
To: Cambridgeshire and Peterborough Combined Authority &
Greater Cambridge Partnership

Author: Edward Leigh

Subject: Combined Authority agenda item 2.1 on
Greater Cambridge Mass Transit Options Assessment Report

Contact: 01223 312 377 / edward@smartertransport.uk / [@SmarterCam](https://www.facebook.com/SmarterCam)

We offer the following observations and recommendations regarding the Steer Davies Gleave (SDG) report on mass transit options.

This is an exciting and historic first step on a journey to build infrastructure that should serve Cambridge and the surrounding region for at least the next hundred years. It is a legacy we are preparing, not simply a fix for today's problems. More important than aspiring to be a 'city of firsts' is to create a legacy that future generations will thank us for – just as we thank the Victorians for building our railways, public water supplies and sewers.

Recommendations

We recommend to the Combined Authority Board that it reject the SDG report as not meeting the written brief, and require SDG to submit a revised report that does.

We offer the following suggestions as additional guidance for what the Board should seek in the revised report:

1. A like-for-like comparison of all potentially viable permutations of infrastructure and vehicle technology, each optimised to achieve the best possible ratings on evaluation criteria.
2. Analysis of existing mass transit systems in city regions comparable to Cambridge: their patronage, effectiveness at relieving congestion, coverage, frequency of service, hours of operation, fares, reliability, longevity, level of subsidy or profit, etc. For those systems that are (nearly) profitable, what salient characteristics make them successful?
3. Analysis of different network models. There is an assumption in this report (not contained in the brief) that the requirement to interchange should be minimised. There is a well-supported contrary view that a network that offers lots of opportunities to interchange relatively painlessly can serve more destinations with

more frequent services with greater resilience (i.e. with more route options). The London Tube and bus network is an example of this.

4. Greater consideration given to trips for education (primary and secondary schools, and tertiary colleges), leisure (including shopping), health (hospital outpatient appointments and visitors) and tourism.
5. Evaluation of environmental and heritage criteria for each shortlisted option.
6. Greater clarity about what the CAM proposal is, in particular what kinds of ordinary roads (if any) it will be expected to run on.

We further recommend to the Board that it not consider proceeding to commissioning a Strategic Outline Business Case of CAM (or any other mass transit option) until SDG has provided a report that meets the original brief, and all relevant stakeholders have had a reasonable period of time to digest its content and feed back to the Board.

Governance

1. That such a crucial report was not published until after the deadline for public questions is wholly inappropriate, and in breach of the government's guide to [Open and accountable local government](#).
2. The agenda and venue details were published a day late, also in breach of government guidance: *"The agenda must be published with any background papers. No item can be considered if the item is not available for inspection by the public with 5 clear [working] days' notice."*

Quality

1. The report has not followed the brief. For instance, SDG have evaluated specific conceptual schemes, such as Cambridge Connect and AVRT, rather than evaluating mass transit technologies on a like-for-like basis.
2. The report does little more than collate information that is already in the public domain. It lacks the detail, depth and critical analysis we should expect from a consultancy of SDG's standing, working to a substantial budget.
3. The budget for this report was £150,000. In our view, if the report cost anything close to that figure, it represents extraordinarily poor value for money.

Specific observations

1. The Proposed Mass Transit Network Schematic (Fig 1 & 4.1) omits an important growth area around Cherry Hinton: Peterhouse Technology Park (home to ARM),

- Capital Park, Fulbourn Hospital, and new housing next to Fulbourn Hospital and north of Cherry Hinton.
2. There is no consideration of trips generated by schools, even though it is recognised that these contribute significantly to road traffic and congestion.
 3. There is no consideration of tourism. Reportedly 7 million people visit Cambridge. What mass transit connections would serve their needs?
 4. Though Ultra/Very Light Rail is mentioned, it is not examined (and no justification is given for not doing so). Given that the *raison d'être* of U/VLR is to be cheaper than traditional LRT, and there is an active project to develop it in the West Midlands, it warrants serious consideration.
 5. There is inconsistency in what CAM is assumed to be. In paragraph 7.21, CAM is described as 'bespoke'. But table 8.5 includes the assertion, "CAM could use, as a starting point, technology already available in the market (e.g. VanHool ExquiCity), and *does not rely on bespoke solutions.*" Furthermore, that vehicle model is not currently available with optical guidance, yet elsewhere it is assumed that CAM will be optically guided (and later driverless). This has significant ramifications for safety, especially in the context of station design and tunnel diameters.
 6. Nowhere in the report does it say whether CAM vehicles (which are articulated) will be suitable for running on ordinary roads, through villages, and mixing with cycles. The repeated use of the word 'flexibility' might be construed unintentionally as meaning this.
 7. If CAM vehicles are not suitable for running on ordinary roads, then it is difficult to see how they can provide a useful "shuttle service" (Figure 9.3) for six years from 2020/21 before tunnels under Cambridge are open (2026/27). Even the proposed Cambourne-Cambridge busway is currently not scheduled to be completed by 2020/21, so what will CAM services be running on?
 8. This opaque assertion in 8.67 seems to be false: "CAM offers significantly greater flexibility to be able to scale the level of operations to meet anticipated demand, and align service levels (the key driver of operating cost) to transit demand (driver of revenue), due to the use of smaller vehicles than LRT." LRT vehicles come in a variety of widths and lengths.
 9. SDG appears to have misunderstood the brief in evaluating the Cambridge Connect and AVRT proposals as if they were contract bids. It is our understanding that both proposals are illustrated concepts, not fully-formed proposals. Variables, including network geography, number of stations, and maximum vehicle speed and capacity, all require optimisation. To discount a technology because a particular concept proposal is flawed is missing the point.

10. The network coverage of each of the evaluated schemes is completely different, making cost comparisons meaningless.
11. The report does not provide any operational costs, which the brief required.
12. The report does not address the brief's request for details of statutory compliance requirements, for instance on matters relating to operating passenger services in tunnels: vehicle design (especially if not physically guided), evacuations, containment of fires, etc.
13. The justification for omitting environmental and heritage considerations for the shortlisted options is unpersuasive. Pollution, carbon footprint, and resilience to climate change are all critically important – more so than some criteria that are evaluated (such as minimising interchanging).
14. Capital costs for all options should be shown with lower and upper limits to reflect uncertainty and risks that can be identified and estimated at this stage. It appears that this has been captured in the 'optimism bias' adjustment, but that is intended to capture unidentified risks (see next point).
15. The optimism bias adjustment is intended to reflect risks that are not identified ('unknown unknowns') or that are impossible to quantify at this stage. This, from TAG UNIT A1.2 Scheme Costs (July 2017):

3.1.16 There also exists "a demonstrated systematic, tendency for project appraisers to be overly optimistic" [HMT Green Book, 2003, p.29]. Therefore, as well as adjusting for identified, quantified risks, risk-adjusted scheme costs should be adjusted to take account of this 'optimism bias'.

There is no justification for using the same (arbitrary 64%) adjustment for all options. LRT is based on long-evolved technology; there is a wealth of documented experience to inform new projects; and there are many contractors able to deliver the infrastructure and vehicles. On the other hand, AVRT is incompletely specified and largely without precedent. The optimism bias for AVRT should therefore be considerably higher than for LRT.

16. The argument in 8.67 that "CAM is likely to operate at a surplus" is unsupported by evidence. Average cost per vehicle km is provided, but not average revenue per vehicle km. The figure given for LRT is "[b]ased on our understanding of typical costs across several UK LRT systems." Is this a reasonable basis? What LRT systems are counted as 'typical' and what lessons may be learned for improving their operational efficiency if starting from scratch?
17. Since it is argued that LRT is most efficient for carrying 'large-demand volumes', we

would expect to see analysis of which, if any, routes (e.g. connecting the city centre, Cambridge station, the Biomedical Campus and major Park & Rides) would be most efficient as LRT, integrated with heavy rail and a modernised bus network.

18. No attempt has been made to quantify indirect costs of disruption during construction, including road closures, diversions and resultant worsening of congestion. This could be an important determinant of what network geography is viable and where stations can be located – especially underground. It is true that there is *no gain without pain*, but too much pain can be intolerable.
19. The claim for CAM that, “Each corridor would benefit from direct, high frequency accessibility to not only the City Centre but also all key destinations and employment hubs, negating the current need for interchange,” (Para 4.15) is either misleading or highly implausible. To connect the six corridors with direct services requires $5+4+3+2+1 = 15$ different routes. Figure 7.9 shows only 8 routes, which means that 7 other routes would require an interchange (e.g. Cambourne or Trumpington P&R to the Science Park). Even with the illustrated network, operating at the indicative service frequency of 5 minutes (Table 7.5), there would be $12 \times 6 = 72$ buses/hour in each direction stopping at Mill Rd and Newmarket Rd stations and 60 buses/hour in each direction at the busiest stops on the network, Cambridge station and the Biomedical Campus. That almost certainly requires two platforms for each direction. That’s a large station which would be very expensive to construct underground.

This list of observations is not definitive. It highlights critically important issues on which we believe the board needs more clarity and analysis. In effect the board is being asked to pick a winner. Whether CAM is that winner is not clear to us from this report.