Prepared for

CAMBRIDGE UNIT DEVELOPMENTS PTY LTD

Transport Assessment

Proposed Medical Centre
143A Stoney Creek Road, Beverley Hills

Ref: P0780r01v01
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1 Introduction

1.1 Overview

Ason Group has been commissioned by Cambridge Unit Developments Pty Ltd to conduct a Transport Assessment (TA) with respect to a proposed medical facility at 143A Stoney Creek Road, Beverley Hill (the Site). The development relates to the demolition of existing structures on the Site and construction of three levels of medical facilities over three levels of basement parking (the Proposal). **Table 1** provides a summary of the main characteristics of the Proposal.

Table 1: Summary of Proposal

GROSS FLOOR AREA R2	
Ground Floor	24 m^2
Level 1	314 m^2
Subtotal	338 m^2
GROSS FLOOR AREA SP2	
Ground Floor	987 m^2
Level 1	1,125 m^2
Level 2	952 m^2
Subtotal	3,064 m^2
Total GFA	**3,402 m^2**

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

- Hurstville Local Environmental Plan 2012 (HLEP)
- Hurstville Development Control Plan 1
- Georges River Car Parking Strategy and Position Paper, May 2020

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

- RMS Guide to Traffic Generating Developments (RMS Guide)
- Australian Standard 2890.1: Parking Facilities, Off Street Car Parking (AS 2890.1)
- Australian Standard 2890.2: Parking Facilities, Off Street Commercial Vehicle Facilities (AS2890.2)
- Australian Standard 2890.3: Parking Facilities, Off Street Parking for People with Disabilities (AS2890.6)

2 Existing Conditions

2.1 Existing Zoning and Land Use

The Site is located on the southern boundary of the Georges River Local Government Area (LGA and is bound by Stoney Creek Road to the north, Cambridge Street to the east and residential houses to the south and west. The northeast portion of the Site (1,874.8 m^2) is currently zoned SP2 – Infrastructure and the southwest portion R2 – Low Density Residential.

The Site currently accommodates an unused Roads and Maritime Services (RMS) Motor Registry and associated parking with vehicular access to Cambridge Street. **Figure 1** shows the Site location within the local road network context.

Figure 1: Site Location and Road Hierarchy

2.2 Public Transport

2.2.1 Rail

A review of the public transport available near the Site shows that it is located approximately 600m walking distance from Beverley Hills Railway Station and has good, convenient access to it. Beverley Hills Station has two platforms servicing the T8 Macarthur to City via Airport or Sydenham line.

2.2.2 Buses

Figure 2 shows that there are four bus stops within 400m (five minutes' walk) of the Site which provides a good level of service for bus connections throughout the LGA as well as further afield throughout Greater

2.3 Active Transport

2.3.1 Walking

Pedestrian paths near the Site are well developed and located on both sides of the surrounding roads as follows:

- Cambridge Street providing access to the Site
- Stoney Creek Road, providing access to Beverley Hills Public School, retail shops churches and bus stops
- King Georges Road, providing access to Beverley Hills station, retail shops and bus stops

A safe walking environment is provided for pedestrians including at signalised crossings on major roads. During the Site visit it was noted that pedestrians generally observed road rules and utilised safe crossing points.

2.3.2 Cycling

Figure 2 identifies the network that forms part of the Georges River Council bike plan. Key initiatives of this plan include connecting the surrounding suburban areas as well as suburban shopping centres.

There is a mixture of recreational routes, regional routes, sub-regional routes and local routes within the LGA. An on-going effort is made to complete routes by filling in missing links. With the assistance of private developers and government agencies, such as the TfNSW, many new routes have been completed (or largely completed).

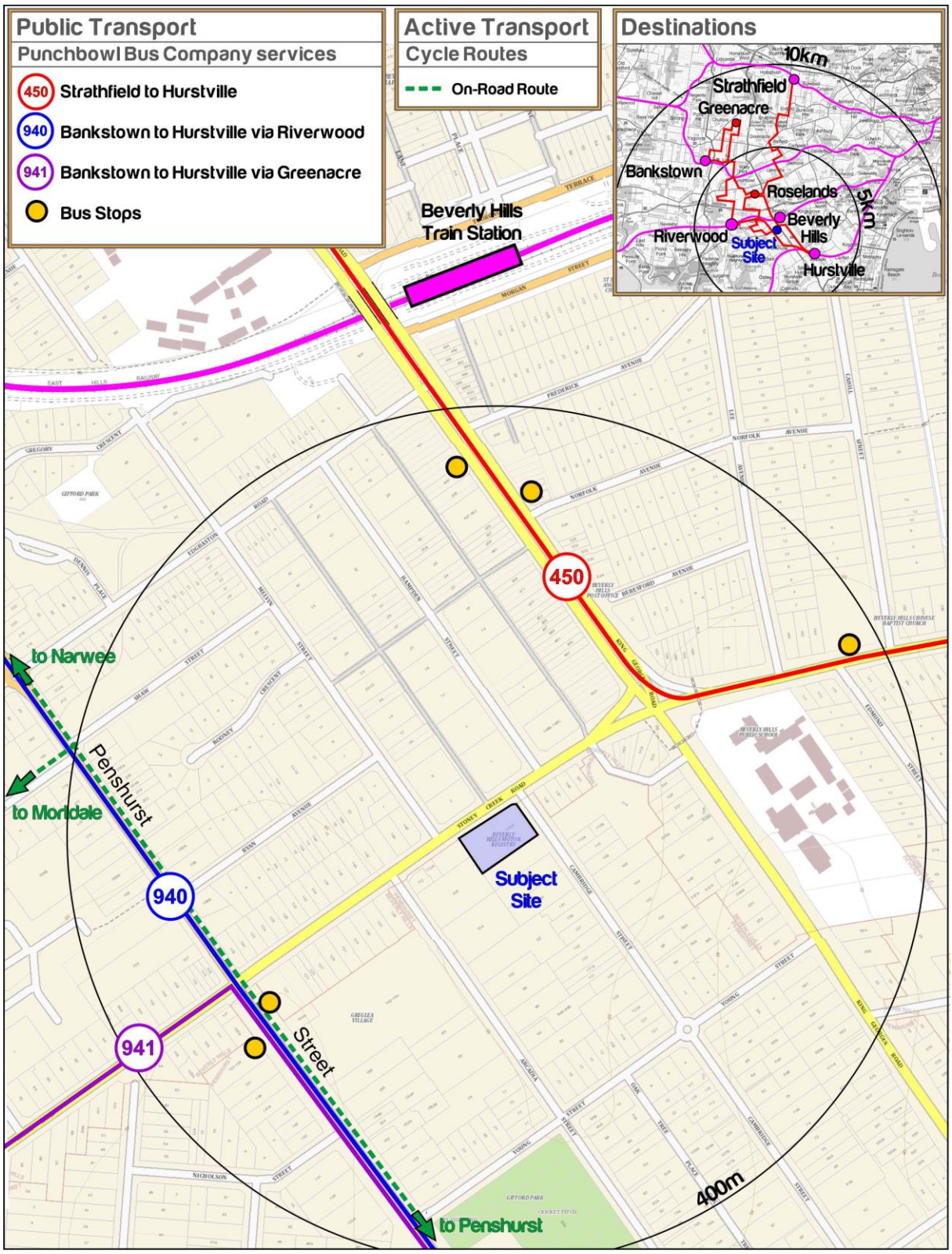


Figure 2: Public and Active Transport

2.4 Parking Conditions

Surrounding the Site, on-street parking on Cambridge Street is generally unrestricted on both sides whilst Stoney Creek Road is No Stopping with AM and PM clearways in place on both sides. An 90% occupancy rate of all available on-street parking along the Site's boundaries was observed during the weekday PM peak site inspection.

2.5 Existing Site Traffic Generation

There is currently an unoperational/unoccupied Motor Registry located on the Site and this was also the case during the traffic surveys. Notwithstanding, the previous use was accommodated on the surrounding road network. **Table 2** shows the assumptions that have been made to determine the previous traffic generation in the absence of site survey data.

Table 2: Previous Traffic Generation

Criteria	Assumptions
Counter / Rooms	18
Utilisation	100% at peak
Staff	20
	(1/counter + 2 general)
Assumed Staff Cars	10
	(1/2 staff)
Mode Share to Car	90%
Average Dwell Time	15min
Visitor Turnover	72
	(18 counters x 4/hour)
Resultant Peak Hourly Trip Generation	**130**
	(72 visitors x 90% car x 2 in/out)

It is reasonable to determine a net change in traffic generation from the previous use for the purpose of assessing the net impact of the Proposal on the surrounding road network. Section 5.1.details the methodology and details of this assessment.

2.6 Existing Intersection and Network Performance

Traffic surveys were undertaken on 5th February 2020 in order to determine existing traffic volumes at the key intersections in the vicinity of the site, including:

- Stoney Creek Road / King Georges Road
- Stoney Creek Road / Cambridge Street

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

- *Degree of Saturation (DOS)* – 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)* – Delay represents the difference between interrupted and uninterrupted travel times through an intersection and is measured in seconds per vehicle. Delays include queued vehicles accelerating and decelerating from/to the intersection stop lines, as well as general delays to all vehicles travelling through the intersection. The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's 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 3** provides a recommended baseline for assessment:

Table 3: Traffic Model Performance Criteria

Level of Service	Average Delay per Vehicle (sec/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; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

The results of the existing scenario SIDRA analysis are summarised in **Table 4** with relevant SIDRA outputs and intersection layouts are attached to this report at **Appendix A**.

Table 4: Existing Intersection Performance

Intersection	Parameter	2020
Stoney Creek Rd / King Georges Rd	Average Delay (sec)	68.8
	LoS	E
Stoney Creek Rd / Cambridge St	Worst Movement	South-Right
	Delay (sec)	630.4
	LoS	F
	Longest queue approach	South-Right
	Longest queue (m)	13

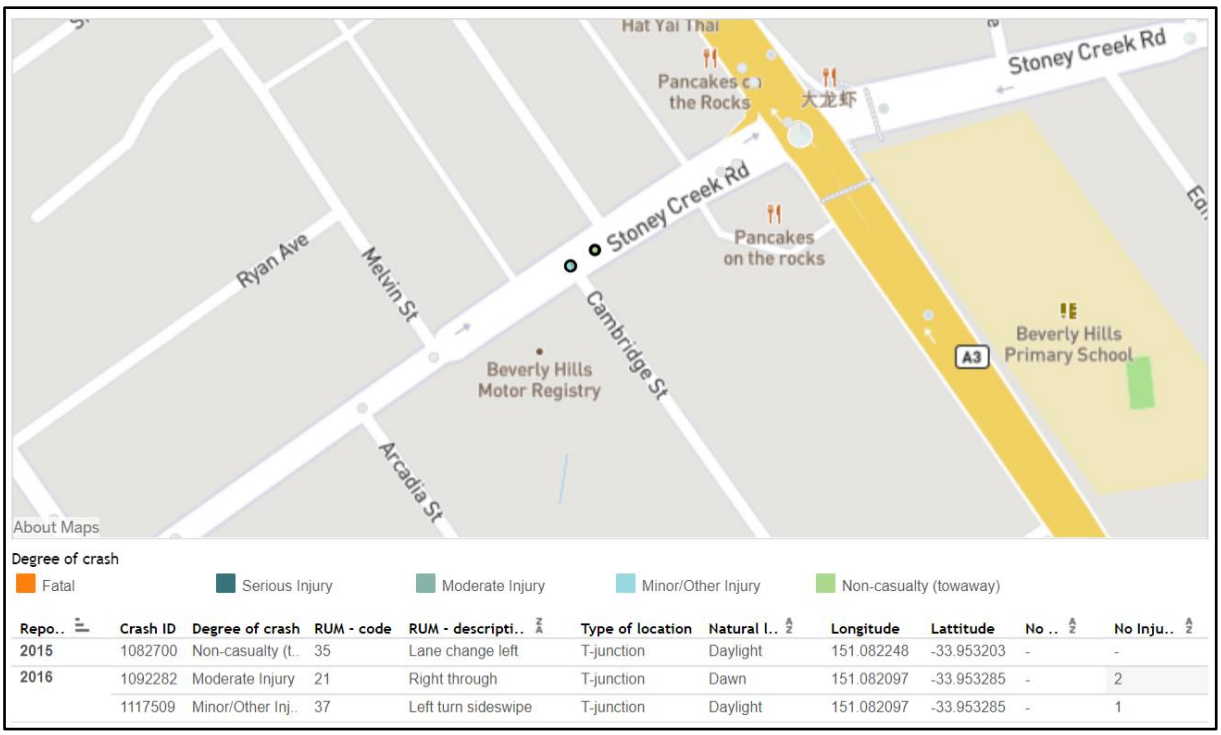
These results show that both intersections are currently operating poorly and failing during both peaks. However, the performance of the Cambridge Street intersection is also largely dependent on the operation of King Georges Road.

Notwithstanding, TfNSW has acknowledged the poor operation of the Stoney Creek Road x King Georges Road intersection in the King Georges Road Upgrade – Stoney Creek Road to Forest Road, Review of Environmental Factors, October 2019 (KGR REF) and they are currently investigating widening King Georges Road to three lanes in each direction from Stoney Creek Rd to Forest Rd and removing right turn movements from some intersections.

The KGR REF also indicates potential for upgrades at Cambridge Street due to its close proximity to King Georges Road. As part of those upgrades it is envisaged that a median in Stoney Creek Road would restrict Cambridge Street to left-in/left-out. On that basis it is expected that a resulting reassignment would have significantly less impact e.g. left-in to Cambridge Street and approaches/departures from the south would have no impact.

2.7 Prevailing Traffic Safety Issues

Recorded road crash history was provided by TfNSW for a five-year period (January 2014 to December 2018) within the Site study area and the results are shown in **Figure 3**. The data was analysed to identify any potential road safety deficiencies, particularly pedestrian-related incidents. There were no fatalities recorded within the study area over the five-year period and only three crashes occurred on roads bordering the Site, reaffirming the safe positioning of the proposed access point.



Repo..	Crash ID	Degree of crash	RUM - code	RUM - descripti..	Type of location	Natural l..	Longitude	Lattitude	No ..	No Inju..
2015	1082700	Non-casualty (t..	35	Lane change left	T-junction	Daylight	151.082248	-33.953203	-	-
2016	1092282	Moderate Injury	21	Right through	T-junction	Dawn	151.082097	-33.953285	-	2
	1117509	Minor/Other Inj..	37	Left turn sideswipe	T-junction	Daylight	151.082097	-33.953285	-	1

Figure 3: Crash Analysis

3 Proposed Development Details

3.1 Site Plan

It is envisaged that the Site would primarily cater to Medical type uses, and this is indeed the key strategic land use driver of the proposed development. However, this DA does not seek consent for any specific tenancy fit-out. Therefore, reasonable assumptions have been made regarding the number of rooms. It is understood that in the future, DAs or Code Complying Development Certificates would be sought to facilitate more specific internal layouts for the Site.

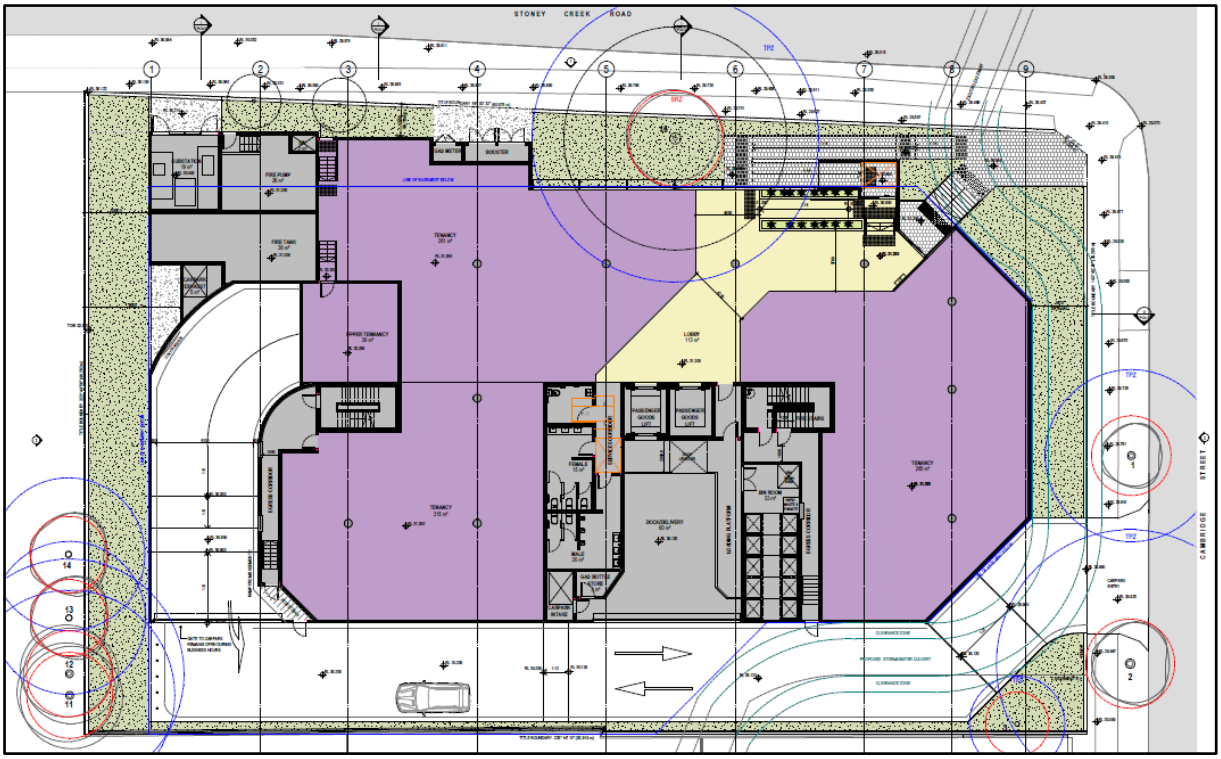


Figure 4: Site Plan

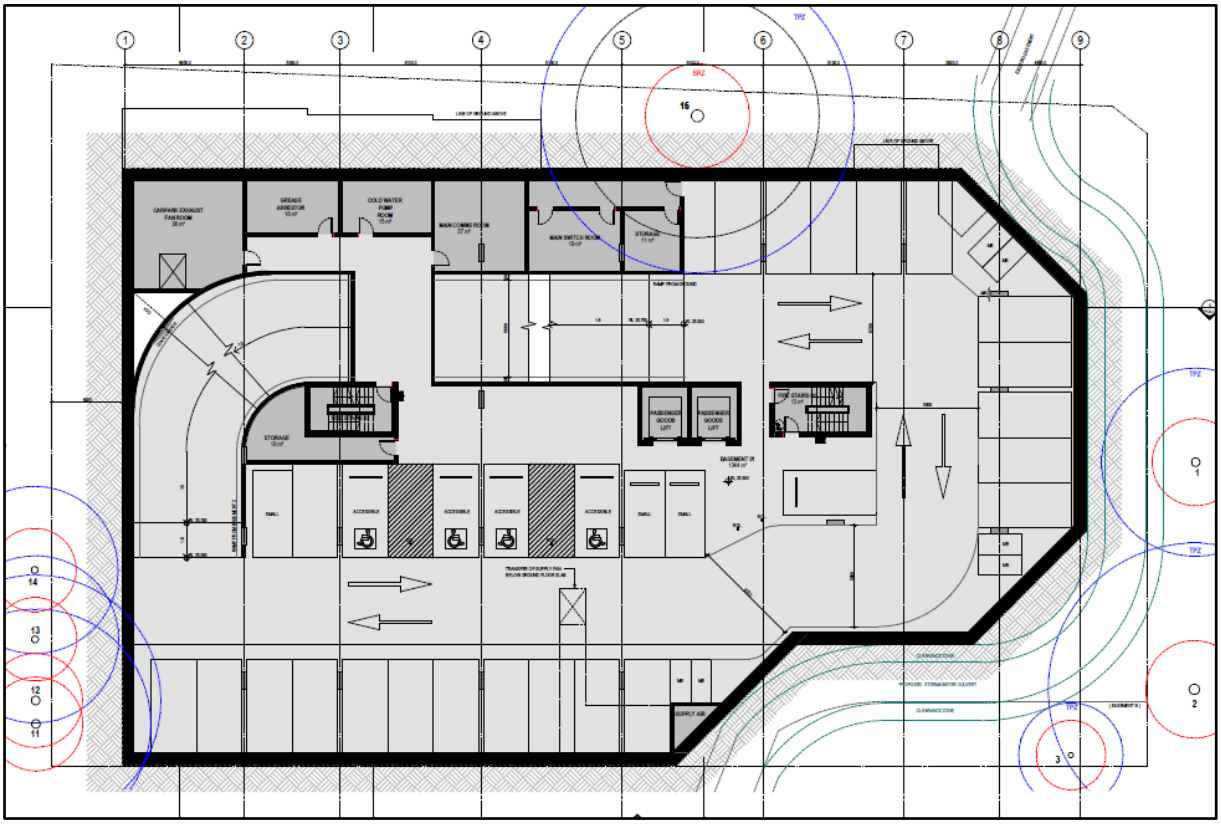


Figure 5: Basement 1

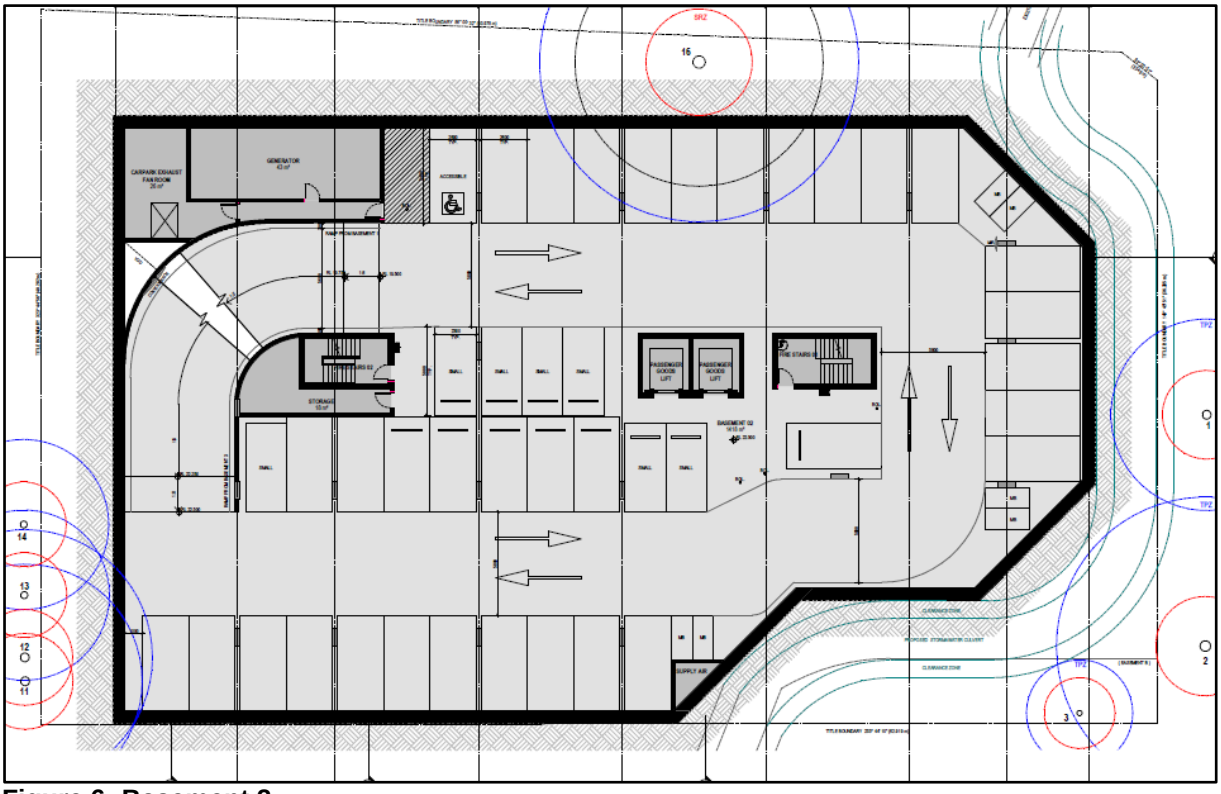


Figure 6: Basement 2

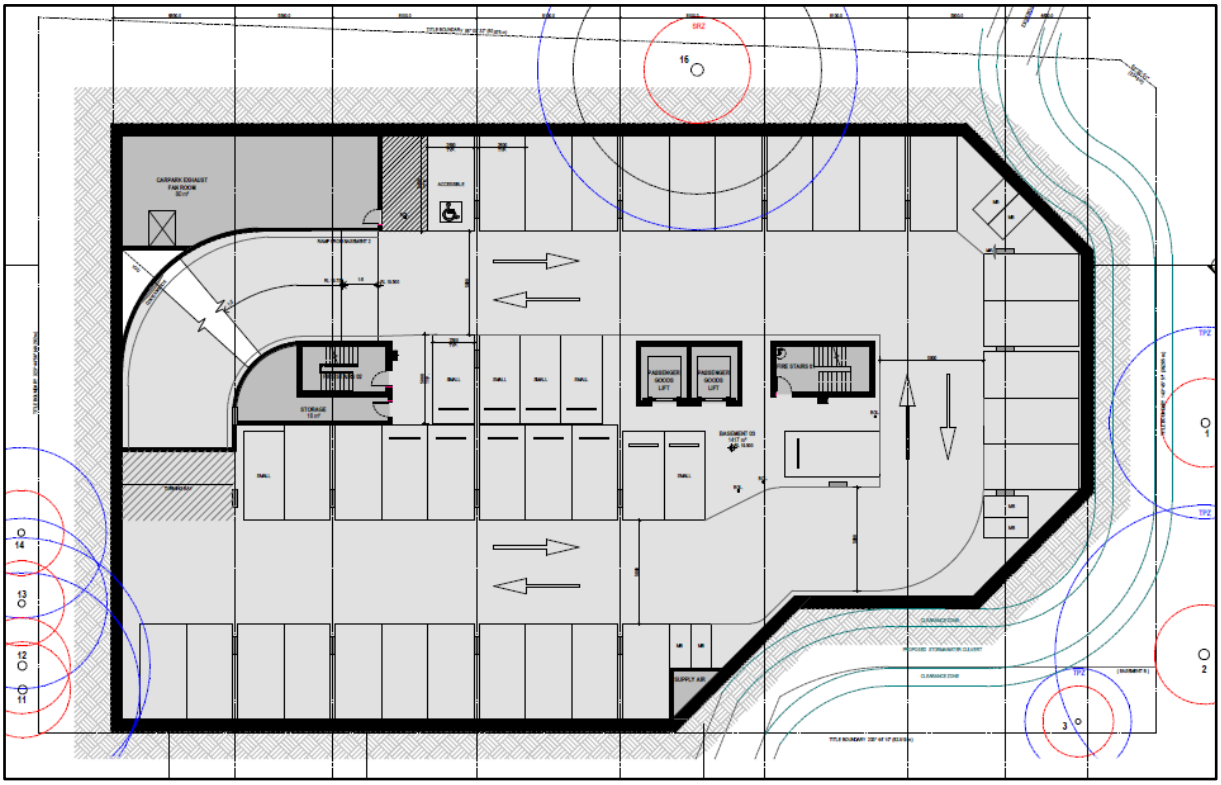


Figure 7: Basement 3

3.2 Operational Details

The development involves the potential provision of a series of tenancies/rooms which are envisaged to accommodate a mix of health services facilities such as medical consulting.

For the purpose of the transport and parking assessment, the following operational assumptions have been made:

- The potential number of consulting rooms for the site is indicatively 80
- With consideration of potential differing uses, 75% utilisation at any one time
- The potential number of staffs is indicatively 60, comprised of 90% doctors and 10% admin staff
- 100% car mode share for patients/visitors due to likely need post consultation
- 30 minute average turnover for each patient
- One trip in and one trip out during each peak with a 50/50 split
- Staff arrive and depart outside peaks

3.3 Parking

Section 3 of the Hurstville Development Control Plan No.1 contains a variety of car parking rates for medical centres depending on whether a site is located within a 'Business or Industrial zone' or alternatively outside a 'Business or Industrial zone'. However, in preparation for the forthcoming Georges River DCP 2020 which will harmonise the various car parking controls within both the Hurstville and Kogarah Development Control Plans, the Georges River Council Car Parking Strategy (July 2018) was endorsed Council on 27 April 2020 as a Strategic Planning document. Accordingly, the application adopts the car parking rate for medical centres as contained within the Georges River Council Car Parking Strategy. This document outlines a parking rate of:

- 1 space per 40m^2 for medical centres < 800m walking distance from a train station

Accordingly, applying this rate to the Proposal produces a requirement of 86 spaces. **Table 5** shows the proposed parking provision in response.

Additionally, accessible parking is provided in accordance with the BCA for a Class 9a building, requiring 1x space for every 50 carparking spaces or part thereof.

Table 5: Parking Provision

Level	Visitor	Accessible	Total
B01	26	4	30
B02	41	1	42
B03	41	1	42
Total	**108**	**6**	**114**

The forecast parking demand of 86 spaces is therefore considered to be adequately accommodated by the provision of 114 spaces, providing additional capacity to accommodate any unexpected short term increase in demand if required.

4 Design Commentary

4.1 Access

Access to the Site for car parking, service and loading vehicles is proposed via one entry/exit driveway to be constructed off Cambridge Street. Three levels of basement car parking including six accessible spaces are proposed.

4.2 Relevant Design Standards

The Site access, car park and loading areas have been designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.6 for accessible (disabled) parking.

A detailed review of the car park and related areas has been undertaken and the following characteristics are noteworthy:

- The main car park aisle has been designed with a minimum clear width of 5.8m. This is considered supportable having regard for the low traffic volumes expected during peak periods.
- All parking spaces are designed in accordance with a User Class 3.
- Parking spaces are provided in accordance with AS2890.1.
- All accessible parking spaces are to be provided in accordance with AS2890.6, which requires a space with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.

Reference should be made to the swept paths and design commentary included in **Appendix B**.

It is expected that any detailed construction drawings in relation to any modified areas of the car park or site access would comply with these Standards. Furthermore, compliance with the above Standards would be expected to form a standard condition of consent to any development approval.

4.3 Service Vehicle Access

The service vehicle facilities of the development have been designed having regard for the operational requirements of the future tenant and the requirements of AS2890.2. In this regard the following is considered noteworthy:

- The internal design of the service area has been undertaken in accordance with the requirements of AS28090.2 for the maximum length vehicle accessing the site being a Medium Rigid Vehicle.
- A minimum clear head height of 4m is provided within all areas traversed by service vehicles.
- A minimum bay width of 3.5m is provided, and
- All service vehicles can enter and exit the site in a forward direction.

The swept path analysis in **Appendix B** also demonstrates compliance with the relevant sections of AS2890.2.

5 Transport Assessment

5.1 Traffic Generation

5.1.1 RMS Traffic Survey Assessment

RMS Trip Generation Surveys – Medical Centres (Analysis Report) provides detailed traffic survey results for a range of medical centres, which includes 5 sites located within Sydney inner suburbs. A summary of traffic generation rates of these sites based on staff numbers is included in the **Table 6** below.

Table 6: RMS Traffic Survey Result Summary – veh/staff

#	Site	Trip Generation Rates	
		AM Peak	PM Peak
2	Crows Nest Medical Practice	0.9	0.8
3	Five Dock Medical Centre	2.4	2.7
6	Hunters Hill Medical Practice	1.8	2.2
8	Sans Souci Medical Practice	1.8	1.6
12	Dee Why Family Practice	1.5	2.1
	Average	**1.7**	**1.9**

Adopting the average trip generation rates to the estimated 60 staff numbers of the Site, the Proposal is expected to generate approximately 101 and 113 trips per hour during AM and PM peak periods, separately.

5.1.2 First Principles Assessment

Based on the assumptions in Section 3.2, **Table 7** shows the forecast peak hour trip generation for the Proposal.

Table 7: First Principles Traffic Generation

Criteria	Proposed
Rooms	80
Utilisation	75% at any one time
Assumed Staff Cars	58 (1/ doctor + 1/2 other staff)
Mode Share to Car	100% (likely need car after any minor surgery)

Criteria	Proposed
Average Dwell Time	30 minutes
Visitor Turnover	55 (55 doctors x 2/hour)
Resultant Peak Hourly Trip Generation	110 (55 visitors x 100% car x 2 in/out)

A comparison of the RMS and First Principles Assessments shows similar results. Therefore, it is considered appropriate to adopt the First Principles Assessment, considering it has been based on the proposed operating conditions.

Also, the current, ongoing COVID-19 pandemic has generated many unknown forecasts for travel behaviour in the future. However, it is clear that some current trends are likely to continue to be developed. One such trend is the rapid expansion of tele-health consultation and treatment which is likely to have a dramatic reduction in traffic associated with medical centres. No data is currently available in relation to this. However, it is reasonable to assume that changing practices and behaviours will reduce trips to the Site.

5.2 Traffic Distribution

Distribution for the Proposal has been based on the estimated catchment area as defined through a current and historical socioeconomic analysis by Atlas Urban Economics in conjunction with .ID. The resulting catchment is shown **Figure 8**.

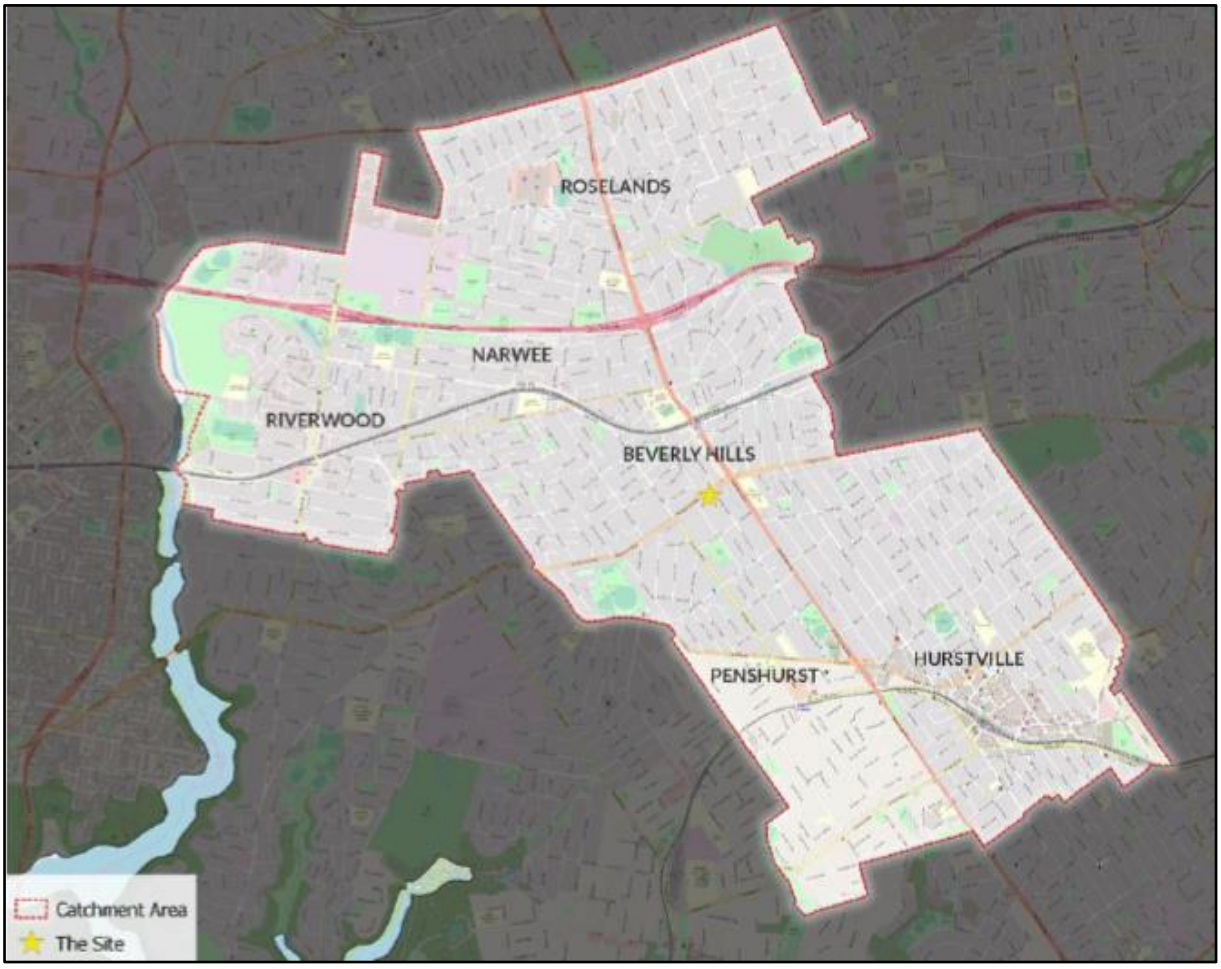


Figure 8: Proposal Catchment

This catchment profile was then used for the distribution of traffic to and from the Site during each peak hour with the resulting volumes shown in **Figure 9**.

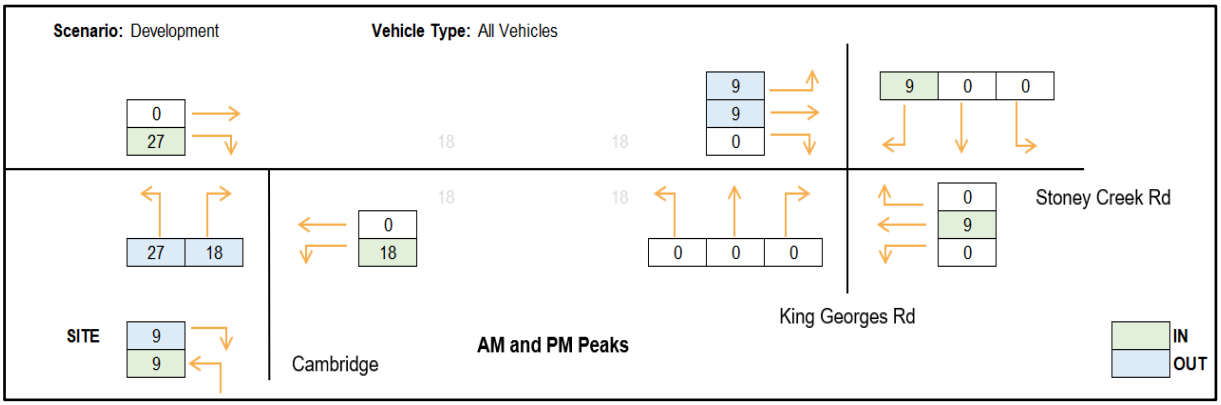


Figure 9: Traffic Distribution

5.3 Traffic Impact Assessment

Whilst the existing operation of the key intersections in the vicinity of the Site are currently operating poorly, the Proposal is forecast to generate less traffic than the previous use, based on a conservative assessment i.e.:

- Previous Use: 130 vehicles per peak hour (2.5)
- Proposal: 110 vehicles per peak hour (Section 5.1.2)

With consideration that the Proposal will generate less traffic than what was previously accommodated on the network, the net reduction is considered an improvement in the operation of the network.

Additionally, TfNSW has acknowledged the poor operation of the Stoney Creek Road x King Georges Road intersection in the King Georges Road Upgrade – Stoney Creek Road to Forest Road, Review of Environmental Factors, October 2019 (KGR REF) and they are currently investigating widening King Georges Road to 3 lanes in each direction from Stoney Creek Road to Forest Road and removing right turn movements from some intersections.

The KGR REF also indicates potential for upgrades at Cambridge Street due to its close proximity to King Georges Road. As part of those upgrades it is envisaged that a median in Stoney Creek Road would restrict Cambridge Street to left-in/left-out. On that basis it is expected that a resulting reassignment for the Site would have significantly less impact e.g. left-in to Cambridge Street and approaches/departures from the south would have no impact.

6 Conclusion and Recommendations

6.1 Key Findings

The key findings of this Traffic Impact Assessment are:

- Ason Group has been commissioned by Cambridge Unit Developments Pty Ltd to conduct a Transport Assessment (TA) with respect to a proposed medical facility at 143A Stoney Creek Road, Beverley Hill (the Site). The aim of this assessment is to investigate and report on the potential transport impact of the proposal and to recommend appropriate mitigation strategies where required.
- The Site is located on the southern boundary of the Georges River Local Government Area (LGA and is bound by Stoney Creek Road to the north, Cambridge Street to the east and residential houses to the south and west. The northeast portion of the Site (1,874.9 m^2) is currently zoned SP2 – Infrastructure and the southwest portion (579.9 m^2) R2 – Low Density Residential.
- Currently the site accommodates an unused RMS Motor Registry and associated parking with vehicular access to Cambridge Street.
- SIDRA analysis shows that the key intersections of Stoney Creek Road / King Georges Road and Stoney Creek Road / Cambridge Street are currently operating poorly and failing during both peaks. However, the performance of the Cambridge Street intersection is also largely dependent on the operation of King Georges Road.
- Whilst the existing operation of the key intersections in the vicinity of the Site are currently operating poorly, the Proposal is forecast to generate less traffic than the previous use, based on a conservative assessment i.e.:

  Previous Use: 130 vehicles per peak hour

  Proposal: 110 vehicles per peak hour

- TfNSW has acknowledged the poor operation of the Stoney Creek Road x King Georges Road intersection in the King Georges Road Upgrade – Stoney Creek Road to Forest Road, Review of Environmental Factors, October 2019 (KGR REF) and they are currently investigating widening King Georges Road to 3 lanes in each direction from Stoney Creek Road to Forest Road and removing right turn movements from some intersections.
- The KGR REF also indicates potential for upgrades at Cambridge Street due to its close proximity to King Georges Road. As part of those upgrades it is envisaged that a median in Stoney Creek Road would restrict Cambridge Street to left-in/left-out. On that basis it is expected that a resulting

reassignment for the Site would have significantly less impact e.g. left-in to Cambridge Street and approaches/departures from the south would have no impact.

- Rapid expansion of tele-health consultation and treatment is likely to have a dramatic reduction in traffic associated with medical centres. Therefore, it is reasonable to assume that changing practices and behaviours will reduce trips generated by the Site.
- Based on the requirements of the Georges River Council Car Parking Strategy (July 2018), the forecast parking demand of 86 spaces is considered to be adequately accommodated by the provision of 114 spaces, providing additional capacity to accommodate any unexpected short term increase in demand if required as well as having no impact on the availability of on-street parking.
- The access and basement have been designed having regard for relevant Australian Standards (AS2890 series). A standard condition of consent requiring compliance with AS2890 would be considered sufficient to ensure that any minor changes to the plans required, if any, could be undertaken as part of detailed Construction Certificate documentation.

6.2 Conclusion

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

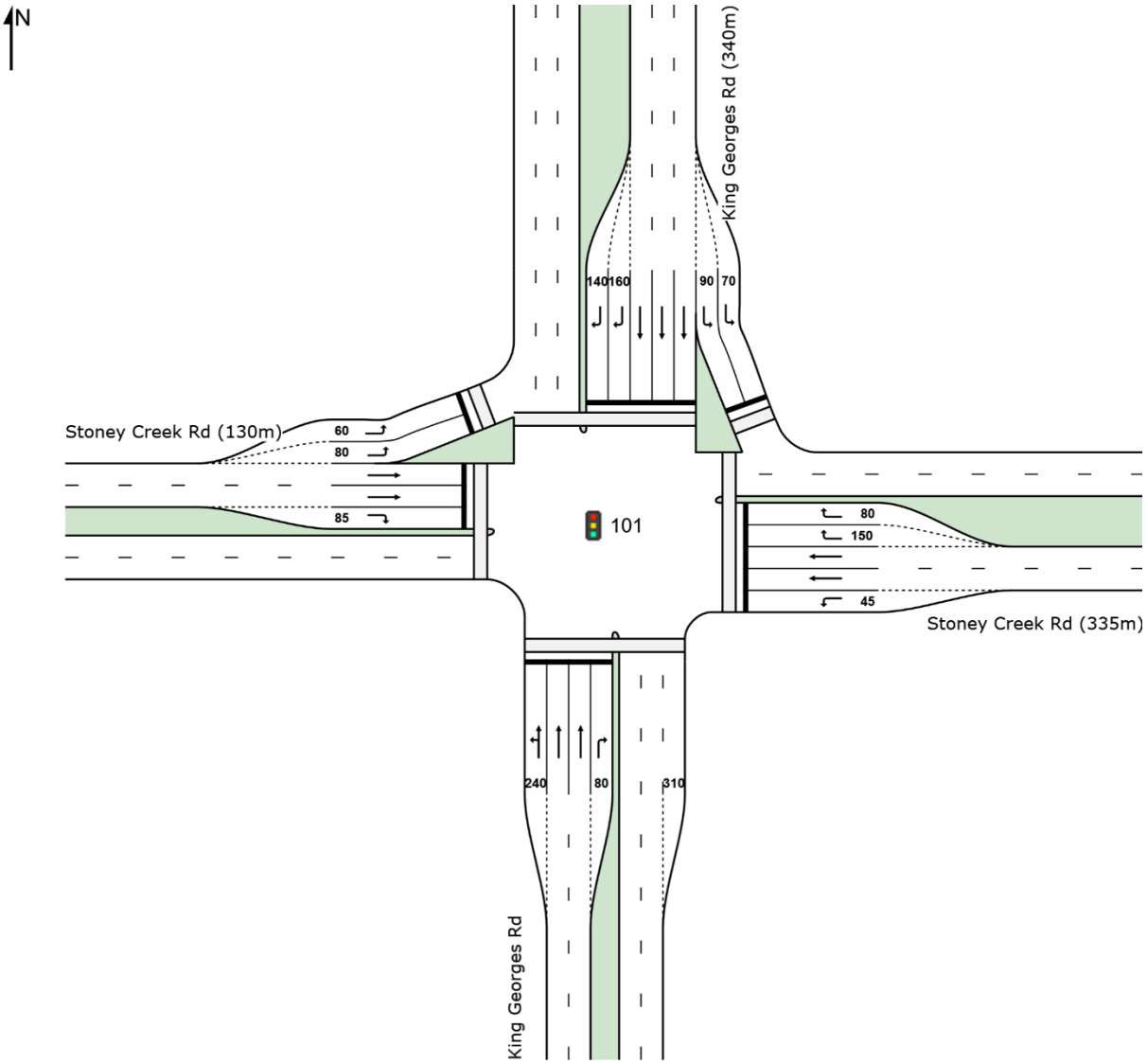
Appendix A

SIDRA Outputs

SITE LAYOUT

Site: 101 [[Existing AM] Stoney Creek Rd x King Georges Rd]

Stoney Creek Rd x King Georges Rd
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101 [[Existing AM] Stoney Creek Rd x King Georges Rd]

Stoney Creek Rd x King Georges Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Georges Rd												
1	L2	8	37.5	0.967	92.3	LOS F	55.4	405.4	1.00	1.15	1.32	18.2
2	T1	1721	4.8	0.967	86.3	LOS F	55.4	404.1	1.00	1.15	1.33	22.6
3	R2	107	4.9	0.898	94.6	LOS F	8.9	65.0	1.00	0.98	1.42	21.1
Approach		1837	5.0	0.967	86.8	LOS F	55.4	405.4	1.00	1.14	1.33	22.4
East: Stoney Creek Rd (335m)												
4	L2	54	2.0	0.070	32.8	LOS C	2.3	16.3	0.63	0.70	0.63	35.7
5	T1	443	5.7	0.383	42.7	LOS D	12.7	93.6	0.83	0.70	0.83	24.8
6	R2	441	10.7	0.959	104.7	LOS F	20.1	153.6	1.00	1.07	1.47	17.2
Approach		938	7.9	0.959	71.3	LOS F	20.1	153.6	0.90	0.87	1.12	20.5
North: King Georges Rd (340m)												
7	L2	843	8.6	0.608	31.8	LOS C	20.0	150.1	0.71	0.79	0.71	33.6
8	T1	1224	9.4	0.716	46.8	LOS D	27.5	207.8	0.93	0.81	0.93	31.6
9	R2	225	14.0	1.001	125.0	LOS F	11.0	86.2	1.00	1.12	1.72	11.4
Approach		2293	9.6	1.001	49.0	LOS D	27.5	207.8	0.86	0.83	0.93	28.9
West: Stoney Creek Rd (130m)												
10	L2	260	8.5	0.177	34.5	LOS C	5.8	43.9	0.66	0.73	0.66	27.2
11	T1	1052	4.3	0.965	86.6	LOS F	49.9	362.4	1.00	1.16	1.34	15.5
12	R2	54	2.0	0.220	68.8	LOS E	3.5	25.2	0.93	0.75	0.93	21.5
Approach		1365	5.0	0.965	76.0	LOS F	49.9	362.4	0.93	1.06	1.20	17.1
All Vehicles		6433	7.0	1.001	68.8	LOS E	55.4	405.4	0.92	0.98	1.13	23.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4B	West Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		316	69.3	LOS F			0.96	0.96

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.

PHASING SUMMARY

Site: 101 [[Existing AM] Stoney Creek Rd x King Georges Rd]

Stoney Creek Rd x King Georges Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

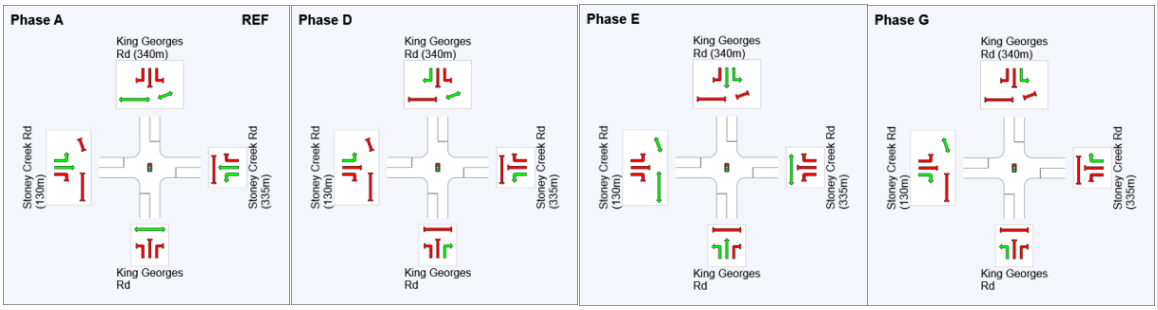
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: SCATS
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

PHASE TIMING SUMMARY

Phase	A	D	E	G
Phase Change Time (sec)	0	53	69	124
Green Time (sec)	47	10	49	20
Phase Time (sec)	53	16	55	26
Phase Split	35%	11%	37%	17%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

OUTPUT PHASE SEQUENCE



REF: Reference Phase
VAR: Variable Phase

Normal Movement
Slip/Bypass-Lane Movement
Stopped Movement
Other Movement Class (MC) Running
Mixed Running & Stopped MCs
Other Movement Class (MC) Stopped
Permitted/Opposed
Opposed Slip/Bypass-Lane
Turn On Red
Undetected Movement
Continuous Movement
Phase Transition Applied

MOVEMENT SUMMARY

Site: 101 [[Existing PM] Stoney Creek Rd x King Georges Rd]

Stoney Creek Rd x King Georges Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: King Georges Rd												
1	L2	51	6.3	0.766	52.2	LOS D	31.9	231.3	0.96	0.85	0.96	26.6
2	T1	1376	4.0	0.766	46.5	LOS D	32.1	232.2	0.95	0.84	0.95	31.6
3	R2	103	3.1	0.532	75.8	LOS F	7.3	52.8	0.99	0.79	0.99	24.2
Approach		1529	4.0	0.766	48.7	LOS D	32.1	232.2	0.95	0.84	0.95	30.8
East: Stoney Creek Rd (335m)												
4	L2	78	6.8	0.110	35.4	LOS C	3.5	25.9	0.66	0.72	0.66	34.6
5	T1	958	1.9	1.038	131.9	LOS F	56.1	398.8	1.00	1.37	1.62	11.0
6	R2	517	6.5	1.040	144.5	LOS F	28.3	209.2	1.00	1.21	1.72	13.4
Approach		1553	3.7	1.040	131.2	LOS F	56.1	398.8	0.98	1.28	1.61	12.5
North: King Georges Rd (340m)												
7	L2	547	5.6	0.295	27.2	LOS B	11.1	81.5	0.61	0.74	0.61	35.9
8	T1	1905	2.0	1.050	135.5	LOS F	79.2	564.0	1.00	1.39	1.62	16.4
9	R2	384	7.9	1.025	136.2	LOS F	20.1	150.2	1.00	1.17	1.71	10.6
Approach		2837	3.5	1.050	114.7	LOS F	79.2	564.0	0.92	1.24	1.44	17.2
West: Stoney Creek Rd (130m)												
10	L2	284	2.2	0.194	36.5	LOS C	6.6	47.4	0.69	0.74	0.69	26.5
11	T1	612	2.8	0.632	53.4	LOS D	19.9	142.7	0.95	0.81	0.95	21.6
12	R2	125	0.0	0.482	70.6	LOS F	8.6	60.1	0.97	0.80	0.97	21.2
Approach		1021	2.3	0.632	50.8	LOS D	19.9	142.7	0.88	0.79	0.88	22.6
All Vehicles		6940	3.5	1.050	94.5	LOS F	79.2	564.0	0.94	1.09	1.29	18.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P3B	North Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
P4B	West Slip/Bypass Lane Crossing	53	69.3	LOS F	0.2	0.2	0.96	0.96
All Pedestrians		316	69.3	LOS F			0.96	0.96

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.

PHASING SUMMARY

Site: 101 [[Existing PM] Stoney Creek Rd x King Georges Rd]

Stoney Creek Rd x King Georges Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Site User-Given Cycle Time)

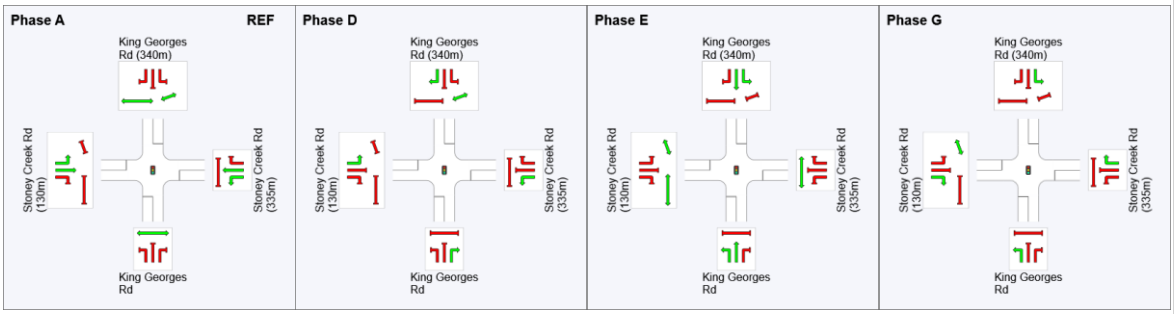
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: SCATS
Reference Phase: Phase A
Input Phase Sequence: A, D, E, G
Output Phase Sequence: A, D, E, G

PHASE TIMING SUMMARY

Phase	A	D	E	G
Phase Change Time (sec)	0	44	66	123
Green Time (sec)	38	16	51	21
Phase Time (sec)	44	22	57	27
Phase Split	29%	15%	38%	18%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

OUTPUT PHASE SEQUENCE



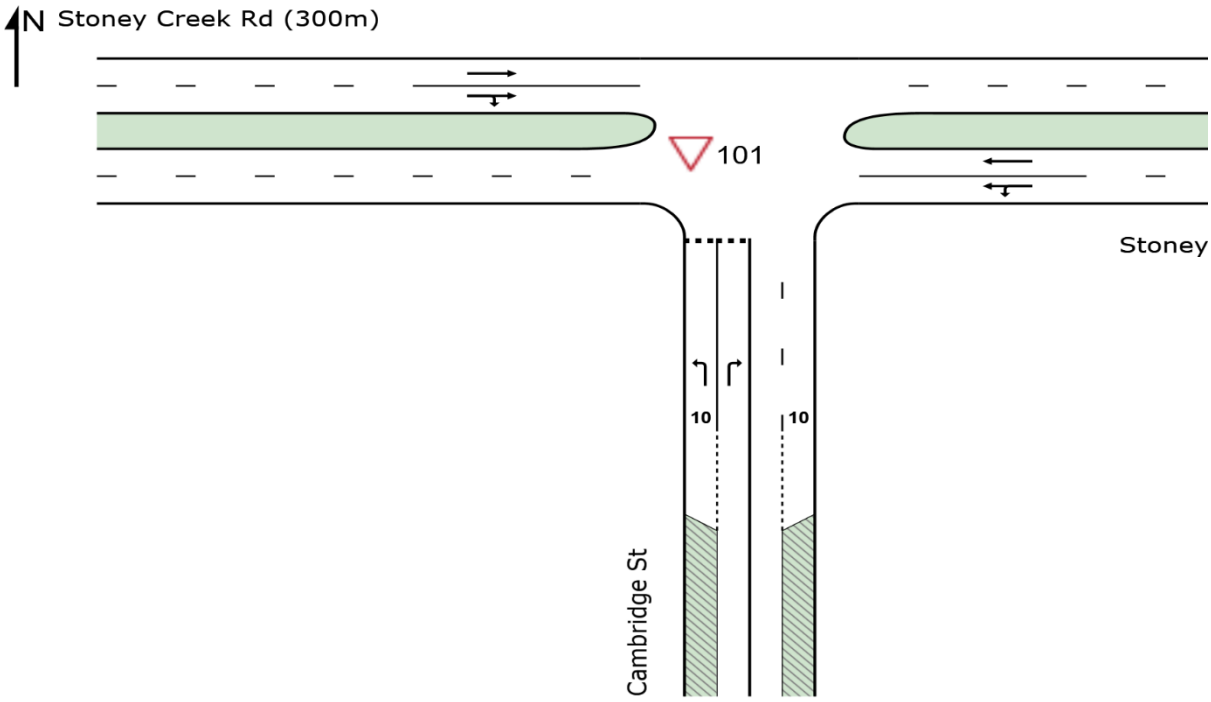
REF: Reference Phase
VAR: Variable Phase

- Normal Movement
- Slip/Bypass-Lane Movement
- Stopped Movement
- Other Movement Class (MC) Running
- Mixed Running & Stopped MCs
- Other Movement Class (MC) Stopped
- Permitted/Opposed
- Opposed Slip/Bypass-Lane
- Turn On Red
- Undetected Movement
- Continuous Movement
- Phase Transition Applied

SITE LAYOUT

Site: 101 [[Existing AM] Stoney Creek Rd x Cambridge St]

Stoney Creek Rd x Cambridge St
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 101 [[Existing AM] Stoney Creek Rd x Cambridge St]

Stoney Creek Rd x Cambridge St
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cambridge St												
1	L2	43	2.4	0.044	7.0	LOS A	0.2	1.3	0.38	0.60	0.38	52.3
3	R2	89	1.2	1.584	630.4	LOS F	26.0	183.7	1.00	2.28	6.66	3.3
Approach		133	1.6	1.584	427.6	LOS F	26.0	183.7	0.80	1.74	4.62	5.6
East: Stoney Creek Rd (130m)												
4	L2	23	4.5	0.187	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	56.6
5	T1	666	8.4	0.187	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		689	8.2	0.187	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.6
West: Stoney Creek Rd (300m)												
11	T1	1268	4.8	0.340	0.1	LOS A	0.2	1.1	0.01	0.00	0.01	59.8
12	R2	5	20.0	0.340	12.2	LOS A	0.2	1.1	0.02	0.00	0.03	57.1
Approach		1274	4.9	0.340	0.1	NA	0.2	1.1	0.01	0.00	0.01	59.8
All Vehicles		2096	5.8	1.584	27.2	NA	26.0	183.7	0.06	0.12	0.30	34.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [[Existing PM] Stoney Creek Rd x Cambridge St]

Stoney Creek Rd x Cambridge St
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

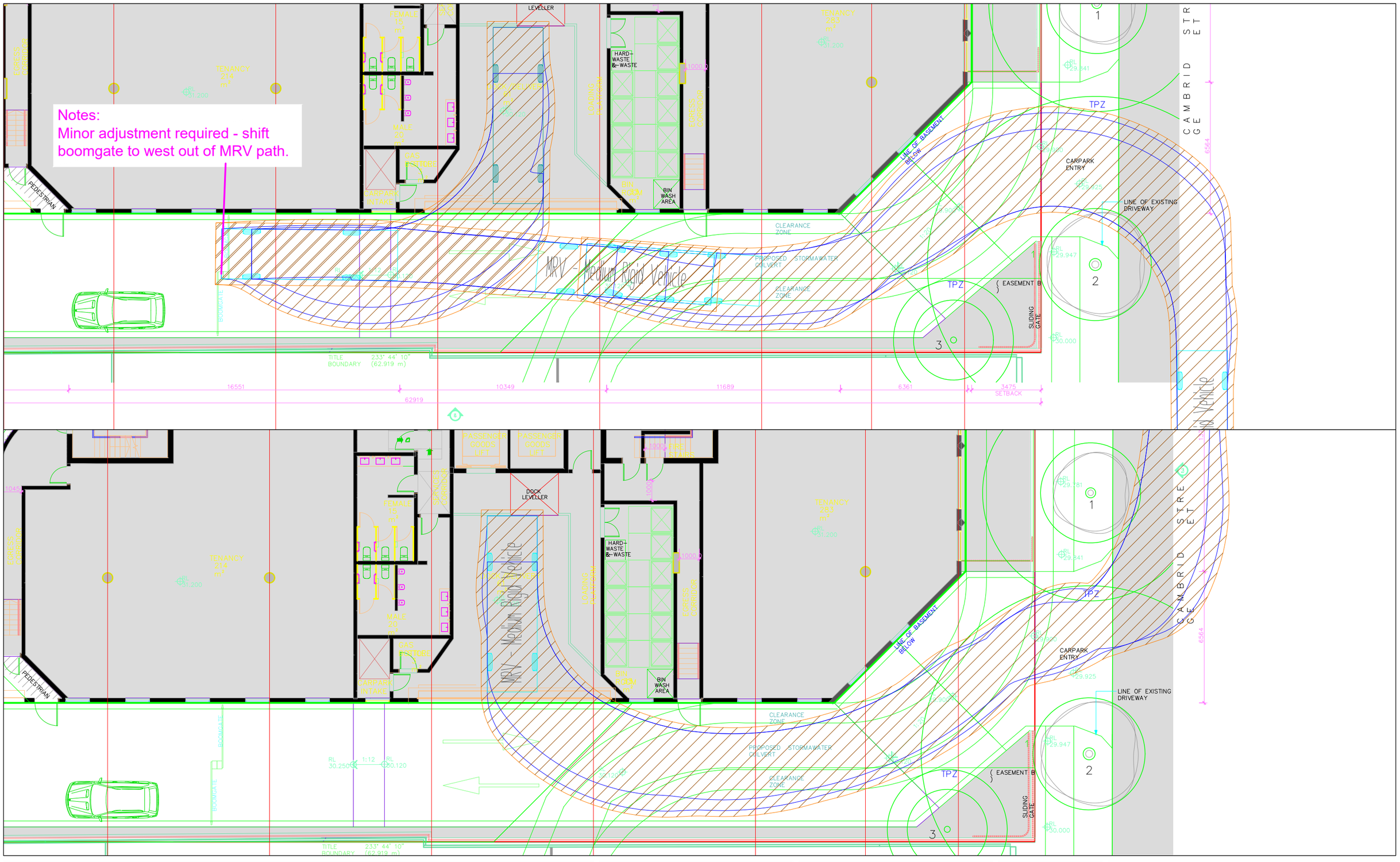
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Cambridge St												
1	L2	28	3.7	0.042	9.2	LOS A	0.2	1.2	0.54	0.71	0.54	50.8
3	R2	18	0.0	0.612	203.8	LOS F	1.8	12.6	0.99	1.04	1.22	9.5
Approach		46	2.3	0.612	84.4	LOS F	1.8	12.6	0.71	0.84	0.80	22.7
East: Stoney Creek Rd (130m)												
4	L2	54	0.0	0.363	5.5	LOS A	0.0	0.0	0.00	0.05	0.00	56.8
5	T1	1337	2.4	0.363	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.6
Approach		1391	2.3	0.363	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.5
West: Stoney Creek Rd (300m)												
11	T1	991	2.7	0.287	1.1	LOS A	1.1	8.0	0.08	0.01	0.10	57.8
12	R2	18	0.0	0.287	21.5	LOS B	1.1	8.0	0.19	0.03	0.23	55.5
Approach		1008	2.6	0.287	1.5	NA	1.1	8.0	0.09	0.01	0.10	57.8
All Vehicles		2445	2.5	0.612	2.3	NA	1.8	12.6	0.05	0.03	0.06	56.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix B

Design Review and Swept Path Analysis

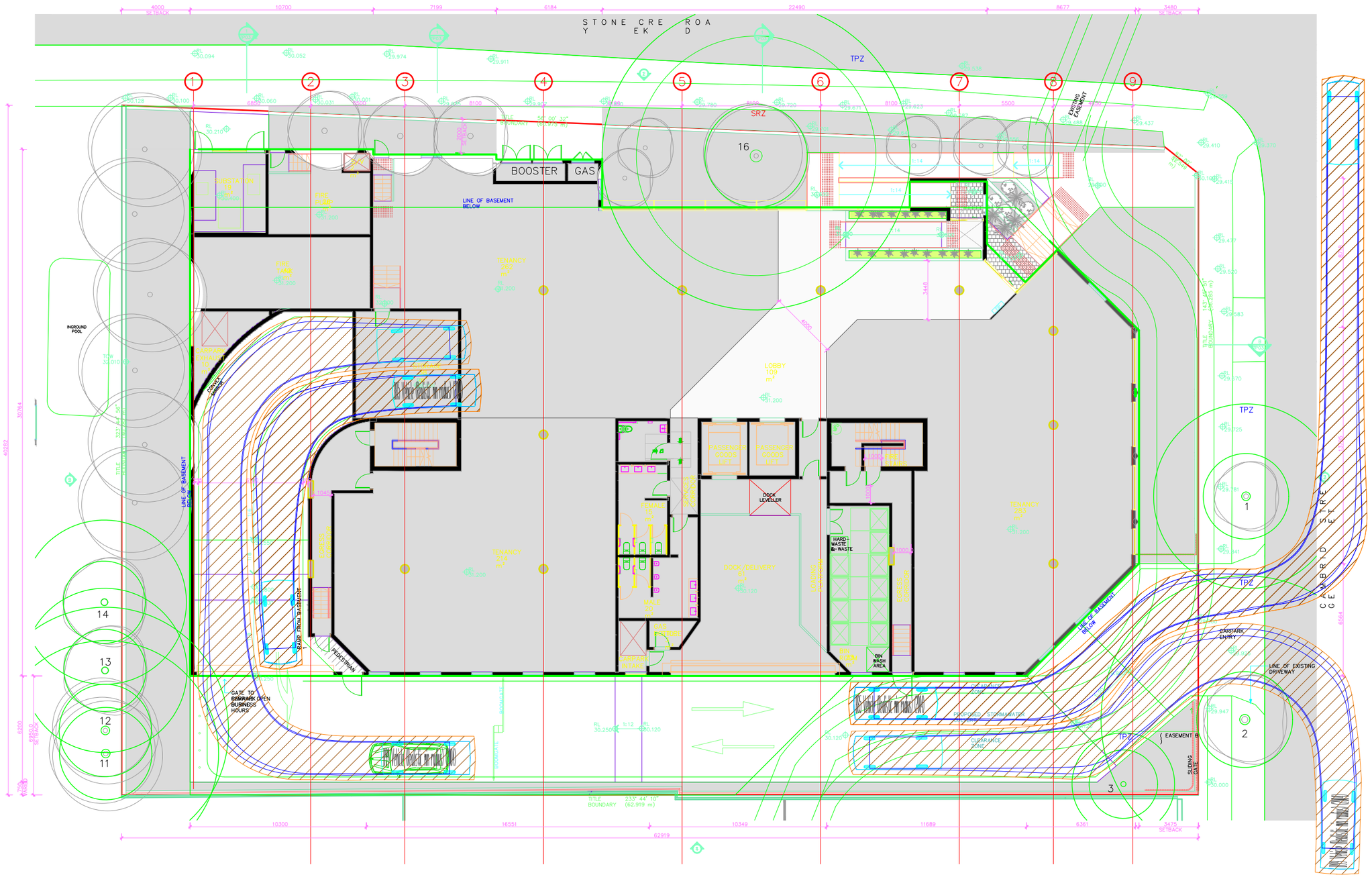
Notes:
Minor adjustment required - shift boomgate to west out of MRV path.



Revision notes:		
Rev:	Date:	Notes:

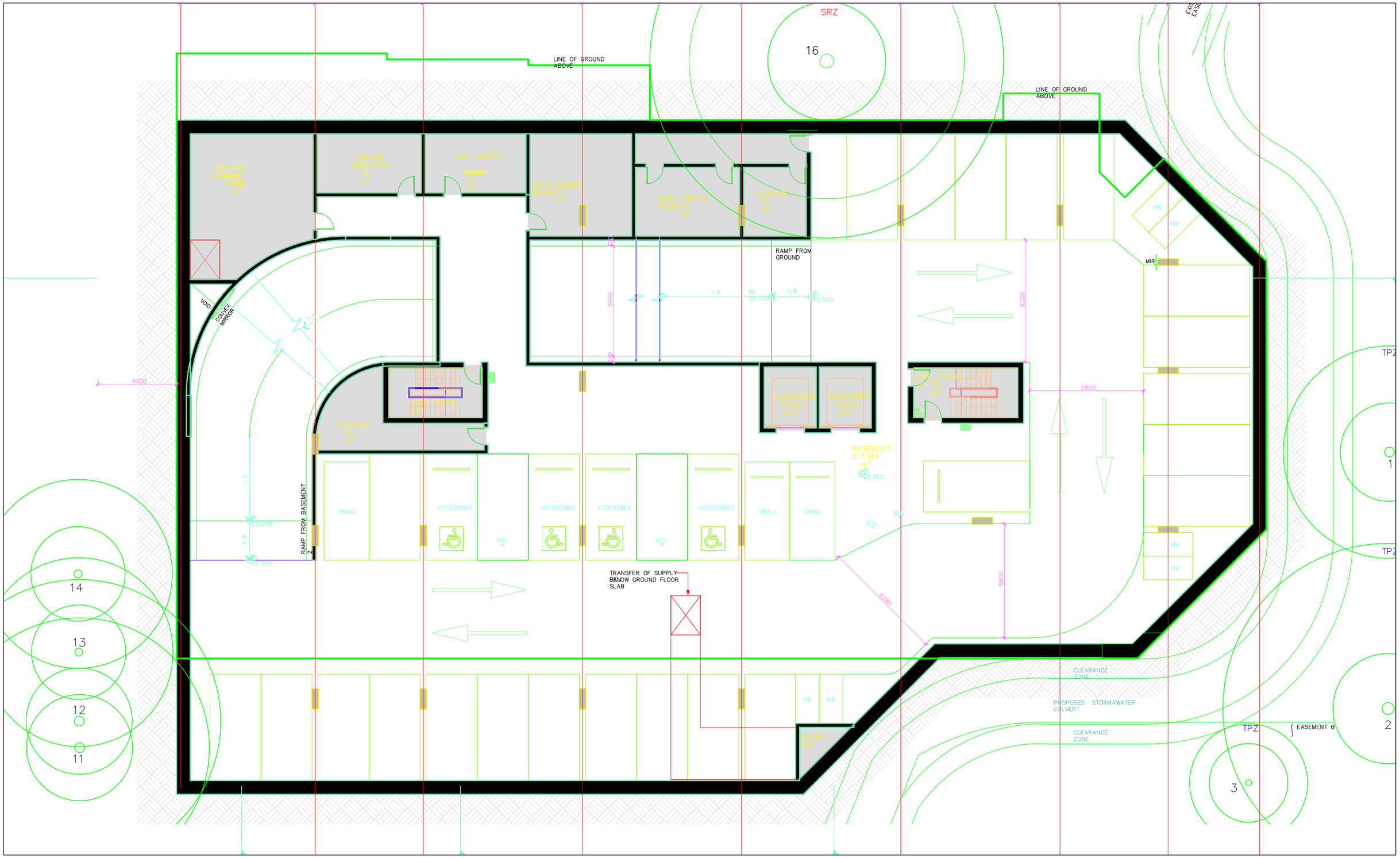
Drawn By:	M TANGONAN
Client:	-
Project:	P0780 143a Stoney Creek Rd, Beverley Hills
Drawing Title:	Commercial vehicle access and loading dock Medium Rigid Vehicle (MRV)
Date:	26-May-20
Scale @ A3:	NTS
Drawing Number:	AG00

asongroup
Suite 5.02, Level 5, 1 Castlereagh Street
Sydney NSW 2000
info@asongroup.com.au



Revision notes:		
Rev:	Date:	Notes:

Drawn By: M TANGONAN	Project: P0780 143a Stoney Creek Rd, Beverley Hills	Date: 26-May-20	asongroup	
Client: -	Drawing Title: Ramp Movements B85 & B99 Private Vehicles	Scale @ A3: NTS	Drawing Number: AG01	Suite 5.02, Level 5, 1 Castlereagh Street Sydney NSW 2000 info@asongroup.com.au



Revision notes:

Rev:	Date:	Notes:

Drawn By:
M TANGONAN

Client:
-

Project:
P0780
143a Stoney Creek Rd, Beverley Hills

Drawing Title:
Basement 1

Date:
26-May-20

Scale @ A3:
NTS

Drawing Number:
AG02

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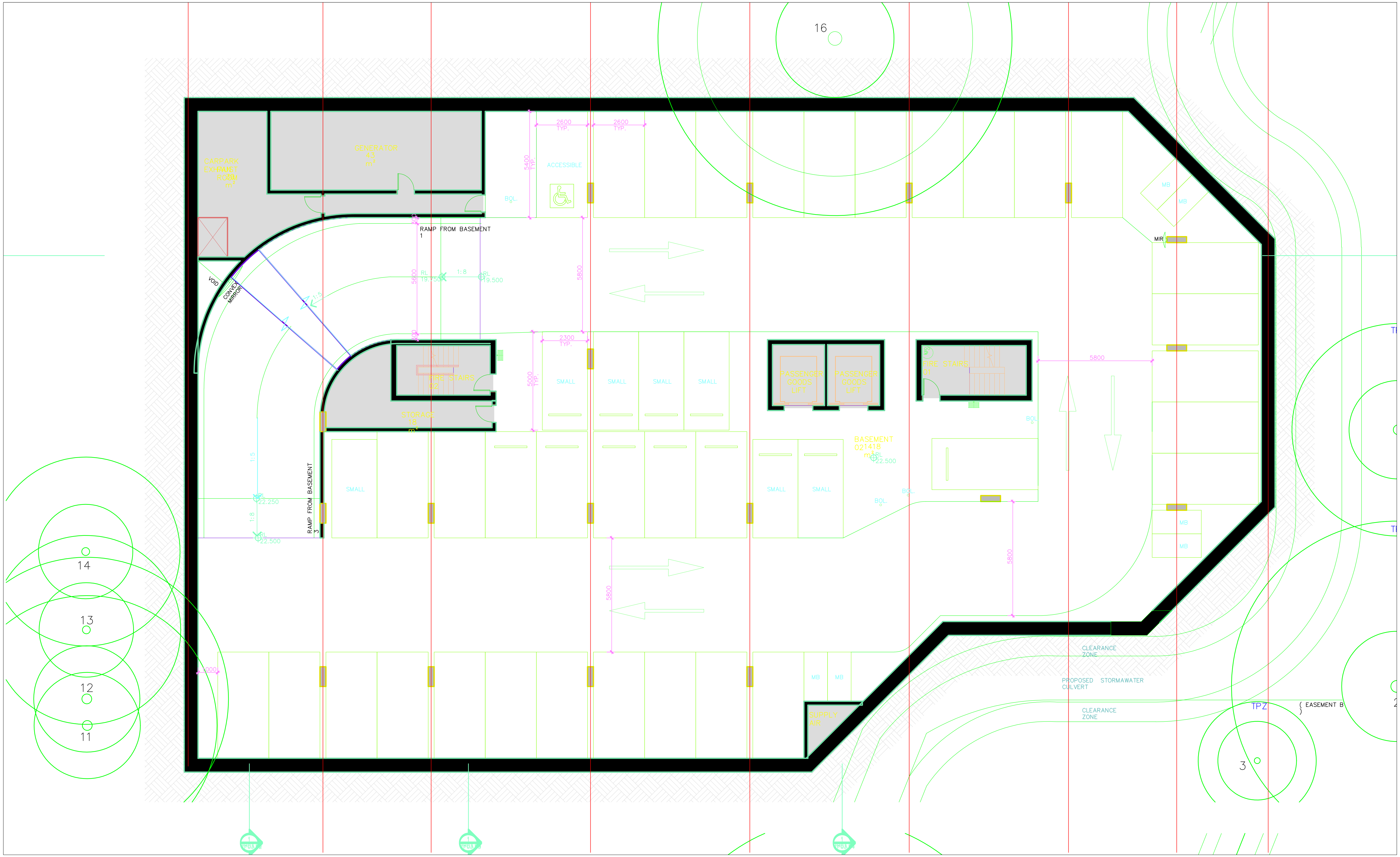

Revision notes:

Rev:	Date:	Notes:

Drawn By: M TANGONAN

Client: -

Project: P0780
143a Stoney Creek Rd, Beverley Hills

Drawing Title: Basement 2

Date: 26-May-20

Scale @ A3: NTS

Drawing Number: AG03

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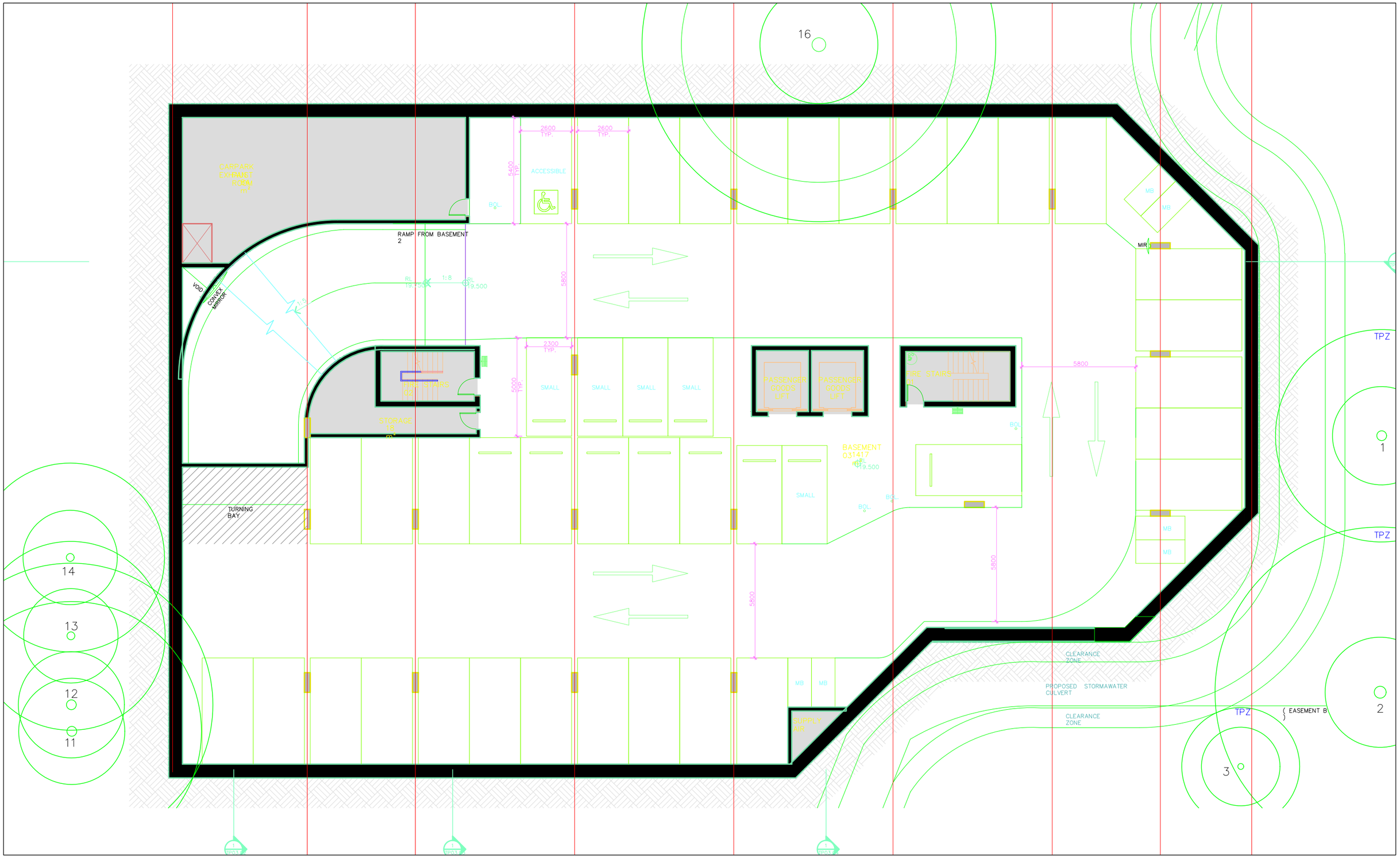

Revision notes:

Rev:	Date:	Notes:

Drawn By:
M TANGONAN

Client:
-

Project:
P0780
143a Stoney Creek Rd, Beverley Hills

Drawing Title:
Basement 3

Date:
26-May-20

Scale @ A3:
NTS

Drawing Number:
AG04

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