

# Cambourne to Cambridge Better Public Transport Project: Independent Audit

## Statement of Assumptions and Constraints

The Greater Cambridge Partnership (GCP) has instigated an independent audit of the key assumptions and constraints underpinning the selection of the preferred route for the Cambourne to Cambridge Better Public Transport Project. The focus of the audit is on the assumptions and constraints that underpinned the analysis that led to the selection of the preferred route and the elimination of alternative options. The objective is to test the robustness of those assumptions and constraints and determine whether they remain appropriate in the context of the current strategic frameworks, the emerging Cambridgeshire Autonomous Metro (CAM) network and the East West Rail plans.

This first stage of the audit comprises the preparation of a statement on the assumptions and constraints. This statement will be published on the GCP web site and will form part of an invitation to representative groups to submit further written representations on the assumptions and constraints and their application throughout the process.

The assumptions and constraints are documented in the tables below. These are derived from the Outline Business Case for the scheme together with supporting materials prepared for the business case and other reports produced by the GCP and its partners. The information sources are referenced against each entry in the table.

Examination of these sources has revealed 51 individual assumptions and constraints which are grouped into 12 categories:

- A. Policy Context
- B. Scheme Objectives
- C. Project Deliverables
- D. Strategic Fit
- E. Connections to CAM and EWR
- F. C2C Options Selection
- G. Economic Case
- H. Financial Case
- I. Commercial Case
- J. Management Case
- K. Full Business Case

## C2C Independent Audit

- L. Covid-19 Impacts

These categories expand upon the 5-case business model framework used in the outline business case including consideration of the wider context for the scheme.

Broadly, the constraints fall into two types: on the positive side, the strategic growth targets and ambitions of the GCP and the Cambridgeshire and Peterborough Combined Authority (CPCA) dictates the development of new public transport capacity to meet future travel demands; on the negative side, deploying this new infrastructure, like the C2C scheme, impacts on local communities and the environment with queries about the premise for the preferred option. The assumptions outline a scheme that can address both areas of concern and demonstrate through evidence the justification for the preferred option. At this stage, the objective is to produce a comprehensive list of assumptions and constraints without prejudice for stakeholders to review and comment on.

For comparison the assumptions are matched with the constraints (or vice versa). This 'mapping' is not always clear cut and there are overlaps and some matters that are more distinct. Nevertheless, this format helps to link the assumptions with the constraints to better understand the need for the intervention, the process of selecting the preferred option, evaluating its impacts, how it will be delivered, and interdependencies with the future CAM and EWR networks. No weighting is given to the categories or individual items. At this stage it is considered appropriate to present the assumptions and constraints in a neutral manner.

The continuing validity and appropriateness of the assumptions and constraints will be analysed in the second part of the audit.

Table A: Policy Context

<b>Assumptions &amp; Constraints Register</b>			
	<b>Assumptions</b>	<b>Constraints</b>	<i>Reference</i>
	<b>A. Policy Context</b>		
A.1	Greater Cambridge Partnership: Created in 2014 to implement City Deal agreed with government to deliver growth aspirations in support of regional and national economic policies.	The C2C corridor has been identified by the GCP's Executive Board as a priority project for development in the first five years of the GCP's transport programme.	<i>Greater Cambridge City Deal. GCP 2014</i>
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.	Local Plans prepared by Cambridge City & South Cambridgeshire Councils: Confirm targets for housing and employment growth and allocate sites in West Cambourne, Bourn Airfield and other sites along the A428 corridor for development as well as at West Cambridge and North West Cambridge.	<i>Greater Cambridge Local Plan. Transport Evidence Report. Cambridgeshire County Council Transport Strategy and Funding Team, November 2020.</i>
A.3	Policy within the TSCSC requires a range of infrastructure interventions on the St Neots and C2C corridor as a key part of the integrated land use and transport strategy responding to levels of planned growth.	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. The strategy provides a plan to manage the rising population and increasing demand on the travel network by shifting people from cars to other means of travel including public transport, walking and cycling.	<i>Transport Strategy for Cambridge and South Cambridgeshire, March 2014</i>

A.4	Cambridgeshire County Council are working with Greater Cambridge Shared Planning (GCSP) comprising Cambridge City and South Cambridgeshire, to provide a transport evidence base to support the preparation and examination of the Greater Cambridge Local Plan (GCLP) that runs to 2041.	Three growth level options being tested through the local plan are: <ul style="list-style-type: none"> <li>• Minimum – Standard Method homes-led</li> <li>• Medium – central scenario employment-led</li> <li>• Maximum – higher employment-led</li> </ul> The GCP City Deal constrained to deliver 44,000 jobs and 33,500 homes by 2031 and is consistent with the Minimum growth projection. Higher growth forecasts imply additional infrastructure and development sites beyond 2031.	<i>Greater Cambridge Local Plan. Transport Evidence Report. Cambridgeshire County Council Transport Strategy and Funding Team, November 2020.</i>
A.5	The Cambridgeshire and Peterborough Combined Authority is responsible for transport infrastructure improvement and the Local Transport Plan. Drawing on the CPIER the goals of the CPLTP published in 2020 are to deliver a transport system that delivers economic growth and opportunities, provides an accessible transport system and protects and enhances the environment to tackle climate change together.	The CPCA established the Cambridgeshire and Peterborough Independent Economic Review (CPIER). The review provides a robust and independent assessment of the Cambridgeshire and Peterborough economy and the potential for growth. 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.	<i>CPIER - Cambridgeshire and Peterborough Independent Economic Review, CPCA, September 2018</i>
A.6	In April 2020 the CPCA published a draft Sub-Strategy to the Local Transport Plan specifically dealing with CAM. The route along the A1303/A428 from Cambridge City centre towards Cambourne, St Neots and Bedford has been highlighted as a strategic project to help make travel by foot, bicycle and public transport more attractive than private car journeys, alleviating congestion and supporting the region's growth issues.	The C2C proposals have been assessed against the policies in the Sub-Strategy and it is concluded that the scheme is compliant, although 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.	<i>Cambourne to Cambridge Better Public Transport Project, Report to GCP Executive Board, 10 December 2020</i>

A.7	National Infrastructure Commission: The NIC has identified the Cambridge – Milton Keynes – Oxford arc as a national priority stating that its world-class research, innovation and technology can help the UK prosper in a changing global economy.	NIC has proposed the development of EWR. 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.	<i>NIC Report, November 2020.</i> <a href="https://nic.org.uk/studies-reports/national-infrastructure-assessment/">https://nic.org.uk/studies-reports/national-infrastructure-assessment/</a>
A.8	Highways England. Dualling of A428 Black Cat to Caxton Gibbet included in RIS2 programme, 2020-2025. 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.	DCO submitted in February 2021 for this Nationally Significant Infrastructure Project connecting the A1 to the A14. Preparatory works are underway. Scheduled for completion by 2023-24?	<i>Highways England. Route Investment Strategy. Road projects in the Eastern Region.</i> <a href="https://highwaysengland.co.uk/our-work/east/#roadprojectform">https://highwaysengland.co.uk/our-work/east/#roadprojectform</a>
A.9	East West Railway Company formed to create a new railway connection between Oxford and Cambridge. Consultation is anticipated on the preferred route alignment which includes stations at Cambourne and in the Sandy/St. Neots area.	The Bedford to Cambridge section is the third stage of the project and construction is not expected to start before 2025 with the train service beginning later this decade at the earliest.	<i>Connecting Communities: The Preferred Route Option between Bedford and Cambridge Executive Summary. EWR, 2019</i>

Table B: Scheme Objectives

	Assumptions	Constraints	Reference
	<b>B. Scheme Objectives:</b>		
B.1	<ul style="list-style-type: none"> <li>● Achieve improved accessibility to support the economic growth of Greater Cambridge</li> <li>● Deliver a sustainable transport network/system that connects areas between Cambourne and Cambridge along the A428/A1303</li> <li>● Contribute to enhanced quality of life by relieving congestion and improving air quality within the surrounding areas along the A428/A1303 and within Cambridge city centre</li> </ul>	<ul style="list-style-type: none"> <li>● Existing car mode share and car ownership within the A428/A1303 corridor is high, and future growth is expected to generate additional demand for car use in this area.</li> <li>● Traffic data shows that AM peak hour traffic speeds are 75% slower than night time average speeds on the route between the Madingley Mulch Roundabout and M11 Junction.</li> <li>● 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.</li> <li>● Travel to work data for key origins along the C2C corridor also illustrate the high level of car use along the route, with the car mode share for residents of Cambourne being particularly high (65%).</li> <li>● Residents of Cambourne and surrounding villages currently have limited options to use public transport due to the low level of service and current unreliability.</li> <li>● 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 and reliability.</li> </ul>	<i>C2C Outline Business Case, Strategic Case GCP January 2020.</i>

B.2	Supporting development through the busway corridor: The scheme is assumed to promote growth in the area and increase investment. It is designed to be the first in a series of steps to push forward growth.	Longer-term plans for the CAM network and EWR need to be taken into account.	<i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i>
B.3	Support for the labour market: Through the wider effects of the scheme it is assumed that there will be an increase in accessibility to jobs, education and training. This has the potential to give easier access into both Cambourne and Cambridge and thereby expand the labour market.	Constraints in this are linked to ticketing and frequency of service. If this is an expensive service, then some may still be priced out. There is no information on ticketing and service schedules have yet to be confirmed.	<i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i>
B.4	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>There are still several pinch points and interactions with general traffic that could create congestion and delay along the route.</p> <ul style="list-style-type: none"> <li>• Scotland Farm P&amp;R access</li> <li>• The section of the scheme which runs through Bourn Airfield must comply with the SPD for the site and complement the development Masterplan.</li> <li>• The section of the scheme which runs through West Cambridge must complement the development Masterplan. Consideration must be given to vibration and EMI impacts on sensitive receptors such as the Department of Materials Science and Metallurgy.</li> </ul>	<i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i>

<p>B.5</p>	<p>In the City Centre, GCP’s City Access project is proposing measures to reduce reliance on car travel and free up the city centre’s congested road space, to run better public transport services.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• City Access will also complement C2C by providing an alternative to car journeys for trips from new developments served by the scheme.</li> </ul>	<p>Bus services across the city centre incur substantial delays due to traffic congestion and the layout of city streets. Significant reallocation of road space to active travel and buses alongside on-street parking management measures will be required to improve bus journey times.</p>	<p><i>Report to GCP Executive Board, 18 March 2021</i></p>
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<p>B.6</p>	<p>On 31st October 2018 the CPCA Board agreed that the C2C scheme should be progressed by the GCP as an essential first phase of developing proposals for the CAM. They accepted the independent review of alignment between the C2C scheme and the CPCA plans for a CAM, undertaken by consultants Arup and commissioned by the CPCA in 2018.</p>	<p>Arup has undertaken a high-level review of route options and concluded that:</p> <ul style="list-style-type: none"> <li>• The process undertaken to date to determine the route is robust and the optimal solution for the corridor is confirmed;</li> <li>• The route is reclassified as a CAM route to serve the wider network, and not an independent guided busway corridor;</li> <li>• The vehicle operating along the A428 corridor will comply with the principles of the CAM;</li> <li>• The route will continue to be designed to align and integrate with the overarching CAM network, comprising one of the phases of the CAM network; and</li> <li>• Options for mitigating the impact of the scheme at West Fields and Coton will be incorporated into scheme design for the SOBC.</li> </ul>	<p><i>Cambridgeshire and Peterborough Combined Authority CAM Expert Advice A428 Report. Arup, October 2018</i></p>
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Table C: Project Deliverables

	Assumptions	Constraints	Reference
	<b>C. Project Deliverables:</b>		
C.1	<p>The project is made up of three key elements:</p> <ul style="list-style-type: none"> <li>• a public transport link between Cambourne and Cambridge,</li> <li>• a new Park and Ride facility off the A428/A1303 to supplement the existing Madingley Road Park and Ride, and</li> <li>• new cycling and walking facilities.</li> </ul>	<p>The C2C scheme will need to deliver on the following elements:</p> <ul style="list-style-type: none"> <li>• A HQPT system using rapid transit technology on dedicated routes.</li> <li>• High frequency, reliable services delivering maximum connectivity.</li> <li>• Continued modal shift away from car usage to public transport.</li> <li>• Capacity provided for growth, supporting transit-oriented development.</li> <li>• State of the art environmental technology, with easily accessible, environmentally friendly, low emission vehicles such as electric/hybrids or similar.</li> <li>• A fully integrated solution, including ticketing and linkages with the wider public transport network to maximise travel opportunities.</li> </ul> <p>Achieving these may be constrained by factors outside of the GCP's control.</p>	<i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i>
C.2	<p>Scotland Farm site chosen as preferred location for Park &amp; Ride site with a capacity for up to 2000 cars. It will also provide a travel hub with potential for cycle storage as well as waiting rooms/information point and retail outlet.</p>	<p>Scotland Farm is attractive location for commuters from areas to the west of Cambridge along the A428 corridor but less so for car users from the south exiting at jnc 13 of the M11. The success as a travel hub will depend on the number of car users and cyclists attracted to the site.</p> <ul style="list-style-type: none"> <li>• Any new Park &amp; Ride service will need to be to a standard similar to that currently operating for Cambridge's Park &amp; Ride services as set out in the current Access Agreement, which states that the</li> </ul>	<i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i>

		<p>Bus Operator will operate the Park &amp; Ride Bus Services in accordance with the established minimum requirements.</p> <ul style="list-style-type: none"> <li>• Provide appropriate traffic calming and management proposals to mitigate rat-running to Park &amp; Ride sites.</li> <li>• The alternative P&amp;R site at Madingly Road may be redeveloped for other use when the lease expires later this decade.</li> </ul>	
C.3	<p>Increase active travel through improved infrastructure for cycling and walking:</p> <ul style="list-style-type: none"> <li>• Comberton Greenway will complement the C2C project as it develops improved pedestrian and cyclist routes with a segregated path continuing beyond the proposed bus route.</li> <li>• Madingly Road cycling improvements enabled by reallocation of road space that complements C2C scheme</li> </ul>	<p>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> <p>The existing cycling network between Cambourne and Cambridge has sections of segregated links of uneven quality but is discontinuous and does not in total provide a high-quality segregated route which would cater for the potential increased modal share of cyclists along the corridor.</p> <p>Madingly Road potential bus lane/priority measures reallocated to cycling infrastructure.</p>	<p><i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i></p>

Table D: Strategic Fit

	Assumptions	Constraints	Reference
	<b>D. Strategic Fit:</b>		
D.1	A substantial level of housing and employment development is planned, or is already under development, along the C2C corridor include Cambourne West, Bourn Airfield, West Cambridge and North West Cambridge (Eddington).	Based on current plans, both those within the current Local Plan or well established through planning applications or known to be emerging, there are around 11,700 additional houses planned and around 13,400 additional jobs along the C2C corridor. 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.	'C2C Outline Business Case, Strategic Case GCP January 2020.
D.2	The C2C project has been recognised in the Local Plans and local transport strategy as a key project to help address these infrastructure constraints on growth by linking Cambridge to growth areas to the west. The provision of a HQPT service supporting journeys to key employment sites presents a viable alternative to car use/purchase for residents in new developments.	Two significant new planned developments (Cambourne West and Bourn Airfield) are, in housing terms, judged to be fully dependent upon the C2C project given the clear policy position within the adopted Local Plan and as supported by Section 106 commitments and ongoing negotiations.	'C2C Outline Business Case, Strategic Case GCP January 2020.
D.3	Supporting increased development density of the corridor: The assumption is that the added capacity of the scheme will support the densification in the areas easily accessible to the busway.	The growth depends on the scheme providing enough capacity to meet anticipated demands.	'C2C Outline Business Case, Strategic Case GCP January 2020.

D.4	<p>The scheme offers further capacity and therefore underpins growth. Whilst there is a wealth of supporting evidence for this assertion, it is hard to establish how much effect on relieving the capacity this scheme will have and how much growth that this scheme in isolation will enable. The scheme is assumed to be the launch point for further connections and shift away from private vehicles.</p>	<p>Existing network cannot increase travel capacity much further. A major constraint is whether this scheme can successfully create the conditions for modal shift? Are other measures required to achieve the 30% modal shift targeted in the GCP transport strategy?</p>	<p><i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i></p>
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Table E: Connections to CAM and EWR

	Assumptions	Constraints	Reference
	<b>E. Connections to CAM and EWR</b>		
E.1	The CAM project proposes an expansive metro network that seamlessly connects Cambridge City Centre, key rail stations (Cambridge, Cambridge North and the future Cambridge South), major City fringe employment sites and key ‘satellite’ growth areas, both within Cambridge and the wider region.	The GCP routes will form the first phase of the Combined Authority’s CAM project. This scheme is still at the planning stage (SOBC) and the preferred alignment, scheme costs and appraisal has yet to be confirmed in an Outline Business Case. There is uncertainty regarding the timeline for CAM implementation; the SOBC indicated a construction period between 2024 - 2030 but the timeline for the preparation of the OBC has already slipped so this appears to be optimistic.	<i>Cambridgeshire Autonomous Metro Strategic Outline Business Case, CPCA, February 2019</i>
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. The CAM station will be at ground level in this vicinity.	Alternative route options for the CAM are still being explored. So far, these rule out any alignment going via the Girton Interchange. A northern route corridor option(s) has been proposed. These would follow an alignment to the north of the A1303 and American Cemetery and connecting to the north side of the A428 and proceeding to Scotland Farm P&R and then crossing over to Bourn Airfield development. An alternative option to extend the CAM tunnel to the west of the M11 on the northern side of A1303 has also been explored. A preliminary evaluation of these 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.	<i>CAM Indicative Northern Route Corridor Options Map, CPCA, October 2020.</i>

E.3	<p>CAM: As a segregated route, the preferred option for the C2C is aligned with the CAM project, at least on the section between West Cambridge and Bourn Airfield. CAM connections through/around Cambourne will depend on the EWR station location. Connections to rest of the CAM network will be via a tunnel through the City Centre.</p>	<p>C2C travel hubs at Scotland Farm P&amp;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.</p>	<p><i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i></p>
E.4	<p>EWR: The C2C full business case will also need to include a sensitivity test to assess the impact of EWR Rail once there is clarity with regards to the proposals. It is unlikely that EWR will have an impact of the core business case for C2C given that it is unlikely that any EWR proposals will have achieved consent during the C2C assessment period.</p>	<p>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. 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><i>'C2C Outline Business Case, Strategic Case GCP January 2020.</i></p>

Table F: C2C Options Selection

	Assumptions	Constraints	Reference
	<b>F. C2C Options Selection</b>		
F.1	Options Sifting: The scheme options were developed in two phases. In total 34 options were considered which were sifted through a multi-criteria assessment framework to derive 6 options (3 phase 1 & 3 phase 2) including the P&R site options. These were then combined into 5 options for both phases including a scheme comparator which was eventually selected as the preferred option. The optioneering process reviewed a wide range of options suggested by stakeholders and following consultation. The assessment criteria followed DfT appraisal guidelines and covered a broad range of issues from policy goodness-of-fit to local environmental impacts.	The MCAF criteria is a qualitative exercise that measures the performance of each option against a wide range of factors grouped into 6 themes. The option scoring is justified on the available evidence but by its nature is subjective. 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. The preferred option would create a new busway crossing designated green belt in West Fields, Coton Orchards and National Trust lands. Options following alignments for the CAM and EWR were not evaluated as these are not confirmed, nor are they committed schemes.	<i>C2C Outline Business Case, Options Appraisal Reports 1, 2 &amp; 3, GCP January 2020.</i>
F.2	Alternative alignments to avoid Coton and Hardwick were evaluated as part of the options development process. These were not found to be suitable and performed worse than the preferred option and no better than the other options assessed.	Alternative northern route options via Girton interchange are not deliverable within the time horizons for the project and not compatible with CAM route corridor options. Other northern route options to the north of the American Cemetery are constrained by environmentally sensitive areas and heritage assets. The Cambridge American Cemetery and the American Battle Monuments Commission is regarded as a unique national memorial which honours the American military personnel killed in the second world war. They would oppose any on-road or off-road scheme which impacted the setting of the cemetery including removing the verges along the A1303 and the	<i>C2C Outline Business Case, Options Appraisal Reports 1, 2 &amp; 3, GCP January 2020. Madingley Road 'Quick-Win' Options Outline. Technical Note. Mott Macdonald. May 2019.</i>



		<p>uninterrupted views to the north. 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>	
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Table G: Economic Case

	Assumptions	Constraints	Reference
	<b>G. Economic Case</b>		
G.1	Options Appraisal: The preferred route from Cambourne to Grange Road has been analysed for its economic benefits and costs. Benefits were assessed at 3 levels following Transport Appraisal Guidelines: level 1 measures the transport user benefits to bus riders and decongestion benefits for car users; level 2 estimates the wider economic benefits assumed to accrue from the scheme from agglomeration; and level 3 estimates the wider economic benefits from land use changes at national and local level, including Gross Value Added through jobs created and the land value uplift from the scheme. These level 3 additionality benefits are what justify the scheme producing a BCR of 1.47 (increased to 3.48 with Greater Cambridge additionality benefits) compared with just 0.43 for the level 1 benefits and 0.48 for the adjusted level 2 benefits.	The scheme has been presented as creating 975 new jobs and increasing housing by around 6,000 which are dependent on the scheme. There is an increase in GVA of £102.8m per annum attributed to the scheme. Over a 30-year period this delivers a significant benefit of £676.1m plus £458m from land value uplift, giving a total benefit of £1.13bn. What constrains this assumption is that if the scheme does not support the housing and jobs growth as expected then there is a danger of reduced economic growth.	<i>C2C Outline Business Case, Economic Case GCP January 2020.</i>
G.2	Segregated busway: Comparison of wider economic impact assessment of the off-road (preferred option) and the on-road option estimates that the on-road option has a slightly positive BCR when local WEI are included whereas the off-road option has a much higher BCR.	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.	<i>C2C Outline Business Case, Economic Case GCP January 2020.</i> <i>'C2C Outline Business Case, Options Appraisal Reports 1, 2 &amp; 3, GCP January 2020.</i>

G.3	<p>Journey Times, Reliability and Ridership: The traffic modelling for the preferred option estimates a 167% increase in bus ridership when the scheme opens and 233% by 2036 when all the housing and employment in the corridor is assumed to be built. This amount of mode shifting, mainly from private car, is predicated on the C2C delivering significant journey time savings to users from Cambourne, Bourn village and the Scotland Farm P&amp;R. For instance, C2C passengers from Cambourne to Cambridge city centre are predicted to have 23 minutes lower journey time in the morning peak hour compared to a do minimum scenario. Alternative on-road options do not offer anywhere near this journey time saving or reliability.</p>	<p>Despite the forecast increase in bus ridership, there will still be a lot of traffic generated by the developments in the corridor so traffic congestion will remain a problem. The predicted mode shift only increases the bus mode share east of the Scotland Farm P&amp;R site from 4% to 6% of travel demand. Off peak C2C journey times are slightly longer due to the diversion from the busway to the Scotland Farm P&amp;R site.</p>	<p><i>'C2C Outline Business Case, Economic Case GCP January 2020.</i></p>
G.4	<p>Sensitivity Tests: A series of sensitivity test were performed to assess the robustness of the scheme against varying levels of growth. This supports the economic case for the scheme in that where costs may increase the VfM of the scheme remain unchanged, and that if a greater level of growth does materialise then the VfM of the scheme will increase.</p>	<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><i>'C2C Outline Business Case, Economic Case GCP January 2020.</i></p>

G.5	<p>Environmental Impact: Overall it is assumed that environmental factors are very limited in terms of the schemes impact on the proposed route. Noise, Air quality and emissions are all very limited. It is assumed they will have minor benefits or be neutral. Similarly, for the landscape impact it is neutral for the proposed route. There is a slightly higher impact on biodiversity, however there are mitigation opportunities for the scheme to reduce impact.</p>	<p>The scheme must achieve a 20% net biodiversity gain.</p> <p>The segregated busway alignment has been designed to minimise the impacts on the environment. Nevertheless, it will require mitigation measures to lessen its impact on the landscape especially where it crosses the green belt and National Trust land.</p> <p>There is also the limitation that if the targets for modal shift are not reached then there will be reduced benefit to the environmental factors such as emissions and air quality.</p>	<p><i>C2C Outline Business Case, Economic Case GCP January 2020.</i></p>
G.6	<p>Green Belt: Whilst it is always preferable to avoid any impacts on the Green Belt, in the case of C2C, impact is inevitable. The National Planning Policy Framework establishes that “certain other forms of development are also not inappropriate in the Green Belt provided they preserve its openness and do not conflict with the purposes of including land within it. These include local transport infrastructure which can demonstrate a requirement for a Green Belt location.”</p>	<p>The C2C scheme has been developed to provide linkage from new settlements located outside the Green Belt to the City of Cambridge. Given the need to connect development outside the Green Belt to the city, some degree of impact on the Green Belt is inevitable.</p>	<p><i>A428 Cambourne to Cambridge Segregated Bus Route Consideration of Green Belt Issues, LDA Design, August 2017</i></p> <p><i>C2C: Report to GCP Executive Board, 10 December 2020</i></p> <p><i>Interim Addendum Report to Planning Appraisal 2017: Cambourne to Cambridge public transport route (C2C) – Phase 1, Strutt and Parker, September 2019</i></p>
G.7	<p>Mitigation measures will be firmed up following the Environmental Impact Statement and in consultation with local landowners and the communities affected.</p>	<p>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.</p> <ul style="list-style-type: none"> <li>• Coton Conservation Area including Grade 1 listed Church.</li> </ul>	<p><i>C2C: Report to GCP Executive Board, 10 December 2020</i></p>

		<ul style="list-style-type: none"> <li>• Land parcels owned by Cambridge Past, Present and Future, which are protected by National Trust Covenants.</li> <li>• 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.</li> <li>• 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</li> </ul>	
G.8	<p>Social Impact: 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>Cost and accessibility is an issue for people on low incomes. High fares will reduce demand. The transport scheme needs to be financially sustainable and too many services with low patronage will drive costs up threatening service levels which in turn could reduce demand.</p>	<p><i>'C2C Outline Business Case, Economic Case GCP January 2020.</i></p>

Table H: Financial Case

	Assumptions	Constraints	Reference
	<b>H. Financial Case</b>		
H.1	The current estimated capital cost of the off-road option is £160.5m, of which £37.7m is anticipated from Section 106 contributions from other third parties such as the developers of the Bourn Airfield site and West Cambridge.	The estimated developer contributions are dependent upon ongoing assessments and negotiations and so are indicative at this stage. However, it is currently anticipated that between 20% and 25% of the scheme costs can be attributed to development and contributions secured accordingly. Any lower contributions would increase the financial risk of the scheme to the GCP.	<i>C2C Outline Business Case, Financial Case GCP January 2020.</i>
H.2	The estimated high-level scheme costs at this stage of the project's development are based on a range of assumptions and exclusions, which are detailed within OBC Appendix Q. These will be revisited and updated in the Full Business Case stage.	The financial case does not include Optimism Bias (currently 44%), which is used within the economic appraisal, but does include a risk allowance of 25%.	<i>C2C Outline Business Case, Financial Case GCP January 2020.</i>

Table I: Commercial Case

	Assumptions	Constraints	Reference
	<b>I. Commercial Case</b>		
I.1	In the SOBC it was concluded that the commercial factors related to the delivery did not significantly differentiate between the options.	As part of the current stage of scheme development and the OBC, a design and build procurement has been selected as the preferred procurement strategy. However, this is subject to further review as part of the next stage of work in developing the scheme and informing the Full Business Case	<i>C2C Outline Business Case, Commercial Case GCP January 2020.</i>
I.2	The design and build model will provide GCP with more opportunity to drive value for money and more opportunity to transfer delay risk and interface risks to the contractor.	Adopting a design and build approach puts the responsibility for design, including integration, with the contractor and it would be the responsibility of GCP to define its requirements.	<i>C2C Outline Business Case, Commercial Case GCP January 2020.</i>
I.3	The operation of the current bus services along the C2C corridor is largely on a commercial basis. With regard to the new HQPT services which are expected to operate along the C2C infrastructure, it is not the intention of GCP to be directly involved in their procurement and control as that is not within GCP's powers.	The potential public transport operating models currently available for the C2C project have been identified and the following issues and key questions considered: <ul style="list-style-type: none"> <li>• Available operating models for providing services;</li> <li>• Appetite in the market to engage with those models;</li> <li>• Impact and influence on fares and patronage;</li> <li>• Risks; and,</li> <li>• Commercial implications of objectives for clean high-quality transport such as high frequency services operated by high quality electric vehicles.</li> </ul>	<i>C2C Outline Business Case, Commercial Case GCP January 2020.</i>

	<p>The proposed Bus Network Strategy is based around three direct express services as follows:</p> <ul style="list-style-type: none"> <li>● Cambourne to Cambridge City Centre at 10-minute interval service (6 buses per hour)</li> <li>● Cambourne to Biomedical Campus at 30-minute interval service (2 buses per hour)</li> <li>● A428 Park and Ride site to Biomedical Campus at 30-minute interval service (2 buses per hour during peak periods)</li> </ul> <p>In addition, 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.</p> <ul style="list-style-type: none"> <li>● Biomedical Campus to Eddington at 15-minute interval service (4 buses per hour)</li> <li>● Biomedical Campus to Cambridge North Station &amp; Cambridge Science Park 30-minute interval service (2 buses per hour)</li> </ul>	<p>The routes and schedule are based on anticipated demand and are proposed routes only and have not been agreed with the existing route operators.</p> <ul style="list-style-type: none"> <li>● Any new Park &amp; Ride service will need to be to a standard similar to that currently operating for Cambridge’s Park &amp; Ride services in accordance with the established minimum requirements.</li> <li>● Communities along the corridor are served by the Citi 4 Bus Service, amongst others. This is a stopping service which could provide a feeder for the busway. Whilst the decision as to future Bus Services lies with bus operators, the provision of the Busway should not prevent the provision of existing services.</li> <li>● All buses are now required to be accessible for all including wheelchair users.</li> <li>● The scheme must be capable of eventual upgrade to form part of the CAM network.</li> </ul>	
1.4	<p>The Local Transport Authority (LTA) that has the relevant powers is the Cambridgeshire &amp; Peterborough Combined Authority (CPCA).</p>	<p>The CPCA Mayor’s recently commissioned Strategic Bus Review concluded that further work was required including procurement and completion of a business case to assess different delivery model options. Following completion of this latter piece of work, the CPCA Mayor is expected to make a decision on the future preferred option for delivering bus services in early 2021.</p>	<p><i>Strategic Bus Review Report, CPCA 2020</i></p>
1.5	<p>There are several options for the Busway maintenance which will be reviewed further at FBC.</p>	<p>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.</p>	<p><i>C2C Outline Business Case, Commercial Case GCP January 2020.</i></p>



Table J: Management Case

	Assumptions	Constraints	Reference
	<b>J. Management Case</b>		
J.1	The management case also identifies the key risks and mitigations for the project. The management case does not differentiate in terms of the options under consideration.	<p>The success and financial viability of the C2C project will be dependent on several factors. Scheme design and delivery will therefore need to consider the following dependencies outlined in the OBC:</p> <ul style="list-style-type: none"> <li>• Delivery of housing and employment sites allocated within the South Cambridgeshire Local Plan</li> <li>• Emerging CPCA Policy specified in the Local Transport Plan. Also need to consider Cambridgeshire Transport Delivery Plan (TDP) for transport capital schemes on the local network to be delivered on a three year time frame and the Transport Investment Plan (TIP) that includes the C2C scheme, developed alongside the TDP to identify schemes to support growth</li> <li>• Monitor how development of CAM progresses as the C2C project aims to deliver the first phase of infrastructure for the larger CAM network</li> <li>• City Access Strategy which aims to improve congestion on routes into the City Centre which will be key to reducing the journey times for buses and therefore making the Park &amp; Ride attractive and successful</li> <li>• Oxford-Cambridge Arc. 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</li> </ul>	<i>C2C Outline Business Case, Management Case GCP January 2020.</i>

C2C Independent Audit

		<ul style="list-style-type: none"> <li>Emerging Technologies. The final specification of C2C will be driven by technology advances and the range of solutions available at the procurement stage.</li> </ul>	
J.2	The Management Case reviews the process of public consultation and engagement. A communication plan sets out how this process is managed, identifying key stakeholders and how engagement is managed including the facilitation of a project specific Local Liaison Forum.	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 and to manage the communication and flow of information relating to the project.	<i>C2C Outline Business Case, Management Case GCP January 2020.</i>

Table K: Full Business Case

	Assumptions	Constraints	Reference
	<b>K. Full Business Case</b>		
K.1	The Full Business Case will develop the detailed design for the preferred scheme and update the appraisal for the economic case. Consultation and engagement with stakeholders and partners will continue through this stage. The risk register will identify outstanding issues that need remedial actions or mitigation measures.	Additional information for the financial, commercial and management cases will be provided together with recommendations on the necessary actions to proceed with the scheme.	<i>The Green Book: appraisal and evaluation in Central Government. HM Treasury 2020.</i>
K.2	Prepare an application for statutory consent anticipated in 2021 with a determination period estimated of around 18 months – completed in 2023.	Authority to construct the scheme is likely to come from a Transport and Works Act Order which would be determined by the Secretary of State for Transport. This process is likely to include a Public Inquiry directed by an independent Inspector	<i>C2C: Report to GCP Executive Board, 10 December 2020</i>
K.3	Prepare Environmental Impact Assessment and Environmental Statement	Work to be undertaken will include Environmental Impact Assessment as well as Transport Assessment, Road Safety Audit etc. This will draw on further work to be done on scheme design including mitigation measures and further stakeholder engagement.	<i>Report to GCP Executive Board, 10 December 2020</i>
K.4	Seek authority to construct project in 2023 depending on statutory powers process	Following the completion of the statutory permissions stage, the GCP Board will be presented with the Final Business Case for approval. This will trigger the construction of the project.	<i>Report to GCP Executive Board, 10 December 2020</i>
K.5	Opening of the scheme to operational services in 2025	Bus services schedule and routes will be determined in discussion with operators. Phasing in of services in response to planned growth and ridership demand	<i>Report to GCP Executive Board, 10 December 2020</i>

Table L: Covid-19 Impacts

	Assumptions	Constraints	Reference
	<b>L. Covid-19 Impacts</b>		
L.1	The implications of the global pandemic remain unknown. While there has been a short-term impact on the use of public transport, the longer-term impact is uncertain. The C2C scheme is consistent with the government’s agenda for innovative public transport solutions and mode switching from private car use in support of climate change goals and net-zero carbon by 2050. So, the prospects for the scheme are considered good in the long-term.	This matter will remain under review. Scheme appraisal will be revisited at Full Business Case stage with sensitivity tests of varying levels of demand and wider economic impacts.	<i>Transport use during the covid pandemic. Transport use by mode: Great Britain, since 1st March 2020. Department for Transport. <a href="https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic">https://www.gov.uk/government/statistics/transport-use-during-the-coronavirus-covid-19-pandemic</a></i>