Imagescape Design Studio
Attention: Stephen Philips

Sent via email: stephen@imagescape.com.au

29 March 2021

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Dear Stephen,

RE : EXPANSION OF PRESIDENT HOSPITAL – ASSESSMENT OF REQUIREMENT FOR A SLIP LANE AT PRESIDENT AVENUE ENTRY TO THE STAFF CARPARK AND PROVISION OF SEPARATE EXIT DRIVEWAY AT PRESIDENT AVENUE, KIRRAWEE

1.0 BACKGROUND AND SCOPE

Greys Consulting was engaged by Imagescape Design Studio to undertake an assessment of requirement for a slip lane at the President Avenue proposed access driveway and a separate exit to President Avenue driveway amid proposed expansion of President Hospital involving addition of an access/egress to staff carpark at President Avenue.

The following documents were used as reference to determine requirement of a slip lane treatment and separate exit at abovementioned location:

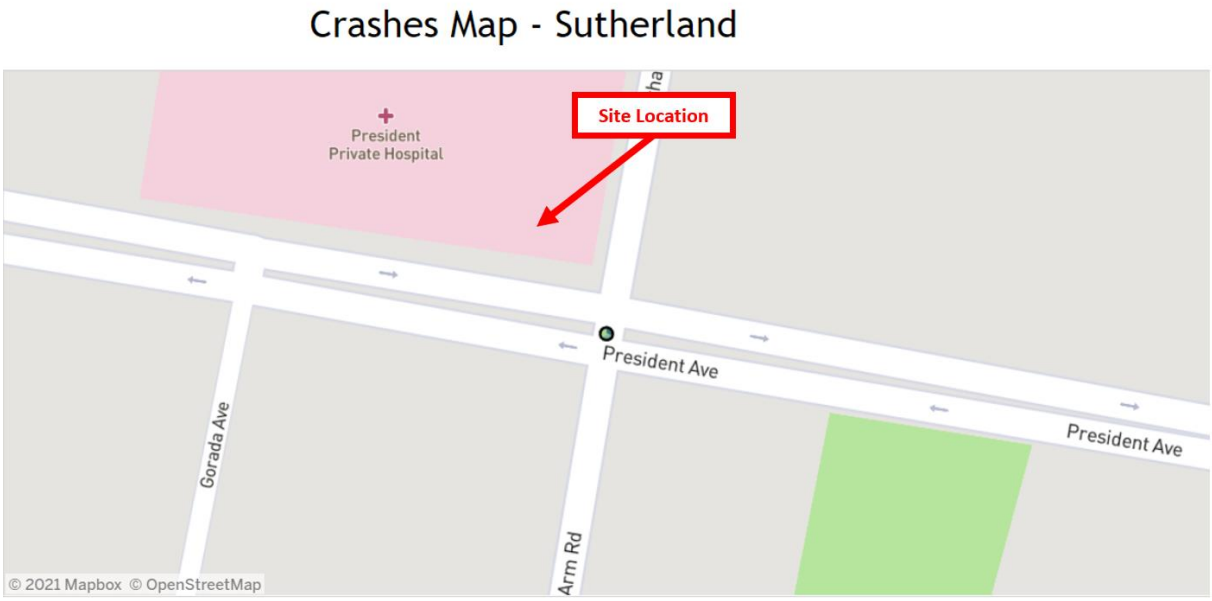
- Car parking and driveway certification prepared by ML Traffic
- Traffic and Parking Impact Assessment report prepared by ML Traffic
- A set of architectural drawings by Imagescape Design Studio

This letter will assess the proposed access driveway in terms of historical crash assessment and potential relevance with the driveway and availability of safe gaps for entering and exiting the driveway during AM and PM peak hours. In addition, the warrants of providing a slip lane again intersection functional area have been assessed separately to determine if the proposed driveway would trigger requirement for providing a slip lane turn treatment. Background Crash Assessment

A crash investigation at President Avenue based on available crash data between 2015 and 2019 revealed that no rear end crash pattern exists at the eastbound approach of President Avenue/Hotham Road intersection. There has been one crash with serious injury back in 2017 with Right-Through RUM Code which is irrelevant the proposed driveway. In general assessment of crash data did not reveal any evidence that the proposed driveway would exacerbate or cause a rear-end or left-through crash pattern at western approach of President Avenue/Hotham Road intersection

Figure 1 overleaf summarises the 5-year crash investigation results.

Figure 1: Crash History at the Intersection of President Avenue/Hotham Road



Repo..	Crash ID	Degree of crash	RUM - code	RUM - description	Type of location	Natural lighting	Longitude	Lattitude	No Killed	No Injured
2016	1107248	Non-casualty (t..	21	Right through	X-intersection	Dawn	151.079865	-34.037071	-	-
	1118017	Moderate Injury	11	Right far	T-junction	Daylight	151.079865	-34.037071	-	1
2017	1158876	Serious Injury	21	Right through	X-intersection	Darkness	151.079865	-34.037071	-	3

2.0 FUNCTIONAL AREA AND SIGHT DISTANCE ASSESSMENT

The functional area of an intersection is the area beyond the physical intersection of two facilities that comprises decision and manoeuvre distance, plus any required vehicle storage length, and can be protected through corner clearance standards and connection spacing standards. The upstream functional area is that length over which vehicles on the through road are manoeuvring to execute a right or left-turn at the intersecting road. This length is the greater of the distance required for the right or left-hand turn, including storage or the queue length. The downstream distance is that required for a driver to avoid a collision with a vehicle entering the road from an access connection.

Upstream dimensions (Figure 2)

d1 – distance travelled during perception-reaction time of driver.

d2 – distance travelled while driver manoeuvres laterally and decelerates to a stop (lateral movement of 1.2 m/sec in urban areas; 0.9 m/sec in rural areas).

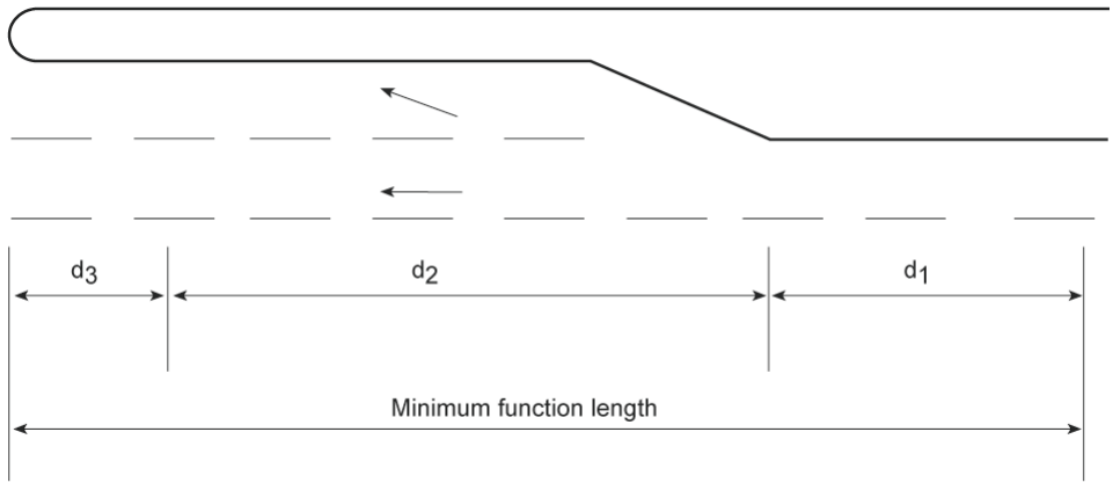
d3 – length required to store turning vehicles.

For urban areas, d1+d2 is in the order of 70m for 50kmh speed zones which would be applicable in this case. The storage (d3) based on 3.4 cars (according to SIDRA results during PM peak) is 20m. Hence Upstream Functional Area of the President Avenue West approach is about 90m.

The proposed driveway entrance is located 80m west of the signalised intersection at President Avenue. While this is an acceptable location for the proposed driveway, it would be desirable to relocate the entrance driveway 10m to the west. This would reduce pedestrian interaction with entering vehicles significantly as well.

The sightline of the driveway has been checked in ML Traffic compliance letter and the future sight distance is deemed compliant with AS2890.1 requirements.

Figure 2: Upstream functional intersection area (based on right-turning vehicles)



3.0 INTERSECTION BLOCKAGE PROBABILITY

The trip generation of the proposed driveway has been adopted from ML Traffic report. It is forecast that 30 and 5 vehicles would access the staff carpark during the AM and PM peak hours, respectively. The maximum queue length during AM and PM peak hours is in the order of 220m along President Avenue western approach. It is concluded that driveway would be blocked (by the queueing vehicles) during the AM and PM peak hours and access/egress would occur within a very low speed environment where drivers' cooperation is maximum. Hence, proposed location of driveway is deemed to be far enough from the intersection in terms of access and egress speed.

On the other hand, the intersection has an arrival rate is projected to be maximum 30vph during the AM peak. This equals 1 vehicle every two (2) minutes during the AM peak. This arrival rate has inconsequential impact on the performance of the intersection. The maximum egressing figure is forecast to occur during the PM peak with 20 exiting vph. This equals 1 vehicle every three (3) minutes during the PM peak. Given the modelled queue length (220m) of the intersection at this approach during the PM peak, drivers are expected to enter President Avenue safely at a very low speed environment. There is enough internal queueing space to accommodate this flow.

4.0 REQUIREMENT FOR SEPARATION OF ENTRY/EXIT DRIVEWAYS

Due to reverse relationship between the accessing and egressing vehicles during the peak hours, significant conflict between the incoming and outgoing vehicles during the peak hours would be improbable. Hence separation of the entry and exit driveways is deemed unnecessary. The swept path of a B85 and a B99 passing each other at the proposed driveway has been checked to ensure sufficient clearance between entering and exiting vehicles at the same time. The swept path diagram and associated manoeuvres were completed successfully with no conflicts. The swept path plan is included in **Appendix A** of this letter.

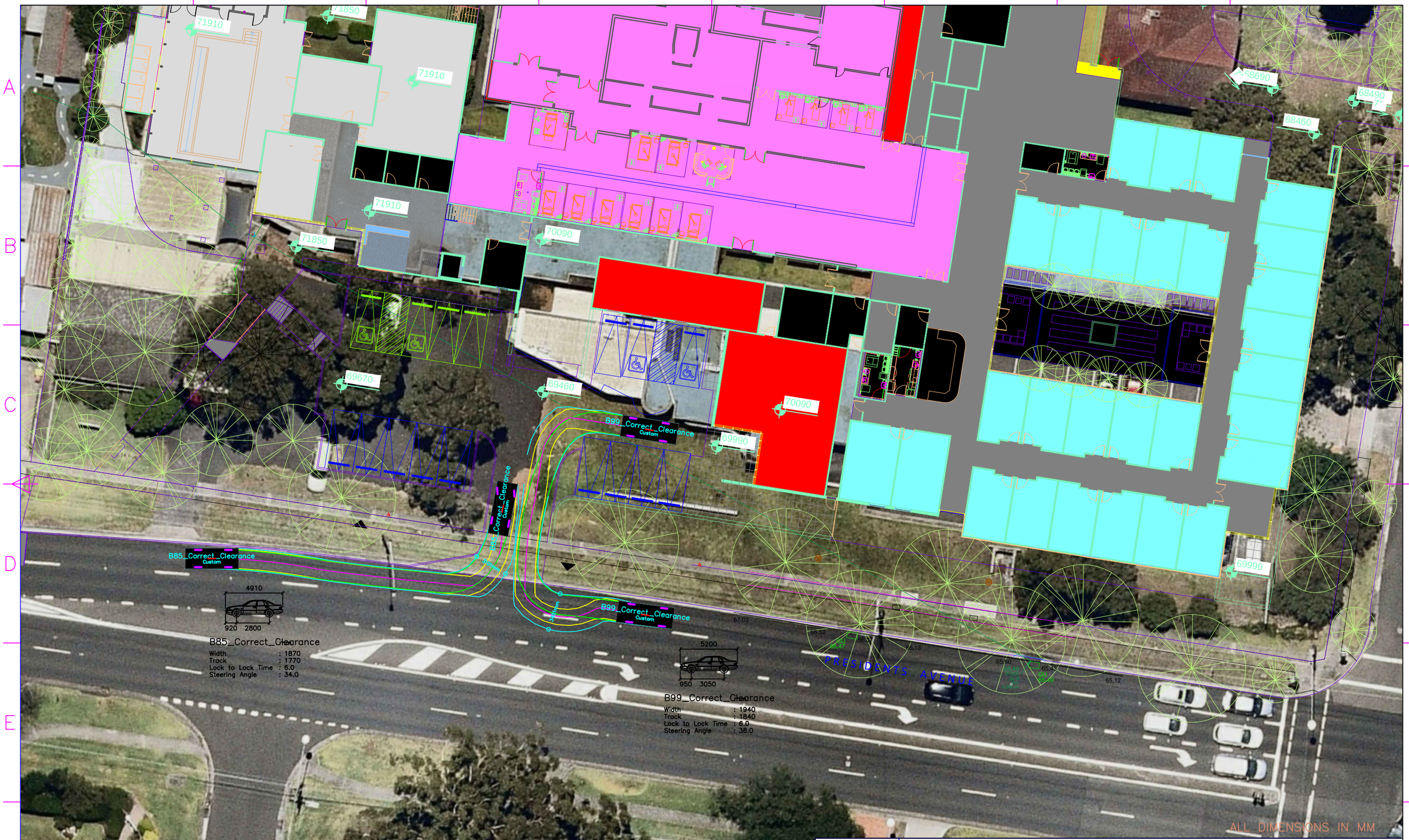
5.0 SUMMARY AND CONCLUSION

In summary, the proposed driveway facilities satisfy the relevant requirements specified in Australian Standards and Austroads and have no negative parking implications. Therefore, it is concluded the proposed driveway will not have any unacceptable risks to pedestrians and motor vehicles accessing/egressing the premises.

Alex Giyahi
FIEAust, CPEng, NER, RPEQ
Principal Traffic Engineer
GREYS CONSULTING

ATTACHMENT 1

DESIGN PLAN & SWEPT PATH DIAGRAMS



Ref. #	P/N:P1924 President Hospital Driveway Assessment Swept Path				
Designed by AG	Checked by AG	Approved by – date 29/03/2021	File name SWEPT_PATH_PLANS	Date 29/03/2021	Scale 1:100

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DRAWING:B85–PASSING.B99

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