CSELR EIS Submission

1 Introduction

This Submission to the EIS for the CBD and South East Light Rail project draws out a number of capacity risks that lead this writer to question the adequacy of the project as it is presently proposed.

2 Background

The CSELR is intended to provide a more orderly and higher capacity public transport service along George Street in the Sydney CBD and to both Kingsford and Randwick in the south eastern suburbs where major bus interchange facilities are to be provided.

The key enabling factor for these benefits is the use of high capacity (each equivalent to five rigid buses) Light Rail Vehicles (LRVs) along only two separate routes so that vehicle bunching, boarding scrambles and unacceptable traffic conflicts can generally be avoided. An on-time reliability of 97% is claimed in the EIS, compared with present bus performance in the range 19-34%, along with an improved ambience for George Street. The EIS notes (quote) traffic analysis demonstrates that the CSELR project can be introduced into the road network without significant detrimental impact to general traffic and buses.

Each 45m LRV is specified to carry 300 passengers, 80 seated and 220 standing, and the system capacity is put at 9,000 passengers per hour per direction. This implies 30 LRVs per hour and thus an average interval between them of 2.0 minutes, although intervals of 2.5-3.0 minutes north of Alison Road junction are proposed initially.

3 Service Capacity

Technical Paper 1 – Traffic Operations – 3.2 – Future Demand provides some information on the anticipated 2021 line load for each section of track, with AM peak inbound from Carlton Street on the Kingsford branch being closest to capacity. Here the initial service of one LRV every six minutes (3,000 passengers per hour) will only just be able to carry the anticipated load of 2,968 passengers per hour. There are two areas of capacity risk to be considered here.

Firstly, the demand is likely to be somewhat lumpy and operating so close to full capacity implies a degree of smoothing such that some passengers will not be able to board the first vehicle that arrives. This will be perceived by passengers as a deterioration in the 97% on time target, even if the target is still met by vehicles. Secondly, all seats (only 800 per hour) will be filled at the termini (both Kingsford and Randwick) and many passengers will need to stand for long periods in increasingly crowded conditions, noting also that the five rigid bus equivalent of each LRV would have provided many more seats with most of them forward facing. A shorter initial interval of five minutes between vehicles on each branch, achieving less crowding and higher first-vehicle boarding rates, is more likely to be acceptable.

Section 3.2 notes that AM peak boardings (both directions) are expected to grow from 18,000 in 2021 to 23,000 in 2036. If this increase of 28% is applied to the AM peak inbound from Carlton Street, the line load would rise to 3,792. However capacity with the proposed five minute interval would be only 3,600 passengers per hour. Although the line load may be a little less, through greater growth on the Randwick branch or in the outbound direction, similar comments to the previous paragraph would still apply leading to the need to provide LRVs at four minute intervals on each branch at this time for the service to be acceptable.

The 2021 situation would be eased a little if Carlton Street could be served by the Randwick branch as the highest line load of 3,000 per hour would then be reached inbound from Todman Avenue in about 2024. Other benefits from this change are explained later.

4 Data Inconsistency

In preparing the Service Capacity section above, this writer noted some inconsistencies in the patronage data contained in 3.2 – Future Demand. Figure 3-11 shows AM peak CSELR boardings of 2,198 for Kingsford and 1,732 for Randwick (necessarily all inbound), whereas Figure 3-12 shows only 1,454 departing Kingsford and 826 departing Randwick. Further, the next step up in inbound line load in Figure 3-12 is greater than the both-way boarding shown in Figure 3-11. This writer has been unable to reverse-engineer a simple explanation for these differences, which are accordingly suggestive of data adjustment (understatement?), and are in contrast to other explainable errors noted; Figure 3-11 boardings for Surry Hills (should be swapped with Central Station) and the 2036 date on Figure 3-13 (should be 2021). Any understatement would constitute a capacity risk for the CSELR project.

5 Event Capacity

3.3 – Special Events provides some information on the proposed capacity for special events at Moore Park. A key issue is the need to balance the cost of additional occasional use facilities against community expectations of a service that is better than buses can provide, noting also that the high numbers presently walking to Central are expected to be reduced by a better service.

The numbers presented in Figure 3-17 and the accompanying text on Page 121 appear to be inconsistent, in that a demand for 17,720 passengers could not be cleared in 55 minutes with a both direction capacity of 14,175 passengers/hour. This suggests that a 2.0 minute interval service (30 LRVs per hour to achieve around 18,000 passengers/hour) would be the minimum acceptable. As well as even less walking, future developments, such as the north west and cross harbour rail links that could lead to bus numbers being reduced, and trends towards less car use to address economic and environmental concerns, indicate that service intervals of less than 2.0 minutes may be needed for the CSELR in due course.

The proposed track arrangements appear to be adequate to support a 2.5 minute interval service using a mix of regular and event special LRVs, but have not been shown to be enough for shorter intervals. As well as track arrangements and traffic conflicts, bulk boarding and unloading delays of event specials at platforms with Opal tap facilities may also need to be addressed for shorter intervals to be achieved.

6 Interval Risk

The more complete quotation from the EIS on integration (Page 10 of Technical Report 1) is as follows:

> By the year 2021 traffic volumes in the study area are forecast to grow by 7% without the implementation of light rail. As a result of this growth on the network average vehicle speeds would likely reduce by approximately 10% from current levels.
>
> Implementation of light rail is forecast to reduce this level of traffic growth by 1% as a result of the positive effect it has on public transport mode share. Whilst the reallocation of road space from general traffic to light rail reduces traffic capacity on the corridor modelling indicates it does not significantly impact functionality of the wider network.
>
> Broadly speaking the traffic analysis demonstrates that the CSELR project can be introduced into the road network without significant detrimental impact to general traffic and buses. A number of key intersections have been identified where further design and optimisation work is underway, to provide increased capacity

Clearly it is reasonable to assume that the "no significant impact" conclusion applies to 2021 conditions with the assumed 3.0 minute regular, and 2.5 minute event special, interval services. However, the previous discussion suggests that shorter intervals will be needed earlier, and intervals below the present 2.0 minute interval design capacity could be needed at some time in the future. Without evidence of the necessary modelling and consequent recommendations for changes to the road network and/or the CSELR to achieve these shorter intervals along with acceptable traffic conditions and George Street ambience, the EIS leaves unanswered the issue of an interval risk to the adequacy of the CSELR capacity.

7 Addressing the Risk

The above has drawn out a number of capacity risks to the CSELR which collectively show that more design work should be undertaken and presented to the community. The surprisingly high BCR advised for the CSELR project is consistent with the project capacity becoming inadequate soon after implementation and is consistent with a view that more work would be economically justified.

The key capacity concern is with the spine from the Alison Road junction to Central Station. Possible enhancements include more grade separation, loops at various locations such as Randwick Racecourse, Moore Park and Central Station, and better facilities for corralling and boarding/unloading special event passengers.

At least some enhancement work on the spine may be avoidable if services can be dispersed onto a more extensive light rail network. For example, the former south eastern suburbs tramway network was split between Railway and Circular Quay for both regular and special event services, whereas the currently proposed CSELR combines them. Annex A explores what using an additional 2.5km branch to Green Square could achieve.

8 Conclusion

A combination of shorter initial service intervals, an earlier need for the specified 2.0 minute interval capacity to be implemented and the lack of any ability to improve on this capacity limitation leave the EIS reader with a strong impression of questionable adequacy. Accordingly the otherwise commendable CSELR concept risks being only a short term solution without detailed consideration and presentation being made on how these internal (LR operations) and external (pedestrian/ traffic conditions and street ambience) capacity issues can be addressed.

Peter Mills
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Annex A – A Green Square Branch

The CSELR EIS in Section 3.1.2.6 of Technical Paper 1 makes reference to developments at Green Square, and notes the availability of rail. However, this is a radial connection with the Sydney CBD to the north. An east west connection between Green Square and the CSELR near Kensington would improve public transport access to POWH/UNSW from a broad area of south and south western Sydney by bypassing a less direct route via Central Station. As well as contributing to the formation of a grid network that can more effectively cater for a wider range of public transport journeys than is possible with a predominantly radial network, this link could also ease some of the specific CSELR capacity risks noted in the main text of this submission.

With respect to special events, the access to Green Square would allow the onward rail component of event clearance to occur in both directions from Moore Park and potentially Randwick Racecourse. In practice, demand for services to Green Square would likely be less than for services to Central Station, such that the overall capacity benefit may be around 50%; still enough to ease the service interval pressure on the CSELR for event traffic. A clearance capacity example based on a 2.0 minute service interval (30 LRVs per hour) and only 50% event services towards Green Square (the other empty 50% from Central Station being turned back at the special event point) is shown below:

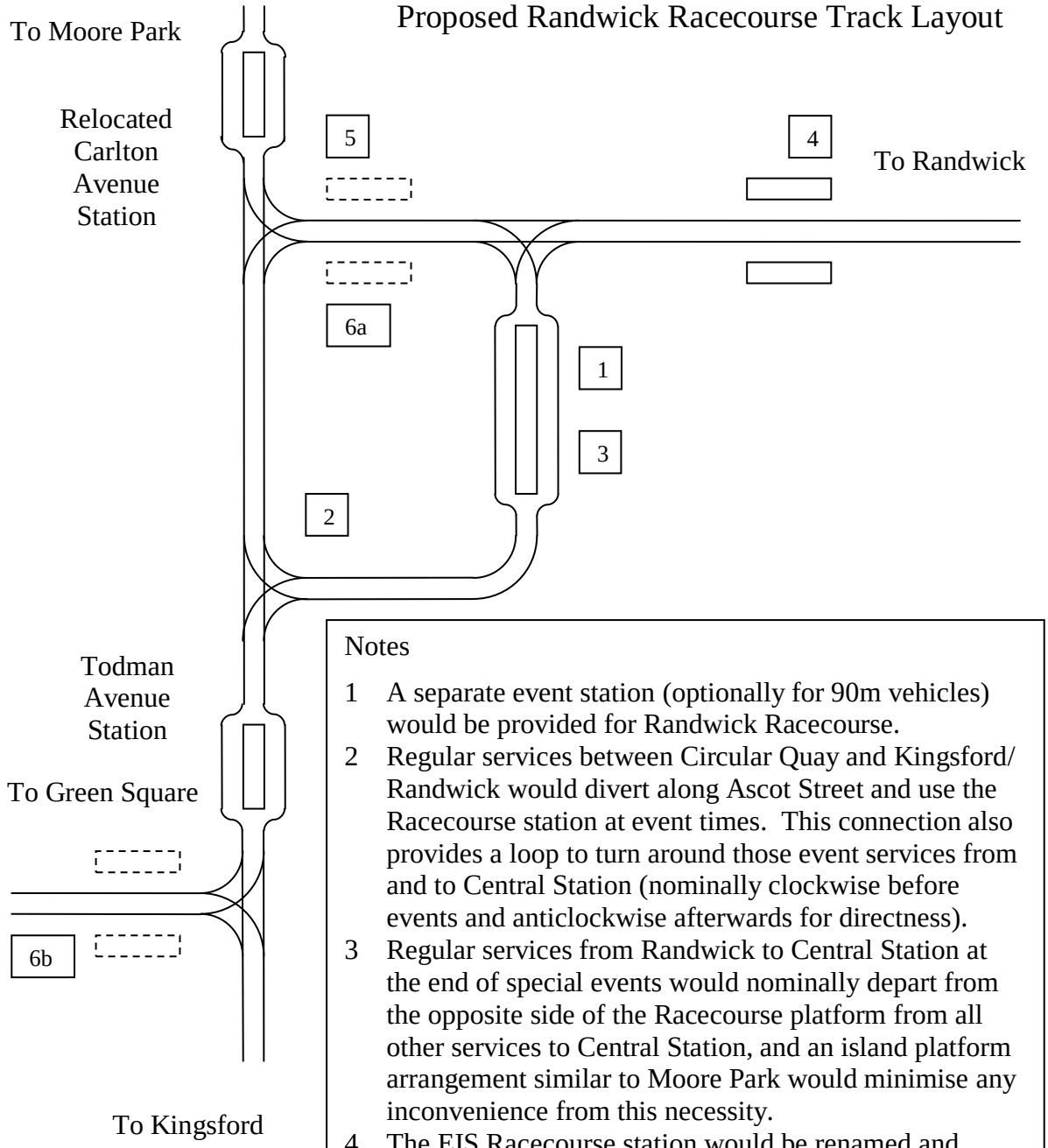
LRVs per hour	LRV capacity	Capacity per hour
12 regular northbound	300	3,600
12 regular southbound	300	3,600
18 event northbound	600	10,800
9 event southbound	600	5,400
		Total 23,400

On a similar basis, 18,000 passengers per hour could be achieved with a 2.5 minute interval service, whereas a 2.0 minute interval would be required to provide the same capacity if all the onward rail component of event clearance is via Central Station.

There is also some prospect for the Green Square link to relieve peak period capacity on the CSELR by providing an alternative path for those connecting to rail to complete their journey. This prospect would be improved if the Airport rail service is to be boosted to improve patronage, with an ideal combination of single deck trains and a direct service to the north side via a new harbour rail crossing offering the most. Regular services from Kingsford and Randwick to Green Square may need to either be less frequent (but with the same minimum frequency) than to the Sydney CBD or make use of shorter vehicles.

Some changes to the track layout around Randwick Racecourse and Carlton Street would be needed if the above Moore Park special event service improvements are also to be applied at Randwick Racecourse. A functional layout, showing a separate event station for Randwick Racecourse to be served by all event and regular services to and from Central Station, is presented on the next two pages. Along with the many benefits, a single grade separated crossing of Alison Road, rather than the two at grade crossings presently envisaged, would be required. The tracks through the special event station could be used for depot purposes at other times. Note that these changes around Randwick Racecourse, and many of the corresponding benefits, can be achieved without/before implementation of the link to Green Square.

Proposed Randwick Racecourse Track Layout



Notes

1 A separate event station (optionally for 90m vehicles) would be provided for Randwick Racecourse.

2 Regular services between Circular Quay and Kingsford/ Randwick would divert along Ascot Street and use the Racecourse station at event times. This connection also provides a loop to turn around those event services from and to Central Station (nominally clockwise before events and anticlockwise afterwards for directness).

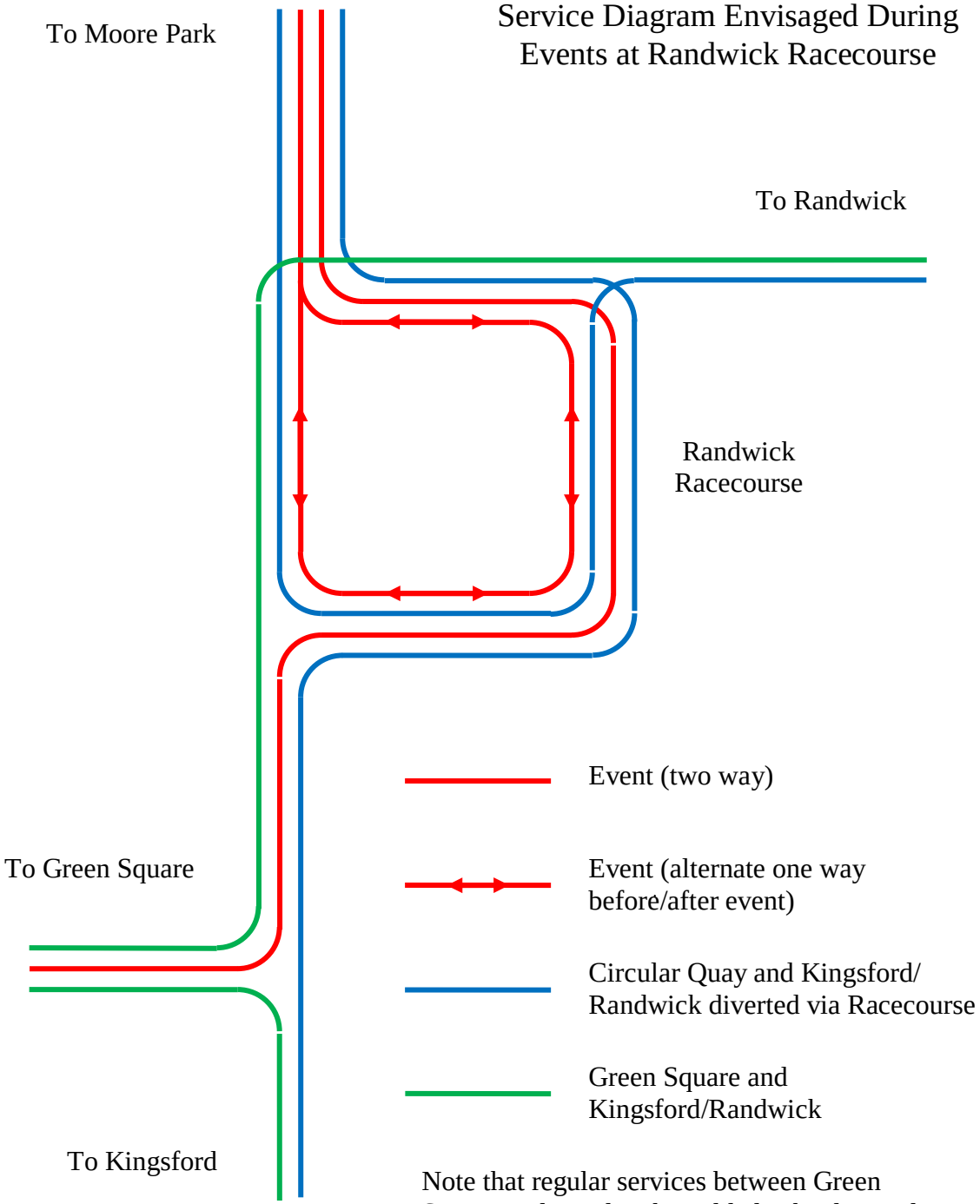
3 Regular services from Randwick to Central Station at the end of special events would nominally depart from the opposite side of the Racecourse platform from all other services to Central Station, and an island platform arrangement similar to Moore Park would minimise any inconvenience from this necessity.

4 The EIS Racecourse station would be renamed and moved east to Darley Road for a better catchment.

5 The Randwick branch would be relocated along Abbotford Street to meet the Kingsford Branch near Carlton Street, and this station would be relocated just north of the Abbotford Street connection with Anzac Parade to avoid being bypassed during events at Randwick Racecourse. This would also allow Randwick - Circular Quay services to serve Carlton Street and provision of a south facing connection so that Randwick - Green Square services can avoid the Racecourse.

6 Auxiliary platforms for Green Square services only; 6a - Randwick and 6b - Kingsford.

Service Diagram Envisaged During Events at Randwick Racecourse



Note that regular services between Green Square and Randwick could also be diverted to serve Randwick Racecourse if the looped event services were to alternate direction during each before and after event period