

Transport Impact Assessment

Proposed Residential Aged Care Facility

43-47 Murray Farm Road, 13 and 19 Watton Rd, Carlingford

14/10/2021

P0713r03v1



info@asongroup.com.au

+61 2 9083 6601

Suite 17.02, Level 17,

1 Castlereagh Street,

Sydney, NSW 2000

Document Control

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Glossary

Acronym	Description
AGRD	Austroads Guide to Road Design
AGTM	Austroads Guide to Traffic Management
CC	Construction Certificate
Council	City of Parramatta Council
DA	Development Application
DCP	Development Control Plan
DoS	Degree of Saturation
FSR	Floor space ratio
GFA	Gross Floor Area
HRV	Heavy Rigid Vehicle (as defined by AS2890.2:2018)
LEP	Local Environmental Plan
LGA	Local Government Area
LoS	Level of Service
MRV	Medium Rigid Vehicle (as defined by AS2890.2:2018)
OC	Occupation Certificate
RMS Guide	Transport for NSW (formerly Roads and Traffic Authority), Guide to Traffic Generating Developments, 2002
S4.55	Section 4.55 Modification
SRV	Small Rigid Vehicle (as defined by AS2890.2:2018)
TDT 2013/04a	TfNSW Technical Direction, Guide to Traffic Generating Developments ± Updated traffic surveys, August 2013
TfNSW	Transport for New South Wales
TIA	Transport Impact Assessment
veh/hr	Vehicle movements per hour (1 vehicle in & out = 2 movements)

1 Introduction

1.1 Background

Ason Group has been engaged by HB&B Property Pty Ltd to prepare a Transport Assessment (TA) to support the Development Application for a proposed residential aged care facility at 43-47 Murray Farm Road, 13 and 19 Watton Road, Carlingford (the Site). The proposal will involve demolition of the existing structures and construction of a new 110 bed facility with basement parking and facilities to accommodate on-site loading/unloading and waste removal (the Proposal). Located within the Local Government Area of City of Parramatta Council (Council), the development is W K H U H I R U H V X E M H F W W R W K D W ¶ V & R X

A previous Transport Assessment was prepared by Ason Group (Transport Impact Assessment Report, ref: P0713r02v01, dated 07/12/2018) (Ason 2018 Report) to support a previous proposal.

The previous proposal was refused development consent on non-traffic related matters. No concerns regarding traffic or parking were raised by Council. Details of this are found in the Sydney Central City Planning Panel Council Assessment Report (Panel reference: PPS-2019CCI013, DA Number: DA/85/2019), hereafter referred to as the 2019 Council Assessment Report.

1.2 Document References

This TA provides an assessment of the relevant traffic, transport and parking implications of the Proposal. In preparing this TA, Ason Group has referenced key planning documents, these include:

- State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (SEPP 2004)
- State Environmental Planning Policy (Housing) 2021 Public Consultation Draft (Draft Housing SEPP 2021)
- Parramatta (former The Hills) Local Environmental Plan 2012 (Parramatta LEP)
- Parramatta Development Control Plan 2011 (Parramatta DCP)

This TIA also references general access, traffic and parking guidelines, including:

- Roads and Maritime Services, Guide to Traffic Generating Developments (RMS Guide)
- Australian Standard 2890.1 (2004): Off-street car parking (AS2890.1:2004)
- Australian Standard 2890.2 (2018): Off-street commercial vehicle facilities (AS2890.2:2018)
- Australian Standard 2890.6 (2009): Off-street parking for people with disabilities (AS2890.6:2009)

2 Overview of Proposal

2.1 Traffic Study Objectives

This TA is a key element of the Statement of Environmental Effects (SEE) which must be addressed in the Development Application (DA). The TA serves as an input to consent authorities in their determination of the proposed development application.

This report sets out an assessment of the anticipated transport implications of the Proposal, including consideration of the following:

- Background review and collation of existing data
- Existing traffic and parking conditions surrounding the site
- Traffic and parking surveys
- Parking requirements and provisions
- Traffic generating characteristics of the proposed development
- Transport impact of the Proposal on the surrounding road network.

2.2 Summary of Proposed Development

A detailed description of the proposed development is included in the Statement of Environmental Effects, prepared separately. In summary, the application seeks demolition of the existing structures and construction of a new residential aged care facility, with basement car parking, and separate loading dock.

The following summarises key aspects of the Proposal:

- 110 beds:
 - ± Basement: 26 beds
 - ± Ground Floor: 46 beds
 - ± First Floor: 38 beds
- Provision of 24 car parking spaces inclusive of 1 accessible space
- Light vehicle access from Murray Farm Road, service vehicle access from Watton Road

Reference should be made to the plans prepared by Thomas Adsett, which are submitted separately. Reduced copies of the relevant plans are shown in Figure 1 and Figure 2 for context.

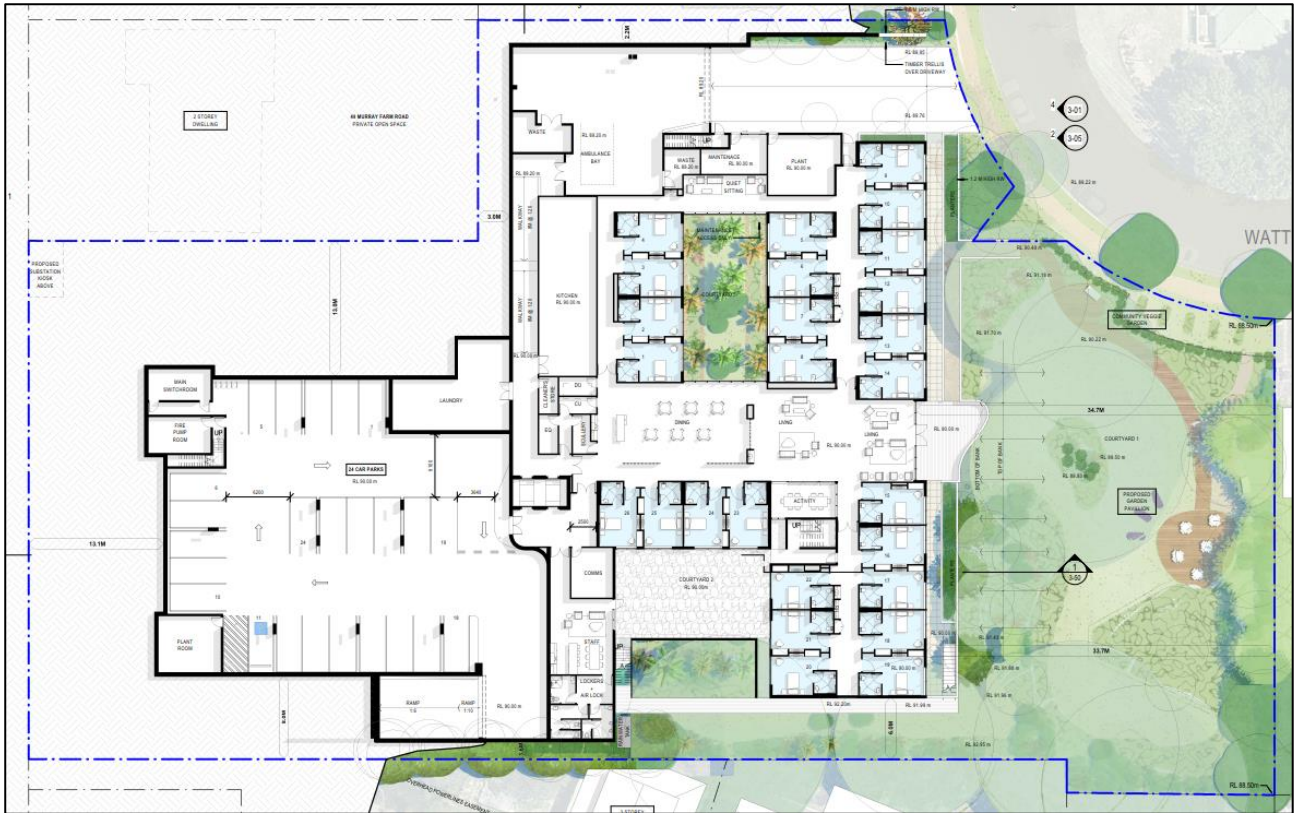


Figure 1: Lower Ground Floor Plan



Figure 2: Ground Floor Plan

3 Existing Conditions

3.1 Site Location and Description

The subject site, located at 43-47 Murray Farm Road, 13 and 19 Watton Road, Carlingford, is bounded by residential properties to the north, east and west, Watton Road to the northwest and Murray Farm Road to the south. Existing structures on the Site are a metal shed and open shelter as well as a pool and brick residence at 13 Watton Road.

Local stores and Carmen Drive Reserve are also located 200 metres to the north along Watton Road with Murray Farm Reserve 300 metres to the west.

3.2 Road Hierarchy

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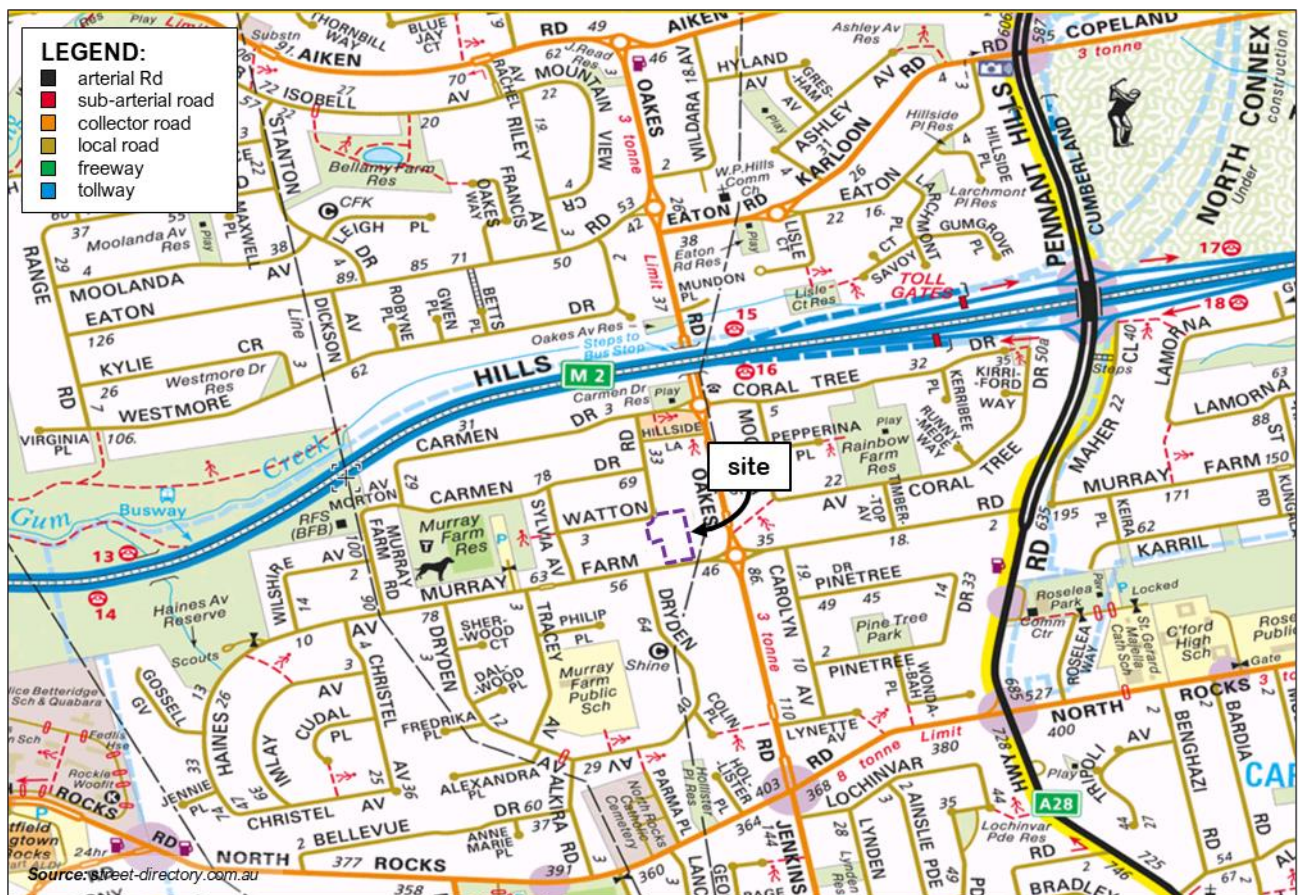


Figure 3: Surrounding Road Hierarchy

The characteristics of key roads in the vicinity of the Site are summarised in Table 1.

TABLE 1 ROAD NETWORK

Road	Classification	Authority	Characteristics
M2 Motorway	Privately Operated Tollway	RMS	Connects directly with the Lane Cove Tunnel, North Ryde and heads north-west connecting to the Westlink M7 motorway at Seven Hills. It forms part of Sydney's M2 route and the 110 km Sydney Orbital Network. Generally, 2-3 lanes in each direction in the vicinity of the Site.
Murray Farm Road	Local Road	Council	A two-way, two lane collector road with unrestricted kerbside parking on both sides in the vicinity of the Site. A speed limit of 50km/h applies to this road.
Oakes Road	Regional Road	Council	A two-way, two lane collector road with unrestricted kerbside parking on both sides in the vicinity of the Site. A speed limit of 50km/h applies to this road.
Watton Road	Local Road	Council	A two-way, two lane collector road with unrestricted kerbside parking on both sides in the vicinity of the Site. A speed limit of 50km/h applies to this road.

3.3 Bus Services

Regarding standard bus travel, the Integrated Public Transport Service Planning Guidelines (Transport for NSW, December 2013) state that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes) of a bus stop. The closest bus stop is located on Oakes Road, some 100 metres from the site. This stop services the 553 route which is a Monday-Friday loop service to and from Beecroft Station.

The M2 Oakes Road interchange is located some 450 metres from the site. This interchange provides various high-frequency Monday-Sunday services between the city and the north-west including:

- Route 611: Macquarie Park to Blacktown via M2
- Route 607N: City QVB to Tallawong Station via M2 Mwy & North West Twy (Night Service)
- Route 607X: City QVB to Bella Vista Station (Express Service)
- Route 610X: Kellyville to City QVB via Lane Cove Tunnel (Express Service)

3.4 Railway Services

The closest train station to the site is the decommissioned Carlingford Railway Station, located approximately 2.4 kilometres to the south. This station is currently undergoing conversion to a light rail station to form part of the Parramatta Light Rail network.

Beecroft Railway Station is located approximately 2.8 kilometres away to the north-east. The site has a direct link via the 553 bus service, as noted in Section 3.3. Beecroft Station is currently being upgraded as part of the NSW Government Transport Access Program, with two new lifts, a new platform canopy, reconfiguration of amenities, improvements to accessible parking, upgraded footpaths, improvements to CCTV, wayfinding, lighting and landscaping works expected to be completed in 2022¹.

¹ Source: <https://www.transport.nsw.gov.au/projects/current-projects/beecroft-station-upgrade>, accessed 12 October 2021

3.5 Existing Cycle Routes

An on-road cycle route with relevant line- PDUNLQJ Š LV SURYLGHG ZLW Kacnt to the UD\) DUP site. Peak hour traffic volumes are moderate with on-street parking also permitted, resulting in this route EHLQJ FDWHJRULVHG DV D ³PRGHUDWH GLILFXOW\ URXWH E\ 7116:

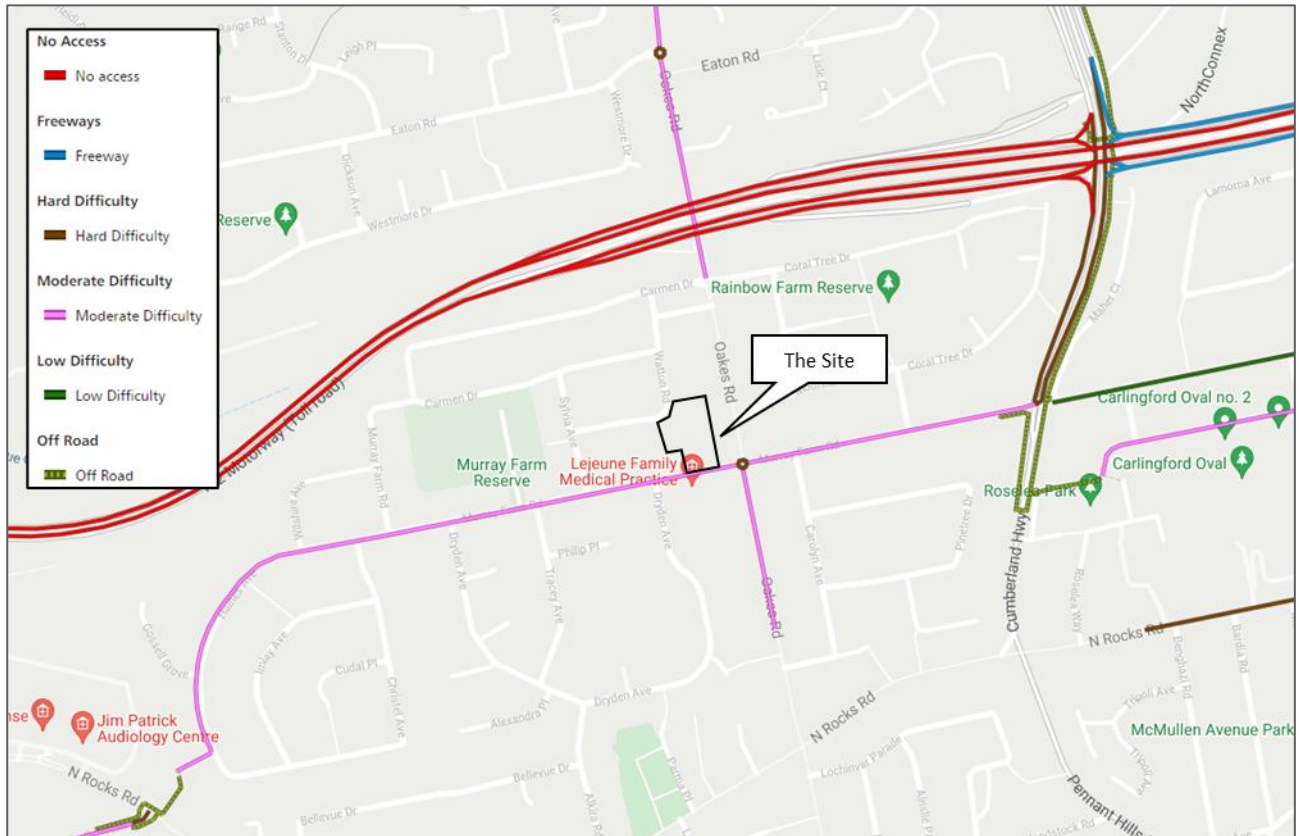


Figure 4: Nearby Cycling Infrastructure

3.6 Pedestrian Accessibility

Key pedestrian desire lines in the vicinity of the Site primarily relate to connections to existing public transport infrastructure (M2 Oakes Road bus interchange); the Carmen Drive Community Shopping Centre; and nearby recreational spaces such as Murray Farm Reserve. In this regard, formal footpaths are provided along most local roads, while pedestrian refuges are provided in the splitter islands of the roundabouts on Oakes Road. Other pedestrian connections are also provided by way of footpaths around Murray Farm Public School.

The northern leg of the Oakes Road/ Coral Tree Drive/ Carmen Drive roundabout has recently (in early 2020) been upgraded from the previous refuge island to a raised pedestrian crossing.

3.7 Existing Traffic

Traffic surveys were previously conducted at key intersections in the vicinity of the site on Wednesday, 17 October 2018, between 7am \pm 10am and 3pm \pm 7pm. The weather was fine throughout the survey period. Analysis of the surveyed data at both roundabouts identified the morning peak to be 7:45-8:45am and evening peak to be 5:00-6:00pm. Resultant peak hour traffic volumes are reproduced in Figure 5.

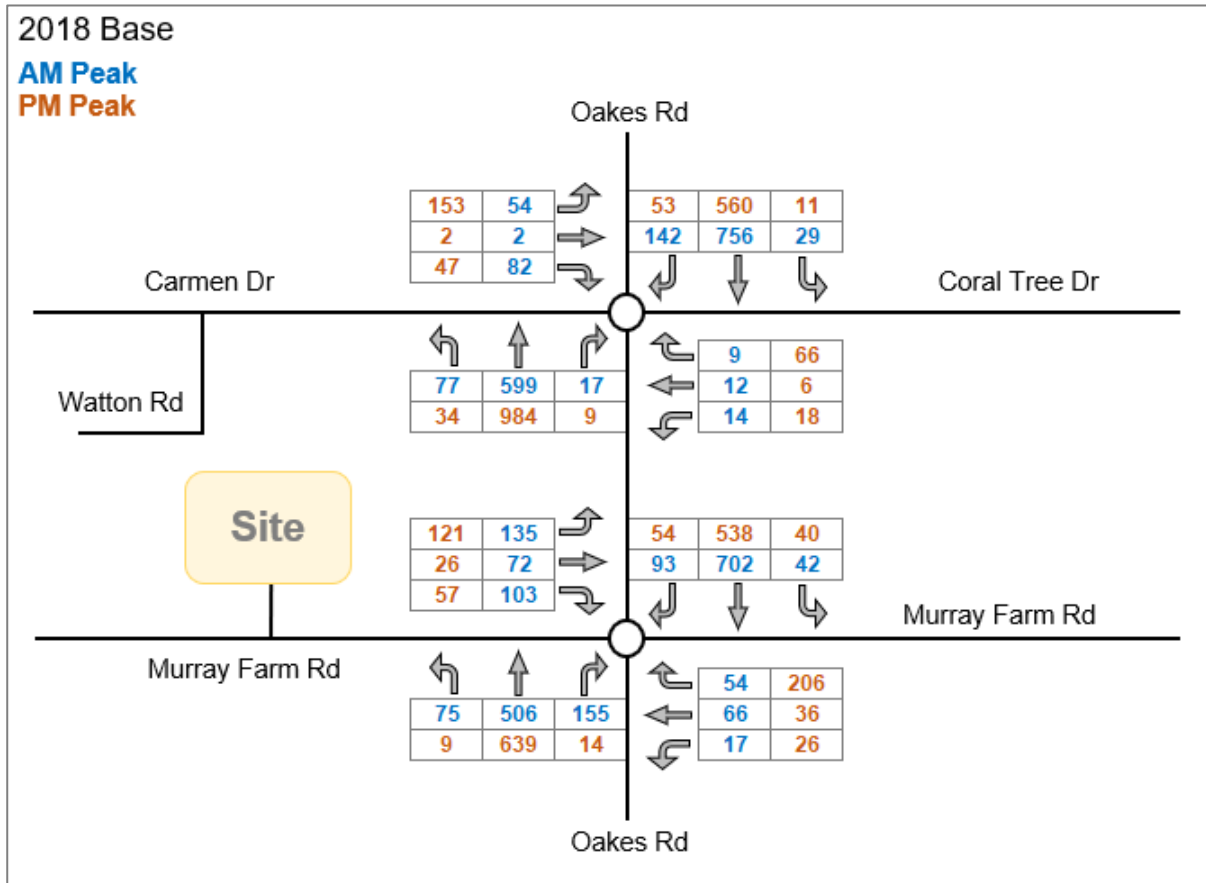


Figure 5 Existing Traffic Volumes (2018)

3.8 Existing Road Performance

The performance of the key intersections has been analysed using the SIDRA Intersection software. SIDRA modelling outputs a range of performance measures, in particular:

- Degree of Saturation (DOS) \pm The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8. Average
- Vehicle Delay (AVD) \pm The AVD (or average delay per vehicle in seconds) for intersections also provides D PHDVXUH RI WKH RSHUDWLRQDO SHUIRUPDQFH RI DQ LQWHUFWHFWL Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all

vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.

- Level of Service (LOS) ± This is a comparative measure that provides an indication of the operating performance, based on AVD. For signalised and roundabout intersections, LOS is based on the average delay to all vehicles, while at priority controlled intersections LOS is based on the worst approach delay.

Table 2 provides a recommended baseline for assessment as per the RMS Guide:

TABLE 2 LEVEL OF SERVICE

Level of Service	Ave Delay/Veh (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity. Excessive delays at signals. Round require other control.	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment

7 KH 6, '5\$ LQWHUVHFWLRQ PRGHOOHQJ UHVXOWV RI WKH NH\ LQWHUVHF shown in Table 3.

TABLE 3 LOCAL NETWORK PERFORMANCE, 2018 BASELINE SCENARIO

Intersection	Criteria	Morning Peak	Evening Peak
Oakes Road / Carmen Drive / Coral Tree Drive	Approach with max delay (worst movement)	East	West
	Delay (sec)	17	46
	LOS	B	D
	Approach with max queue	North	South
	Queue length (m)	30	43
Oakes Road / Murray Farm Road	Approach with max delay (worst movement)	North	West
	Delay (sec)	25	19
	LOS	B	B
	Approach with max queue	North	South
	Queue length (m)	70	25

The analysis shows that both key intersections operate well within acceptable delays with spare capacity during the morning peak and in the evening peak for the Oakes Road / Murray Farm Road intersection. During the evening peak the western approach to Oakes Road / Carmen Drive / Coral Tree Drive is nearing capacity. However, all other approaches at these intersections operate at a LOS A. Relevant SIDRA outputs are contained in Appendix A.

4 Operational Impacts

4.1 Parking

4.1.1 SEPP Parking Requirements

Car parking for the development has been assessed under the State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 (SEPP 2004) for which Chapter 3, Part 7, Division 2 states:

“A consent authority must not refuse consent to a development application made pursuant to this Chapter for the carrying out of development for the purpose of a residential care facility on any of the following grounds:

(d) parking for residents and visitors: if at least the following is provided:

- (i) 1 parking space for each 10 beds in the residential care facility (or 1 parking space for each 15 beds if the facility provides care only for persons with dementia), and*
- (ii) 1 parking space for each 2 persons to be employed in connection with the development and on duty at any one time, and*
- (iii) 1 parking space suitable for an ambulance.*

Note. The provisions of this clause do not impose any limitations on the grounds on which a consent authority may grant development consent.”

Table 4 provides an overview of the parking requirements for the proposed development.

TABLE 4 PERMITTED PARKING REQUIREMENT

Land Use	Units/Beds	Parking Rate	Parking Requirement
Beds	110	1 per 10 beds	11
Staff	25	1 per 2 staff on duty	13
Ambulance	Facility	1	1
Parking Requirement			24 (+1 ambulance)

The proposed development provides 24 spaces and a separate location for service vehicle parking, therefore meeting the SEPP requirement.

The NSW Government is developing a new Housing State Environmental Planning Policy (Housing SEPP) which, among other changes, seeks to consolidate five existing housing-related SEPPs including SEPP 2004. At the time of this report it is in draft status, expected to be finalised in October 2021.

In the draft Housing SEPP, Part 4, Chapter 3, Division 7, Clause 96 states that:

“(2) The following are non-discretionary development standards in relation to development for the purposes of a hostel or a residential care facility—

...

(h) for a residential care facility—at least 1 parking space for every 15 beds in the facility”

As this rate is lower than the current rate in SEPP 2004, the parking provision calculated in Table 4 (based on SEPP 2004) will exceed the required provision in the Housing SEPP following its future gazettal.

4.1.2 Accessible Parking

Section 3.6.2 Design Controls C.13 of the Parramatta DCP 2011 Part 3 states that

- *“The number of accessible carparking spaces to be provided as prescribed in Table D3.5 of the Building Code of Australia.”*

The Building Code of Australia requires, in Table D3.5, for a Class 3b building:

- *“1 space for every 100 car parking spaces or part thereof”*

Based on the provision of 24 car spaces, this equates to a requirement of a single accessible car parking space.

The Proposal provides 1 accessible space in the basement car park, thereby satisfying this requirement.

4.1.3 Motorcycle Parking

The Parramatta DCP and SEPP 2004 G R Q ¶ W R X W O L Q H D U H T X L U H G P R W R U F \ F O H S D U M aged care facilities. No motorcycle parking is proposed for the development.

4.1.4 Bicycle Parking

The Parramatta DCP and SEPP 2004 do not outline a required bicycle parking provision for residential aged care facilities. Guidance is instead drawn from the NSW Government Planning Guidelines for Walking and Cycling 2004 which suggests a bicycle parking provision (for nursing homes) of:

- 3-5% of staff numbers for staff use
- 5-10% of staff numbers for visitor use

Based on 25 staff, this is 1-2 bicycle spaces for staff, and 2-3 bicycle spaces for visitors.

In response, 5 bicycle spaces have been provided within the basement car park.

4.2 Service Vehicle Requirements

4.2.1 Objectives

Section 3.6.2 Design Principles P.6 states that:

- *“On site parking is to be provided at a rate sufficient for residents, employees, visitors and service vehicles as relevant to the development.”*

The Proposal will provide a loading dock at the rear of the site, accessed from Watton Road, for vehicles up to 8.8m long Medium Rigid Vehicles (MRV). This adequately accommodates the expected service vehicles for the site which are envisaged to be infrequent ambulances, the waste collection vehicle, and the occasional delivery vehicle.

Segregation of the loading dock area and basement car park is expected to provide increased amenity and safety through the separation of different user groups.

4.2.2 Waste Access

Swept path assessment has been prepared (see Appendix B) demonstrating the ability for the nominated design service vehicle (8.8m long MRV) to enter and exit the site in a forward manner.

All servicing, loading, and waste collection and storage facilities are located wholly within the site and in a separate area to the basement car park.

4.2.3 Access Management

As a single loading bay will be provided, dynamic signage will be provided near the Watton Road access, linked to a detection system within the loading dock. The dynamic signage will notify arriving service vehicles if the loading dock is occupied. This in conjunction with a booking system to ensure appropriate separation between planned loading/ servicing arrivals is appropriate for the level of service vehicle activity expected for this site.

4.3 Design Commentary

4.3.1 Drop-off Area

A drop-off area is proposed on the ground level, accessed via Murray Farm Road. Swept path assessment has been prepared, demonstrating the ability for a B99 vehicle to drop-off passengers in the drop-off loop before proceeding into either the basement car park or turn around in a forward manner to exit the site.

This drop-off area is separate to the basement car park and increases separation between visitor and staff vehicle movements.

4.3.2 Ramps

The ramp to the basement car park is around 18.5m long and provides a maximum grade of 20% (1:5). At the top and bottom of the ramp, 2m long grade transitions of 10% (1:10) are provided. The basement ramp grades are in accordance with Clause 2.5.3 of AS2890.1:2004.

4.3.3 Parking Modules and Internal Circulation

Parking spaces have been designed in accordance with User Class 3 (AS2890.1:2004) and provide minimum space lengths of 5.4m, widths of 2.6m and minimum aisle widths of 5.8m (6.1m where opposite a high obstruction).

Disabled parking spaces have been designed in accordance with AS2890.6:2009 providing minimum 2.4m width, 5.4m length, and adjacent 2.4m shared area.

Swept path assessment has been prepared (refer to Appendix B) to demonstrate suitable circulation throughout the car park.

4.3.4 Headroom Requirements

A minimum headroom of 3.7 metres is provided along the service access driveway and a headroom of 4.0 metres in the loading dock itself. This is expected to be suitable for the rear loading private contractor waste truck (which has a vehicle height of 3.4m) and ambulance access (the tallest ambulance in the NSW fleet being a 3.2m tall Bariatric Ambulance).

Although a departure from AS2890.2:2018 which requires a headroom of 4.5m for MRVs, the proposed headroom is considered suitable based on the expected vehicle fleet to service the site. A height bar at the loading dock access or similar form of signage will be required to notify users of the available height clearance.

A minimum headroom of 3.2 metres is provided along the car park ramp, which exceeds the minimum requirement of 2.2 metres measured in accordance with Section 5.3 of AS2890.1:2004.

4.4 Traffic

4.4.1 Development Traffic Generation

The RMS Guide states that morning peak periods for this type of development generally do not coincide with the morning commuter peak, although there is a closer correlation between evening site peaks and network peaks. The Proposal has a total of 110 beds with a maximum of 25 staff on duty at any given time and it is estimated that 50% of the staff would either drive or be dropped off during the morning and evening peak periods. The RMS Guide:

- Daily vehicle trips = 1 - 2 per dwelling
- Evening peak hour vehicle trips = 0.1 - 0.2 per dwelling

Additionally, the following assumptions have been adopted for trip generation to/from the Site:

- Morning peak hour trips to be equal to the evening peak hour trips
- Hourly trips calculated from the RMS Guide rates (22) are visitor trips only
- Visitor trips: 50% in and 50% out in both peaks
- Additional trips: 25 (1 for each staff on duty)
- Staff trips: 50% in during morning peak and 50% out during evening peak.

Total number of trips assumed for both peak periods are shown in Table 5.

TABLE 5 SUMMARY OF TRIP GENERATION

# of Trips	Morning Peak		Evening Peak	
	In	Out	In	Out
Visitors	11	11	11	11
Staff	13	-	-	13
Total	24	11	11	24

Comparison is drawn to the Ason 2018 Report which had a morning peak trip generation of 28 vehicles in and 13 vehicles out, and an evening peak trip generation of 13 vehicles in and 28 vehicles out, summarised in Table 6.

TABLE 6 TRIP GENERATION COMPARISON

Scenario	Previous proposal (Ason 2018 Report)	Current Proposal	Difference
Morning Peak Vehicle Trips	41	35	-6
Evening Peak Vehicle Trips	41	35	-6

4.4.2 Traffic Impacts

The SIDRA traffic modelling from the Ason 2018 Report has been extracted in Table 7.

TABLE 7 LOCAL NETWORK PERFORMANCE, 2018 BASELINE SCENARIO

Intersection	Criteria	Morning Peak		Evening Peak	
		Base	Base + Development	Base	Base + Development
Oakes Road / Carmen Drive / Coral Tree Drive	Approach with max delay (worst movement)	East	East	West	West
	Delay (sec)	17	17	46	50
	LOS	B	B	D	D
	Approach with max queue	North	North	South	South
	Queue length (m)	30	31	43	44
Oakes Road / Murray Farm Road	Approach with max delay (worst movement)	North	North	West	West
	Delay (sec)	25	29	19	21
	LOS	B	C	B	B
	Approach with max queue	North	North	South	South
	Queue length (m)	70	82	25	27

The analysis from the Ason 2018 Report indicated that the net increase in traffic volumes generated by the Site would result in minimal increases in delay at the key intersections.

The analysis further demonstrated that the net traffic generation volumes are of a sufficiently low order that once distributed onto the surrounding road network, the impacts of these volumes at the key intersections would be negligible and the intersections would operate very close to existing.

As the current Proposal has a lower yield compared to the previous proposal assessed in the Ason 2018 Report (110 beds compared to the previous 132 beds), the expected traffic generation is also lower, as reflected in Table 6. Therefore, it is expected that the traffic impact of this development is less than that previously assessed and will result in minimal impacts to the operation of the surrounding road network.

Reference is also drawn to the 2019 Council Assessment Report which stated that (in the context of the previous proposal assessed in the Ason 2018 Report):

“Council’s Senior Traffic Engineer has reviewed the application and advised that based on the analysis and information submitted by the applicant, the proposed development is not expected to have a significant traffic impact on the surrounding road network. The proposal can be supported on traffic and parking grounds subject to recommended traffic related conditions.”

As the revised proposal presents reduced traffic generation, the previous commentary outlined in the 2019 Council Assessment Report continues to apply.

5 Summary and Conclusions

The key findings of this Traffic Impact Assessment are:

- Ason Group has been engaged by HB&B Property to undertake an updated review of the transport, access and parking implications of the proposed residential aged care facility. This updated Transport Assessment (TA) relates to properties located at 43-47 Murray Farm Road, 13 and 19 Watton Road, Carlingford (the Site).
- A TA was previously prepared by Ason Group in 2018 for a previous iteration of this development, involving demolition of the existing structures and construction of a new 132 bed facility with basement parking and facilities to accommodate on-site loading/unloading and waste removal.
- That previous proposal was refused development consent on non-traffic related matters. It is noted that Council did not raise any concerns regarding traffic or parking in the 2019 Council Assessment Report.
- The updated Proposal proposes a reduction in scale, reducing the number of beds in the facility to 110. Consequently, a reduced SEPP car parking requirement of 24 car spaces is required. The Proposal provides 24 car spaces, meeting this requirement.
- Of this provision, 1 accessible space will be provided, satisfying the requirements of the Building Code of Australia and Parramatta DCP.
- The Proposal is expected to generate approximately 35 vehicle trips during the morning and evening peak hours. This is less than the previous proposal assessed in 2019 (41 vehicle trips) and will not have a material impact to the operation of the surrounding road network with key intersections remaining at Level of Service D or better during peak periods.
- Light vehicle access is proposed via Murray Farm Road, with service vehicle access proposed via Watton Road.
- User groups are appropriately separated as the drop-off loop (for visitors), basement car park (for staff), and loading dock (for service vehicles) are provided in different locations, reducing comingling of different users.
- Site access, internal circulation and car parking arrangements have been developed with consideration of the requirements of the Parramatta DCP and relevant Australian Standards (i.e. AS2890.1:2004, AS2890.2:2018 and AS2890.6:2009) and has been deemed acceptable. All access and circulation manoeuvres are in a forward manner.

In summary, the Proposal is supportable on traffic engineering and transport planning grounds and is not expected to result in any adverse impacts on the surrounding road network or the availability of on-street parking.

Appendix A. SIDRA Output Results from Ason 2018 Report

MOVEMENT SUMMARY

 Site: 1 [Oakes x Carmen _ Base _ AM]

 Network: N101 [Base AM]

Oakes Road x Carmen Drive x Coral Tree Drive intersection, Carlingford
 2018 Road Conditions
 Traffic: 2018 Existing AM
 Site Category: 4 leg
 Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Oakes Rd (300m)														
1	L2	81	1.3	81	1.3	0.637	5.5	LOS A	2.5	18.0	0.65	0.59	0.65	44.2
2	T1	631	2.0	631	2.0	0.637	5.3	LOS A	2.5	18.0	0.65	0.59	0.65	44.2
3	R2	18	0.0	18	0.0	0.637	8.4	LOS A	2.5	18.0	0.65	0.59	0.65	44.8
Approach		729	1.9	729	1.9	0.637	5.4	LOS A	2.5	18.0	0.65	0.59	0.65	44.2
East: Coral Tree Dr (500m)														
4	L2	15	0.0	15	0.0	0.099	14.1	LOS A	0.3	1.9	0.92	0.86	0.92	35.8
5	T1	13	0.0	13	0.0	0.099	13.9	LOS A	0.3	1.9	0.92	0.86	0.92	41.6
6	R2	9	0.0	9	0.0	0.099	17.1	LOS B	0.3	1.9	0.92	0.86	0.92	40.6
Approach		37	0.0	37	0.0	0.099	14.8	LOS B	0.3	1.9	0.92	0.86	0.92	39.6
North: Oakes Rd (380m)														
7	L2	31	0.0	31	0.0	0.759	5.2	LOS A	4.2	30.1	0.70	0.54	0.70	44.4
8	T1	796	1.3	796	1.3	0.759	5.0	LOS A	4.2	30.1	0.70	0.54	0.70	40.1
9	R2	149	1.4	149	1.4	0.759	8.2	LOS A	4.2	30.1	0.70	0.54	0.70	44.9
Approach		976	1.3	976	1.3	0.759	5.5	LOS A	4.2	30.1	0.70	0.54	0.70	41.6
West: Carmen Dr (500m)														
10	L2	57	1.9	57	1.9	0.244	9.2	LOS A	0.6	4.6	0.80	0.85	0.80	42.2
11	T1	2	0.0	2	0.0	0.244	8.9	LOS A	0.6	4.6	0.80	0.85	0.80	43.5
12	R2	86	6.1	86	6.1	0.244	12.4	LOS A	0.6	4.6	0.80	0.85	0.80	38.6
Approach		145	4.3	145	4.3	0.244	11.1	LOS A	0.6	4.6	0.80	0.85	0.80	40.5
All Vehicles		1887	1.7	1887	1.7	0.759	6.1	LOS A	4.2	30.1	0.69	0.59	0.69	42.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 1 [Oakes x Carmen _ Base _ PM]

 Network: N101 [Base PM]

Oakes Road x Carmen Drive x Coral Tree Drive intersection, Carlingford
 2018 Road Conditions
 Traffic: 2018 Existing PM
 Site Category: 4 leg
 Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Oakes Rd (300m)														
1	L2	36	2.9	36	2.9	0.857	6.7	LOS A	6.1	42.6	0.90	0.61	0.92	43.4
2	T1	1036	0.7	1036	0.7	0.857	6.4	LOS A	6.1	42.6	0.90	0.61	0.92	43.3
3	R2	9	0.0	9	0.0	0.857	9.6	LOS A	6.1	42.6	0.90	0.61	0.92	44.0
Approach		1081	0.8	1081	0.8	0.857	6.5	LOS A	6.1	42.6	0.90	0.61	0.92	43.3
East: Coral Tree Dr (500m)														
4	L2	19	5.6	19	5.6	0.151	9.5	LOS A	0.4	2.6	0.75	0.81	0.75	38.3
5	T1	6	16.7	6	16.7	0.151	9.9	LOS A	0.4	2.6	0.75	0.81	0.75	43.1
6	R2	69	0.0	69	0.0	0.151	12.2	LOS A	0.4	2.6	0.75	0.81	0.75	42.4
Approach		95	2.2	95	2.2	0.151	11.5	LOS A	0.4	2.6	0.75	0.81	0.75	41.9
North: Oakes Rd (380m)														
7	L2	12	0.0	12	0.0	0.482	4.2	LOS A	1.8	12.9	0.35	0.45	0.35	45.5
8	T1	589	1.3	589	1.3	0.482	4.0	LOS A	1.8	12.9	0.35	0.45	0.35	42.1
9	R2	56	1.9	56	1.9	0.482	7.2	LOS A	1.8	12.9	0.35	0.45	0.35	46.0
Approach		657	1.3	657	1.3	0.482	4.3	LOS A	1.8	12.9	0.35	0.45	0.35	42.8
West: Carmen Dr (500m)														
10	L2	161	2.0	161	2.0	0.741	43.5	LOS D	3.3	23.5	1.00	1.31	1.75	29.4
11	T1	2	0.0	2	0.0	0.741	43.1	LOS D	3.3	23.5	1.00	1.31	1.75	31.2
12	R2	49	0.0	49	0.0	0.741	46.3	LOS D	3.3	23.5	1.00	1.31	1.75	22.8
Approach		213	1.5	213	1.5	0.741	44.1	LOS D	3.3	23.5	1.00	1.31	1.75	28.2
All Vehicles		2045	1.1	2045	1.1	0.857	9.9	LOS A	6.1	42.6	0.73	0.64	0.82	40.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 1 [Oakes x Carmen _ Base w Dev _ AM]

 Network: N101 [Base w Dev AM]

Oakes Road x Carmen Drive x Coral Tree Drive intersection, Carlingford

2018 Road Conditions

Traffic: 2018 Existing AM

Site Category: 4 leg

Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Oakes Rd (300m)														
1	L2	81	1.3	81	1.3	0.640	5.5	LOS A	2.6	18.2	0.66	0.59	0.66	44.2
2	T1	634	2.0	634	2.0	0.640	5.3	LOS A	2.6	18.2	0.66	0.59	0.66	44.2
3	R2	18	0.0	18	0.0	0.640	8.4	LOS A	2.6	18.2	0.66	0.59	0.66	44.8
Approach		733	1.9	733	1.9	0.640	5.4	LOS A	2.6	18.2	0.66	0.59	0.66	44.2
East: Coral Tree Dr (500m)														
4	L2	16	0.0	16	0.0	0.104	14.4	LOS A	0.3	2.0	0.93	0.87	0.93	35.6
5	T1	13	0.0	13	0.0	0.104	14.2	LOS A	0.3	2.0	0.93	0.87	0.93	41.5
6	R2	9	0.0	9	0.0	0.104	17.4	LOS B	0.3	2.0	0.93	0.87	0.93	40.4
Approach		38	0.0	38	0.0	0.104	15.1	LOS B	0.3	2.0	0.93	0.87	0.93	39.4
North: Oakes Rd (380m)														
7	L2	31	0.0	31	0.0	0.768	5.2	LOS A	4.4	31.0	0.71	0.54	0.71	44.4
8	T1	806	1.3	806	1.3	0.768	5.0	LOS A	4.4	31.0	0.71	0.54	0.71	40.0
9	R2	149	1.4	149	1.4	0.768	8.2	LOS A	4.4	31.0	0.71	0.54	0.71	44.9
Approach		986	1.3	986	1.3	0.768	5.5	LOS A	4.4	31.0	0.71	0.54	0.71	41.5
West: Carmen Dr (500m)														
10	L2	57	1.9	57	1.9	0.247	9.2	LOS A	0.6	4.7	0.81	0.85	0.81	42.1
11	T1	2	0.0	2	0.0	0.247	8.9	LOS A	0.6	4.7	0.81	0.85	0.81	43.5
12	R2	87	6.0	87	6.0	0.247	12.5	LOS A	0.6	4.7	0.81	0.85	0.81	38.6
Approach		146	4.3	146	4.3	0.247	11.2	LOS A	0.6	4.7	0.81	0.85	0.81	40.5
All Vehicles		1903	1.7	1903	1.7	0.768	6.1	LOS A	4.4	31.0	0.70	0.59	0.70	42.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 1 [Oakes x Carmen _ Base w Dev _ PM]

 Network: N101 [Base w Dev PM]

Oakes Road x Carmen Drive x Coral Tree Drive intersection, Carlingford

2018 Road Conditions

Traffic: 2018 Existing PM

Site Category: 4 leg

Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Oakes Rd (300m)														
1	L2	36	2.9	36	2.9	0.862	6.9	LOS A	6.3	44.1	0.92	0.62	0.94	43.4
2	T1	1042	0.7	1042	0.7	0.862	6.6	LOS A	6.3	44.1	0.92	0.62	0.94	43.3
3	R2	11	0.0	11	0.0	0.862	9.8	LOS A	6.3	44.1	0.92	0.62	0.94	44.0
Approach		1088	0.8	1088	0.8	0.862	6.6	LOS A	6.3	44.1	0.92	0.62	0.94	43.3
East: Coral Tree Dr (500m)														
4	L2	19	5.6	19	5.6	0.152	9.5	LOS A	0.4	2.6	0.75	0.81	0.75	38.2
5	T1	6	16.7	6	16.7	0.152	9.9	LOS A	0.4	2.6	0.75	0.81	0.75	43.1
6	R2	69	0.0	69	0.0	0.152	12.3	LOS A	0.4	2.6	0.75	0.81	0.75	42.3
Approach		95	2.2	95	2.2	0.152	11.6	LOS A	0.4	2.6	0.75	0.81	0.75	41.8
North: Oakes Rd (380m)														
7	L2	12	0.0	12	0.0	0.487	4.2	LOS A	1.8	13.0	0.35	0.45	0.35	45.5
8	T1	595	1.2	595	1.2	0.487	4.0	LOS A	1.8	13.0	0.35	0.45	0.35	42.1
9	R2	56	1.9	56	1.9	0.487	7.2	LOS A	1.8	13.0	0.35	0.45	0.35	46.0
Approach		662	1.3	662	1.3	0.487	4.3	LOS A	1.8	13.0	0.35	0.45	0.35	42.8
West: Carmen Dr (500m)														
10	L2	161	2.0	161	2.0	0.761	47.1	LOS D	3.5	24.7	1.00	1.34	1.81	28.5
11	T1	2	0.0	2	0.0	0.761	46.7	LOS D	3.5	24.7	1.00	1.34	1.81	30.3
12	R2	49	0.0	49	0.0	0.761	49.9	LOS D	3.5	24.7	1.00	1.34	1.81	21.8
Approach		213	1.5	213	1.5	0.761	47.7	LOS D	3.5	24.7	1.00	1.34	1.81	27.3
All Vehicles		2058	1.1	2058	1.1	0.862	10.3	LOS A	6.3	44.1	0.73	0.65	0.83	40.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2 [Oakes x Murray _ Base _ AM]

 Network: N101 [Base AM]

Oakes Road x Murray Farm Road intersection, Carlingford
2018 Road Conditions
Traffic: 2018 Existing AM
Site Category: 4 leg
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Oakes Rd (480m)														
1	L2	79	0.0	79	0.0	0.711	7.2	LOS A	3.4	24.1	0.78	0.72	0.84	44.4
2	T1	533	1.6	533	1.6	0.711	7.1	LOS A	3.4	24.1	0.78	0.72	0.84	40.9
3	R2	163	0.6	163	0.6	0.711	10.2	LOS A	3.4	24.1	0.78	0.72	0.84	44.9
Approach		775	1.2	775	1.2	0.711	7.8	LOS A	3.4	24.1	0.78	0.72	0.84	42.6
East: Murray Farm Rd (500m)														
4	L2	18	0.0	18	0.0	0.381	14.1	LOS A	1.2	8.2	0.99	1.01	1.03	40.8
5	T1	69	1.5	69	1.5	0.381	14.1	LOS A	1.2	8.2	0.99	1.01	1.03	41.5
6	R2	57	0.0	57	0.0	0.381	17.0	LOS B	1.2	8.2	0.99	1.01	1.03	35.5
Approach		144	0.7	144	0.7	0.381	15.3	LOS B	1.2	8.2	0.99	1.01	1.03	39.7
North: Oakes Rd (300m)														
7	L2	44	11.9	44	11.9	0.924	22.3	LOS B	9.8	69.6	1.00	1.33	1.84	35.9
8	T1	739	1.3	739	1.3	0.924	21.6	LOS B	9.8	69.6	1.00	1.33	1.84	36.3
9	R2	98	1.1	98	1.1	0.924	24.6	LOS B	9.8	69.6	1.00	1.33	1.84	36.4
Approach		881	1.8	881	1.8	0.924	21.9	LOS B	9.8	69.6	1.00	1.33	1.84	36.3
West: Murray Farm Rd (500m)														
10	L2	142	0.0	142	0.0	0.602	16.1	LOS B	2.4	16.7	0.98	1.13	1.30	34.3
11	T1	76	0.0	76	0.0	0.602	16.0	LOS B	2.4	16.7	0.98	1.13	1.30	40.6
12	R2	108	0.0	108	0.0	0.602	19.0	LOS B	2.4	16.7	0.98	1.13	1.30	40.3
Approach		326	0.0	326	0.0	0.602	17.0	LOS B	2.4	16.7	0.98	1.13	1.30	38.5
All Vehicles		2126	1.2	2126	1.2	0.924	15.6	LOS B	9.8	69.6	0.92	1.06	1.34	38.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2 [Oakes x Murray _ Base _ PM]

 Network: N101 [Base PM]

Oakes Road x Murray Farm Road intersection, Carlingford
2018 Road Conditions
Traffic: 2018 Existing PM
Site Category: 4 leg
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m			km/h	
South: Oakes Rd (480m)														
1	L2	9	0.0	9	0.0	0.718	9.2	LOS A	3.6	25.3	0.87	0.86	1.02	43.8
2	T1	673	0.5	673	0.5	0.718	9.0	LOS A	3.6	25.3	0.87	0.86	1.02	39.9
3	R2	15	0.0	15	0.0	0.718	12.1	LOS A	3.6	25.3	0.87	0.86	1.02	44.3
Approach		697	0.5	697	0.5	0.718	9.1	LOS A	3.6	25.3	0.87	0.86	1.02	40.2
East: Murray Farm Rd (500m)														
4	L2	27	0.0	27	0.0	0.442	11.0	LOS A	1.3	9.4	0.86	0.95	0.94	41.8
5	T1	38	0.0	38	0.0	0.442	10.8	LOS A	1.3	9.4	0.86	0.95	0.94	42.5
6	R2	217	0.0	217	0.0	0.442	13.9	LOS A	1.3	9.4	0.86	0.95	0.94	37.0
Approach		282	0.0	282	0.0	0.442	13.2	LOS A	1.3	9.4	0.86	0.95	0.94	38.8
North: Oakes Rd (300m)														
7	L2	42	5.0	42	5.0	0.525	4.7	LOS A	2.0	14.2	0.47	0.50	0.47	44.5
8	T1	566	1.1	566	1.1	0.525	4.5	LOS A	2.0	14.2	0.47	0.50	0.47	45.3
9	R2	57	0.0	57	0.0	0.525	7.6	LOS A	2.0	14.2	0.47	0.50	0.47	45.2
Approach		665	1.3	665	1.3	0.525	4.8	LOS A	2.0	14.2	0.47	0.50	0.47	45.2
West: Murray Farm Rd (500m)														
10	L2	127	1.7	127	1.7	0.478	16.0	LOS B	1.6	11.2	0.97	1.07	1.16	34.4
11	T1	27	0.0	27	0.0	0.478	15.8	LOS B	1.6	11.2	0.97	1.07	1.16	40.7
12	R2	60	0.0	60	0.0	0.478	18.9	LOS B	1.6	11.2	0.97	1.07	1.16	40.4
Approach		215	1.0	215	1.0	0.478	16.8	LOS B	1.6	11.2	0.97	1.07	1.16	37.7
All Vehicles		1859	0.7	1859	0.7	0.718	9.1	LOS A	3.6	25.3	0.73	0.77	0.83	41.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2 [Oakes x Murray _ Base w Dev _ AM]

 Network: N101 [Base w Dev AM]

Oakes Road x Murray Farm Road intersection, Carlingford
 2018 Road Conditions
 Traffic: 2018 Existing AM
 Site Category: 4 leg
 Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				
South: Oakes Rd (480m)														
1	L2	88	0.0	88	0.0	0.735	8.1	LOS A	3.8	26.9	0.82	0.77	0.92	44.1
2	T1	533	1.6	533	1.6	0.735	7.9	LOS A	3.8	26.9	0.82	0.77	0.92	40.4
3	R2	163	0.6	163	0.6	0.735	11.0	LOS A	3.8	26.9	0.82	0.77	0.92	44.6
Approach		784	1.2	784	1.2	0.735	8.6	LOS A	3.8	26.9	0.82	0.77	0.92	42.2
East: Murray Farm Rd (500m)														
4	L2	18	0.0	18	0.0	0.408	15.3	LOS B	1.3	9.0	1.00	1.04	1.09	40.3
5	T1	76	1.4	76	1.4	0.408	15.3	LOS B	1.3	9.0	1.00	1.04	1.09	40.9
6	R2	57	0.0	57	0.0	0.408	18.2	LOS B	1.3	9.0	1.00	1.04	1.09	34.8
Approach		151	0.7	151	0.7	0.408	16.4	LOS B	1.3	9.0	1.00	1.04	1.09	39.2
North: Oakes Rd (300m)														
7	L2	44	11.9	44	11.9	0.947	26.9	LOS B	11.5	81.5	1.00	1.47	2.09	34.0
8	T1	739	1.3	739	1.3	0.947	26.1	LOS B	11.5	81.5	1.00	1.47	2.09	34.3
9	R2	109	1.0	109	1.0	0.947	29.2	LOS C	11.5	81.5	1.00	1.47	2.09	34.4
Approach		893	1.8	893	1.8	0.947	26.5	LOS B	11.5	81.5	1.00	1.47	2.09	34.3
West: Murray Farm Rd (500m)														
10	L2	146	0.0	146	0.0	0.635	17.2	LOS B	2.6	18.5	1.00	1.16	1.37	33.6
11	T1	80	0.0	80	0.0	0.635	17.1	LOS B	2.6	18.5	1.00	1.16	1.37	40.1
12	R2	114	0.0	114	0.0	0.635	20.2	LOS B	2.6	18.5	1.00	1.16	1.37	39.8
Approach		340	0.0	340	0.0	0.635	18.2	LOS B	2.6	18.5	1.00	1.16	1.37	37.9
All Vehicles		2167	1.2	2167	1.2	0.947	18.0	LOS B	11.5	81.5	0.94	1.14	1.49	37.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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MOVEMENT SUMMARY

 Site: 2 [Oakes x Murray _ Base w Dev _ PM]

 Network: N101 [Base w Dev PM]

Oakes Road x Murray Farm Road intersection, Carlingford
2018 Road Conditions
Traffic: 2018 Existing PM
Site Category: 4 leg
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed	
		Total veh/h	HV %	Total veh/h	HV %	v/c	sec		Vehicles veh	Distance m				km/h
South: Oakes Rd (480m)														
1	L2	14	0.0	14	0.0	0.729	9.6	LOS A	3.8	26.5	0.88	0.88	1.06	43.6
2	T1	673	0.5	673	0.5	0.729	9.4	LOS A	3.8	26.5	0.88	0.88	1.06	39.5
3	R2	15	0.0	15	0.0	0.729	12.5	LOS A	3.8	26.5	0.88	0.88	1.06	44.0
Approach		701	0.5	701	0.5	0.729	9.5	LOS A	3.8	26.5	0.88	0.88	1.06	39.8
East: Murray Farm Rd (500m)														
4	L2	27	0.0	27	0.0	0.460	11.5	LOS A	1.4	10.1	0.88	0.97	0.99	41.5
5	T1	41	0.0	41	0.0	0.460	11.4	LOS A	1.4	10.1	0.88	0.97	0.99	42.2
6	R2	217	0.0	217	0.0	0.460	14.5	LOS A	1.4	10.1	0.88	0.97	0.99	36.6
Approach		285	0.0	285	0.0	0.460	13.8	LOS A	1.4	10.1	0.88	0.97	0.99	38.5
North: Oakes Rd (300m)														
7	L2	42	5.0	42	5.0	0.547	4.9	LOS A	2.1	15.0	0.52	0.52	0.52	44.3
8	T1	566	1.1	566	1.1	0.547	4.7	LOS A	2.1	15.0	0.52	0.52	0.52	45.1
9	R2	62	0.0	62	0.0	0.547	7.7	LOS A	2.1	15.0	0.52	0.52	0.52	45.0
Approach		671	1.3	671	1.3	0.547	5.0	LOS A	2.1	15.0	0.52	0.52	0.52	45.0
West: Murray Farm Rd (500m)														
10	L2	136	1.6	136	1.6	0.541	18.1	LOS B	1.9	13.7	0.99	1.12	1.27	33.2
11	T1	36	0.0	36	0.0	0.541	17.8	LOS B	1.9	13.7	0.99	1.12	1.27	39.8
12	R2	71	0.0	71	0.0	0.541	20.9	LOS B	1.9	13.7	0.99	1.12	1.27	39.5
Approach		242	0.9	242	0.9	0.541	18.9	LOS B	1.9	13.7	0.99	1.12	1.27	36.8
All Vehicles		1899	0.7	1899	0.7	0.729	9.7	LOS A	3.8	26.5	0.77	0.80	0.89	41.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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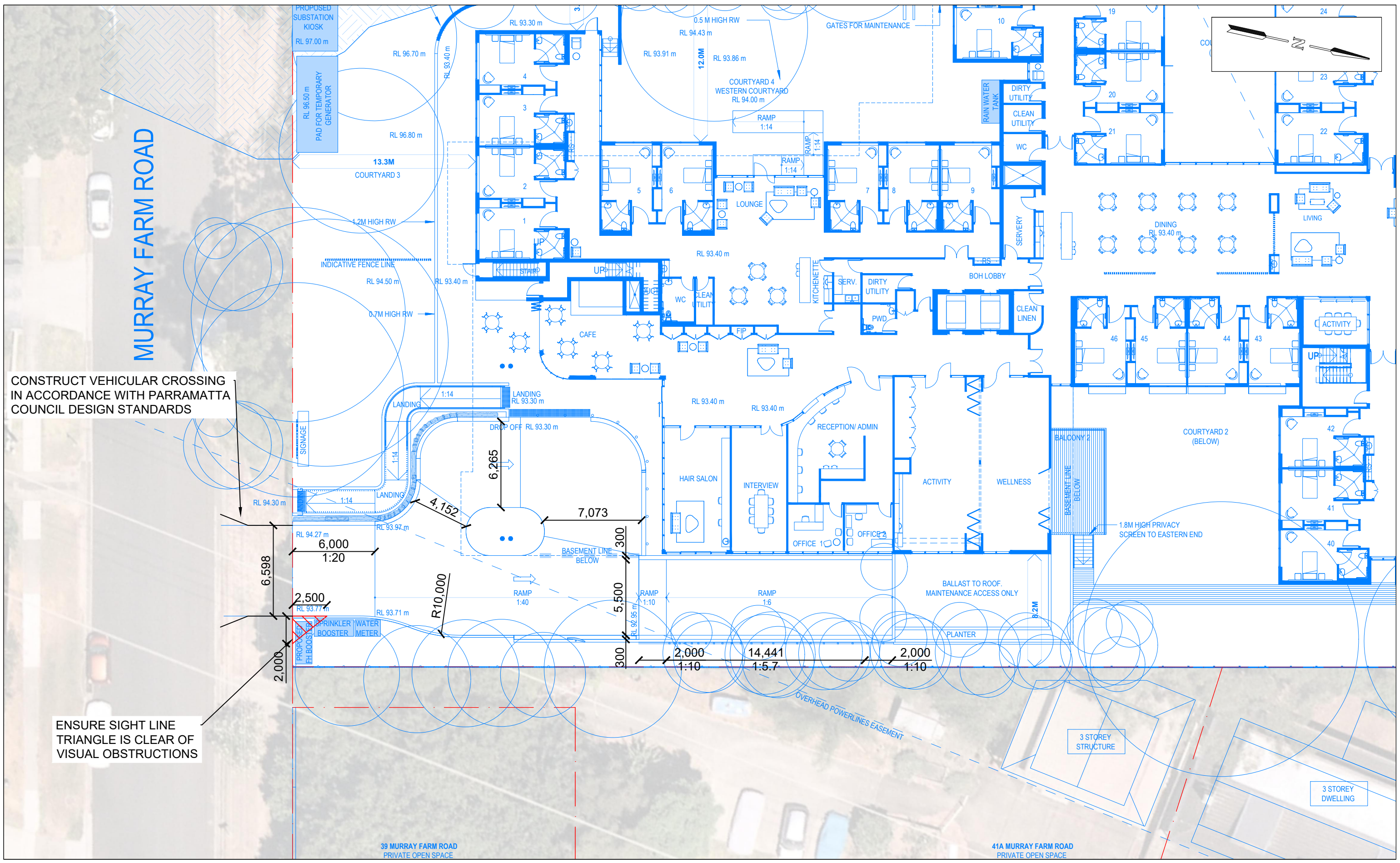
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Appendix B. Swept Path Analysis

MURRAY FARM ROAD

CONSTRUCT VEHICULAR CROSSING
IN ACCORDANCE WITH PARRAMATTA
COUNCIL DESIGN STANDARDS

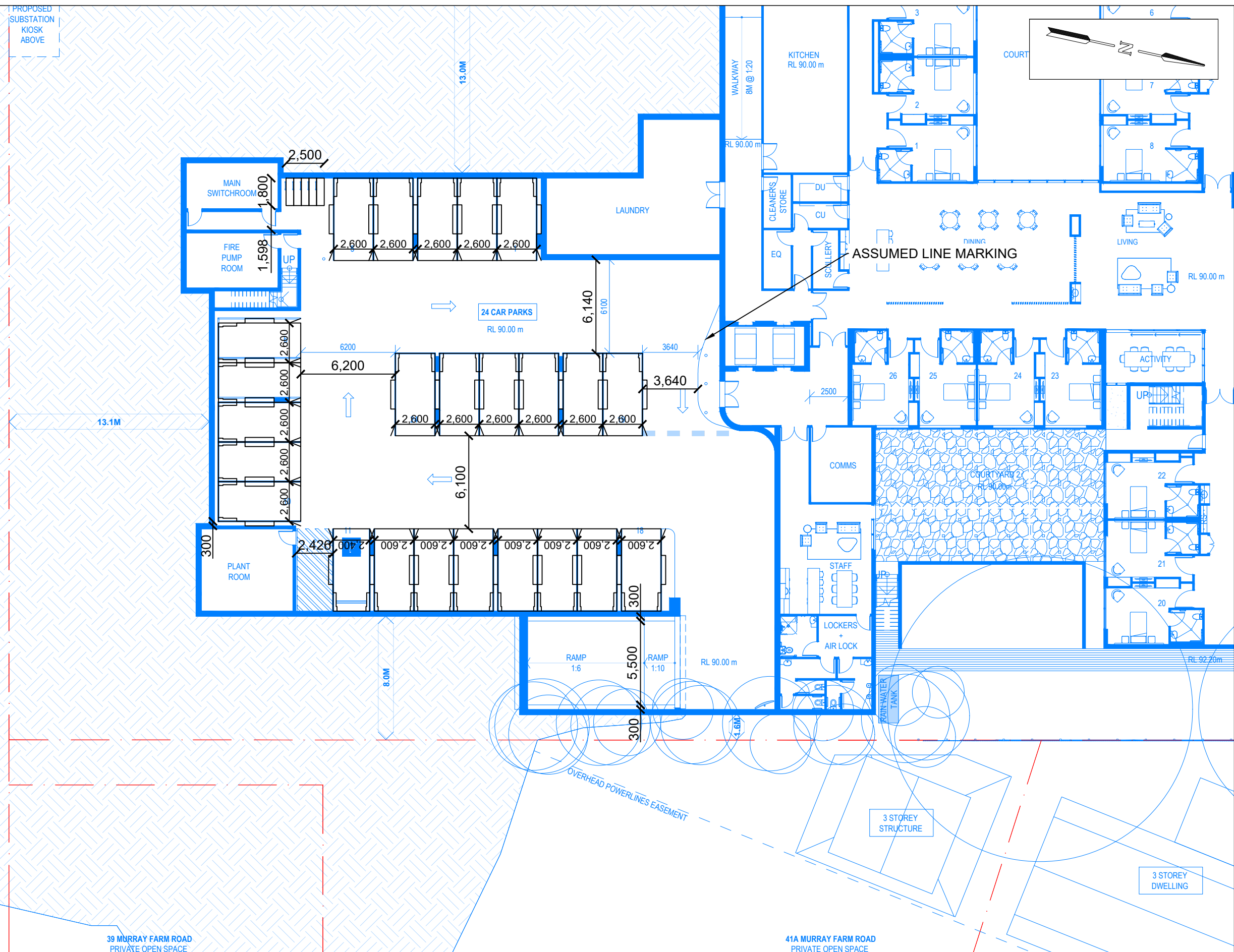
ENSURE SIGHT LINE
TRIANGLE IS CLEAR OF
VISUAL OBSTRUCTIONS



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	APPROVED BY Tim Lewis	DATE 11.10.2021	PROJECT 0713	DEVELOPMENT APPLICATION	
	SCALE 1:250		47 Murray Farm Road, Carlingford	DESIGN REVIEW	
				FILE NAME AG0713-01-v02.dwg	SHEET AG01


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MURRAY FARM ROAD



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Swept path assessments completed at 5 km/h and 300mm clearance.

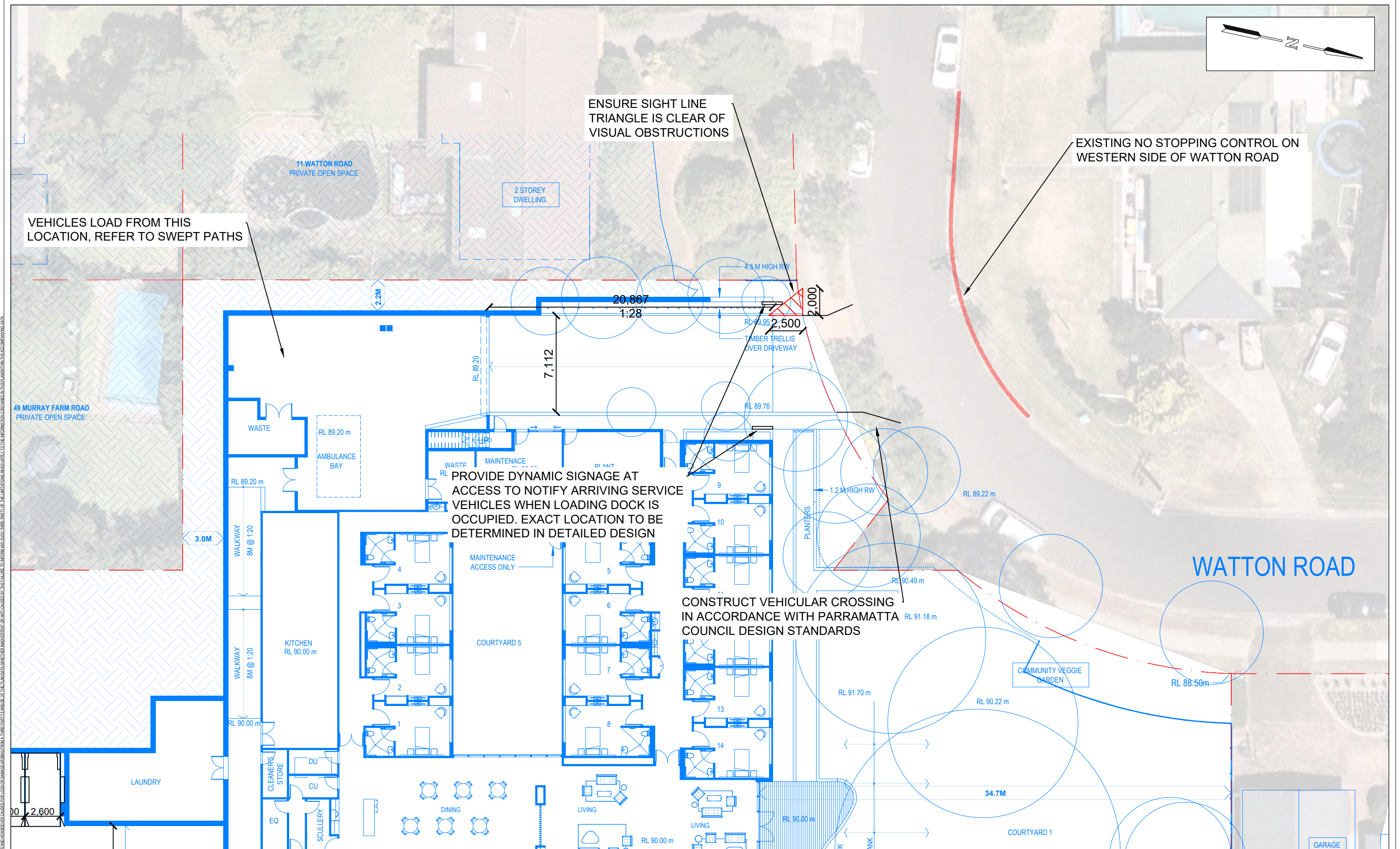
DESIGNED Eric Ye	PAPER SIZE A3
APPROVED BY Tim Lewis	DATE 11.10.2021
SCALE 1:250	

CLIENT	HB+B Property
PROJECT	0713 47 Murray Farm Road, Carlingford

DOCUMENT INFORMATION	
DEVELOPMENT APPLICATION	
DESIGN REVIEW	
FILE NAME	SHEET
AG0713-01-v02.dwg	AG02

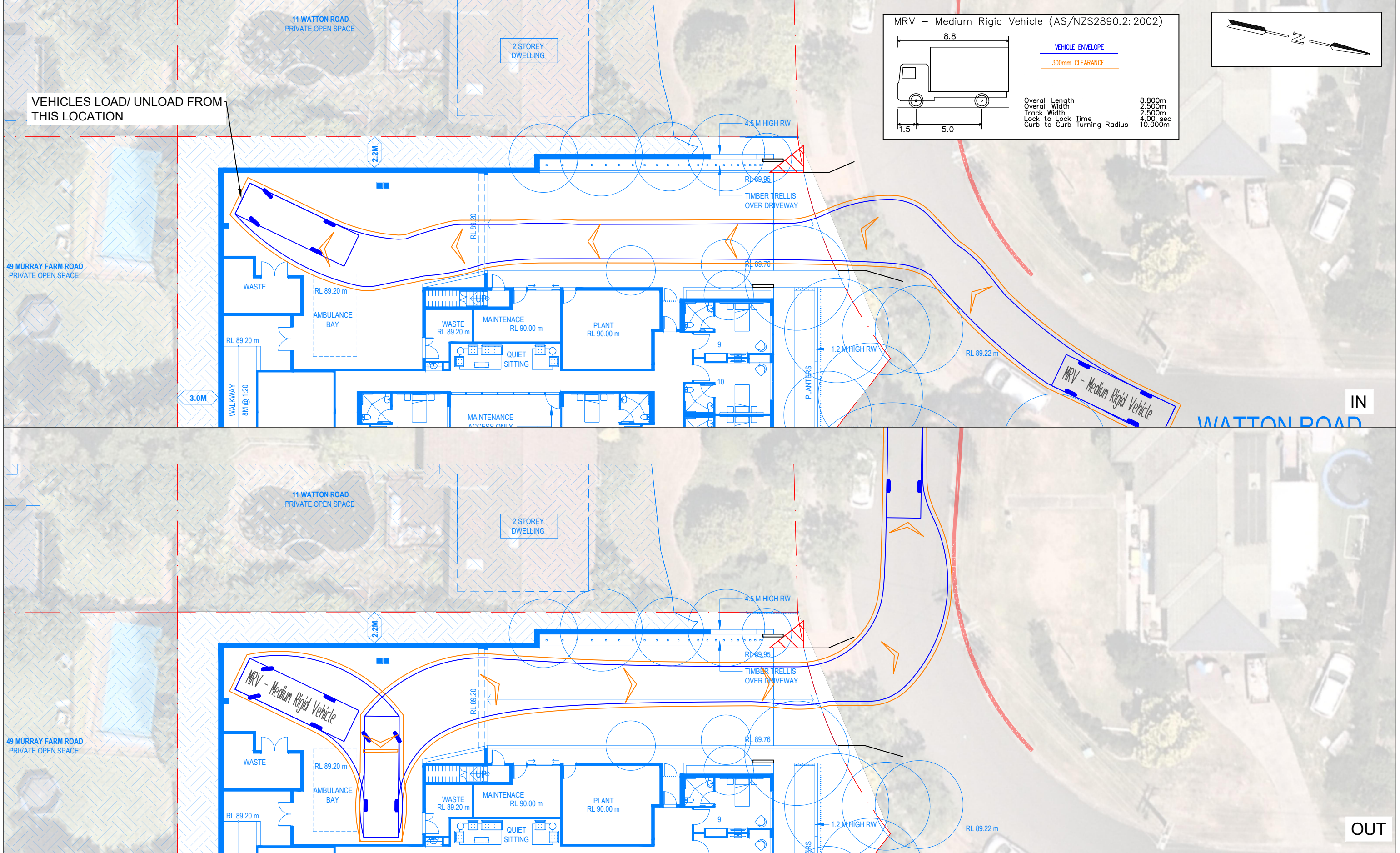
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	APPROVED BY Tim Lewis	DATE 11.10.2021	PROJECT 0713	DEVELOPMENT APPLICATION	
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MRV – Medium Rigid Vehicle (AS/NZS2890.2: 2002)

8.8

VEHICLE ENVELOPE

300mm CLEARANCE

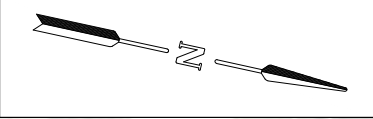
Overall Length 8.800m

Overall Width 2.500m

Track Width 2.500m

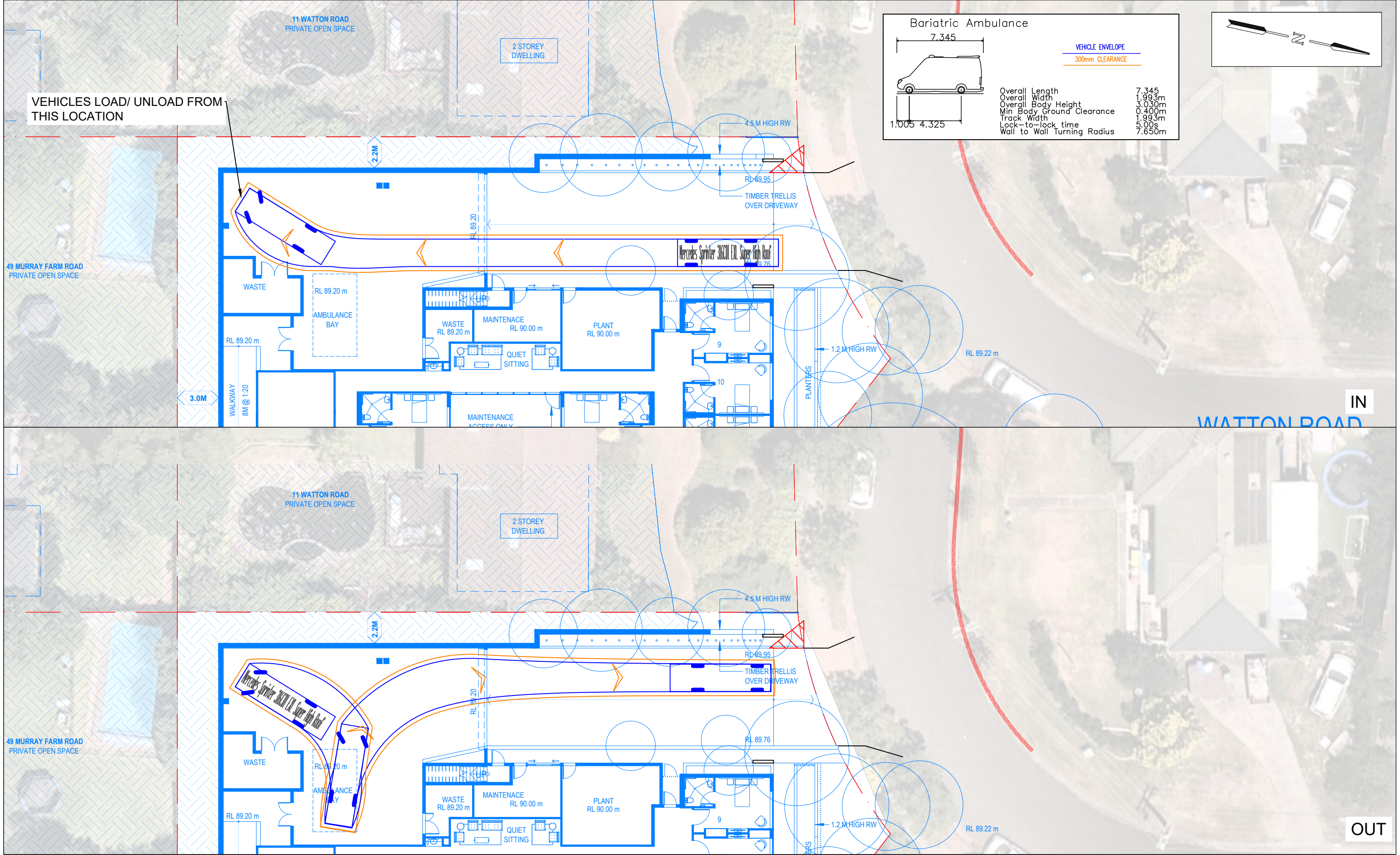
Lock to Lock Time 4.00 sec

Curb to Curb Turning Radius 10.000m



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	Eric Ye	A3	HB+B Property	DEVELOPMENT APPLICATION		
	APPROVED BY	DATE	PROJECT	SWEPT PATH ASSESSMENT		
	Tim Lewis	11.10.2021	0713			
	SCALE	02.55		FILE NAME	SHEET	
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Bariatric Ambulance

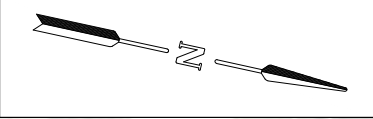
7.345

1.005 4.325

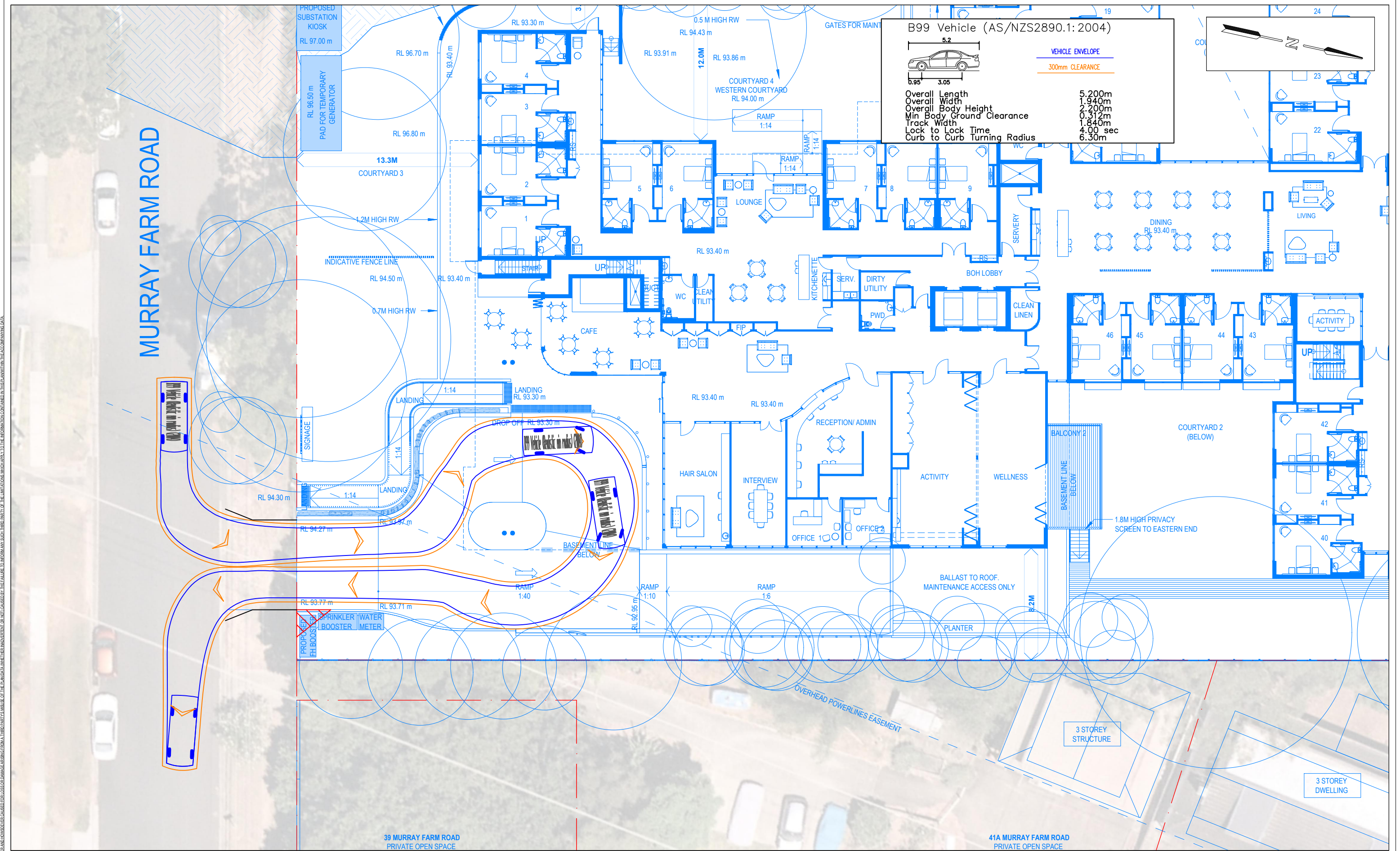
VEHICLE ENVELOPE

300mm CLEARANCE

Overall Length 7.345m
Overall Width 1.993m
Overall Body Height 3.030m
Min Body Ground Clearance 0.400m
Track Width 1.993m
Lock-to-lock time 5.00s
Wall to Wall Turning Radius 7.650m



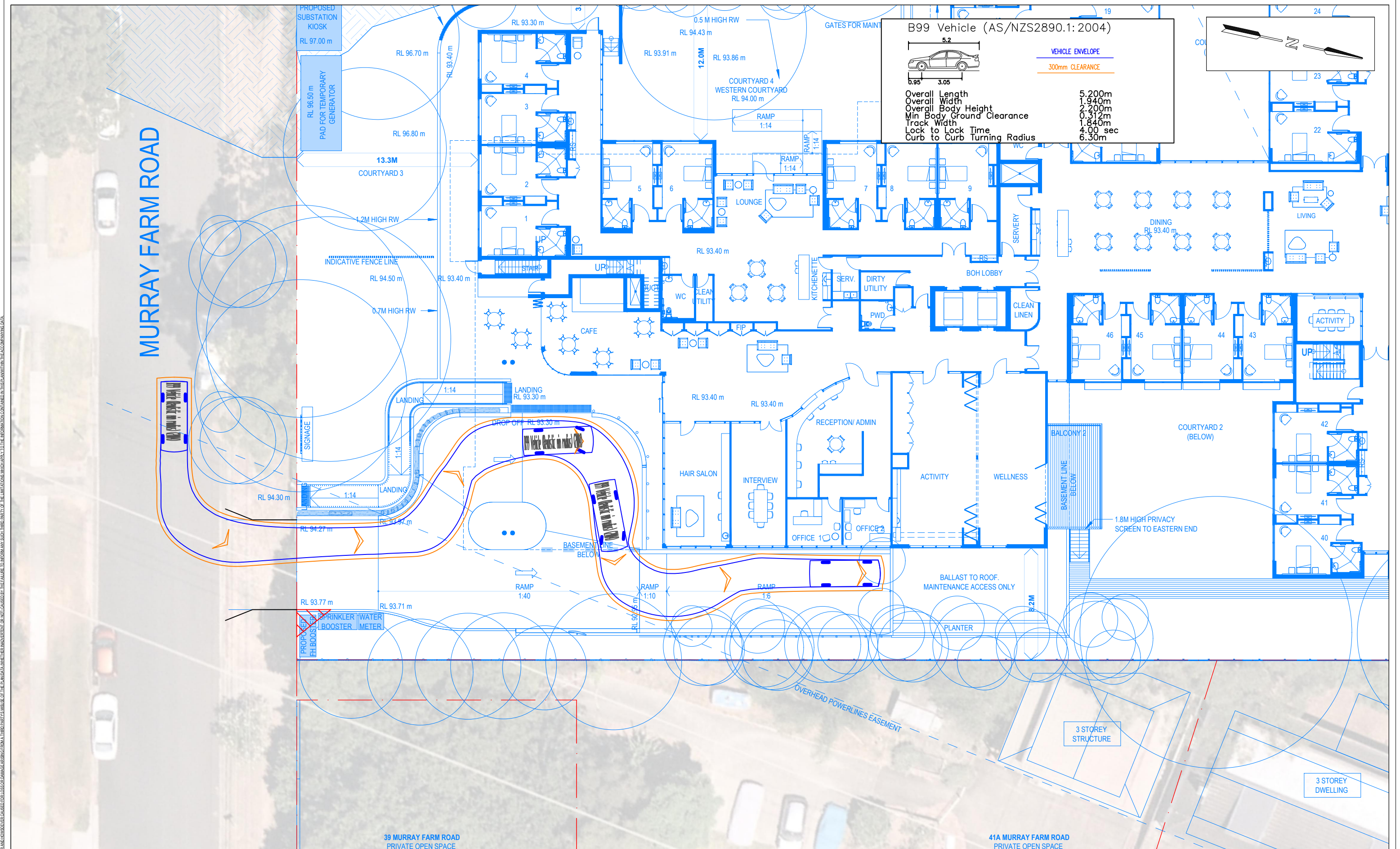
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	APPROVED BY <p>Tim Lewis</p>	DATE <p>11.10.2021</p>	PROJECT <p>0713</p>		
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				FILE NAME AG0713-01-v02.dwg	AG06

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	APPROVED BY Tim Lewis	DATE 11.10.2021	PROJECT 0713	DEVELOPMENT APPLICATION	
	SCALE 1:250	02.55	47 Murray Farm Road, Carlingford	SWEPT PATH ASSESSMENT	
				FILE NAME AG0713-01-v02.dwg	SHEET AG08

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MURRAY FARM ROAD

PROPOSED
SUBSTATION
KIOSK
ABOVE

13.0M

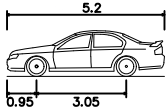
13.1M

8.0M

39 MURRAY FARM ROAD
PRIVATE OPEN SPACE

41A MURRAY FARM ROAD
PRIVATE OPEN SPACE

B99 Vehicle (AS/NZS2890.1: 2004)

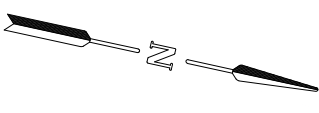


VEHICLE ENVELOPE

300mm CLEARANCE

Overall Length 5.200m
Overall Width 1.940m
Overall Body Height 2.200m
Min Body Ground Clearance 0.312m
Track Width 1.840m
Lock to Lock Time 4.00 sec
Curb to Curb Turning Radius 6.30m

COURT



MAIN
SWITCHROOM

FIRE
PUMP
ROOM

PLANT
ROOM

LAUNDRY

CLEANER'S
STORE

DU

CU

EQ

SCULLERY

DINING

LIVING

RL 90.00 m

ACTIVITY

COMMS

STAFF

LOCKERS
+
AIR LOCK

FOOTWATER
TANK

3 STOREY
STRUCTURE

3 STOREY
DWELLING

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Swept path assessments completed at 5 km/h and 300mm clearance.

DESIGNED

Eric Ye

PAPER SIZE

A3

CLIENT

HB+B Property

PROJECT

0713

47 Murray Farm Road, Carlingford

APPROVED BY

Tim Lewis

DATE

11.10.2021

SCALE

1:250

0 2.5 5

DOCUMENT INFORMATION

DEVELOPMENT APPLICATION

SWEPT PATH ASSESSMENT

FILE NAME

AG0713-01-v02.dwg

SHEET

AG10

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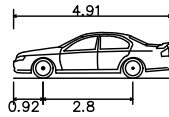
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MURRAY FARM ROAD

PROPOSED
SUBSTATION
KIOSK
ABOVE

13.0M

B85 Vehicle (AS/NZS2890.1: 2004)



VEHICLE ENVELOPE

300mm CLEARANCE

COURT

MAIN
SWITCHROOM

FIRE
PUMP
ROOM

LAUNDRY

CLEANER'S
STORE

DU

CU

EQ