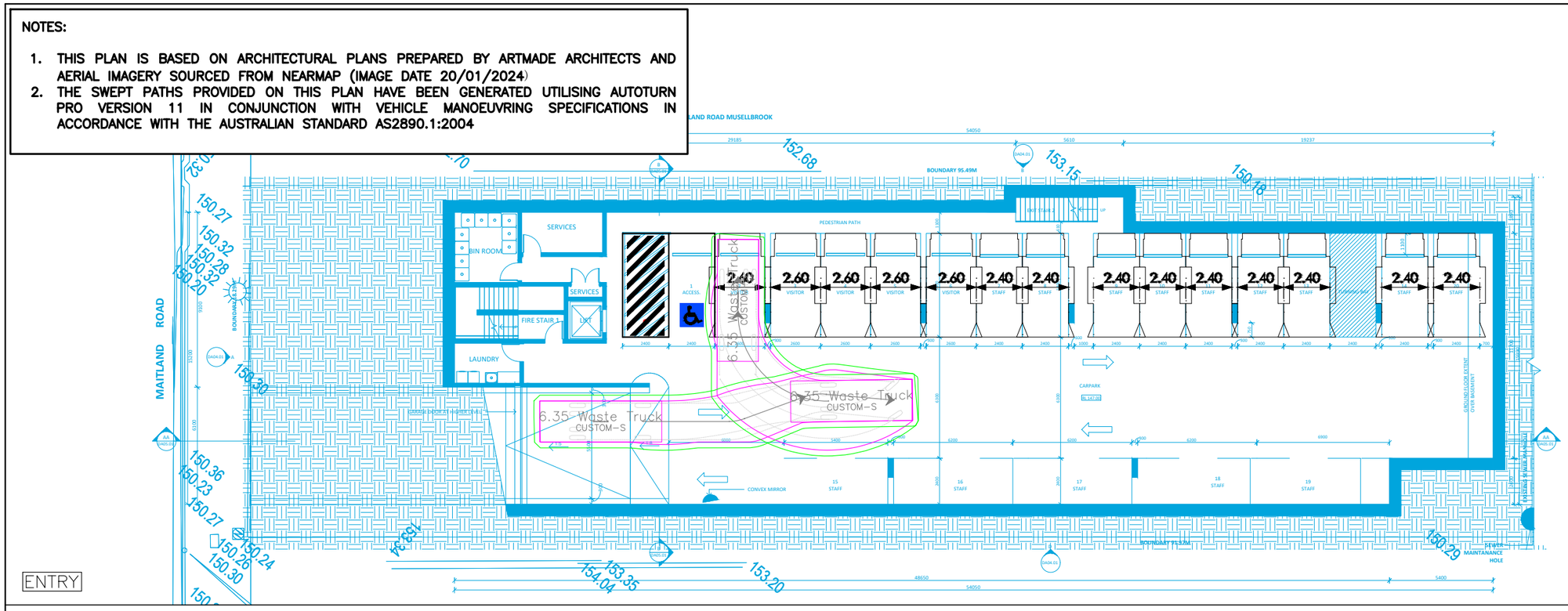

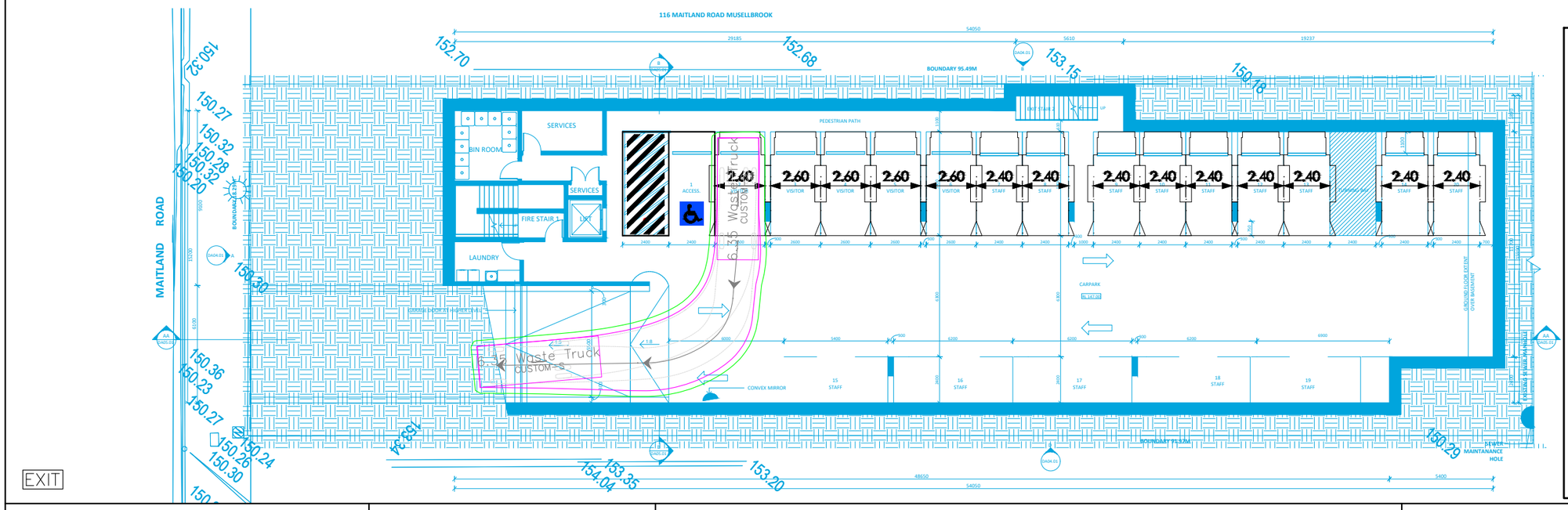

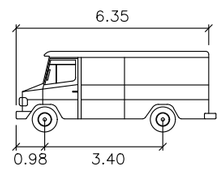

6.35 Waste Truck

	meters
Width	: 2.14
Track	: 1.90
Lock to Lock Time	: 4.0
Steering Angle	: 36.2

SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

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STANBURY TRAFFIC PLANNING

118 MAITLAND STREET, MUSWELLBROOK
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
BASEMENT

SCALE	0 2.5 5.0 1:250@A3	CREATED BY	Y.H
DRAWING NO.	23–100–02–V2	APPROVED BY	M.S
DATE	13 March 2024	SHEET	06 / 10

NOTES:

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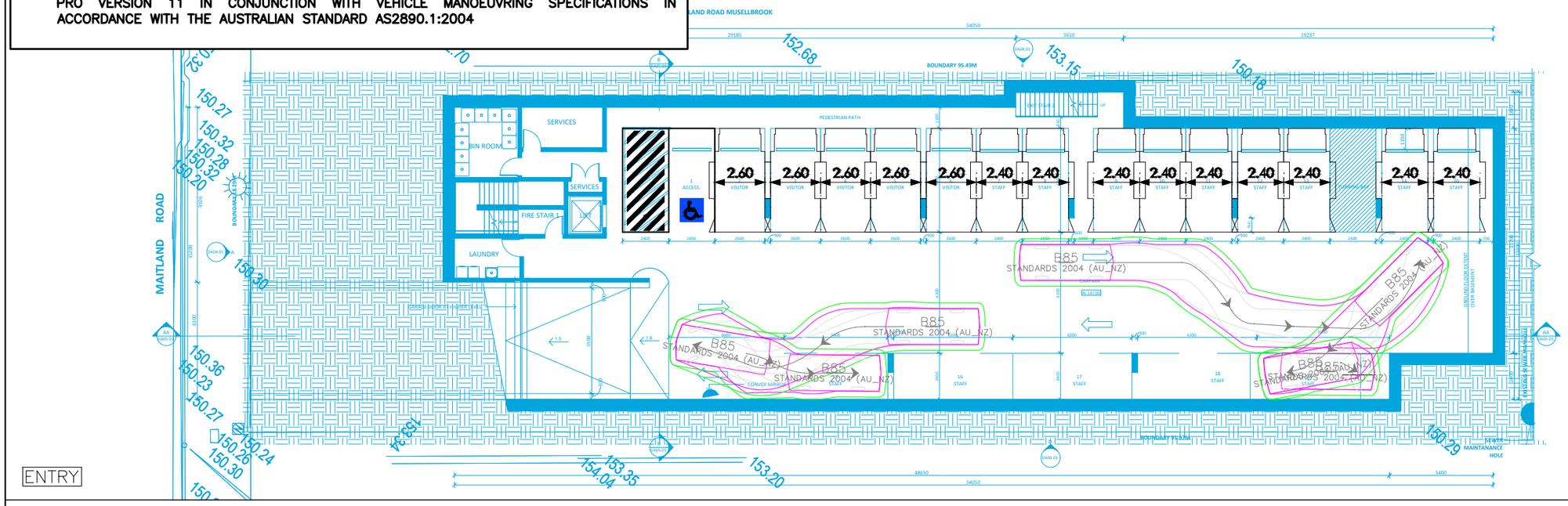

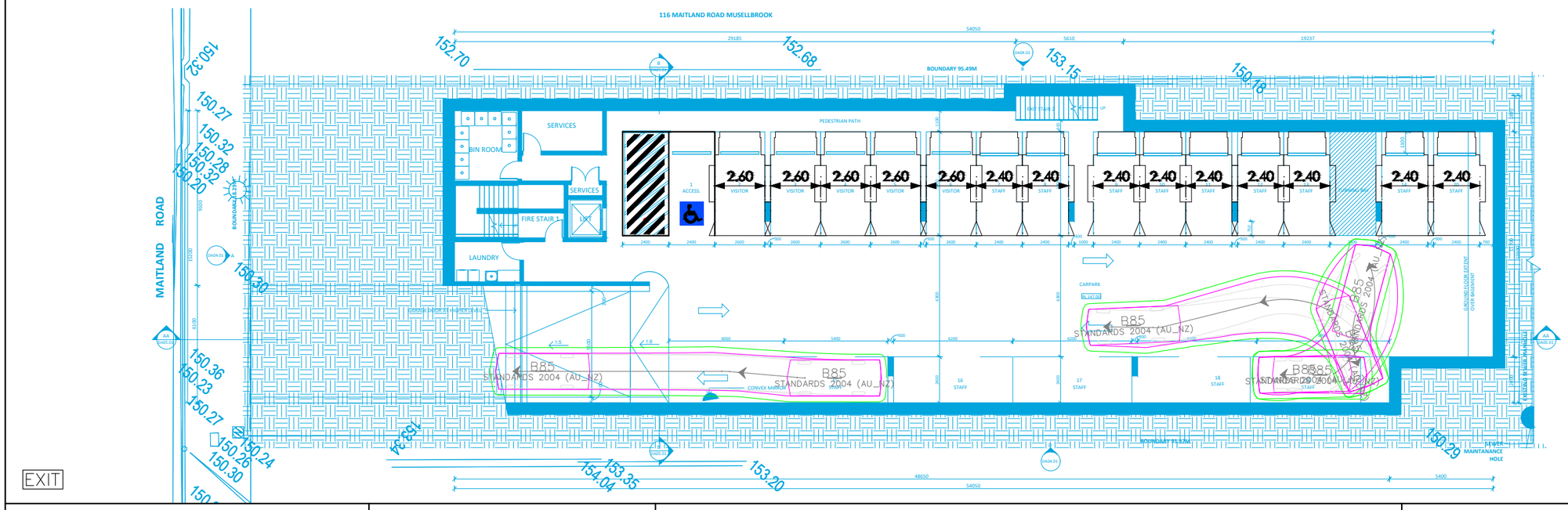

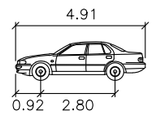

B85

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

SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

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STANBURY TRAFFIC PLANNING

118 MAITLAND STREET, MUSWELLBROOK
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
BASEMENT

SCALE	0 2.5 5.0 1:250@A3	CREATED BY	Y.H
DRAWING NO.	23–100–02–V2	APPROVED BY	M.S
DATE	13 March 2024	SHEET	07 / 10

NOTES:

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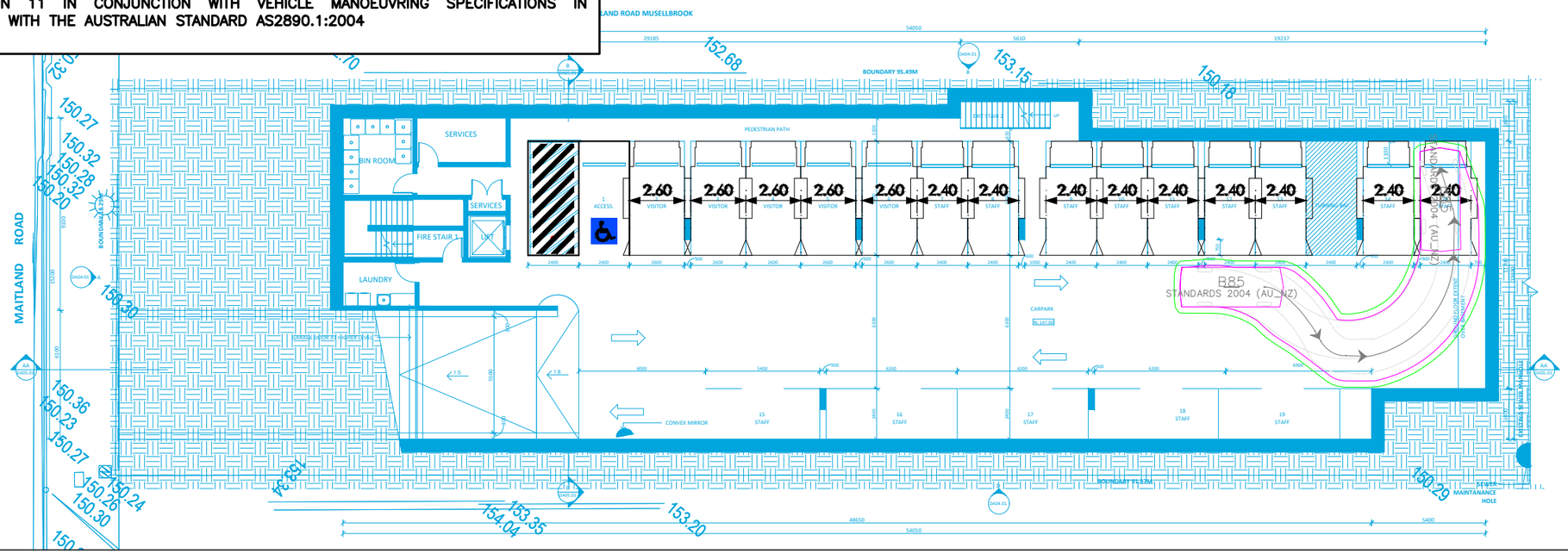

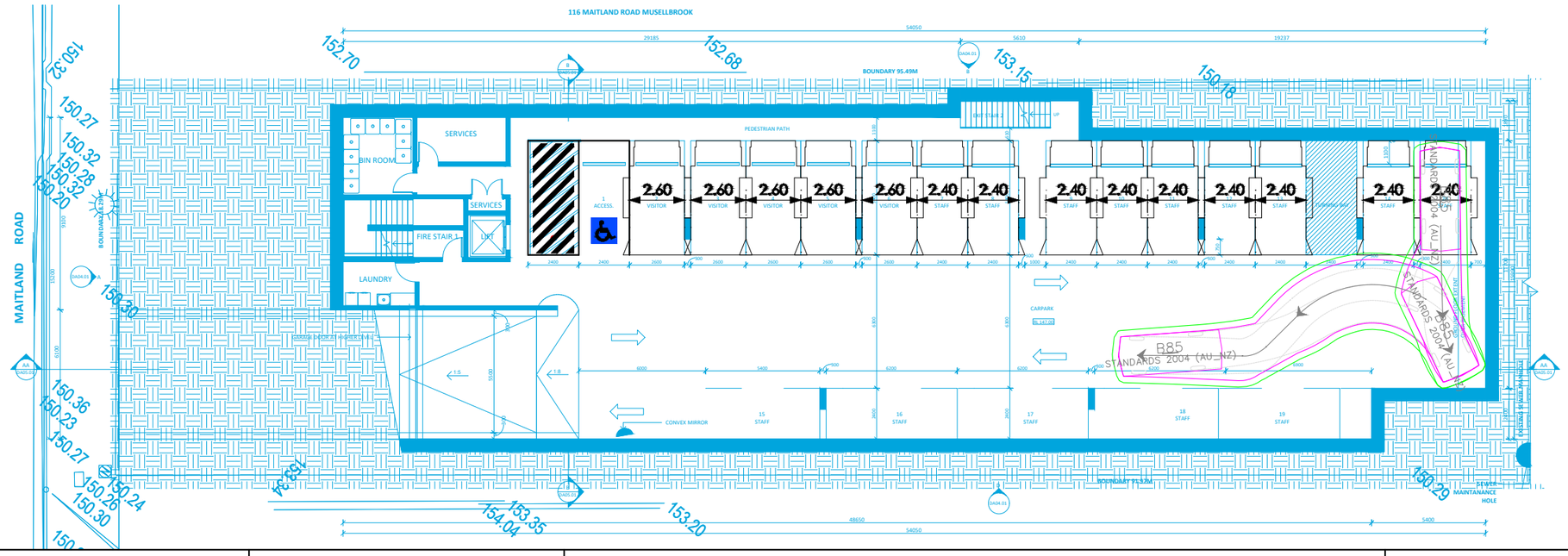

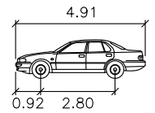

B85

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

SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 300mm CLEARANCE FROM VEHICLE BODY

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STANBURY TRAFFIC PLANNING

118 MAITLAND STREET, MUSWELLBROOK
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
BASEMENT

SCALE	0 2.5 5.0 1:250@A3	CREATED BY Y.H
DRAWING NO.	23–100–02–V2	APPROVED BY M.S
DATE	13 March 2024	SHEET 08 / 10

NOTES:

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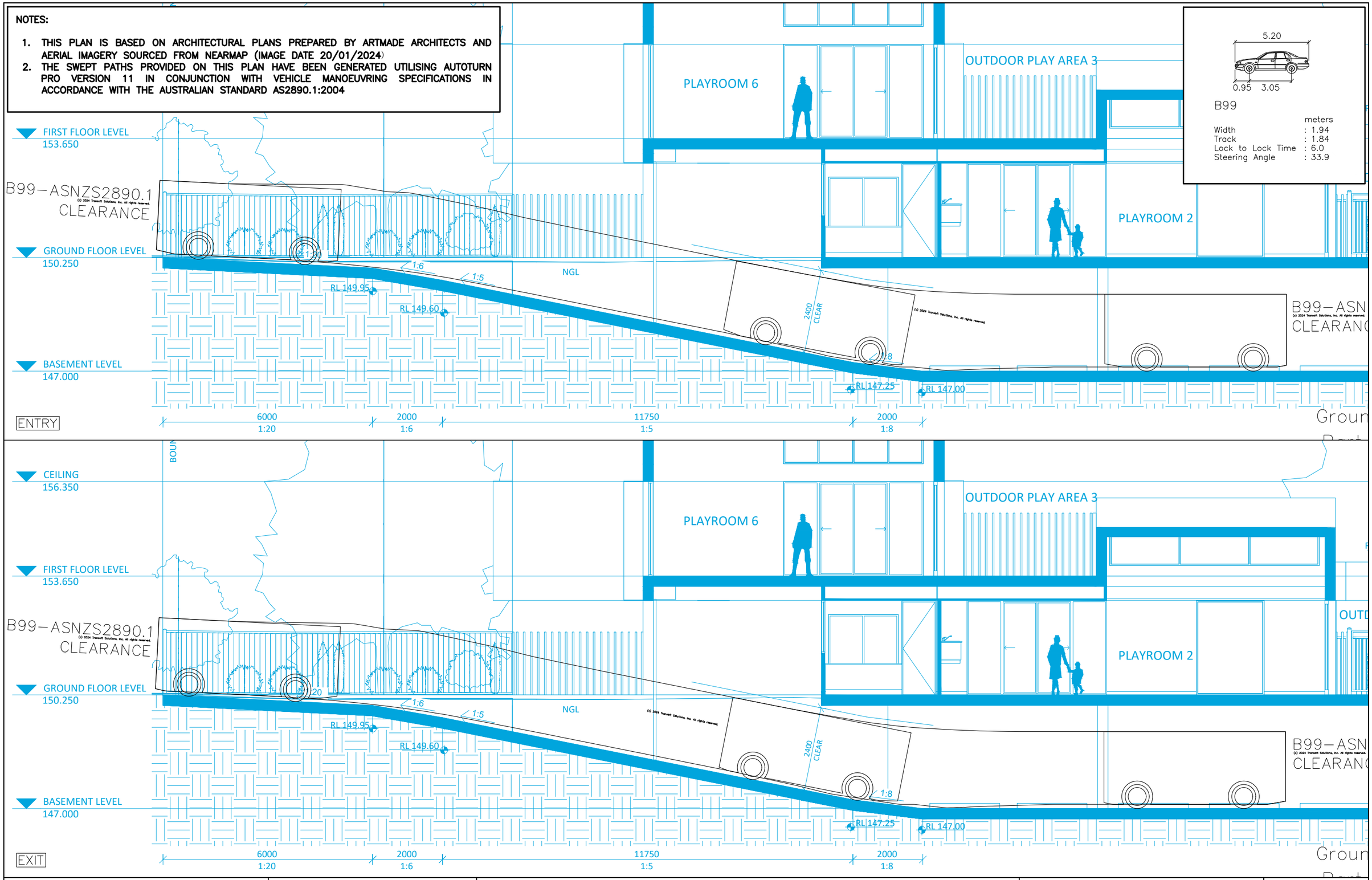

STANBURY TRAFFIC PLANNING TRAFFIC, PARKING & TRANSPORT CONSULTANTS	ADDRESS: 401/380 HARRIS ST, PYRMONT PH: (02) 8971 8314 EMAIL: info@stanburytraffic.com.au WEBSITE: www.stanburytraffic.com.au	STANBURY TRAFFIC PLANNING 118 MAITLAND STREET, MUSWELLBROOK CAR PARK COMPLIANCE REVIEW VERTICAL CLEARANCE ASSESSMENT MAIN ACCESS RAMP	SCALE 0 1.0 2.0 1:100@A3 DRAWING NO. 23–100–02–V2 DATE 13 March 2024	CREATED BY Y.H APPROVED BY M.S SHEET 09 / 10

NOTES:

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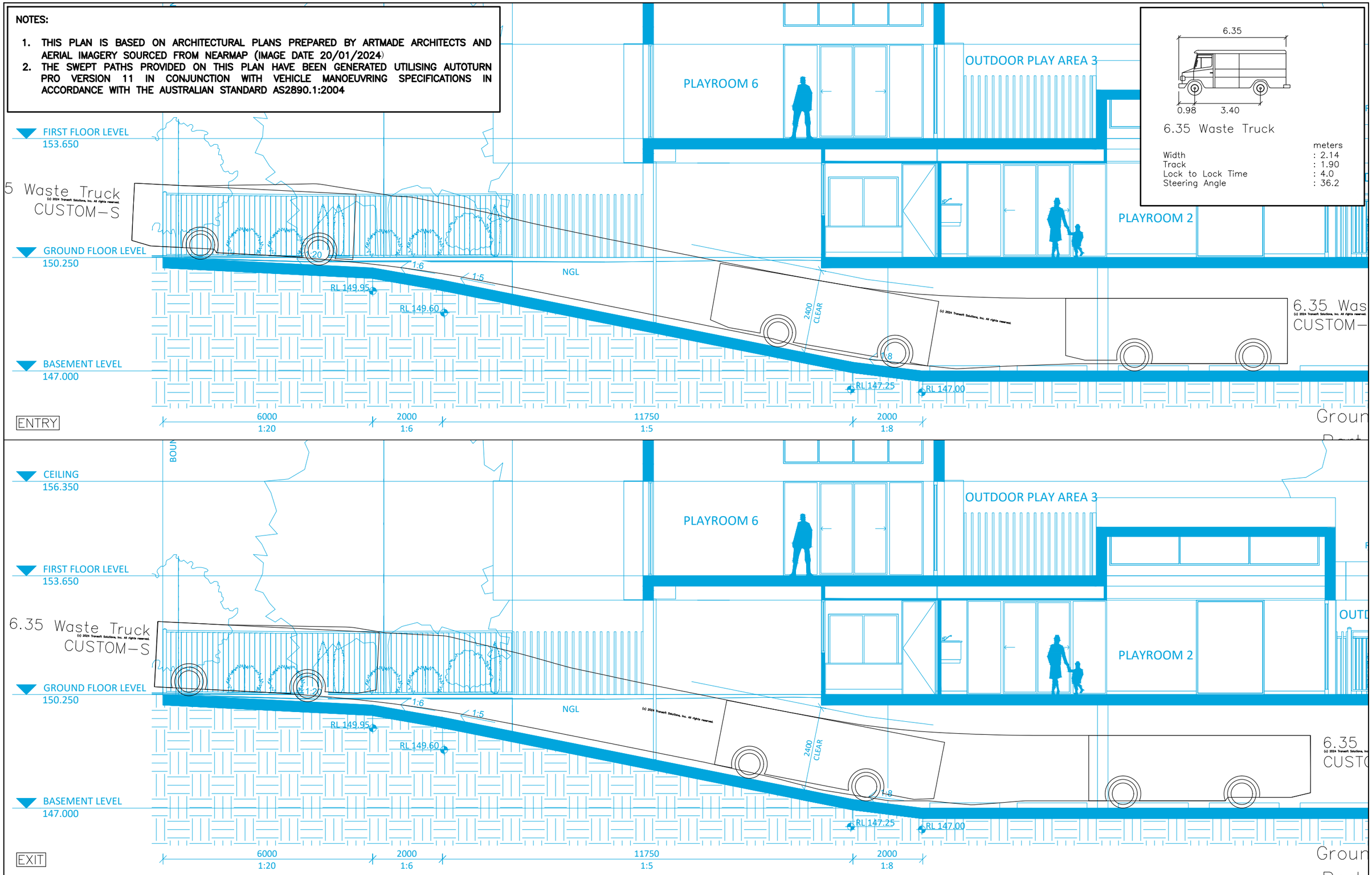


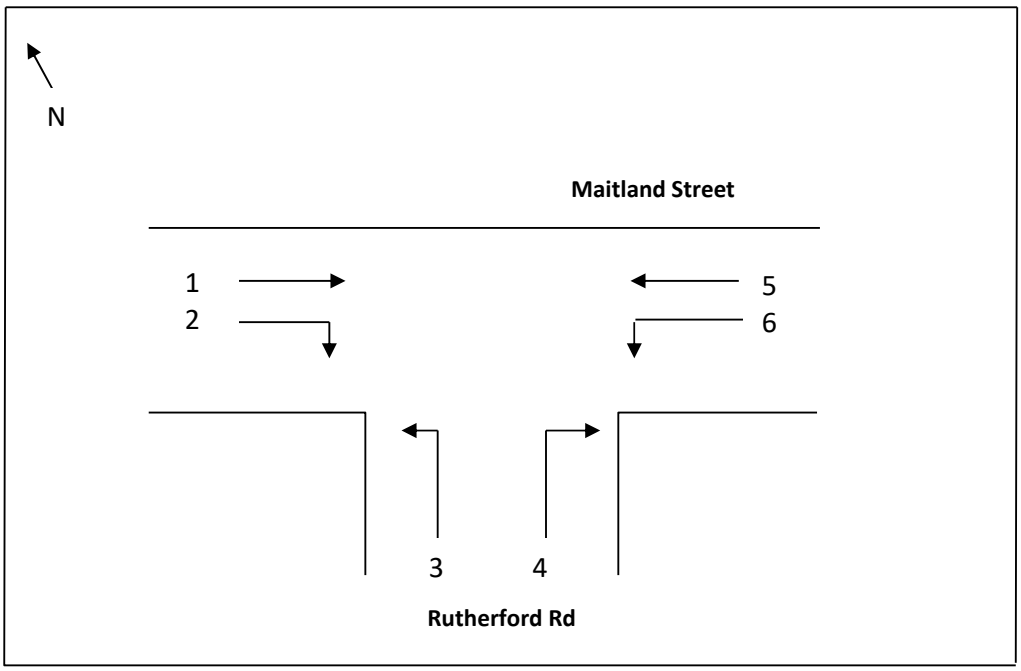
STANBURY TRAFFIC PLANNING TRAFFIC, PARKING & TRANSPORT CONSULTANTS	ADDRESS: 401/380 HARRIS ST, PYRMONT PH: (02) 8971 8314 EMAIL: info@stanburytraffic.com.au WEBSITE: www.stanburytraffic.com.au	STANBURY TRAFFIC PLANNING 118 MAITLAND STREET, MUSWELLBROOK CAR PARK COMPLIANCE REVIEW VERTICAL CLEARANCE ASSESSMENT MAIN ACCESS RAMP	SCALE 0 1.0 2.0 1:100@A3 DRAWING NO. 23-100-02-V2 DATE 13 March 2024	CREATED BY Y.H APPROVED BY M.S SHEET 10 / 10

APPENDIX 4

STANBURY TRAFFIC PLANNING
TRAFFIC, PARKING & TRANSPORT CONSULTANTS

TRAFFIC COUNTS AT: Maitland Street and Rutherford Road
DATE: Wednesday 21st of June 2023
TIME: 7:00am to 9:00am and 4:00pm to 6:00pm
WEATHER: Overcast

Time	Direction of Vehicular Traffic						
	1	2	3	4	5	6	Total
AM Period							
7.00 – 7.15am	68	27	22	12	77	13	219
7.15 – 7.30am	71	15	25	26	59	15	211
7.30 – 7.45am	66	21	34	9	115	16	261
7.45 – 8.00am	88	37	48	24	136	24	357
8.00 – 8.15am	70	38	42	16	165	19	350
8.15 – 8.30am	70	44	67	33	139	23	376
8.30 – 8.45am	97	62	70	27	154	32	442
8.45 – 9.00am	83	75	72	24	154	24	432
PM Period							
4.00 – 4.15pm	154	112	80	41	168	36	591
4.15 – 4.30pm	115	83	88	62	164	38	550
4.30 – 4.45pm	147	78	101	76	172	37	611
4.45 – 5.00pm	106	89	75	55	158	36	519
5.00 – 5.15pm	140	112	103	81	178	53	667
5.15 – 5.30pm	117	86	121	65	158	33	580
5.30 – 5.45pm	91	76	86	62	111	32	458
5.45 – 6.00pm	102	76	73	32	114	39	436



APPENDIX 5

MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - AM (Site Folder: Pre-Development (2023))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	103	5.0	103	5.0	0.168	24.3	LOS B	2.5	18.1	0.73	0.72	0.73	37.7
2	T1	All MCs	644	5.0	644	5.0	* 0.508	21.1	LOS B	9.1	66.4	0.85	0.72	0.85	39.3
Approach			747	5.0	747	5.0	0.508	21.6	LOS B	9.1	66.4	0.83	0.72	0.83	39.0
North: Maitland St (north)															
8	T1	All MCs	337	50.0	337	50.0	0.170	4.6	LOS A	2.1	21.3	0.39	0.33	0.39	47.1
9	R2	All MCs	231	5.0	231	5.0	* 0.359	16.2	LOS B	5.2	37.6	0.74	0.76	0.74	40.1
Approach			567	31.7	567	31.7	0.359	9.3	LOS A	5.2	37.6	0.53	0.50	0.53	44.0
West: Rutherford Rd															
10	L2	All MCs	264	5.0	264	5.0	0.293	16.2	LOS B	5.4	39.6	0.64	0.73	0.64	40.0
12	R2	All MCs	105	5.0	105	5.0	* 0.370	34.4	LOS C	3.4	24.6	0.94	0.77	0.94	33.5
Approach			369	5.0	369	5.0	0.370	21.4	LOS B	5.4	39.6	0.72	0.74	0.72	37.9
All Vehicles			1684	14.0	1684	14.0	0.508	17.4	LOS B	9.1	66.4	0.71	0.65	0.71	40.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
All Pedestrians		30	32	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09

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.

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MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - PM (Site Folder: Pre-Development (2023))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	167	5.0	167	5.0	0.384	35.8	LOS C	4.9	35.9	0.88	0.78	0.88	35.1
2	T1	All MCs	701	5.0	701	5.0	* 0.820	35.9	LOS C	13.9	101.4	1.00	1.00	1.23	34.5
Approach			868	5.0	868	5.0	0.820	35.9	LOS C	13.9	101.4	0.98	0.96	1.16	34.6
North: Maitland St (north)															
8	T1	All MCs	537	50.0	537	50.0	0.311	8.0	LOS A	4.7	46.7	0.54	0.46	0.54	45.1
9	R2	All MCs	384	5.0	384	5.0	* 0.664	27.2	LOS B	9.9	72.1	0.91	0.96	0.93	35.8
Approach			921	31.2	921	31.2	0.664	16.0	LOS B	9.9	72.1	0.70	0.67	0.70	40.7
West: Rutherford Rd															
10	L2	All MCs	421	5.0	421	5.0	0.387	14.6	LOS B	7.7	56.2	0.57	0.81	0.57	41.5
12	R2	All MCs	292	5.0	292	5.0	* 0.892	47.5	LOS D	12.4	90.2	1.00	1.19	1.47	30.3
Approach			713	5.0	713	5.0	0.892	28.1	LOS B	12.4	90.2	0.75	0.97	0.94	36.1
All Vehicles			2502	14.7	2502	14.7	0.892	26.3	LOS B	13.9	101.4	0.81	0.86	0.93	37.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
All Pedestrians		30	32	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09

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.

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MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - AM (Site Folder: Pre-Development (2033))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	128	5.0	128	5.0	0.209	28.1	LOS B	3.1	22.9	0.75	0.74	0.75	37.5
2	T1	All MCs	799	5.0	799	5.0	* 0.650	24.1	LOS B	12.4	90.4	0.90	0.78	0.90	38.7
Approach			927	5.0	927	5.0	0.650	24.6	LOS B	12.4	90.4	0.88	0.77	0.88	38.5
North: Maitland St (north)															
8	T1	All MCs	418	50.0	418	50.0	0.211	4.7	LOS A	2.7	27.3	0.41	0.35	0.41	47.0
9	R2	All MCs	286	5.0	286	5.0	* 0.479	21.0	LOS B	7.3	53.3	0.84	0.84	0.84	38.2
Approach			704	31.7	704	31.7	0.479	11.3	LOS A	7.3	53.3	0.58	0.55	0.58	42.9
West: Rutherford Rd															
10	L2	All MCs	327	5.0	327	5.0	0.363	16.7	LOS B	7.0	51.1	0.67	0.75	0.67	39.8
12	R2	All MCs	131	5.0	131	5.0	* 0.458	34.9	LOS C	4.3	31.1	0.95	0.78	0.95	33.4
Approach			458	5.0	458	5.0	0.458	21.9	LOS B	7.0	51.1	0.75	0.76	0.75	37.7
All Vehicles			2089	14.0	2089	14.0	0.650	19.5	LOS B	12.4	90.4	0.75	0.69	0.75	39.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
All Pedestrians		30	32	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09

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.

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MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - PM (Site Folder: Pre-Development (2033))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 73 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	207	5.0	207	5.0	0.444	29.6	LOS C	6.3	46.3	0.88	0.79	0.88	35.0
2	T1	All MCs	869	5.0	869	5.0	* 0.884	38.6	LOS C	18.3	133.6	1.00	1.12	1.33	32.7
Approach			1077	5.0	1077	5.0	0.884	36.9	LOS C	18.3	133.6	0.98	1.06	1.24	33.1
North: Maitland St (north)															
8	T1	All MCs	665	50.0	665	50.0	0.367	7.5	LOS A	5.9	58.9	0.53	0.46	0.53	45.4
9	R2	All MCs	477	5.0	477	5.0	* 0.799	33.2	LOS C	13.9	101.3	0.97	1.07	1.10	33.9
Approach			1142	31.2	1142	31.2	0.799	18.2	LOS B	13.9	101.3	0.71	0.72	0.77	39.7
West: Rutherford Rd															
10	L2	All MCs	522	5.0	522	5.0	0.488	14.5	LOS A	11.0	80.1	0.63	0.76	0.63	40.8
12	R2	All MCs	361	5.0	361	5.0	* 0.909	48.7	LOS D	16.1	117.3	1.00	1.11	1.45	29.7
Approach			883	5.0	883	5.0	0.909	28.4	LOS B	16.1	117.3	0.78	0.90	0.97	35.4
All Vehicles			3102	14.7	3102	14.7	0.909	27.6	LOS B	18.3	133.6	0.82	0.89	0.99	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	30.8	LOS D	0.0	0.0	0.92	0.92	184.6	200.0	1.08
North: Maitland St (north)												
P3	Full	10	11	30.8	LOS D	0.0	0.0	0.92	0.92	184.6	200.0	1.08
West: Rutherford Rd												
P4	Full	10	11	30.8	LOS D	0.0	0.0	0.92	0.92	184.6	200.0	1.08
All Pedestrians		30	32	30.8	LOS D	0.0	0.0	0.92	0.92	184.6	200.0	1.08

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.

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APPENDIX 6

MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - AM (Site Folder: Post-Development (2023))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	111	5.0	111	5.0	0.180	24.7	LOS B	2.7	19.5	0.74	0.73	0.74	37.6
2	T1	All MCs	658	5.0	658	5.0	* 0.521	21.4	LOS B	9.4	68.5	0.85	0.73	0.85	39.2
Approach			768	5.0	768	5.0	0.521	21.9	LOS B	9.4	68.5	0.83	0.73	0.83	39.0
North: Maitland St (north)															
8	T1	All MCs	351	50.0	351	50.0	0.177	4.6	LOS A	2.2	22.3	0.40	0.33	0.40	47.0
9	R2	All MCs	231	5.0	231	5.0	* 0.362	16.8	LOS B	5.3	38.3	0.75	0.76	0.75	39.9
Approach			581	32.1	581	32.1	0.362	9.4	LOS A	5.3	38.3	0.54	0.50	0.54	43.9
West: Rutherford Rd															
10	L2	All MCs	264	5.0	264	5.0	0.293	16.2	LOS B	5.4	39.6	0.64	0.73	0.64	40.0
12	R2	All MCs	113	5.0	113	5.0	* 0.396	34.5	LOS C	3.6	26.5	0.94	0.77	0.94	33.5
Approach			377	5.0	377	5.0	0.396	21.7	LOS B	5.4	39.6	0.73	0.74	0.73	37.8
All Vehicles			1726	14.1	1726	14.1	0.521	17.6	LOS B	9.4	68.5	0.71	0.65	0.71	40.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
All Pedestrians		30	32	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09

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.

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MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - PM (Site Folder: Post-Development (2023))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	173	5.0	173	5.0	0.396	36.2	LOS C	5.1	37.1	0.88	0.78	0.88	35.1
2	T1	All MCs	713	5.0	713	5.0	* 0.837	37.2	LOS C	14.5	105.7	1.00	1.03	1.26	34.1
Approach			885	5.0	885	5.0	0.837	37.0	LOS C	14.5	105.7	0.98	0.98	1.19	34.3
North: Maitland St (north)															
8	T1	All MCs	548	50.0	548	50.0	0.326	8.6	LOS A	5.0	49.7	0.56	0.48	0.56	44.8
9	R2	All MCs	384	5.0	384	5.0	* 0.698	29.1	LOS C	10.3	75.4	0.94	0.99	0.98	35.2
Approach			933	31.5	933	31.5	0.698	17.0	LOS B	10.3	75.4	0.72	0.69	0.73	40.3
West: Rutherford Rd															
10	L2	All MCs	421	5.0	421	5.0	0.387	14.6	LOS B	7.7	56.2	0.57	0.81	0.57	41.5
12	R2	All MCs	297	5.0	297	5.0	* 0.851	42.1	LOS C	11.7	85.2	1.00	1.10	1.34	31.8
Approach			718	5.0	718	5.0	0.851	25.9	LOS B	11.7	85.2	0.75	0.93	0.89	36.8
All Vehicles			2536	14.7	2536	14.7	0.851	26.5	LOS B	14.5	105.7	0.82	0.86	0.94	37.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
All Pedestrians		30	32	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09

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.

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MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - AM (Site Folder: Post-Development (2033))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - AM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	136	5.0	136	5.0	0.212	28.0	LOS B	3.3	23.8	0.73	0.73	0.73	37.8
2	T1	All MCs	855	5.0	855	5.0	* 0.671	24.0	LOS B	13.3	97.3	0.90	0.79	0.91	38.9
Approach			991	5.0	991	5.0	0.671	24.5	LOS B	13.3	97.3	0.88	0.78	0.89	38.7
North: Maitland St (north)															
8	T1	All MCs	432	50.0	432	50.0	0.218	4.8	LOS A	2.8	28.4	0.41	0.35	0.41	46.9
9	R2	All MCs	286	5.0	286	5.0	* 0.504	22.2	LOS B	7.5	54.6	0.86	0.86	0.86	37.7
Approach			718	32.1	718	32.1	0.504	11.7	LOS A	7.5	54.6	0.59	0.55	0.59	42.7
West: Rutherford Rd															
10	L2	All MCs	327	5.0	327	5.0	0.374	17.4	LOS B	7.2	52.6	0.68	0.75	0.68	39.5
12	R2	All MCs	138	5.0	138	5.0	* 0.484	35.0	LOS C	4.5	33.0	0.96	0.79	0.96	33.3
Approach			465	5.0	465	5.0	0.484	22.7	LOS B	7.2	52.6	0.76	0.76	0.76	37.5
All Vehicles			2174	13.9	2174	13.9	0.671	19.9	LOS B	13.3	97.3	0.76	0.70	0.76	39.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09
All Pedestrians		30	32	29.3	LOS C	0.0	0.0	0.91	0.91	183.1	200.0	1.09

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.

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MOVEMENT SUMMARY

Site: 101 [Maitland St & Rutherford Rd - PM (Site Folder: Post-Development (2033))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Maitland St & Rutherford Rd - PM
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 72 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Maitland St (south)															
1	L2	All MCs	213	5.0	213	5.0	0.449	29.1	LOS C	6.4	46.8	0.88	0.79	0.88	35.1
2	T1	All MCs	881	5.0	881	5.0	* 0.884	38.0	LOS C	18.3	133.6	1.00	1.12	1.33	32.9
Approach			1094	5.0	1094	5.0	0.884	36.3	LOS C	18.3	133.6	0.98	1.06	1.24	33.3
North: Maitland St (north)															
8	T1	All MCs	677	50.0	677	50.0	0.376	7.6	LOS A	6.0	60.3	0.54	0.47	0.54	45.3
9	R2	All MCs	477	5.0	477	5.0	* 0.821	34.7	LOS C	14.3	104.1	0.98	1.09	1.15	33.4
Approach			1154	31.4	1154	31.4	0.821	18.8	LOS B	14.3	104.1	0.72	0.73	0.79	39.5
West: Rutherford Rd															
10	L2	All MCs	522	5.0	522	5.0	0.493	14.6	LOS B	11.0	80.2	0.64	0.76	0.64	40.8
12	R2	All MCs	366	5.0	366	5.0	* 0.910	48.2	LOS D	16.1	117.9	1.00	1.11	1.45	29.8
Approach			888	5.0	888	5.0	0.910	28.5	LOS B	16.1	117.9	0.79	0.91	0.98	35.4
All Vehicles			3136	14.7	3136	14.7	0.910	27.7	LOS B	18.3	133.6	0.83	0.89	1.00	36.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Maitland St (south)												
P1	Full	10	11	30.3	LOS D	0.0	0.0	0.92	0.92	184.1	200.0	1.09
North: Maitland St (north)												
P3	Full	10	11	30.3	LOS D	0.0	0.0	0.92	0.92	184.1	200.0	1.09
West: Rutherford Rd												
P4	Full	10	11	30.3	LOS D	0.0	0.0	0.92	0.92	184.1	200.0	1.09
All Pedestrians		30	32	30.3	LOS D	0.0	0.0	0.92	0.92	184.1	200.0	1.09

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.

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