

Cambourne to Cambridge Better Public Transport Project: Response to Independent Audit Assumptions and Constraints report vFinal (23 April 2021)

	Assumption/constraint	Comment
A.1	City Deal agreed	No comment
A.2	“Local Plan policies for the strategic developments of sites along the C2C corridor require High Quality Public Transport (HQPT) to link new homes to employment and services in and around Cambridge.”	<p>This is an incomplete summary of the Local Plan, which admits of a mix of measures that may include “bus priority measures or busway” between Madingley Mulch roundabout and Queen’s Rd, and “any measures necessary” west of Madingley Mulch roundabout:</p> <p><i>The new village [Bourn Airfield] will be founded on a comprehensive movement network for the whole village, that connects key locations including the village centre and schools to encourage the use of sustainable modes of travel and includes:</i></p> <p>a. <i>Significant Improvements in Public Transport, including:</i></p> <ul style="list-style-type: none"> i. <i>Provision of a segregated bus link from Cambourne to Bourn Airfield new village across the Broadway, and on through the development to the junction of the St Neots Road with Highfields Road;</i> ii. <i>Any measures necessary to ensure that a bus journey between Caldecote / Highfields and the junction of the A428 and the A1303 is direct and unaffected by any congestion suffered by general traffic;</i> iii. <i>Provision of high quality bus priority measures or busway on or parallel to the A1303 between its junction with the A428 and Queens Road, Cambridge;</i> <p>b. <i>Measures to Promote Cycling and Walking, including:</i></p> <ul style="list-style-type: none"> i. <i>Provision of a network of attractive, direct, safe and convenient walking and cycling routes from the start of the development linking homes to public transport and the main areas of activity such as the village centre, schools and employment areas;</i> ii. <i>Provision of a direct, segregated high quality pedestrian and cycle links to west Cambridge, Cambourne, Caldecote / Highfields, Hardwick and Bourn;</i>

		<p><i>iii. A Smarter Choices package including residential, school and workplace travel planning</i></p> <p>East West Rail will be an HQPT service to the Cambridge Biomedical Campus, CB1 and Cambridge Science Park for residents of Cambourne West and Bourn Airfield. Combined with improved bus services to West Cambridge and other parts of the city, as set out in the in-highway solution proposed by CambridgePPF (2021), the Local Plan objectives will be fully satisfied.</p> <p>At the South Cambridgeshire District Council planning committee meeting to consider the first phase of the Bourn Airfield development (19 February 2021), the developer indicated that the site will be built out at a rate of 200 units per year over 15 years, completing in 2038. This slower rate than previously stated will therefore fit with the timetable for delivery of East West Rail.</p> <p>Bourn Airfield has permission for only 500 dwellings before public transport improvements are in place. An in-highway solution, such as the one proposed by CambridgePPF (2021) could be delivered more quickly than the C2C busway, which would avoid any delay in the build-out.</p>
A.3	“The Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) was prepared in parallel with the development of the Local Plans and was agreed in March 2014.”	Note that this pre-dates the Net Zero Carbon commitments of the British government, Cambridge City Council and South Cambridgeshire District Council, which create a new and vitally important constraint on future development and transport.
A.4	“The GCP City Deal constrained to deliver 44,000 jobs and 33,500 homes by 2031”	In that same time frame, other policies must also be implemented that will have a bearing on future transport demand (see B.5).
A.5	“The CPIER confirmed the growth targets established in the City Deal and the need for a package of transport and other infrastructure projects to alleviate the growing pains of Greater Cambridge including HQPT scheme from Cambridge to Cambourne.”	<p>The CPIER did not commission detailed origin-destination data to confirm that mobility would be best improved by the creation of a busway between Cambourne and West Cambridge.</p> <p>Future growth beyond the current Local Plan will be supported by East West Rail and CAM. An in-highway solution for Cambourne to Cambridge, as proposed by CambridgePPF (2021), would support the current phase of growth more quickly and cost-efficiently than a busway (see A.2), which may or may not be CAM-compliant (see B.6 and E.3).</p>
A.6	“The C2C proposals have been assessed against the policies in the Sub-	In contrast to GCP’s own assessment, a report by Jacobs (2020),

	<p>Strategy [to the Local Transport Plan] and it is concluded that the [C2C] scheme is compliant”</p>	<p>commissioned by the Combined Authority, identified twelve areas where CAM objectives were not met. It concluded that GCP’s preferred C2C route was not compliant, and that alternative routes should be assessed.</p> <p>As CAM is still at an early concept stage, it is not possible to concluded definitively that the C2C infrastructure will be compatible with CAM vehicles (see B.6).</p> <p>Even if the proposed busway is compliant with the Local Transport Plan Sub-Strategy policies, it does not follow that it is the <i>best</i> means of satisfying them.</p> <p>Bus priority that is provided almost entirely within the existing highway, as proposed by CambridgePPF (2021), can achieve most of the time savings of the C2C busway at a fraction of the cost. It is therefore likely to yield a Very High Value for Money BCR (i.e. greater than 4.0). It could also be delivered far more quickly, providing benefit to people moving into the homes now being built at Cambourne West (see A.2). The environmental, landscape and heritage impacts are also much lower. The CambridgePPF proposal also includes a better route for non-motorised users (see C.3).</p>
<p>A.6</p>	<p>“further review of the eastern end of the scheme (City Access) has been undertaken and a review of the western end will be required once there is clarity with regards to proposals for EWR and a station in the Cambourne area.”</p>	<p>These reviews are of fundamental importance in determining the residual transport needs that need to be satisfied by this scheme. It is therefore premature to go ahead with detailed designs and commissioning contractors to build a busway while the context is still unclear.</p> <p>The in-highway solution proposed by CambridgePPF (2021) would be entirely compatible with East West Rail, wherever Cambourne station is sited; nor does it need to second-guess the route or vehicle specifications for CAM. It can complement demand-responsive transport into any travel hubs that may be built at Cambourne, Comberton and elsewhere.</p>
<p>A.7</p>	<p>“Integrating mass rapid transit with this scheme will enable effective first/last mile connectivity, in a way that enhances the value of these strategic infrastructure projects.”</p>	<p>C2C is a linear bus rapid transit scheme, similar to a railway. It is as yet unclear how it may connect with the railway at either Cambourne or Cambridge, or with other bus services other than in Cambridge city centre and West Cambridge (see I.3).</p> <p>Outside of Cambridge, the C2C includes no plan for how to reach people living in Caxton, Papworth, Elsworth, Bourn, Comberton, Toft, Kingston, etc., all of whom are within the catchment area for public transport to</p>

		<p>employment, education, retail, leisure and culture centres in Cambridge.</p> <p>In Cambridge, most connections will be made, as now, in the city centre. Between the end of the busway at Grange Rd and Drummer St is 0.8 miles inbound and 1.4 miles outbound, on slow and often congested roads through the city. This will add considerably to journey times. Few people will therefore make trips that require a change of bus.</p> <p>The in-highway solution proposed by CambridgePPF (2021) is more compatible with first/last mile connectivity because it would provide benefit to buses or coaches originating anywhere, without applying for permits or paying busway access charges. The CambridgePPF proposal also includes a bus station at Cambourne, which would become a hub for connecting village bus services with express services to Cambridge, St Neots and elsewhere.</p>
A.8	“HE has no other major road schemes planned for the GCP area having recently completed the upgrade to the A14 and Girton interchange with the M11.”	<p>It was reported in the press and by Anthony Browne MP in February 2021 that Highways England are reviewing connectivity at the Girton Interchange. It was recognised in the consultation on the current A14 upgrade that additional connectivity between the A428 and M11 (at a minimum) would be beneficial; however, funding was not made available to include it.</p>
A.9	East West Railway	<p>East West Rail will provide by far the quickest, most reliable route from Cambourne to the Biomedical Campus and CB1, abstracting a large proportion of passengers who, in the C2C business plan, were expected to use the busway.</p>
B.1	Scheme objectives	<p>The strategic case currently lacks SMART (Specific, Measurable, Achievable, Realistic, Time-limited) objectives. These are a Green Book requirement (paragraphs 4.9 to 4.11). The principle SMART objective is modal shift from solo-occupancy driving to public, active and shared transport. This should first be quantified in terms that are compatible with forecasts for population and employment growth and the constraints of the existing road network. In other words, how much modal shift would be required to avoid any increase in congestion? The next question is, what packages of interventions would support that level of modal shift?</p> <p>It is far from clear that GCP’s preferred scheme is the only package of interventions that could satisfy the project objectives, nor that it is the most cost-efficient.</p>

B.1	<p>“Contribute to relieving congestion and improving air quality within the surrounding areas along the A428/A1303 and within Cambridge city centre.”</p>	<p>Modal shift alone does not relieve congestion or reduce traffic volumes, as any relief in congestion is soon lost to induced demand. GCP’s policies are premised on being unable to reduce congestion, and hence having to build segregated bus infrastructure to bypass congestion. The St Ives Guided Busway did not arrest growth in traffic on the A14, necessitating the recent £1.5 billion upgrade to increase the capacity. Without demand management measures traffic on the A428 will also continue to grow.</p>
B.1	<p>“Planned growth, between 2011 and 2031, along the A428/A1303 corridor eastbound car trips are forecast to increase by 14% in the AM Peak hour, 82% in the Inter-peak period and, 37% in the PM Peak period. Without intervention this could lead to a further deterioration in traffic speeds and reliability of journey times.”</p>	<p>Naïve extrapolation of current modal shares (“predict-and-provide”) is discredited as a basis for developing a transport strategy. Decarbonisation in particular requires a reversal of this approach. That is, start from a transport scenario that is compatible with a 1.5°C decarbonization pathway, and develop policies and infrastructure delivery plans to direct and support transport behaviours compatible with that outcome.</p>
B.1	<p>“In the absence of substantial bus priority in the corridor, congestion and delays mean journeys of around 10 miles can take over an hour during peak times. Buses therefore offer no competitive advantage over private cars in terms of journey times.”</p>	<p>This overlooks the fast journey times East West Rail will offer to the Biomedical Campus and CB1. This will lead to a reduction in car traffic that currently congests Madingley Hill and delays buses. With demand-management measures, as planned as part of the City Access Strategy, that reduction in congestion may be sustained for the long-term.</p> <p>The in-highway solution proposed by CambridgePPF (2021) demonstrates how bus priority can be a viable and effective alternative to a busway. A bus lane has the distinct advantage of showing to car drivers every day they sit in traffic that bus is quicker. There can be no clearer way to demonstrate its competitive advantage over the private car.</p>
B.2	<p>“Longer-term plans for the CAM network and EWR need to be taken into account.”</p>	<p>Also need to take into account:</p> <ul style="list-style-type: none"> • GCP’s objective to reduce traffic in Cambridge by 15% of 2011 levels • Demand management measures (such as road, access or emissions pricing) in Cambridge or nationally • Decarbonisation of transport, which must be below 50% of 2019 levels by 2030 to be on a 1.5°C-compatible pathway. • Potential future work on the Girton Interchange (see A.8)
B.3	<p>“If this is an expensive service, then some may still be priced out”</p>	<p>The C2C service will necessarily cost more to run on segregated infrastructure, because the maintenance and renewal costs will have to be born either by the operators or the local authority. If operators bear the</p>

		<p>cost, then they will pass it onto passengers through the fare; if the local authority bears the cost, it will divert money that could otherwise be used to subsidise more bus services (or, in a franchise arrangement, to subsidise fares). Services running on public roads do not face this additional cost.</p> <p>The in-highway solution proposed by CambridgePPF (2021) would create minimal additional maintenance costs, helping to restrain inflationary pressures on bus fares, thereby helping to support modal shift to bus travel.</p>
B.4	<p>“The scheme will create a congestion free, high quality public transport corridor: The OBC assumes that the scheme will be able to create this corridor as a segregated busway.”</p>	<p>The specified requirement that the scheme provide a “congestion-free ... corridor” is both unrealistic and unnecessarily prescriptive. The C2C option is not entirely segregated, as the audit report acknowledges. Therefore, alternatives should not be ruled out on the grounds that they are not fully segregated. The in-highway solution proposed by CambridgePPF (2021) proposes segregation only where the benefits are large; whereas the C2C scheme includes long sections of segregation where the net social benefits are negative.</p> <p>The strategic objectives for the scheme should be set in terms of performance not design. The most important performance metric is modal shift from solo-occupancy driving to more space- and energy-efficient modes of transport (see D.3).</p>
B.4	<p>“There are still several pinch points and interactions with general traffic that could create congestion and delay along the route”</p>	<p>One of the main interactions with general traffic will be at the Scotland Rd crossing of the A428. Here, the C2C proposal envisages buses from Cambourne detouring to the new Park & Ride. This will add several minutes to journey times, making them longer than now when St Neots Rd and Madingley Rd are uncongested. Cambridge to Cambourne journey times will be longer than now at all times of day outside of the morning rush hour.</p> <p>Further delays will occur within Cambridge, between the end of the busway and the city centre. The proposed route inbound will encounter significant congestion and delays, in particular along Downing/Pembroke St, which is a single-lane, one-way road that also feeds the Grand Arcade multi-storey car park. Outbound, buses may have to detour via Lensfield Rd and The Fen Causeway, which also suffer significant congestion at peak times. Both of these routes are slower than the existing bus route via Madingley Rd, Northampton St, Chesterton Rd and Victoria Ave.</p>

B.5	<p>“The objectives of the City Access scheme complement the C2C project by seeking to improve conditions for sustainable transport within the City Centre, thereby benefitting users of the C2C scheme either through improved journey times for public transport or better connectivity to pedestrians and cyclists.”</p>	<p>To date there has been very little progress made on the City Access project, with unresolved political and resident opposition to demand management measures. Even the rollout of relatively uncontroversial Residents’ Parking Schemes is currently suspended. There is still no agreed policy on an “intelligent” road user charging scheme. The Citizens’ Assembly, called by GCP, preferred road closures to road charging, but this does not solve the problem of congestion on most bus routes; nor does it provide a funding stream with which to subsidise an expansion of the coverage, hours and frequencies of bus services, to achieve a level of convenience that rivals private car travel.</p> <p>Partly because of a lack of progress on this, the Combined Authority is pursuing a strategy for CAM that involves tunnelling under the city. However, this is still at an early concept stage, with no financing plan in place.</p>
B.6	<p>“The route is reclassified as a CAM route to serve the wider network, and not an independent guided busway corridor; The vehicle operating along the A428 corridor will comply with the principles of the CAM;”</p>	<p>There is no technical detail underpinning this “reclassification”. This is because there is no technical specification for CAM: type and size of vehicles, tunnel specifications, tunnel portal locations (in particular in West Cambridge); guidance system(s); fire, safety and evacuation requirements, etc.</p> <p>The DROMOS pod (ULTra vehicle) concept design in particular has very different design requirements to a bus, requiring a 1.4m wide runway and multiple bays at stops and stations. Even the different requirements of multi-door or articulated buses will have implications for the infrastructure design.</p> <p>If CAM vehicles will be articulated buses, the geometry of curves and turns will need to be designed to the tracking characteristics of the chosen vehicle to ensure they do not endanger people walking or cycling by overrunning or overhanging footways and cycleways.</p>
C.1	<p>“A HQPT system using rapid transit technology on dedicated routes.” “Continued modal shift away from car usage to public transport.” “Capacity provided for growth, supporting transit-oriented development.”</p>	<p>These objectives may be fully achieved by the phased introduction of:</p> <ul style="list-style-type: none"> ● Targeted bus priority measures and improvements to bus services, as set out in the in-highway solution proposed by CambridgePPF (2021) ● An integrated cycling network (see C.3) ● East West Rail

		<ul style="list-style-type: none"> • CAM
C.1	“High frequency, reliable services delivering maximum connectivity”	Connectivity is good only between Cambourne/Bourn Airfield and West Cambridge. No other employment centre, secondary school, further education establishment, leisure or cultural centre is made more accessible by the busway.
C.1	“State of the art environmental technology, with easily accessible, environmentally friendly, low emission vehicles such as electric/hybrids or similar.”	This does not require a busway. GCP has already assisted Stagecoach to buy electric buses.
C.1	“A fully integrated solution, including ticketing and linkages with the wider public transport network to maximise travel opportunities.”	This does not require a busway. The Combined Authority is empowered to use franchising or Enhanced Partnerships to achieve these objectives (see I.4).
C.2	“Scotland Farm is attractive location for commuters from areas to the west of Cambridge along the A428 corridor”	<p>This encapsulates precisely how Park & Ride undermines rural bus services. By making it attractive to start a journey by car, demand for bus services from Cambourne (and other towns and villages west of Cambridge) will be attenuated. If demand were not satisfied by a Park & Ride, there would be more demand to travel by bus from Cambourne, supporting the viability of services running at higher frequency, for longer hours and directly to more destinations (e.g. north, central and south Cambridge).</p> <p>Any buses accessing the P&R en-route between Cambourne or St Neots and Cambridge will incur a time penalty for the detour, reducing the competitive advantage of bus services over private car (see B.4).</p> <p>If East West Rail will provide a station next to the A428, it further undermines the business case for a Park & Ride at Scotland Farm. The railway station will be the natural location for a multimodal transport interchange. Therefore, and any car parking requirement will be best located there.</p>
C.2	“Scotland Farm is ... less [attractive] for car users from the south exiting at jnc 13 of the M11.”	<p>This is an extraordinary understatement. The detour to and from the Scotland Farm P&R would be 11km. That is neither attractive nor sustainable.</p> <p>GCP has not commissioned a viability assessment nor an appraisal of a Park & Ride at the Girton Interchange. Initially that would serve only drivers arriving on the A14 from the west, but additional connections from the M11</p>

		and A428 (see A.8) could make this an ideal location to intercept drivers arriving on any of the strategic roads (A14, A428 and M11).
C.2	“The alternative P&R site at Madingley Road may be redeveloped for other use when the lease expires later this decade.”	<p>In light of the previous observation, it is unlikely that this site could be released for redevelopment if GCP goes ahead with a P&R-based strategy. The assertion would in any case need to be supported by an analysis of where users of Madingley P&R start their journeys.</p> <p>For anyone starting their journey south of Cambridge, there is no direct public transport option proposed for them to reach west or north-west Cambridge in a time that is competitive with driving. Madingley P&R will therefore continue to provide the only public transport option for the foreseeable future.</p>
C.3	“The scheme must provide a segregated route for non-motorised users, as a minimum to include cyclists and walkers, but where appropriate equestrians, and to ensure that all pedestrian facilities are accessible for all.”	<p>The segregated route for non-motorised users should be designed for the needs of its users, not the convenience of building it alongside the busway. The most attractive route for cycling/walking would be to extend the Comberton Greenway, which is a committed GCP scheme for an NMU path between Cambridge, Hardwick and Comberton. The solution proposed by CambridgePPF (2021) shows how this could be extended to Cambourne. This route would avoid the relatively steep Madingley Hill, be more direct, run closer to more people’s homes and serve more destinations (including Comberton Village College). It would also be more enjoyable to use than a cycleway alongside St Neot’s Rd, the busway and the A428 (including for horse-riders). All of this would contribute to greater modal shift to cycling and walking than GCP’s option, and thus better achieve policy objectives.</p> <p>At the time the C2C project was conceived, there was no Greenways programme and it was assumed that the busway would require a maintenance track, like the existing Cambridgeshire Guided Busway. In the current context, the need for an NMU path alongside the busway should be reviewed, and the design adjusted to meet the likely level of demand.</p> <p>It should be noted that GCP has previously rejected in-highway solutions in part because its policy has been to provide a three-metre-wide cycleway and two-metre-wide footway (5 metres in total) alongside the bus route. This introduces a major constraint on an in-highway scheme. GCP has refused to accept that, if most NMU users were to use an alternative, more attractive route, there would be no need to provide full-width, segregated NMU paths</p>

		<p>alongside the bus route. A 2.5m-wide shared footway, as already exists along much of Madingley Rd, is likely to be adequate (with some improvements at junctions) for the relatively small number of people who will use it. (For reference, DNA path between Great Shelford and the Biomedical Campus is 2m wide.)</p>
D.1	<p>“Around 50% of all housing planned (c. 6,000 houses) would be directly linked to Cambridge City centre and other key employment locations via the C2C project.”</p>	<p>“other key employment locations” in fact means only West and North West Cambridge. There will be no direct link to the Biomedical Campus, Cambridge Science Park or the other business parks in north-east Cambridge, as those will be reached via an interchange at West Cambridge. Access to east Cambridge employment sites will require a change of bus in the city centre. All of these public transport routes will compete poorly with the private car.</p> <p>East West Rail is likely to open half-way through the build-out of Bourn Airfield (see A.2), providing high-capacity, high-speed and high-reliability connections to Cambridge Biomedical Campus, CB1, potentially east Cambridge, as well as Bedford, Milton Keynes and other major employment centres.</p>
D.2	<p>“Two significant new planned developments (Cambourne West and Bourn Airfield) are, in housing terms, judged to be fully dependent upon the C2C project”</p>	<p>This is not the case. Homes in Cambourne West are already being built and marketed. If they were not viable without the busway, the developer would not have proceeded. Similarly, planning consent has been granted for the first phase of development on Bourn Airfield. There is no rational basis for claiming these developments are “fully dependent” on the busway. The justification is that the roads will be filled to capacity by the additional transport demand created by these developments and background growth in through-traffic. However, this is not a plausible future scenario – see B.1.</p> <p>Bourn Airfield has permission for only 500 units before public transport improvements are in place. The in-highway solution proposed by CambridgePPF (2021) could be delivered more quickly than the C2C busway, which would allow the development to progress more quickly.</p>
D.3	<p>“The assumption is that the added capacity of the scheme will support the densification in the areas easily accessible to the busway.”</p>	<p>This is true only if road capacity continues to be used inefficiently by mostly solo-occupancy cars. Capacity can be increased more quickly and sustainably through modal shift to active and public transport. One bus carrying 70 passengers is equivalent to about 58 cars. At 20mph those cars occupy about</p>

		1,000m of road space compared with 30m for a bus. At 45mph, those cars occupy about 2,000m versus 60m for a bus. At 65mph, they occupy about 3,000m versus 100m for a bus. Existing road capacity can move up to thirty times more people if it is used more efficiently.
D.4	“Existing network cannot increase travel capacity much further.”	This is wrong (see D.3). The in-highway solution proposed by CambridgePPF (2021) sets out how to provide large time-savings to bus services, which will encourage modal shift to buses. That in turn will increase the carrying capacity (in terms of people per hour) of the existing roads, in particular the A1303 (Madingley Rd).
D.4	“Are other measures required to achieve the 30% modal shift targeted in the GCP transport strategy?”	The answer is, undoubtedly, yes. Demand management and bus priority measures in the city and on Hauxton Rd will also be needed. Additional funding to subsidise the running of services at unprofitable times is also essential. If those are successful (as they must be if we are to meet our decarbonisation target), then congestion will be reduced, obviating the need for new busways into Cambridge.
D	Strategic Fit (<i>additional point</i>)	<p>There should be an explicit appraisal of how the C2C scheme fits within the wider programme of transport interventions:</p> <ul style="list-style-type: none"> • A428 dualling (Highways England) • Comberton Greenway (GCP) • Future expansion of the NMU network (GCP, County Council) • Madingley Rd cycling & walking (GCP) • Cambridge South West Travel Hub (GCP) • Barton Park & Ride (included in Future Bus Network) (GCP) • East West Rail (East West Rail Co) • City Access (including demand management measures) (GCP) • Strategic Bus Review (Combined Authority) • CAM (Combined Authority, One CAM) • Girton Interchange (Highways England) • M11 Smart Motorway (Highways England) <p>This requirement is described in the Green Book Review 2020 (paragraph 2.9):</p> <p><i>Whether the proposal is for a programme within a strategic portfolio or is a project within a programme, its objectives need to be understood in terms of</i></p>

		<i>its individual contribution to the wider group of interventions of which it is part.</i>
E.1	CAM project	No comment
E.2	CAM SOBC	Smarter Cambridge Transport identified serious flaws in the Strategic Outline Business Case for CAM.
E.2	“CAM SOBC assumes the portal connecting the city centre underground section to the C2C route will be in West Cambridge at the southern edge of the proposed development area”	Neither the University of Cambridge West Cambridge development plan nor the North Barton Road Development Group’s proposals include a tunnel portal south of the existing West Cambridge development.
E.2	“Alternative route options for the CAM are still being explored. So far, these rule out any alignment going via the Girton Interchange.”	A public transport route via a Park & Ride or visitor transfer hub at the Girton Interchange would provide benefit to a much wider catchment population than the C2C busway. GCP confirmed at the most recent C2C LLF meeting that they had not appraised those additional benefits of this option.
E.2	“A preliminary evaluation of [more northerly] route options indicates that they would be higher cost alignments for the busway/CAM and would have environmental impacts on the American Cemetery, 800 Wood, Madingley village and White Pits Plantation, incur longer journey times compared to the preferred busway option and would not attract as many bus riders.”	We are unaware of any technical assessments being carried out to examine the environmental impacts of any route north of the A1303. Without such an assessment, how can anyone compare the relative impacts of a northern route option and the preferred option? Since the latter has significant impacts on heritage and nature conservation sites, alternative routes cannot be ruled out automatically because they too have identifiable impacts.
E.3	“C2C travel hubs at Scotland Farm P&R site and in Cambourne may require the CAM to follow a different alignment to the C2C busway in these sections in order to access these facilities depending on the vehicle technology chosen.”	This contradicts B.6, which states that the C2C route has been deemed CAM-compatible. The C2C route alignment through Bourn Airfield and the West Cambridge campus, which are not proposed to be fully segregated, may also prove to be incompatible with the CAM vehicle technology chosen.
E4	“EWR focuses substantially on longer term growth beyond the Local Plan period and not the immediate and worsening issues of congestion and lack of connectivity for expanding communities west of Cambridge.”	Progress with East West Rail, and the route revision to include a station at Cambourne (rather than Bassingbourn), combined with a slower build-out of Bourn Airfield (see A.2) mean that the current Local Plan objectives will be partly met by EWR. This fundamentally alters the business case for the C2C busway (and the CAM network, of which it is intended to be a part) and what travel requirements it should serve. The delay in delivering C2C (originally due to open in 2020) now makes it more important to deliver something quickly to support bus services in the interim before East West Rail and CAM open.

E.4	<p>“Once a preferred alignment has been agreed for EWR and confirmation of the location of a Cambourne station there will need to be a programme to ensure integration between EWR, C2C and the wider CAM network.”</p>	<p>The geographical constraints on a railway are far greater than those on a busway or whatever CAM is likely to become. The design and construction costs for the busway are already large (£160.5m). Late-stage design changes will add significantly to that cost. It is therefore only prudent to wait until the alignment of the railway and location of the Cambourne station is determined before designing C2C/CAM.</p> <p>If nothing else is done in the interim, existing bus services will continue to be unattractive. The opportunity to form new transport habits will be missed, in particular amongst residents moving into Cambourne West and workers starting at the new business centre in Bourn Airfield. This will significantly reduce the scheme benefits in the short term when those benefits would be valued most highly (under established principles of discounting future benefits).</p> <p>The in-highway solution proposed by CambridgePPF (2021) offers a way to start to develop sustainable transport behaviours, and capture social benefit sooner.</p>
F.1	<p>“The results indicated that the best performing option was the segregated off-road option with Park & Ride at Scotland Farm but only by a small margin.”</p>	<p>The assumption that CAM vehicles will have the operating characteristics of buses (resembling trams in appearance only) is premature. For instance, one of the CAM concept options is for pods running on 1.4m wide tracks (see B.6). If CAM is not a bus-based service, both the C2C appraisal (which makes assumptions about the operational capacity, costs and revenues over a 60-year period) and public consultations are invalid.</p>
F.1	<p>“The optioneering process reviewed a wide range of options suggested by stakeholders and following consultation.”</p>	<p>Although options proposed by the LLF and other bodies were evaluated, GCP applied artificial constraints to their appraisal. For instance, no option was appraised or consulted on that combined in-highway bus priority with a separate NMU route (see C.3). In the end, CambridgePPF had to commission work on this at its own expense.</p> <p>That analysis established that there is no requirement for bus priority outbound from Cambridge along Madingley Hill, further simplifying the requirements for an in-highway solution, as proposed by CambridgePPF (2021).</p> <p>In light of the current proposals for East-West Rail to include a station at Cambourne, and continuing uncertainty about the technical requirements for CAM, the Cambridge PPF proposal should be appraised alongside a</p>

		reappraisal of the C2C busway.
F.1	“The option scoring is justified on the available evidence but by its nature is subjective.”	<p>Subjective assessments are prone to (unconscious) cognitive biases, such as confirmation bias (seeking evidence that confirms rather than refutes a prior belief), false consensus bias (overestimating the degree of agreement, e.g. amongst professional colleagues or “the silent majority”), and availability bias (being unaware of what you don’t know, and what evidence has not been gathered).</p> <p>The LLF and others have challenged the weightings given in the MCAF, which have not been satisfactorily justified. Since the MCAF was drawn up, there has been a major shift in understanding of the importance of carbon emissions, ecology, air quality and public health.</p> <p>It is therefore essential that MCAF scorings and weightings are reviewed by completely independent assessors against current national and local policies, extant and emerging.</p>
F.1	“The preferred option would create a new busway crossing designated green belt in West Fields, Coton Orchards and National Trust lands.”	The implications of this are covered in our response to G.5, G.6 and G.7.
F.2	“On-road options for bus lanes/bus tidal flows are also constrained by impact on SSSI and American Cemetery along the A1303 as well as impacts on properties along the route.”	<p>The in-highway solution proposed by CambridgePPF (2021) fully addresses this constraint.</p> <p>Any impact on the verge outside the cemetery should be considered against the very significant impact of crossing the green belt, damaging designated sites for nature conservation and other non-designated habitats such as mature woodland, orchards and meadows. This includes land that is owned by Cambridge Past, Present & Future and covenanted by the National Trust in order to protect it from development.</p>
G.1	“The scheme has been presented as creating 975 new jobs and increasing housing by around 6,000 which are dependent on the scheme.”	The evidence does not support the claim of dependence – see D.2 and D.3 – nor the creation of 975 net new jobs to the UK – see next point.
G.1	“There is an increase in GVA of £102.8m per annum attributed to the scheme.”	<p>This is based on a false premise, that “44% of the jobs supported by the C2C project can be considered net additional at a UK level.”</p> <p>This inference is based on an incomplete reading of the CPIER report, which summarises the survey (page 54) as follows:</p>

For some of these knowledge-intensive sectors, Cambridge is the only viable cluster in the UK. In such a scenario they would be likely to move abroad. 35.4% of respondents to the qualitative survey said it was possible, likely, or certain that they would move activity abroad to elsewhere in Europe, and of those respondents who said they would likely or certainly move activity outside of the area, significantly more indicated that they would move abroad (44.2%) than elsewhere in the UK (25.0%). One commented: “Our reliance on a highly skilled work force, which could not easily be found elsewhere, would make relocation from the C&P area very difficult.” This point serves to highlight the net additionality of the area to economic output in the UK, and once again shows that the success of Cambridgeshire and Peterborough is a project of national importance.

The 44.2% figure applies only to a subset of the 35.4% who responded that it was “possible, likely, or certain that they would move activity abroad”. It is not possible to conclude from this that 44% of jobs in the Cambridge cluster are at risk of being relocated abroad. At the highest, it is 44% of a fraction of 35.4%, i.e. less than 15%.

The OBC Strategic Economic Narrative & Economic Impacts Report ([OBC Appendix J](#)) implies that the entire risk of job relocation abroad falls on the delivery of the C2C Busway. This discounts not only other transport schemes, such as East West Rail, but also national government policies, such as post-Brexit trade agreements or tax treatment of R&D expenditure and venture capital.

The CPIER survey only relates to existing jobs relocating elsewhere in the event that certain conditions, including improvements to local transport, are not met. The survey did not ask specifically whether delivery of the C2C busway will, by itself or in combination with other factors, lead to companies creating new jobs. Therefore, the business case must offer some direct evidence for this claim that goes beyond what is already captured as labour market effects in the TAG cost-benefit analysis (including “move to more productive jobs” and agglomeration effects).

G.2	<p>“the on-road option has a slightly positive BCR when local WEI are included whereas the off-road option has a much higher BCR.”</p>	<p>It is a methodological error to include monetised Wider Economic Impacts in the benefit-cost ratio. Conventional appraisal (levels 1 and 2) and WEI assessments approach quantification in different ways that necessarily overlap (e.g. people’s willingness to pay for a transport intervention is reflected in increased house prices). Therefore, they cannot be added together without introducing double-counting errors. Moreover, the methodology for WEI assessment is much more uncertain and prone to errors (see G.1).</p> <p>There is also no justification for assuming that an in-highway solution would have much lower Wider Economic Impacts. Any intervention that supports growth in the number of people able to travel between Cambourne and employment sites in and around Cambridge, in line with the Local Plan, will have the same WEI.</p>
G.2	<p>“The traffic growth generated by the developments along the corridor would increase congestion and impact on the journey times and reliability of an on-road scheme along the A1303 even with bus priority measures such as bus lanes or a tidal bus way.”</p>	<p>This conclusion is based on discredited and inappropriate predict-and-provide modelling (see B.1). The in-highway solution proposed by CambridgePPF (2021), combined with City Access measures to restrain demand to travel by car, could start a virtuous cycle of modal shift to buses to make more efficient use of the A1303 (see D.3).</p>
G.3	<p>“Alternative on-road options do not offer anywhere near this journey time saving or reliability.”</p>	<p>This is wrong, as the report in-highway solution proposed by CambridgePPF (2021) demonstrates.</p>
G.4	<p>“The scheme is judged to have medium VfM but is sensitive to changes in land value uplift and GVA generated by additional jobs. If these are less than expected, then the VfM would be poor.”</p>	<p>As the GVA uplift has been miscalculated, the Value for Money ranking is poor (see G.1).</p>
G.5	<p>Environmental impacts</p>	<p>The evolving methodology for economic appraisal considers that future monetised environmental costs should not be discounted at the same rate (3.5% per year) used to discount social costs and benefits. This is covered in the Green Book Review 2020 (paragraphs 3.12 to 3.17).</p>
G.5	<p>“for the landscape impact it is neutral for the proposed route.”</p>	<p>The landscape impact of the section between Cambourne and Madingley Mulch has not been assessed. An assessment has only been carried out for the section between Madingley Mulch and Cambridge. That was before a decision was made to remove a significant section of woodland adjacent to the A428. See also next point.</p>

		<p>The assessment that the preferred option would have a neutral impact was carried out by Mott Macdonald and has been challenged by the National Trust and CambridgePPF. We do not believe that the assessment was genuinely independent and therefore believe that it should not be considered as an assumption. It is obvious, even to a lay person, that building a major piece of infrastructure through woodland and across open countryside on the side of a hill will have a negative impact on the landscape. Furthermore, it is relevant that the end lifetime of this infrastructure will be reached before any of the trees planted in mitigation have reached middle age.</p> <p>The assessment of the neutral impact was reached prior to the decision to route East-West Rail via Cambourne, potentially crossing the C2C busway at Highfields. Cumulative impact is a material planning consideration, and therefore these two schemes must be evaluated in combination (see G.6).</p> <p>Historic England (dated 28 February 2018) considered that all three C2C Phase 1 options consulted on in late 2017 “are likely to cause harm to heritage significance, either to the American Cemetery or to the significance of the village of Coton.”</p>
G.5	<p>“The segregated busway alignment has been designed to minimise the impacts on the environment.”</p>	<p>The segregated busway alignment has not been designed to minimise the impacts on the environment. Between Hardwick and Madingley Mulch a significant strip of woodland and meadow would be destroyed by the busway.</p> <p>Damage to ecology along St Neots Road and at Madingley Much could be avoided by realigning the busway to the south, bypassing the roundabout (see Figure 1). This route option should be evaluated in accordance with the mitigation hierarchy of avoiding negative impact before considering mitigation.</p> <p>CambridgePPF has previously asked why this option had not been considered. The oral response was that the route was not compatible with the Park & Ride site, which was originally planned to be located on the north side of Madingley Rd, opposite Madingley Mulch. As the preferred location for the P&R site is now at Scotland Farm, this route option is viable and should be evaluated.</p> <p>Most of the woodland along St Neots Road that would be destroyed is on</p>

		land owned by the County Council. We are concerned that the relative costs of land acquisition may have influenced GCP in not considering this route option.
G.5	“it will require mitigation measures to lessen its impact on the landscape especially where it crosses the green belt and National Trust land.”	<p>The route does not cross land owned by the National Trust. The route crosses land that is owned by Cambridge Past, Present & Future at Madingley Mulch and also close to Coton village. The latter also has National Trust covenants to prevent development. The land was purchased by CambridgePPF to protect the landscape and prevent it from being developed.</p> <p>Historic England (in its submission dated 28 February 2018) considered that all three C2C Phase 1 options consulted on in late 2017 “are likely to cause harm to heritage significance, either to the American Cemetery or to the significance of the village of Coton”.</p>
G.6	“Whilst it is always preferable to avoid any impacts on the Green Belt, in the case of C2C, impact is inevitable.”	Only GCP’s preferred solution, of a segregated busway, has an inevitable negative impact on the green belt. As the in-highway solution proposed by CambridgePPF (2021) demonstrates, significantly improving bus services need not harm the green belt. Because it “is always preferable to avoid impacts on the Green Belt”, this option should be fully and fairly evaluated.
G.6	“Given the need to connect development outside the Green Belt to the city, some degree of impact on the Green Belt is inevitable.”	<p>The inevitability derives from a predict-and-provide transport model, which is no longer appropriate (see B.1).</p> <p>It is only East West Rail that will have unavoidable impacts on the green belt. There is a planning requirement to consider the <i>cumulative</i> impacts on the green belt of both East West Rail and the C2C preferred route. Because the geographical constraints on a railway are considerably more restrictive than on a busway, C2C must be evaluated <i>after</i> the alignment for East West Rail between Cambourne and Cambridge has been confirmed. Until then, it is not possible to understand the cumulative impact of both schemes. It is therefore premature to consider the EIA of the C2C preferred route.</p>
G.7	“There are specific concerns about the impact on the Green Belt, West Fields, the Orchards near Coton as well as the alignment close to Coton conservation area, and the busway section between St. Neots Road and the A428 at Hardwick.	There will also be impacts on Madingley Mulch Waterworks site which includes mature woodland and meadow (see the ecological survey for this site which identifies ecological value). If a segregated busway is pursued, then an alignment should be considered that avoids damaging the trees on

	<ul style="list-style-type: none"> • Coton Conservation Area including Grade 1 listed Church. • Land parcels owned by Cambridge Past, Present and Future, which are protected by National Trust Covenants. • Fitting within available space in areas where the alignment passes relatively close to properties. For example, along some parts of the St Neots Road. Where necessary noise barriers will need to be explored as an option to ensure that traffic noise experienced by residents reduces. • Minimising the impact on the Coton Orchard and a City Wildlife Site, to the west and east of the M11 respectively which are bisected by the alignment for the preferred option.” 	<p>the northern boundary of the Madingley Waterworks site and the meadow located within it (see G.5 and Figure 1).</p> <p>Impact on all of these environmental receptors are avoided by the in-highway solution proposed by CambridgePPF (2021). In conformance with the mitigation hierarchy, of avoiding impact before considering mitigation, this option should be given full consideration.</p>
G.8	<p>“Overall the scheme is assumed to benefit a range of social areas. Reduced accidents due to lower private vehicle use. Providing access to services, which are affordable is also assumed. Creating a more secure and easy to use bus service will attract a broader cohort of users.”</p>	<p>None of these benefits is dependent on building a busway. Improving the quality, affordability and integration of bus services will provide social benefit to people over a much wider area than a single busway can. The in-highway solution proposed by CambridgePPF (2021) would provide a similar journey-time benefit for a fraction of the cost of the C2C busway, with minimal additional maintenance costs. Those would have to be covered by the fares, either via the operator or from funds that the local authority could otherwise use to subsidise bus services (see B.3).</p>
H.1	<p>“The current estimated capital cost of the off-road option is £160.5m”</p>	<p>By comparison, the in-highway solution proposed by CambridgePPF (2021) would provide a similar journey-time benefit for less than £10m. The remainder of the budgeted money would be better spent on extending the Greenways network, building a bus station in Cambourne, securing electric buses for the route, providing five-year funding for increases to existing services, and new complementary services, including demand-responsive feeder services from surrounding villages, investing in electric club cars and charging points in all the villages, planning works at the Girton Interchange, etc.</p> <p>Are the land cost estimates used in arriving at the scheme capital still valid? Land values (including “hope value”) are increasing as speculation grows around what sites will be chosen for the next Local Plan, including South West Cambridge.</p>
H.2	<p>Estimated high-level scheme costs</p>	<p>No comment</p>
I.1	<p>Procurement</p>	<p>How are lessons learned from previous project cost overruns, delays and</p>

		<p>problems being put into practice? There have been huge cost-overruns of major infrastructure schemes procured by the county council in recent years: Ely Southern Bypass, King’s Dyke crossing, Fendon Road roundabout, Chisholm Trail and Abbey-Chesterton bridge. Further back in time, the Cambridgeshire Guided Busway ran heavily over budget and was delayed by two years. It suffers from probable design flaws, which are still the subject of dispute with the contractor, BAM Nuttall.</p>
I.2	Design and build approach	No comment
I.3	“The proposed Bus Network Strategy is based around three direct express services.”	All of the proposed services could be run on existing roads using the priority measured set out in the in-highway solution proposed by CambridgePPF (2021).
I.3	“Cambourne to Cambridge City Centre at 10-minute interval service (6 buses per hour)”	East West Rail will offer a considerably faster and more reliable journey time from Cambourne to CB1.
I.3	“Cambourne to Biomedical Campus at 30-minute interval service (2 buses per hour)”	This is not a high enough frequency to qualify as a “high quality public transport service.” In any case, East West Rail will offer a considerably faster and more reliable journey time from Cambourne to the Biomedical Campus.
I.3	“... passengers from Cambourne to Cambridge corridor services would also be able to interchange with the Universal service at West Cambridge which would serve Cambridge North Station and the Cambridge Science Park.”	How attractive will it be for workers at the Cambridge Science Park and other business parks in north-east Cambridge to interchange in West Cambridge with a service that runs twice per hour? The most direct route by car, via the A428 and A14, will almost always be considerably faster than this option.
I.4	Strategic Bus Review	<p>According to the National Bus Strategy timetable, the Combined Authority must decide by end of June 2021 how it intends to design and commission bus services in future. This will have fundamental implications for how bus services and maintenance of bus-only infrastructure will be funded.</p> <p>It should be noted that GCP’s busway strategy is premised in part on the need to offer private operators in a deregulated market an attractive alternative to using ordinary roads. That may no longer be relevant under the National Bus Strategy, where franchising and Enhanced Partnership agreements can provide non-market incentives or even contractual requirements for operators to run improved services on ordinary roads. Combined with demand management measures to reduce congestion, the</p>

		need for new bus-only infrastructure will be greatly diminished.
I.5	“The busway maintenance option decided upon will depend to an extent on the arrangement used for the Operation of the bus service, which is yet to be determined, as noted above.”	Busway maintenance is a significant additional cost that will have to be met either by operators or the local transport authorities. Bus operators running commercial services will recoup the cost of any access fees through fares. If the cost is not passed on to bus operators, it will reduce the funding the transport authorities have available to support non-commercial bus services. The in-highway solution proposed by CambridgePPF (2021) would not carry this additional cost.
J.1	“Both the Expressway and EW Railway will impact on the C2C route and whilst the scheme is not dependent directly upon these proposals, they may have a significant influence.”	The “may” is unwarranted: EWR and the A428 dualling will radically alter the residual long-term transport requirements. (The Expressway project has been cancelled, but the A428 dualling is going ahead.)
J.2	“Public and stakeholder consultation is essential to ensure that the various aspirations of the general public and key stakeholders are taken into account throughout development and delivery of the project”	One of the principles in the government’s guidance on consultation is, “Explain the responses that have been received from consultees and how these have informed the policy.” GCP’s reports on consultations have been notoriously unbalanced, cherry-picking ideas and sentiments that support its proposals and dismissing or ignoring alternative suggestions. GCP has responded to feedback in certain respects, for instance in the location of the Park & Ride, but not on the busway. It has commissioned numerous studies of alternatives, but has not engaged communities in setting the terms of reference. GCP could have taken a co-creative approach, making resources available to help communities or other groups develop viable alternatives. Those could then have been put out to consultation on an equal footing to GCP’s proposals. It has chosen instead to defend its own proposals to the death.
K.1	“The Full Business Case will develop the detailed design for the preferred scheme and update the appraisal for the economic case.”	Before proceeding to a Full Business Case, GCP should re-evaluate all options, including the in-highway solution proposed by CambridgePPF (2021), in the light of changed requirements and context.
K.2	Transport and Works Act Order	No comment
K.3	Environmental Impact Assessment and Environmental Statement	As the requirements outlined in the Environmental Impact Assessment (EIA) Directive are likely to continue to apply post-Brexit to TWA Orders, the need to demonstrate consideration of “reasonable alternatives” will apply to the

		C2C Scheme. This should include the in-highway solution proposed by CambridgePPF (2021).
K.4	Authority to construct	No comment
K.5	“Bus services schedule and routes will be determined in discussion with operators.”	The Combined Authority is likely to start the statutory process of franchising services, in accordance with the National Bus Strategy. If successful, this will mean that services will be designed by the local authority, not by private operators.
K.5	“Opening of the scheme to operational services in 2025.”	Given that Cambourne West and part of Bourn Airfield is being built out now, improved bus services are needed well before 2025. People moving into those new homes and business premises will be making transport choices now that will determine their travel behaviours for many years. Therefore, it is imperative that GCP introduce bus priority measures urgently – for instance, the in-highway solution proposed by CambridgePPF .
L.1	“Scheme appraisal will be revisited at Full Business Case stage with sensitivity tests of varying levels of demand and wider economic impacts.”	See K.1.



Figure 1: Potential alternative route between St Neots Rd and Madingley Rd, avoiding damage along the boundary of the Madingley Mulch Waterworks site