

Traffic Impact Assessment

Proposed place of worship at 68 Waterloo Road, Greenacre, NSW



Prepared for

Eco Space Design

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	Name	Signature	Date
Approved by:	Abdun Noor		August 2021

1. Introduction

This report has been prepared for Bankstown-Canterbury City Council in support of a development application for a proposed change of use from residential dwellings to a place of worship and community facility at 68 Waterloo Road, Greenacre, NSW. The purpose of this study is to assess the parking and access requirements of the site and determine the impacts of the proposed development on the surrounding road network. This report will focus on the traffic generation and the potential impacts of the additional traffic associated with the proposed development on the existing road network and the suitability of the proposed parking on site, both in terms of the number of spaces and the layout of the parking areas and access requirements to the parking area.

2. Locality map

The following plan in Figure-1 shows the location of the proposed development in the context of the surrounding road network.

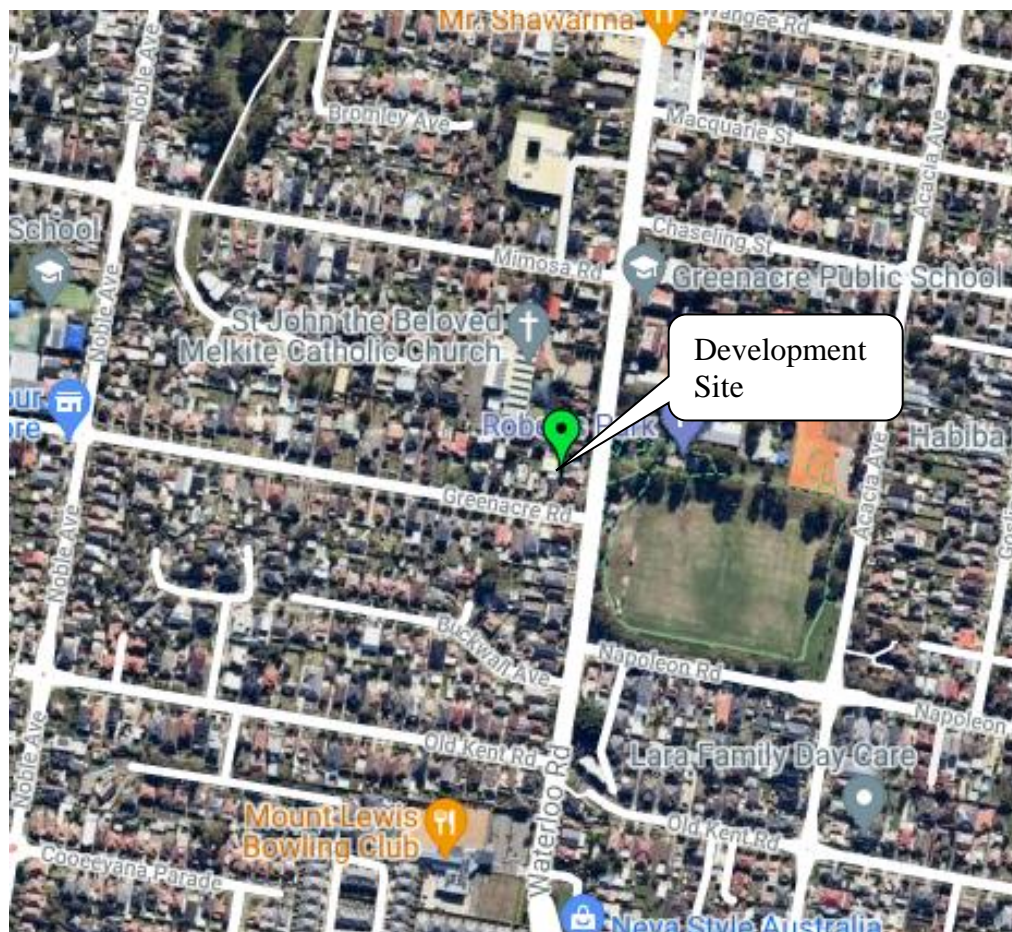


Figure-1: Locality Plan

3. Scope of works

The scope of this report is outlined below:

- Assessment of the existing traffic and parking environment.
- Assessment of the traffic generation of the proposed change of use and its impact on surrounding street network.
- Assessment of the parking requirement of the proposed change of use in accordance with Council's Development Control Plan.
- Assessment of the access requirements of the site in accordance with AS2890.1.
- Assessment of the vehicular movements and internal circulation pattern.

This report should be read in conjunction with the architectural plans, reduced copies of which are contained within **Appendix A**.

4. Proposed development

The proposed development site comprised of the properties at 68 Waterloo Road and 3 Greenacre Road. The proposal is to demolish existing dwellings in these properties and construct a place of worship with ancillary facilities such multipurpose hall for community activity and indoor games. The main prayer hall has a useable floor area of approximately 200 m². It is proposed to construct two levels of basement car park. The multipurpose community hall has a floor area of approximately 225 m². The proposed community hall is an ancillary facility and for the exclusive use of the mosque-community/families when there is no activity in the prayer hall, and not for rent to public.

Proposed hours of operations are indicated below:

Table 1: Activity and duration

Day	Activities	Duration	Attendees	
			Prayer Hall	Community Hall
Friday	Morning prayer	5.00am - 6:00am	20-30	0
	Mid-day prayer	12.00am - 1.30pm	90-110	0
	Elderly community gathering	2:00pm - 4.00 pm	0	20-30
	Afternoon prayer	4:00pm - 4.30 pm	20-30	0
	Evening prayer	5:00pm - 5.30 pm	20-30	0
	Youth community gathering/activity	5:30pm - 7.30 pm	0	20-30
	Late evening prayer	7:30pm - 8.00 pm	20-30	0
Other weekdays	Morning prayer	5.00am - 6:00am	20-30	0
	Mid-day prayer	12.00am - 1.30pm	20-30	0
	Elderly community gathering	2:00pm - 4.00 pm	0	20-30
	Afternoon prayer	4:00pm - 4.30 pm	20-30	0
	Evening prayer	5:00pm - 5.30 pm	20-30	0
	Youth community gathering/activity	5:30pm - 7.30 pm	0	20-30
	Late evening prayer	7:30pm - 8.00 pm	20-30	0
Weekend days	Morning prayer	5.00am - 6:00am	20-30	0
	Mid-day prayer	12.00am - 1.30pm	20-30	0
	Elderly community gathering	2:00pm - 4.00 pm	0	20-30
	Afternoon prayer	4:00pm - 4.30 pm	20-30	0
	Evening prayer	5:00pm - 5.30 pm	20-30	0
	Youth community gathering/activity	5:30pm - 7.30 pm	0	20-30
	Late evening prayer	7:30pm - 8.00 pm	20-30	0
	Late evening family activity	8:30pm – 10.00 pm	0	20-30

It is estimated that a maximum of between 10 and 15 parking spaces would be required for the maximum of 30 attendees on a regular prayer time. There will be about 50 parking spaces including 3 disability spaces proposed at two levels of basement parking.

5. Existing Traffic Controls

Waterloo Road is a collector road with a carriageway width of approximately 13.5m. Parking is allowed on both sides of Waterloo Road. In the south it connects with Wattle Street at a signalised T-intersection.

Wattle Street a major collector road runs in the east-west direction and connects Stacey Street in the west and Roberts Road in the east. In the north Waterloo Road connects with Hume Highway at another signalised T-intersection, Hume Highway is an arterial road runs in the north-south direction.

The site is located in the vicinity of the intersection of Greenacre Road and Waterloo Road which is a sign-controlled T-intersection. The main access to the development site is from Greenacre Road approximately 50m to the west of the intersection with Waterloo Road. Greenacre Road is a local road with a carriageway width of 11.0m. Parking is allowed on both sides of Greenacre Road. The speed limit in Greenacre road is 50km/hr. The speed limit in Waterloo Road is 60km/hr in the vicinity of the development site.

6. Assessment of traffic generation and its impact

6.1 Existing Trip Generation

The proposed development site comprised of the properties at 68 Waterloo Road and 3 Greenacre Road. There are two existing dwelling houses in these two properties.

The Former RTA's "*Guide to Traffic Generating Developments -2002*" has been used to calculate the trip generation of the existing development at the development site as shown in Table-2 and 3 below.

Table-2: Trip Generation Rate

Use	Rate/per 100 m2 GLFA	
	Daily	Peak hour
Dwelling Houses	9/dwelling	0.85/dwelling

Table-3: Existing Trip Generation

Use	Number	Trip Generation	
		Daily	Peak hour
Dwelling house	2	18 trips	2 trips
Total		18 trips	2 trips

6.2 Development trip generation

RTA's "*Guide to Traffic Generating Developments -2002*" makes no reference to the trip generation rate for place of public worship or similar developments.

Therefore the following information supplied by the applicant has been used to calculate the trip generation for the proposed place of public worship using first hand principle:

Table-4: Relevant information supplied by the applicant

Busiest event	Maximum number of parishioners	Duration	Mode of Transport	
			Car	Walk
Friday Prayer	90-110	12:00am-1:30pm	80-90	20-30

The following additional assumptions have been made in estimating the trip generation of the proposed place of public worship:

1. A vehicle occupancy rate of 3 persons per vehicle has been assumed on Fridays, given the nature of the development where a family consists of parents and a child (3 people) usually share single vehicle.
2. Although the peak hours span for 1,5 hours, for the purpose of this study to consider worst-case scenario, it is assumed that all the parishioners will arrive the site in one hour and leave the site in the following hour.

Based on the information supplied by the applicant and the assumptions made, the trips generation potential of the proposed change of use has been calculated as follows:

Table-5: Proposed trip generation

Busiest Event	Maximum number of parishioners using car transport	Occupancy	Trips per hour
Friday Paryer	90	3/vehicle	30

6.3 Net trip generation

Due to the proposed change of use a maximum net increase of trips from the development site would be $(30-2 = 28)$ 28 vehicular movements combined in and out in the peak hour.

6.4 Development impact

The midblock capacity of an urban road and its relation with the level of service has been identified in Table 4.4 of former RTA's "*Guide to Traffic Generating Developments -2002*" and stipulated below:

Table-6: Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lane (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

Source: Table 4.4: RTA's "*Guide to Traffic Generating Developments -2002*"

The proposed development has been projected to generate in the order of 28 additional vehicle trips to and from the development site. Such level of traffic represents **one additional vehicle movement every 2 or so minutes** during off peak hours within Greenacre Road, Waterloo Road and through the surrounding road network. This level of additional traffic is considered to have minimal impacts on the overall operation of the surrounding road network.

Further, the mosque service hours do not overlap with the commuter peak hours in Greenacre Road, Waterloo Road and the surrounding street network. Therefore, the calculated increase in trips due to the proposed change of use is more theoretical rather than a reality.

Nonetheless, the above-mentioned extent of additional traffic is unlikely to have an adverse impact on the capacity of Greenacre Road, Waterloo Road and the surrounding street network.

Therefore, the estimated additional trips due to the proposed development can readily be accommodated within the surrounding street network, without any adverse impact on the capacity and level of service of Greenacre Road, Waterloo Road and the surrounding street network.

7. Parking

7.1 DCP parking requirement

The following has been extracted from Bankstown DCP 2015-Part B5-Schedule of Off-street parking.

Land use	Off-street parking requirements
Places of public worship	<p>Car parking must be provided on-site at a minimum rate of 1 car space per 5m² of the assembly area.</p> <p>Car parking for ancillary uses and social / special events must be provided on-site on the basis of a Parking Study, to be submitted with the development application.</p>

The parking requirements of the proposed change of use, in accordance with Bankstown DCP 2015-Part B5-Schedule of Off-street parking have been calculated below.

The gross floor area of the prayer hall has been used to calculate the parking requirements as the community hall is an ancillary use and do not generate any parking demand at the time of the busiest event at the site.

Table-7: DCP off-street parking requirements for the proposed place of worship

Use	Gross Floor Area(m2) - Main Hall		DCP Rate	Required Parking
Place of public worship	200		1space per 5m2 GFA	(200/5)x1 = 40spaces
	Required Parking			40 spaces

Therefore, based on the calculated parking demands in Table7, in accordance with Bankstown Development Control Plan, the proposed change of use would generate a parking demand of maximum 40 spaces during the busiest event once in a week on Fridays in mid-day.

The proposed community hall is an ancillary facility and for the exclusive use of the mosque-community/families when there is no activity in the prayer hall. In accordance with DCP for any ancillary use parking need to be provided on the basis of a parking study.

Traffic and parking studies/surveys have been undertaken at the following community centers which are similar facilities as the proposed community hall that forms part of the proposed change of use at 68 Waterloo Road, Greenacre.

Table-9: Parking Study Location

Facility	Address	Floor Area (Approximate)	Off-street Parking provision
Georges Hall Community Hall	188 Birdwood Rd, Georges Hall, NSW	420 m2	18 spaces
Kingsgrove Community Hall	30 Morgan St, Kingsgrove NSW	750 m2	24 spaces

Parking occupancy surveys have not been undertaken due to the current pandemic situation. However, it is assumed 90% occupancy of the provided parking spaces during the peak periods to estimate the parking demands of this kind of facilities on a typical weekday.

Based on the parking studies undertaken at similar facilities, the parking demand for the proposed ancillary community hall has been estimated below:

Table-10: Parking estimation of the proposed community hall

Facility	Floor area	Off-street parking provision	90% peak parking occupancy	Parking rate	Estimated parking requirement
Georges Hall Community Hall	420 m2	18 spaces	16 spaces	4 space per 100 m2 of floor area	-
Kingsgrove Community Hall	750 m2	24	22 spaces	3 space per 100 m2 of floor area	-
Proposed community hall	225 m2	-	-	Adopting the highest rate of the above two rates	(225/100) *4 = 9 spaces

Based on the parking studies at similar facilities, the proposed community hall would generate a maximum demand of 9 parking spaces.

The total parking demands of the proposed change of use has been estimated as follows:

Table-11: Parking requirements of the proposed change of use

Use	Rate	Required Parking
Place of public worship	DCP rate	40 spaces
Ancillary Community Hall	Parking study	9 spaces
Total		49 spaces

7.1 Proposed parking provision

A total of 50 off-street parking spaces have been proposed within the site boundary located in two levels of basement. Therefore, the proposed off-street parking provisions meet the parking requirements of Council's Development Control Plan.

8. Public transport accessibility of the site

New South Wales Government released a fact sheet in May 2011, where it states the requirements for a development site to be considered as public transport accessible. For the purpose of this study the fact sheet has been used to assess the public transport accessibility of the site at 68 Waterloo Road, Greenacre.

Following are the requirements for a site to be within accessible area as stipulated in; Fact Sheet; May 2011:

Accessibility requirements:

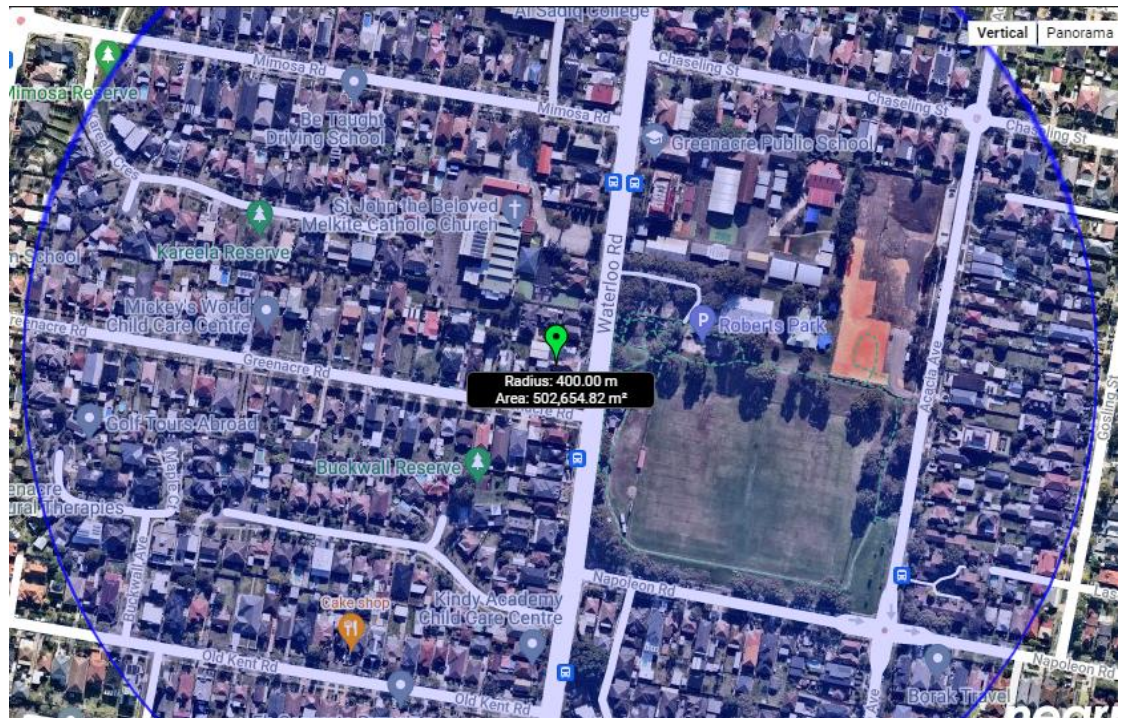
(a) Sydney Region

- Within 800m walking distance of a railway station or a Sydney Ferries wharf;
- Within 400m walking distance of a light rail station;

Or

- Within 400m walking distance of a bus stop used regularly between 6am and 9pm Monday to Friday, and 8am to 6pm weekends.

The following plan indicates the available public transport within 400m radius of the development site.



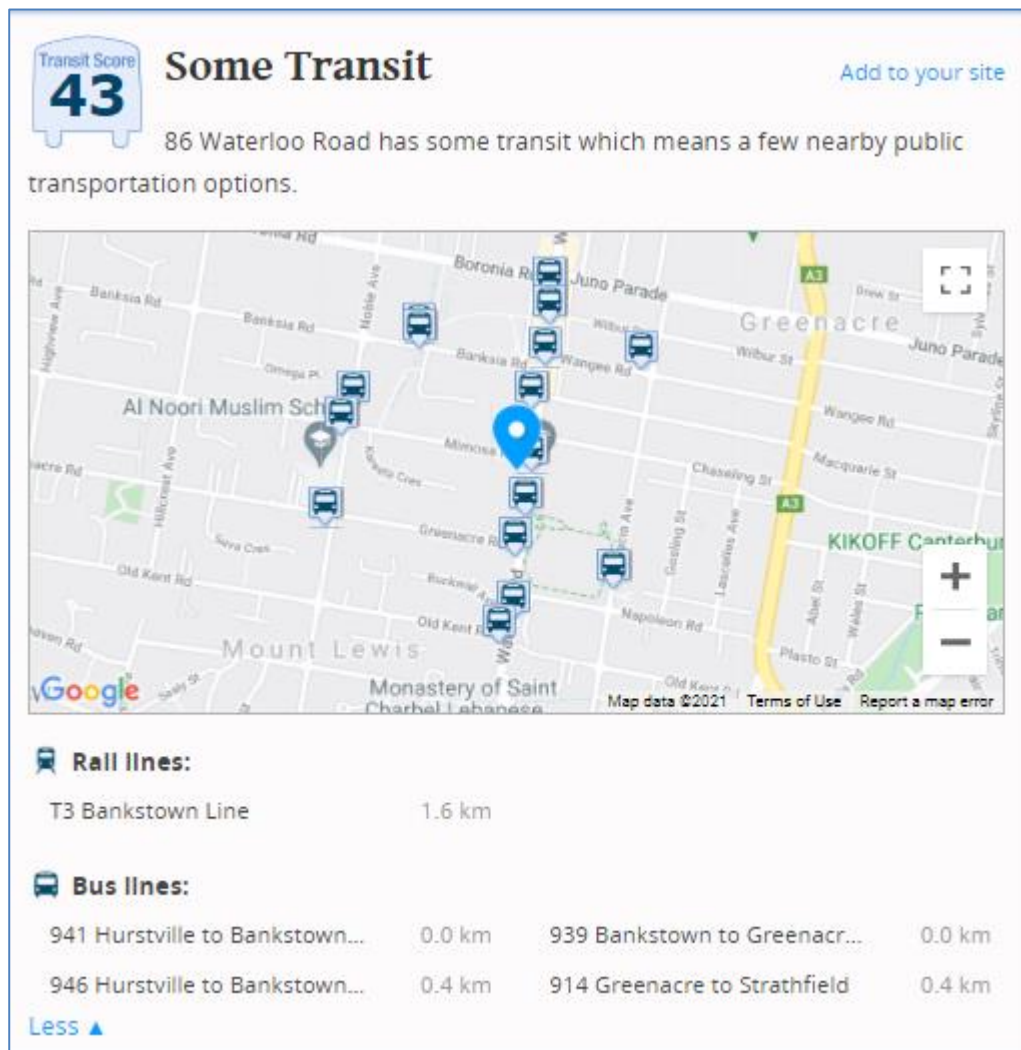
The nearest bus stop is located on Waterloo Road and 70m walking distance from the site. Bus route 941 runs via Waterloo Road between Bankstown and Hurstville.

The following table shows the summary of availability of bus services at these bus stops are extracted from the time-tables for the route:

TABLE: Bus Service Availability

Bus Route	Walking Distance	Availability
Route 941	70m	5:30am-9:00pm
Route 939	80m	6:40am-6:10pm
Route 946	400m	6:56am-6:55pm
Route 914	400m	6:30am-8:00pm

Following has been extracted from ‘Walkscore’ website associated with the development site:



From the above discussion it is clear that the proposed development site is well within the reach of the available public transport in the area.

9. Sustainable Transport Initiatives

Local Governments in New South Wales have set a strategic goal of increasing sustainable transport in the local area and for the journey to work. Sustainable transport includes walking, cycling, **the use of public transport** and car sharing initiatives. Sustainable transport aims to reduce car trips and hence decrease congestion, save time and money and reduce the environmental impact of transport. Bankstown-Canterbury LGA is well connected by bus, road, rail and cycle networks. New developments can provide opportunities to support and encourage the use of sustainable transport by providing car share parking, **developing travel plans, providing bicycle parking** and end of trip facilities and other initiatives.

In adhering to the above strategy the following sustainable transport initiatives could be considered implementing as part of the proposed change of use of the site

9.1 Education and Information

The provision of information is an effective way to allow people to make informed decisions about their transport choices and understand the impacts of their choices. Understanding transport services and travel choices is a key element for a well-designed public transport system. Information can be in a wide variety of formats including websites, posters, hotlines and flyers. Trip planner in Transport for NSW website, should be promoted as a good source of information about the most convenient way to undertake trips. In this regard the mosque management could play an important role.

9.2 Walking and Cycling

The proposed development has provision for secure bicycle parking within the site. A car parking demand assessment should also take into account the likely generation of active transport to the venue.

We have utilised the ‘WalkScore’ website tool to ascertain the likelihood of Active Travel to the development site from surrounding areas. The WalkScore website provides a ‘walkability’ assessment of a locality taking various factors which promote walking, specifically pedestrian generating developments and associated infrastructure, into account when providing that score.

Walkability Rating

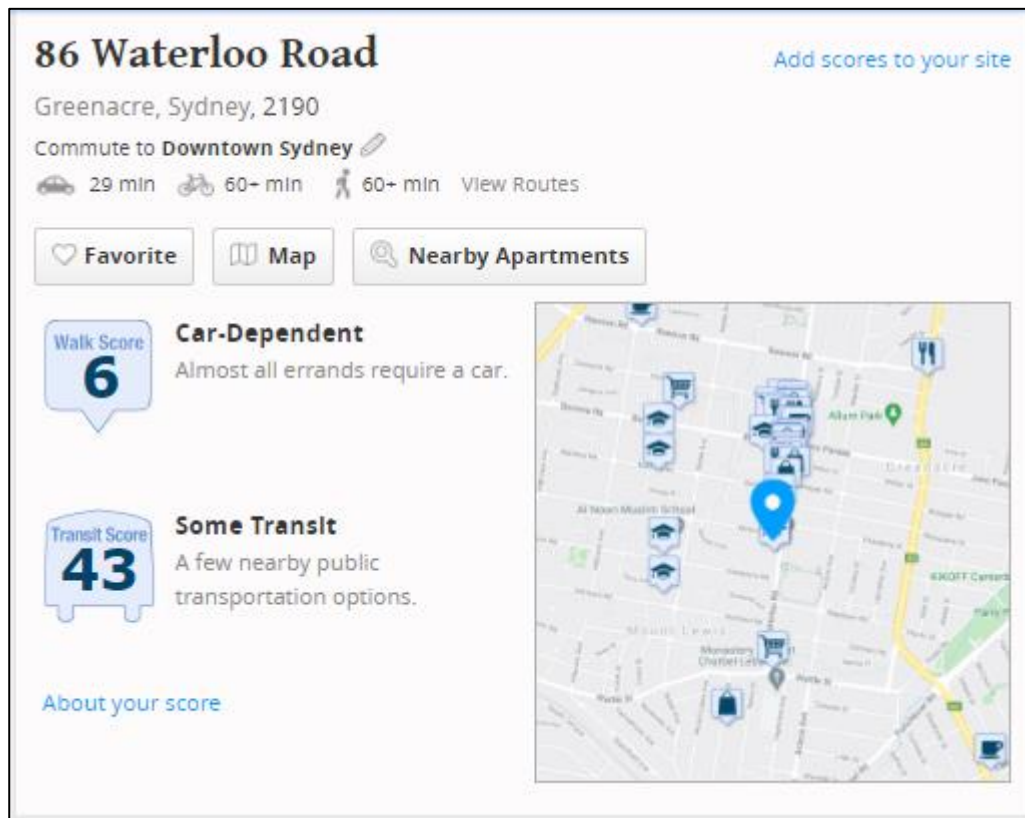


Figure: Walkability Rating

86 Waterloo Road has a Walk Score of 6 out of 100. This location is a Car-Dependent neighborhood so almost all errands require a car.

The following images are taken directly from the WalkScore site:

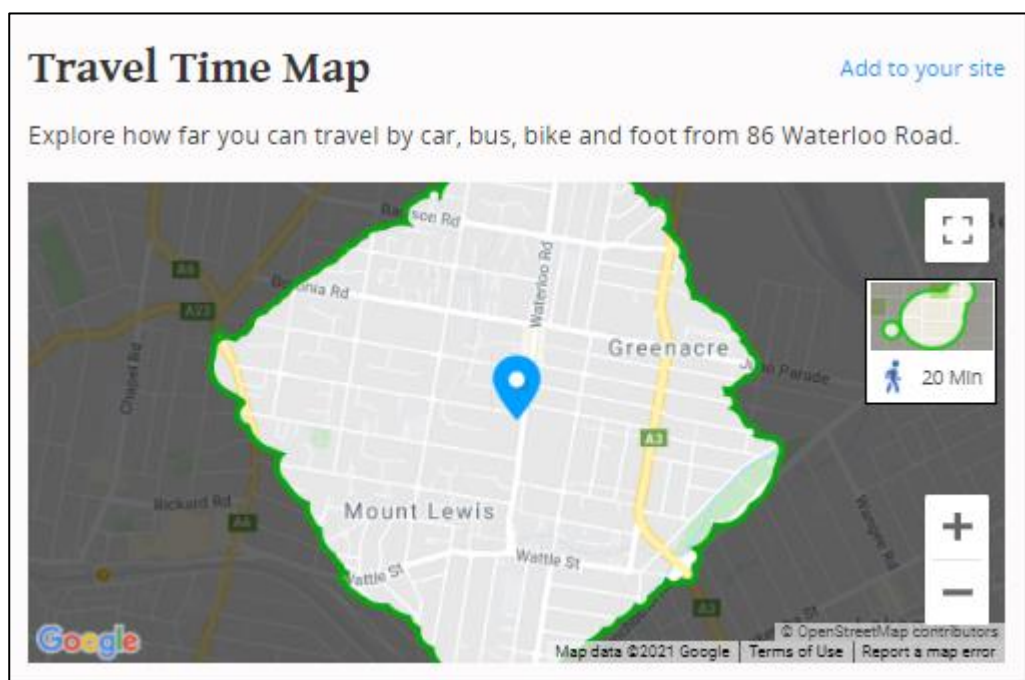


Figure: Walking Map (20 Minutes Radius)

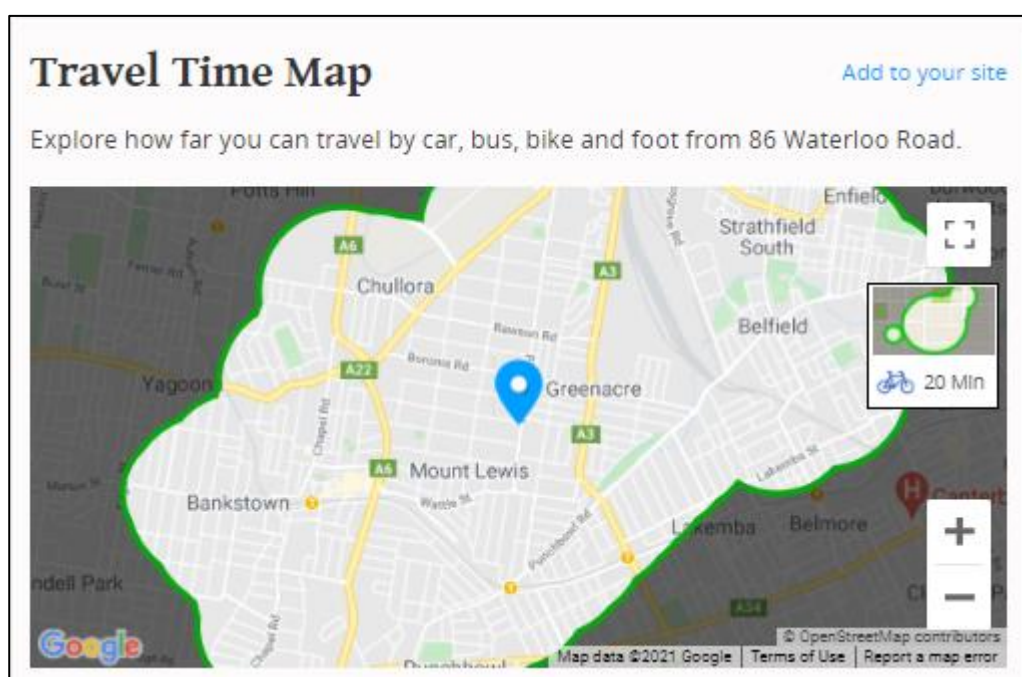


Figure: Bicycle Map (20 Minutes Radius)

From the above discussion it is clear that the proposed development site is well connected by available pedestrian and bicycle network in the area.

10. Assessment of parking layout and access

An assessment of the access-way and the proposed car parking layout has been undertaken in accordance with Australian standard AS2890.1:2004-off street parking facility and AS2890.6 for the accessible parking.

A new 6.4m wide driveway has been proposed off Greenacre Road for vehicular access to the lower basement. A separate 4.0 m wide entry is posed off Greenacre Road and 4.0m wide exit driveway is proposed off Waterloo Road for the upper basement level.

10.1 Accessway Width:

The user class of the proposed lower basement parking facility as part of the proposed development is determined to be user class 1 from the Table 1.1 of AS/NZS 2890.1.200 as shown below.

TABLE 1.1
CLASSIFICATION OF OFF-STREET CAR PARKING FACILITIES

User class	Required door opening	Required aisle width	Examples of uses (Note 1)
1	Front door, first stop	Minimum for single manoeuvre entry and exit	Employee and commuter parking (generally, all-day parking)
1A	Front door, first stop	Three-point turn entry and exit into 90° parking spaces only, otherwise as for User Class 1	Residential, domestic and employee parking
2	Full opening, all doors	Minimum for single manoeuvre entry and exit	Long-term city and town centre parking, sports facilities, entertainment centres, hotels, motels, airport visitors (generally medium-term parking)
3	Full opening, all doors	Minimum for single manoeuvre entry and exit	Short-term city and town centre parking, parking stations, hospital and medical centres
3A	Full opening, all doors	Additional allowance above minimum single manoeuvre width to facilitate entry and exit	Short term, high turnover parking at shopping centres
4	Size requirements are specified in AS/NZS 2890.6 (Note 2)		Parking for people with disabilities

Greenacre Road is a local road, and a total of 25 off-street parking spaces have been proposed as part of the proposed development. Based on the user Class of the proposed parking facility, type of frontage road and number of parking spaces proposed, the access facility category of the proposed driveway is determined from table 3.1 of AS/NZS 2890.1:2004 as shown below. The category of the proposed driveway is determined to be Category 1 in accordance with Table 3.1 below:

TABLE 3.1
SELECTION OF ACCESS FACILITY CATEGORY

Class of parking facility (see Table 1.1)	Frontage road type	Access facility category				
		Number of parking spaces (Note 1)				
		<25	25 to 100	101 to 300	301 to 600	>600
1.1A	Arterial	1	2	3	4	5
	Local	1	1	2	3	4
2	Arterial	2	2	3	4	5
	Local	1	2	3	4	4
3.3A	Arterial	2	3	4	4	5
	Local	1	2	3	4	4

Therefore, the minimum combined (entry and exit) width requirement for the driveway of the proposed lower basement parking facility is 3.0-5.5m as shown below in the table 3.2 of AS/NZS 2890.1:2004.

The 4.0m wide separate access driveways for the upper basement also comply with the above requirements of AS2890.1:2004.

TABLE 3.2
ACCESS DRIVEWAY WIDTHS

metres			
Category	Entry width	Exit width	Separation of driveways
1	3.0 to 5.5	(Combined) (see Note)	N/A
2	6.0 to 9.0	(Combined) (see Note)	N/A
3	6.0	4.0 to 6.0	1 to 3
4	6.0 to 8.0	6.0 to 8.0	1 to 3
5	To be provided as an intersection, not an access driveway, see Clause 3.1.1.		

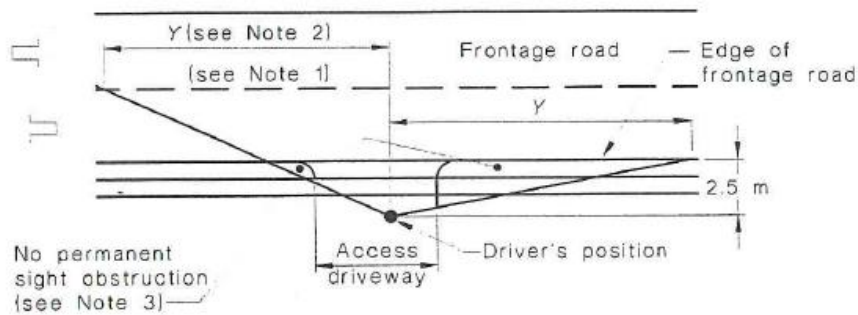
NOTE: Driveways are normally combined, but if separate, both entry and exit widths should be 3.0 m min.

Therefore, the proposed widths of the driveways meet the requirements for this class of parking facility as per Australian Standard AS2890.1:2004.

10.2 Vehicular Sight Lines:

Greenacre Road is a local road in an urbanised area. Default speed limit of 50km/h would apply at the frontage of the proposed development site. The minimum sight distance requirement at a driveway with a frontage road of 50km/h speed limit can be determined from figure 3.2 of AS/NZS 2890.1:2004 below. From figure 3.2 below the sight distance requirement at the proposed combined entry/exit driveway is 45m minimum and 69m desirable.

Waterloo Road has a speed limit of 60km/h at the frontage of the proposed development site. From the figure 3.2 of AS/NZS 2890.1:2004 below the sight distance requirement at the proposed exit driveway is 65m minimum and 83m desirable.



Frontage road speed (Note 4) km/h	Distance (Y) along frontage road m		
	Access driveways other than domestic (Note 5)		Domestic property access (Note 6)
	Desirable 5 s gap	Minimum SSD	
40	55	35	30
50	69	45	40
60	83	65	55
70	97	85	70
80	111	105	95
90	125	130	Use values from 2 nd and 3 rd columns
100	139	160	
110	153	190	

FIGURE 3.2 SIGHT DISTANCE REQUIREMENTS AT ACCESS DRIVEWAYS

The proposed development is located at a straight section of Greenacre Road. Approximately 100m of sightline is available in the west and 50m in the east at the proposed locations of the driveways.

The proposed development is also located at a straight section of Waterloo Road. Approximately 100m of sightline is available in both directions at the proposed location of the exit driveway.

Therefore, the available sight distances at the proposed driveways meet the minimum requirements of AS/NZS2890.1.2004.

10.3 Pedestrian Sight Lines:

An assessment of minimum sight lines for pedestrian safety at the proposed driveways have been undertaken in accordance with Figure 3.3 of AS2890.1 below and making reference to the site plan. The assessment indicated no obstruction to pedestrian sightlines.

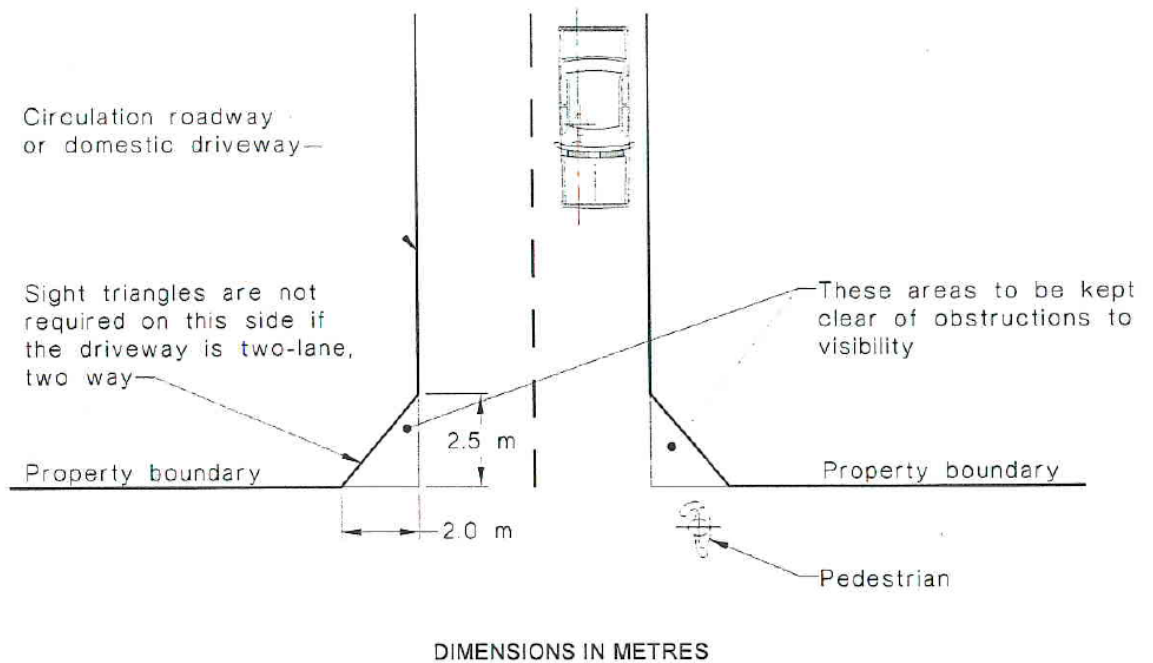


FIGURE 3.3 MINIMUM SIGHT LINES FOR PEDESTRIAN SAFETY

10.4 Dimensions:

Dimensions of the proposed parking spaces and aisle width have been shown in the plans in **Appendix A**. The proposed parking spaces have been assessed against the following table of AS2890.1:2004.

(c) Bays at 60°

(d) Bays at 90°

User class (Note 1)	A (Note 3)	B	C ₁	C ₂	C ₃	Aisle width (Note 4)
1	2.4	2.4	5.4	4.8	5.4	6.2
1A	2.4	2.4	5.4	4.8	5.4	5.8
2	2.5	2.5	5.4	4.8	5.4	5.8
3	2.6	2.6	5.4	4.8	5.4	5.8
3A	2.6	2.6	5.4	4.8	5.4	6.6
3A	2.7	2.7	5.4	4.8	5.4	6.2

4 (See Note 5)

*Dimension C is selected as follows (see Note 6):

C1—where parking is to a wall or high kerb not allowing any overhang.

C2—where parking is to a low kerb which allows 600 mm overhang in accordance with Clause 2.4.1(a)(i).

C3—where parking is controlled by wheelstops installed at right angles to the direction of parking, or where the ends of parking spaces form a sawtooth pattern, e.g. as shown in the upper half of Figure 2.4(b).

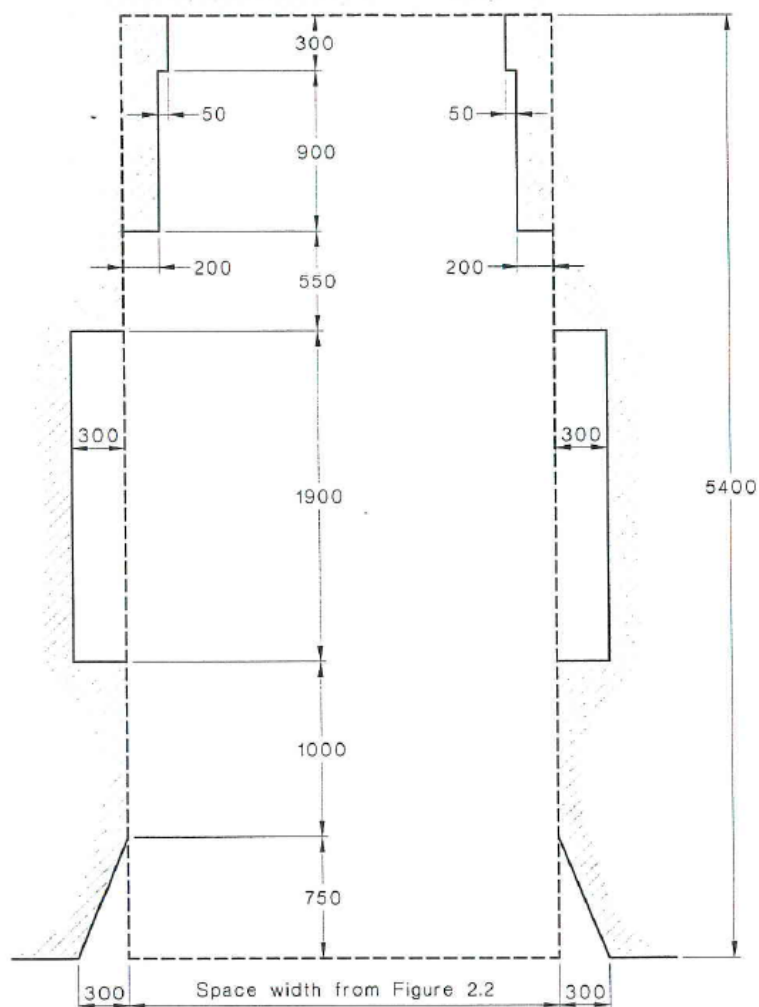
The following table shows the assessed dimensions of the proposed car parking facility:

Component	Minimum Standard Dimension(m)	Dimension provided(m)	Compliance/Comments
Width	2.4	2.4	Compliant
Length	5.4	5.5	Compliant
Aisle Width	5.8	6.2	Compliant
Shared space	2.4m x 5.4m	2.4m x 5.4m	Compliant

The parking spaces are minimum 2.4m wide and 5.4m deep which comply with the requirement of Australian Standard AS2890.1:2004. The aisle width opposite the parking spaces has been proposed to be of minimum 6.2m which is in excess of the Australian Standard requirement. The proposed dimensions of the disability spaces and the associated shared space also comply with the dimension requirements of AS2890.6.

10.5 Column Locations:

The proposed locations of the columns within the ground floor comply with the clearance requirements of Figure 5.2 below as per Australian Standard AS2890.1:2004.



NOTE: The design envelope provides for structural elements to be clear of all four side doors.

DIMENSIONS IN MILLIMETRES

FIGURE 5.2 DESIGN ENVELOPE AROUND PARKED VEHICLE TO BE KEPT CLEAR OF COLUMNS, WALLS AND OBSTRUCTIONS

10.6 Manoeuvring and Swept Paths:

The proposed parking layout fully complies with the aisle width and space dimensions requirement of Australian Standards AS2890.1:2004, therefore meet the standard minimum manoeuvring requirements. Swept path diagrams for the critical movements within the parking lots have been shown in **Appendix B**. Also onsite turnaround is achieved within the aisle and using the turning bay. Therefore a car can enter and exit the site in a forward direction when all other spaces are occupied.

It should be noted that as per Section B4.4 of Appendix B of AS2890.1:2004, *'Drivers can manoeuvre vehicles within smaller spaces than swept turning paths would suggest.'*

10.7 Driveway Grades:

Section 3.3 of AS/NZS 2890.1:2004 stipulates the gradient requirement at or near the access driveway as follows:

3.3 GRADIENTS OF ACCESS DRIVEWAYS

At entry and exit points, the access driveway should be graded to minimize problems associated with crossing the footpath and entering the traffic in the frontage road.

Maximum gradients on and near access driveways, other than at domestic properties (see Clause 2.6), shall be as follows:

- (a) *Property line/building alignment/pedestrian path*—max. 1 in 20 (5%) between edge of frontage road and the property line, building alignment or pedestrian path (except as provided in Item (d)), and for at least the first 6 m into the car park (except as provided below).

The grade of the first 6 m into the car park may be increased to 1 in 8 (12.5%) under the following conditions:

- (i) The grade is a downgrade for traffic leaving the property and entering the frontage road.
- (ii) The user class is Class 1, 1A or 2 only.
- (iii) The maximum car park size is—
 - (1) for entry into an arterial road—25 car spaces, or
 - (2) for entry onto a local road—100 car spaces.

The maximum grade across the property line shall remain at 1 in 20 (5%).

The proposed gradient at the driveway between the edge of the frontage road and the property line should be maximum 1:20. The plan in **Appendix C** shows that the driveway for the six (6) metres within the property boundary has a gradient of 5%.

Therefore, the proposed driveway grades, as shown in the plan in **Appendix C**, comply with Australian Standards AS2890.1:2004.

The longitudinal profiles of the driveway ramps and overall reduce levels have been plotted and enclosed. The longitudinal profiles of the ramps have been checked for minimum ground clearance for a B85 design vehicle following the procedure outlined in APPENDIX C of AS/NZS 2890.1:2004 with the aid of computer program AUTOTRACK, along the critical edges of the proposed driveway ramps. No bottoming or scraping have been identified. Therefore, the proposed driveway ramps with the proposed grades as shown in the attached plans in **Appendix C** complies with the minimum ground clearance requirements of Australian Standard AS/NZS 2890.1:2004.

10.8 Headroom:

Figure below outlines the requirements from AS 2890.1-2004 regarding critical headroom measurement at a grade change. To permit access for both cars and light vans, the height between the floor and an overhead obstruction shall be a minimum of 2200 mm. As shown in the elevation plan in **Appendix A**, the proposed floor height clearances within the basement levels are 2.9m. Also a minimum headroom of 2200mm proposed at the driveway ramp. Therefore the height clearances comply with the headroom requirements of AS2890.1:2004, AS2890.6 and Council's Development Control Plan both for general and accessible car spaces.

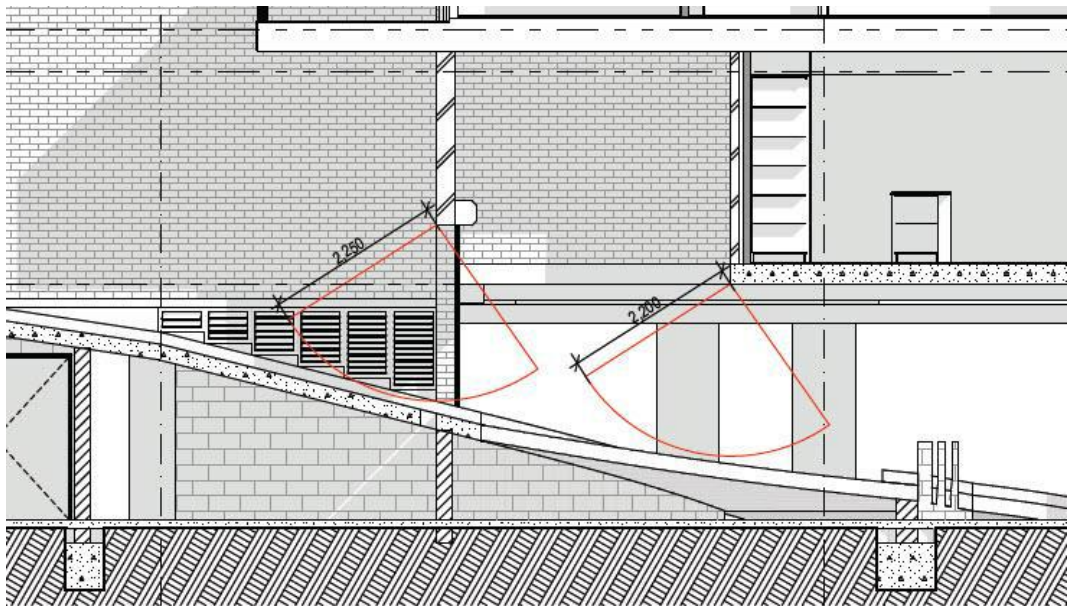


Figure: Headroom Clearance Measurement

11. Conclusion

The proposed community facility consists of a prayer hall and an ancillary community hall at 68 Waterloo Road, Greenacre, NSW has been assessed in terms of, trip generation and its impact on the public street network, off-street parking demand and supply, design of the proposed parking layout; access driveway ramps and traffic circulation within site. The following conclusions are made:

1. The proposed development will have minimal impact on the traffic capacity of Greenacre Road, Waterloo Road and the surrounding street network in the area.
2. The proposed provisions for car parking satisfy the requirements of Councils Development Control Plan.
3. The proposed parking layout complies with the Australian Standard in terms of space dimensions, aisle width, column location, headroom and manoeuvring requirements of both AS2890.1 and AS2890.6.
4. The proposed driveway location meets the sight distance requirements of Australian Standard AS2890.1:2004 both for vehicles and pedestrians.
5. The proposed grades of the driveway ramps meet the requirements of Australian Standard AS2890.1:2004.
6. Minimal traffic impact on the amenity of the surrounding development has been anticipated.
7. Manoeuvring and circulation within the site can be accommodated with minimal safety concerns.
8. The development site is accessible by the available public transport in the area.

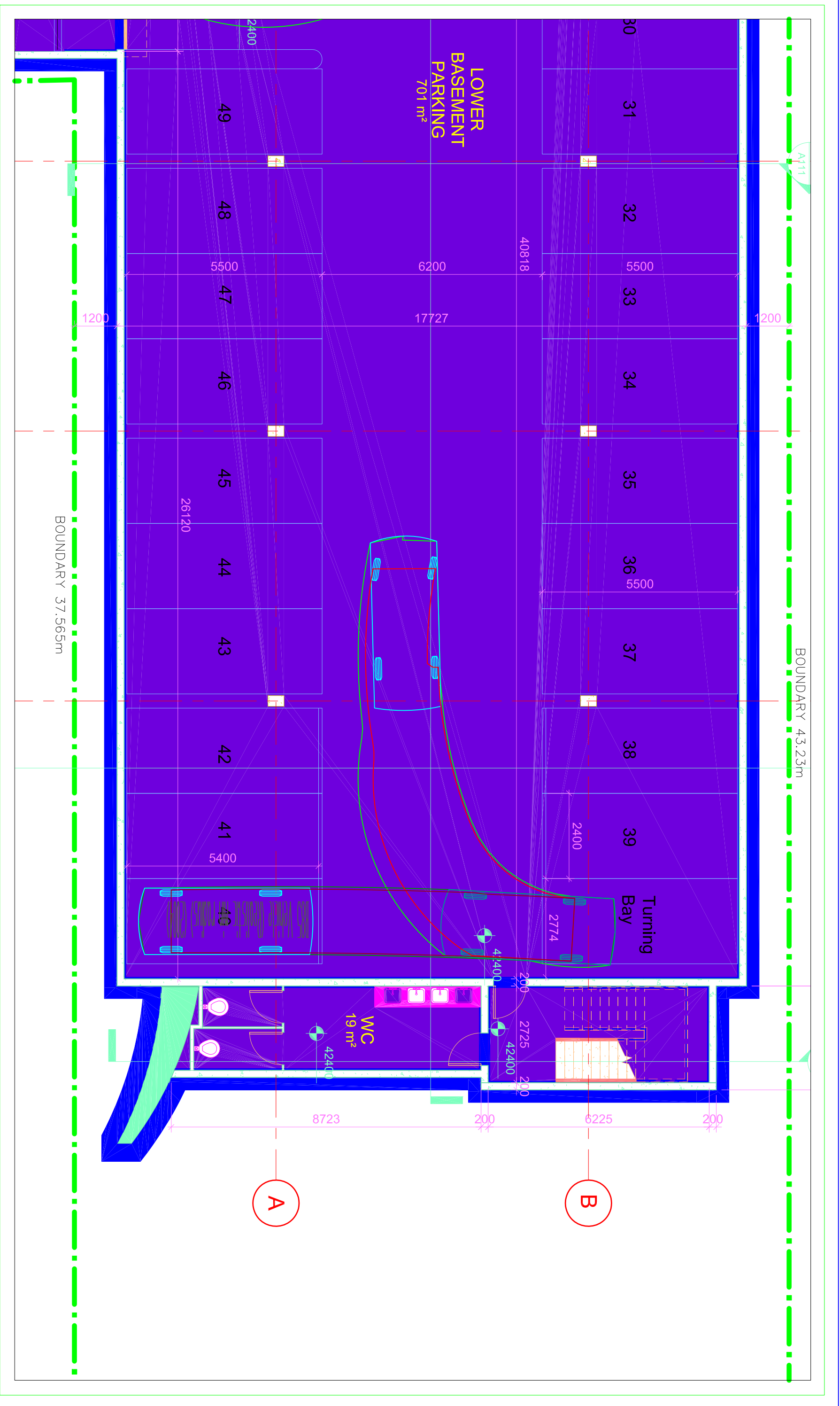
Based on the findings of this report, the proposed the proposed community facility at 68 Waterloo Road, Greenacre could be supported given that the development will have minimal impact on the existing traffic and parking environment in the area.

Appendix A

SITE & FLOOR PLANS

Appendix B

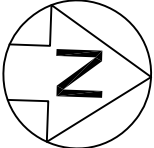
SWEPT PATH DIAGRAMS

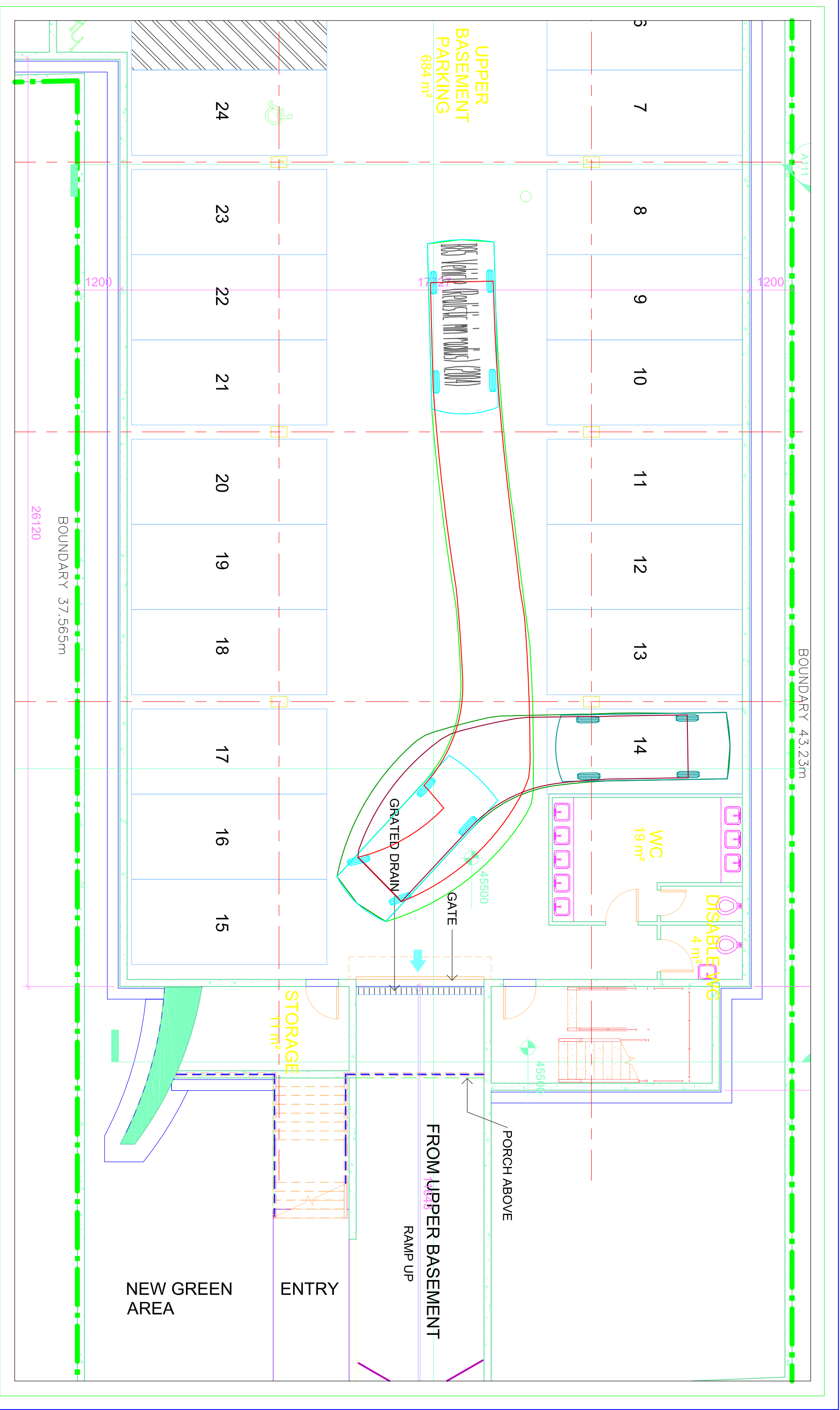


Express Traffic Engineering Solutions

68 Waterloo Road, Greenacre

Swept Path Diagram- B85 Design Vehicle (AS2890.1:2004)





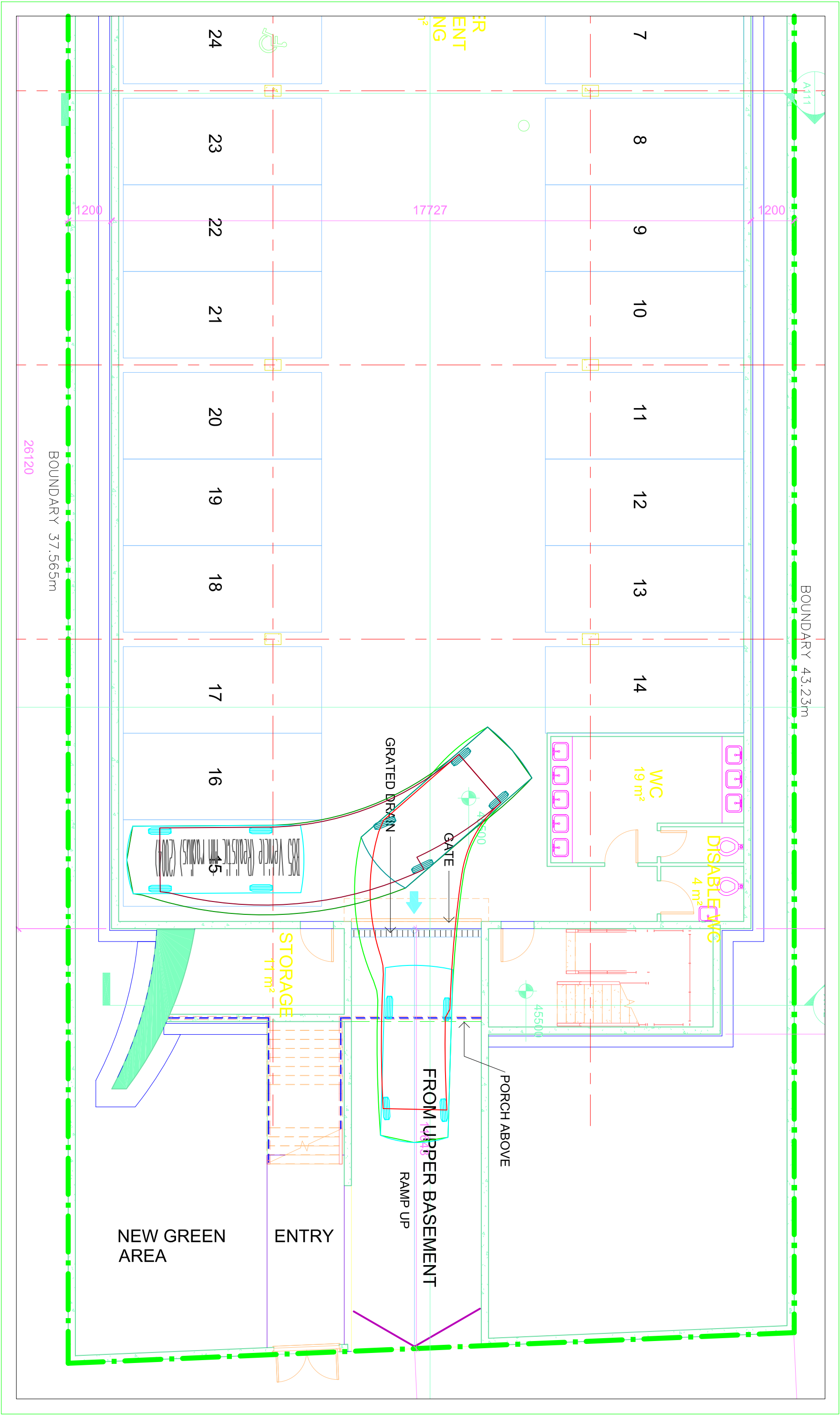
Express Traffic Engineering Solutions

68 Waterloo Road, Greenacre

Swept Path Diagram- B85 Design Vehicle (AS2890.1:2004)

Scale 1:100



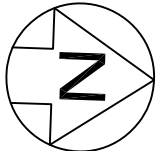


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68 Waterloo Road, Greenacre

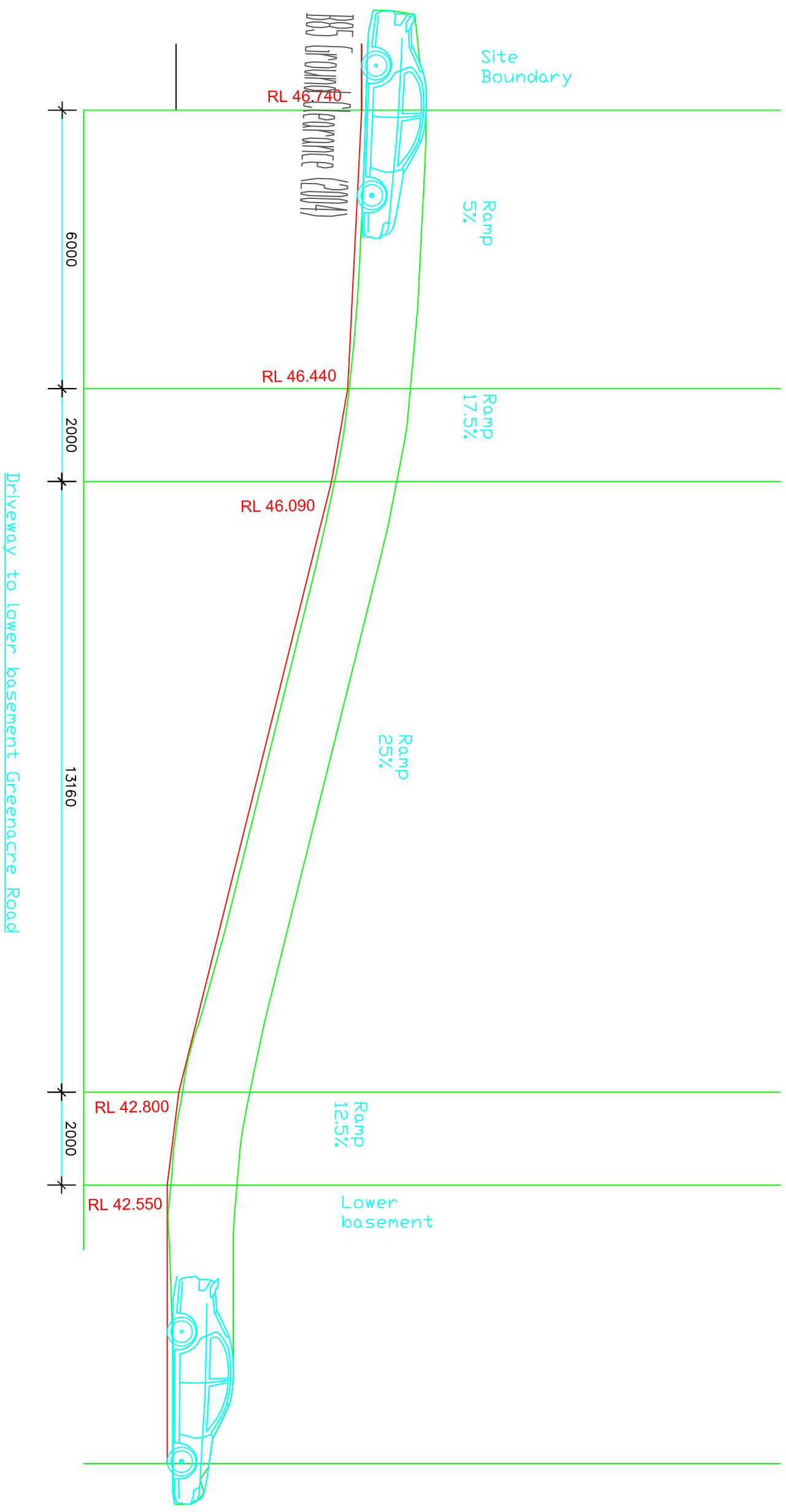
Swept Path Diagram- B85 Design Vehicle (AS2890.1:2004)

Scale 1:100



Appendix C

Driveway Ramps Long sections/Vertical Clearances

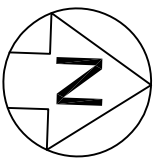


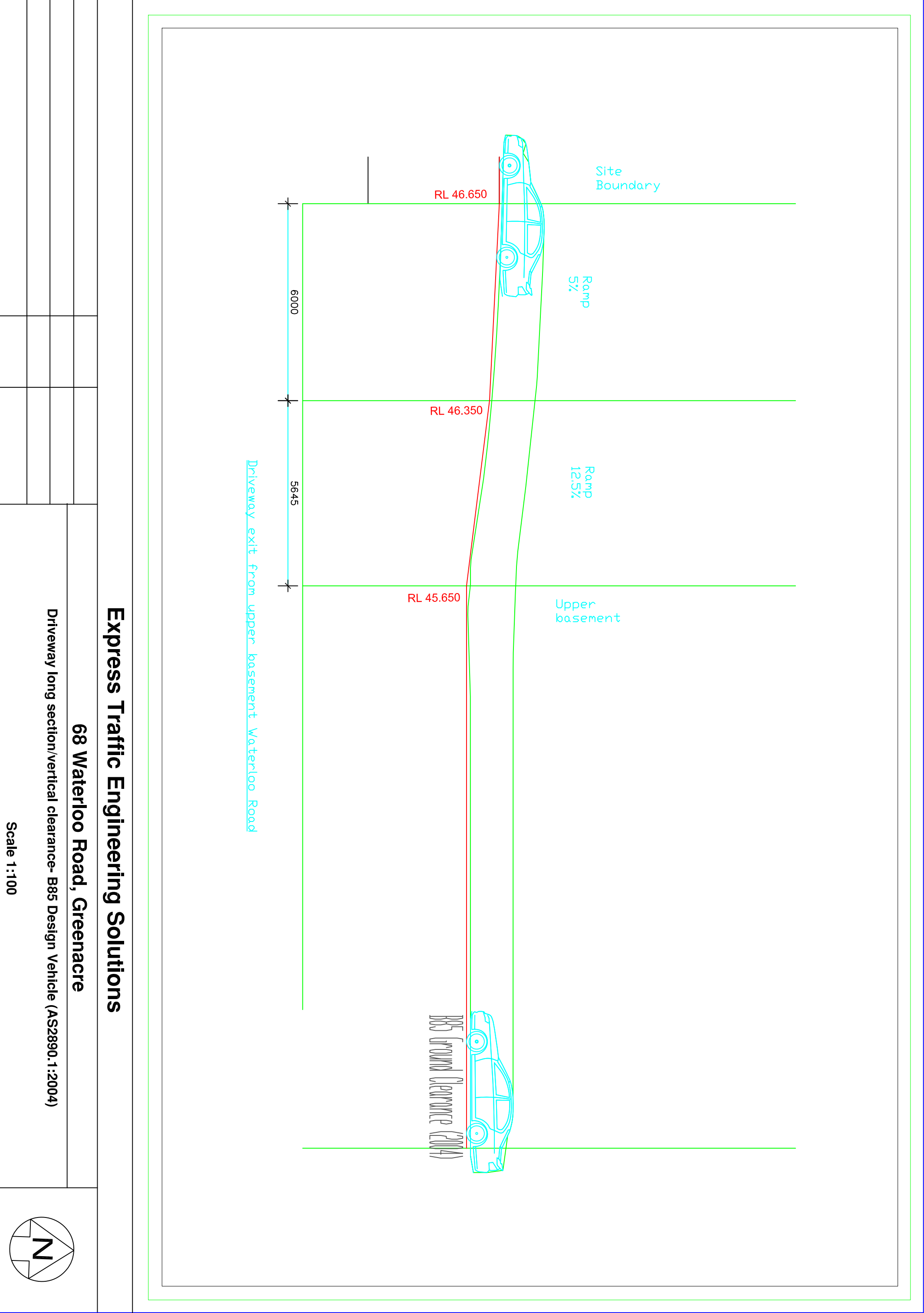
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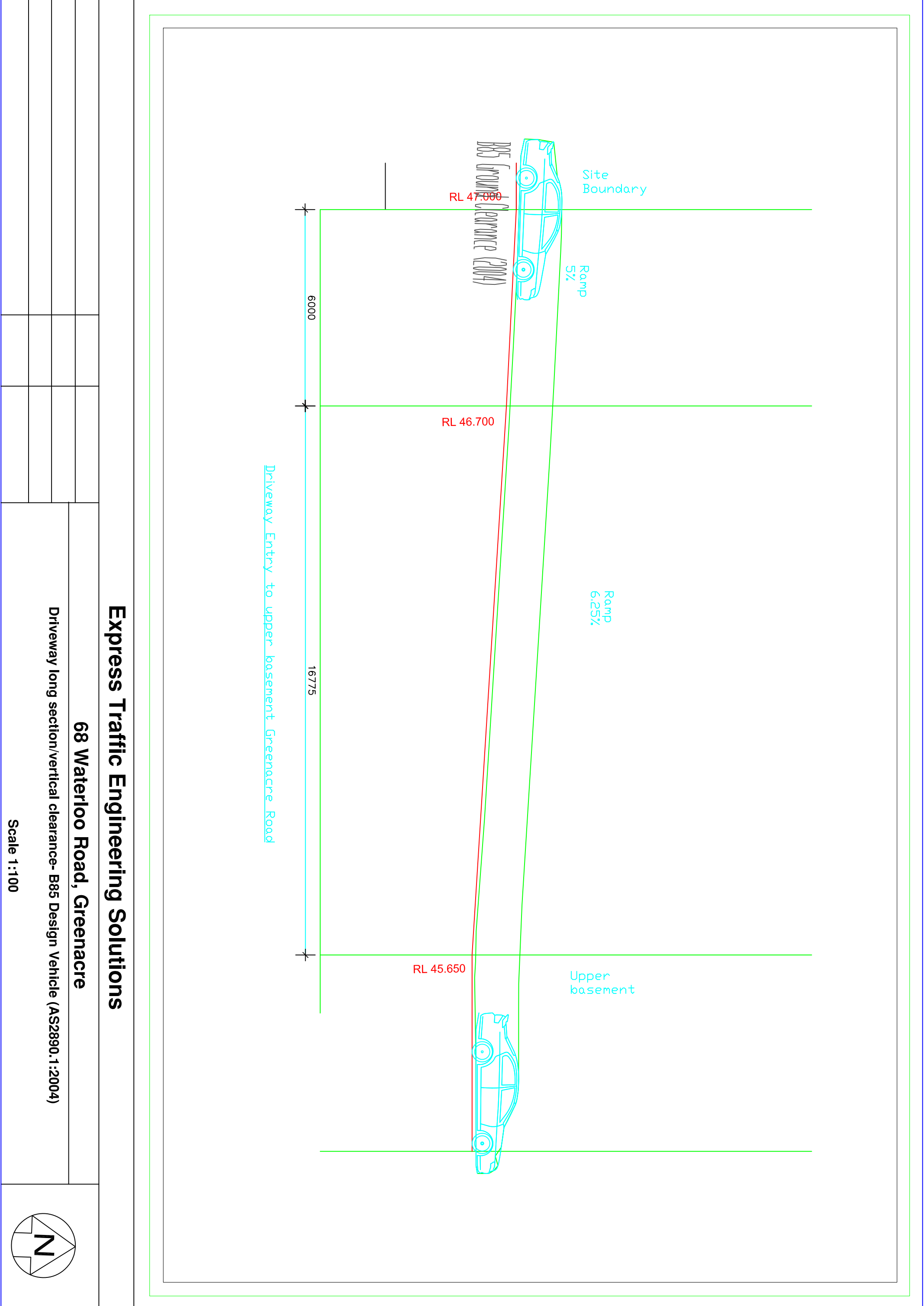
68 Waterloo Road, Greenacre

Driveway long section/vertical clearance- B85 Design Vehicle (AS2890.1:2004)

Scale 1:100







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68 Waterloo Road, Greenacre

Driveway long section/vertical clearance- B85 Design Vehicle (AS2890.1:2004)

Scale 1:100

