

TRANSPORT TOPIC PAPER 1



Date: 19th December 2022

Job Number: 332210903

Subject: Site structuring features and principles, including accesses, public transport and neighbourhood design approach.

Prepared by: E Page / K Stannard

1. Purpose

This topic paper is one of a number which seeks to explore different topics which have a transport implication. The aim of topic papers is to set out succinctly the variations, different considerations, and resulting implications of different approaches within that specific topic. Topic papers will be refreshed and updated at each stage of the Local Plan review process to ensure the latest information / position is available.

The intention of the topic papers is to provide background information; they do not contain any policies, proposals, or site allocations.

The main issues covered by this Topic Paper are:

1. Connected 5-minute Neighbourhoods contributing to a 15-minute City
2. Points of Access
3. Design Principles of the high frequency Public Transport Route (Eastern Access Phase B)

These principles have been identified as being structuring elements that should be reflected in emerging policy and design thinking.

2. Connected 5-minute Neighbourhoods contributing to a 15-minute City

The design of the site and the neighbourhoods will be subject to masterplanning in due course. However, there are elements that have underpinned the transport case made thus far which are considered important to the success of the transport strategy and the subsequent adherence to the Trip Budget requirements going forward (See Topic Paper 2 for details of the trip budget).

These should be capable of reinterpretation by the designers of the site but should be considered as guiding principles that would help to support a successful low car community.

- A series of interconnected 5-minute neighbourhoods bounded by green infrastructure corridors and / or integrated with green infrastructure which would incorporate active modes of transport.

- Neighbourhoods are characterised in transport terms as having full connectivity to the rest of the site for all modes except the private car i.e. it is not possible for a resident to drive between one neighbourhood and another without leaving the site. Connectivity would be possible for key services, e.g. refuse collection.
- The heart of each neighbourhood would be based around living streets with car access strictly controlled.
- Car parking would, as a principle in the majority, be remote from properties especially in the heart of the neighbourhood, although there will still be some on-plot parking and considerations will be given to how disabled drivers needs can be served.
- The majority of car parking for each neighbourhood would be in specific car barns or multi-storey car parks that would be located close to the edge of the neighbourhood where greater car access is more typically designed for. Further work will develop how to manage private car ownership per dwelling.
- A single or limited private vehicle access to the public highway per neighbourhood.
- Reduced convenient car access would be supplemented by shared transport solutions (including car clubs) and mobility hubs within each neighbourhood.
- To support local living and complement the creation of a 15-minute 'city' at Cambridge East, a number of local other uses would be expected within the 5-minute neighbourhood such as children's play areas, green space, bus stops, some local shops (subject to context within a wider masterplan).

3. Points of Access

The precise access locations and junction types will be informed through masterplanning, demand forecasting, capacity, and safety analysis. However, the principle of access onto the surrounding corridors has been explored as part of the early capacity testing for the site and how access locations can, in combination with the principles for neighbourhood blocks, be relied upon to support the development and the principles of the transport strategy developed thus far.

At this stage it is considered that accesses in the following locations as described below can be explored further through subsequent stages of the planning and design process:

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- Access or accesses onto Barnwell Road, between the northern edge of the Barnwell East Nature Reserve and the southern edge of residential estate (Barnes Close).
- Access or accesses onto Newmarket Road between and including Marshall Group Gate A and the Airport Way / Newmarket Road roundabout. Access design and location will need to account for existing junctions, Eastern Access Phase A proposals, the principle of neighbourhoods blocks and the need to deter short vehicle trips to and from surrounding communities.
- Due to the presence of the Green Corridor and the requirement that general private traffic will not cross it, any new general vehicle access onto Airport Way is not anticipated. Access instead is assumed through safeguarded routes within the Land North of Cherry Hinton scheme with access at the new signalised junction with Airport Way/Cherry Hinton Road and the existing roundabout with Gazelle Way providing points of access to and from the site.
- Access or accesses onto Coldhams Lane, between the Land North of Cherry Hinton Coldhams Lane access and Nuttings Road.

4. Design Principles of the high frequency Public Transport Route (Eastern Access Phase B)

There is a need for high quality public transport to support the scheme. A step change in public transport access for the site and the east side of the city is needed and the Greater Cambridge Partnership (GCP) are sponsors of an emerging scheme referred to as Eastern Access Phase B. This will be supplemented by other public transport services connecting to key destinations to the north and south of the city, for example Cambridge North Station and Science Park; and Addenbrookes and the Cambridge Biomedical Campus.

Phase A of the GCP's Eastern Access scheme involves improvements to Newmarket Road and the delivery of a relocated Park and Ride site, further east towards the Quay roundabout. Phase B includes a route through the airport site (if redeveloped) and onto the city centre and station. Facilitating this connection will be integral to any masterplanning of the site.

Discussions with the GCP have been ongoing for a number of months and as the site is not yet at masterplan stage, flexibility must be left for the design team. However, in order for the GCP to have assurance that their objectives to deliver a transport scheme of a particular level of service can be achieved, the following design principles should be adhered to:

- ensure that public transport is a direct, convenient and efficient way of moving within the site and to access destinations further afield.

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- Deliver a bus offer that is highly visible, served by high quality halts/ stops situated to maximise accessibility and interchange opportunity.
- Safeguard an alignment for a rapid transit route through the Cambridge East site within the masterplan, exclusively for the use of public transport and identify adequate space for the construction of public transport halts.
- Provide high quality halts as part of the development proposal, with quality pedestrian and cycle routes linking to the halts from the proposed neighbourhoods.
- Where there are on-street bus routes away from the main corridor, buses will be given priority over general traffic. Streets must be designed and built to accommodate the efficient and smooth running of buses.

The following core principles should be adopted within the subsequent planning and design of the site to enable these principles to be achieved:

- Provision must be allowed for buses to enter and exit the airport site at a point(s) close to the Airport Way / Newmarket Road roundabout. The location(s) will be determined through design work with the GCP who are progressing plans for a relocated Park and Ride on land east of Airport way adjacent to the roundabout subject to consultation and final decisions on the preferred park and ride location. The junction(s) would only be for the access and egress of buses and not general traffic.
- Within the site, a 7.3m wide route of segregated carriageway for use by buses (thus creating flexibility to adapt to future mass transit technologies) is required throughout. Pedestrian and cycle infrastructure may be provided alongside the corridor but will be subject to the masterplanning exercise within the context of other primary and secondary walking and cycling routes within the site arising from the eventual location of different land-uses.
- The design speed of the route should vary to reflect different character conditions within the site and the density of primary and secondary walking and cycling networks – however, this should be no less than 20mph in urban areas or neighbourhoods and higher than this in other areas where pedestrian and cycle interactions are fewer.
- Crossings of the carriageway for buses should include formalised crossings and informal crossings. The frequency and nature of these crossings should balance the need to maintain reliable journey times for buses whilst creating safe and convenient crossing points for a range of users, avoiding severance. This can be determined as part of the masterplanning exercise.

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- Up to three halts (including one main hub) be provided within the site (in addition to the P&R) and account should be taken of actual walk distances to halts. These halts should include opportunities for modal interchange.
- The southern communities of the site require connected and comparable public transport access to the rest of the site.
- Buses to leave the site either via Barnwell Road and/or Coldham's Lane. The definitive point of access / egress will be informed through discussions with the GCP. This will be informed through off-site constraints.
- The overall route decision will be taken as the masterplan for the scheme is developed further and the different character areas and densities are understood and planned.

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Date: 19th December 2022

Job Number: 332210903

Subject: Establishing and Working within a Trip Budget

Prepared by: K Stannard / E Page

1. Purpose

This topic paper is one of a number that seek to explore different topics which have a transport implication. The aim of topic papers is to set out the variations, different considerations, and resulting implications of different approaches within that specific topic. Topic papers will be refreshed and updated at each stage of the Local Plan review process to ensure the latest information / position is available.

The intention of the topic papers is to provide background information; they do not contain any policies, proposals or site allocations.

The main issues covered by this Topic Paper are:

- The role of a trip budget
- The stages of defining a trip budget
- What needs to be considered when setting a trip budget at Cambridge East
- The early trip budget for Cambridge East
- Next steps

This topic paper should be read alongside the other Topic Papers for the Cambridge East site, in particular:

- Topic Paper 3 - Understanding the transport implications of different mixes of Homes and Jobs at Cambridge East; and
- Topic Paper 4 - Low Car Living and Mode Share Precedents.
- Topic Paper 5 – Transport Scenario Testing Results and Deliverability

2. The Role of a Trip Budget

What is a trip budget?

A trip budget can be defined as:

A transport policy approach that sets a limit on the level of vehicular trips that can be generated from a particular development. It seeks to ensure through all stages of the planning process that there are tools and mechanism in place to measure performance with reference back to this level of trip making.

The above is based upon the definition provided within the 'Transport Evidence Report Preferred Option Update (October 2021)'. Both Alconbury Weald and Waterbeach new town have had trip budgets implemented through the planning process. A Monitor and Manage Adaptive Approach is implemented at both sites.

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This means each key phase coming forward through detailed planning, the baseline and performance of the site against the cap is reassessed and mitigation tailored to respond to the changes.

What is its role in Local Plan making?

Large scale strategic sites present a unique position for plan making which is stated in National Policy Guidance below:

Where plans are looking to plan for longer term growth through new settlements, or significant extensions to existing villages and towns, it is recognised that there may not be certainty and/or the funding secured for necessary strategic infrastructure at the time the plan is produced. In these circumstances strategic policy-making authorities will be expected to demonstrate that there is a reasonable prospect that the proposals can be developed within the timescales envisaged. [Paragraph 059]

The role of the trip budget in plan making is to create confidence that strategic sites can be allocated with effects which are consistent with the Plan's strategy and with planned infrastructure investment, insofar as it can be predicted at the time a trip budget is identified.

At the plan making stage, the trip budget approach fulfils the National Policy Guidance as it:

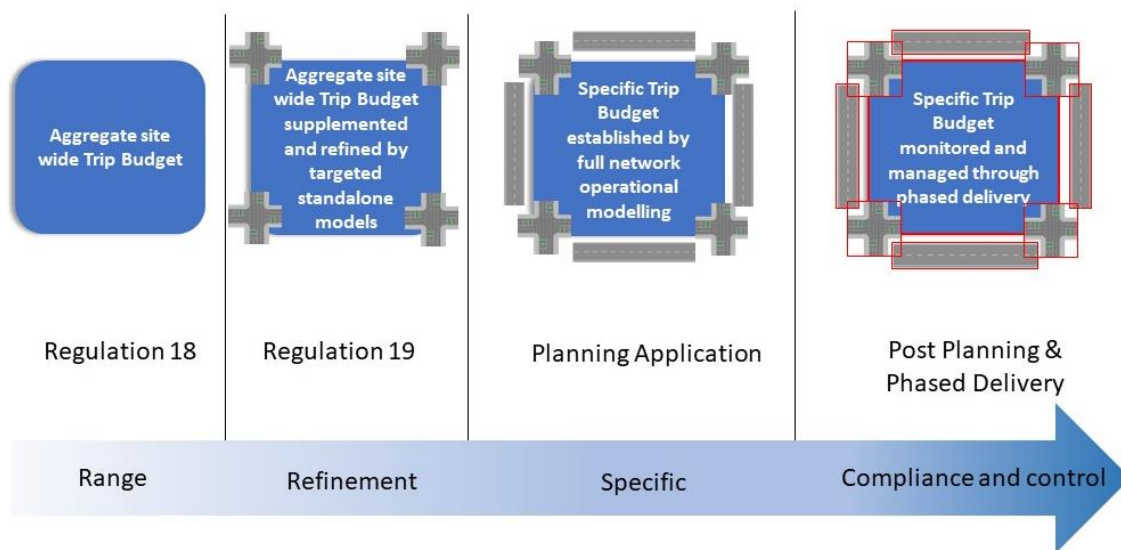
- provides proportionate evidence that a quantum of development can be delivered with a credible car driver mode share;
- demonstrates deliverability through obtaining commitment to the principle from the site's promotor / developer
- retains some flexibility in its application in the short term so it can respond to unforeseen changes and major sustainable infrastructure delivery as the plan period progresses
- enables an early definition of how the approach will inform future detailed planning phases where the specific trip budget can be better and more fully defined.

3. The Stages of Defining a Trip Budget

The trip budget approach consists of a number of distinct stages, allowing proportionate evidence at each stage of the plan making progress, planning application, delivery and occupation.

The stages are schematically shown overleaf and explained further in the subsequent text.

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Regulation 18 Local Plan - 'The Range Stage'

At the Reg 18 stage of plan making, very early principles around the trip budget are established. There are two parts to this. The first part is to define a broad level of traffic impact and network performance that is considered acceptable. At this stage, these conclusions need to be based on proportionate evidence (and tools) commensurate with this early stage of the plan making process.

The second part, is then to consider what this vehicular trip limit means for the development quantum, mix and mitigation packages at the site, and what vehicular mode shares would then need to occur at the site to not breach the trip budget and the network performance. The resulting car driver mode shares associated with the eventual development quantum and mix should be credible and defensible. Both parts are necessary to demonstrate there is a reasonable prospect that this scale of development could come forward for further, more detailed assessment as part of the Local Plan process and that the principle of the site's development is not likely to be inconsistent with the emerging local plan strategy.

Developing the trip budget at Reg 18 stage therefore includes:

- a high-level understanding of the trip budget based on any broad estimates of the existing site traffic generation and forecasts of capacity within the road network, taking account of likely known infrastructure investment and other trends, such as increases in home or hybrid working¹.
- an indicative level of trip generation and distribution associated with the full scheme build out after mitigation;
- an indicative car driver mode share which it will be necessary to achieve for the development to meet the trip budget – and an assessment of whether this is credible;

¹ Other emerging impacts (e.g. 'cost of living') are also likely to be relevant but until more certainty is known about the longevity of these impacts, any direct influence on trip budget is excluded.

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- consideration, in principle, of whether any further mitigation may be necessary to ensure the development can operate consistently with the plan's emerging strategy.

Regulation 19 Local Plan – 'The Refinement Stage'

During later stages of the plan making process (Reg 19), refinement of the above is undertaken, taking into account more advanced assumptions on land-use mix, quantum and mitigation packages arising from cross-topic evidence stages and a more detailed understanding of the capacity of the network and of planned infrastructure investment. This leads to a refinement of both of the parts above. In addition, a number of standalone operational models can be used to consider specific junctions and access locations. These operational models would be supplementary and would seek to validate the conclusions drawn from earlier stages of assessment.

Planning Application – 'The Specific Stage'

During the planning application process, further operational network assessments would be undertaken as part of the Transport Assessment to further refine Part 1 of the trip budget. These will take full account of phasing, detailed access designs, network mitigations and wider changes, as well as detailed and agreed methodologies for wider growth/ reductions and other committed schemes. The Transport Assessment will report the trip generation, distribution, mode share and assignment in detail of the completed development using a methodology scoped and agreed with Cambridgeshire County Council.

The outcome of the modelling at this stage will be to establish the level of acceptable trip making from the site on the surrounding network on a corridor and junction basis which will form then the basis of obligations and ongoing post-planning monitoring. It is at this stage that detailed conclusions can be reached about the precise trip budget and how it is to be applied and monitored.

It is generally standard practice that 'worst case' traffic scenarios are tested at this stage ('i.e. predict and provide' - although this could be done on a strategic level). However, emerging practice is moving towards a 'decide and provide' policy which places less emphasis on traffic, and more on sustainable modes of travel and what infrastructure and services are required to deliver high levels of sustainable travel. A 'monitor and manage' approach may be the best way of delivering the development in accordance with this approach and agreed mode shares and trip budget.

Post Planning – Phased Delivery – 'The Compliance and Control Stage'

At each reserved matters application seeking consent for the details of phases of development, the technical work will be updated to consider the performance of the external network and the performance of the site against the trip budget and the car driver mode share target established at Outline Stage. External changes can be incorporated into further assessments alongside detailed monitoring data from occupied parts of the development. Monitoring will ensure full accountability and if

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necessary further mitigation, or refocussed mitigation which may be needed to ensure that overall compliance with the trip budget is achieved. The full detail of these mechanisms would be established in the s.106 obligations entered into on the grant of outline consent.

As development phases progress so a 'monitor and manage' process will bring sharper focus on mode shares and actual outcomes against a trip budget.

4. Additional site-specific considerations for defining a trip budget at Cambridge East at different stages of the process

Taking into account the above, the following must also be considered when establishing a trip budget at Cambridge East:

- The existing workforce at the airport and the impact on the trip budget i.e. there are extant trips that are already on the network associated with the site. Early outcomes set out in the Employment Topic Paper state around 64% of the existing 1,600 workforce would move away from the area, 24% relocate within Cambridgeshire and only 12% relocate within Cambridge. This extant generation should be factored into the net trip budget for Cambridge East as it exists in the baseline. This needs to be undertaken at the Refinement Stage.
- The site is bounded by four roads (Newmarket Road, Barnwell Road, Coldhams Lane and Airport Way). The next stage (Refinement) of CSRM modelling will refine the access assumptions to ensure that access onto each corridor is modelled (if appropriate). That same work would be used to inform the trip budget, as the budget will need to take account of likely trip distribution, which is in turn dependent in part on the site access strategy.
- The potential for neighbourhood block specific trip budget monitoring. The approach to internal neighbourhood design (i.e. each parcel is proposed to be accessed individually with no vehicular movement between parcels – see Topic Paper 1), and parking strategy means neighbourhood specific car driver mode share targets could be set and monitored in line with an overall trip budget. This will not affect the trip budget setting for the Local Plan stages but could be considered at planning application stage (specific stage).
- The public transport and active travel strategies and the extent to which both provide attractive alternatives to the private car for journeys within and, critically, beyond the site boundary to key destinations.

5. City-wide considerations for defining trip budgets

The trip budget approach needs to be flexible during the plan making stages as there are many transport schemes currently planned and committed which will influence network performance and sustainable travel behaviour at Cambridge East between today and when the site is fully built out and mitigation in place. As time progresses, certainty about the timing of these schemes will increase and the potential impacts

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on the network will be better understood. Expectations for the budget will need to adjust to this increasing granularity of information.

Committed schemes relevant to Cambridge East include the GCP's Making Connections study and GCP's Cambridge Eastern Access Study amongst others.

The impact of these schemes is included for within the CSRM modelling and therefore taken into account so far at a high level, but further work is likely to be required as the local plan preparation progresses and at the planning and post-planning stages to appreciate and take into account the effects of surrounding network capacity that results from these significant policy and physical changes.

Other, as yet unknown, schemes or policy initiatives at local and national level are likely to come forward over time that will influence the trip budget setting process. Whilst details cannot be known now, it is likely that the effect of any 'unknowns' will reduce the attractiveness of car journeys within the site and urban area especially.

6. Defining a first stage trip budget at Cambridge East

Stage 1 – establishing the broad level of acceptable traffic impact.

The 'Greater Cambridge Local Plan Preferred Option Transport Evidence Report' (October 2021) contains an assessment of the potential traffic impacts of 7,000 homes and 9,000 jobs against a 2041 baseline (i.e. referred to hereafter as 'Local Plan Option').

Stantec requested additional analysis of these existing GCSP Local Plan modelling runs to understand the traffic impacts of 7,000 homes and 9,000 jobs at Cambridge East. This was provided in a technical note to Stantec² and showed that initial testing indicated the Cambridge East at Full Build Out with GCSP/CCC mitigation (Ref:T1254b) produced:

- Active travel mode shares of between 47% – 57%
- Car driver mode shares of between 32% to 42%
- A relatively consistent public transport mode share of around 9 – 10%.
- Internalisation levels of between 15% and 19%
- Delays (post mitigation) of between 1.5 to 2 minutes each at the Newmarket Road junctions with Ditton Lane and Barnwell Road and delays less than one minute across all other junctions shown around the site during the morning peak hour.
- Delays of between 2 and 3.5 minutes at the Newmarket Road / Barnwell Road roundabout in the evening peak hour with delays less than one minute at all other junctions.

In this earliest run of the CSRM, the Cambridge East site was modelled using two zones and only two points of access to Newmarket Road and Barnwell Drive. Mitigation was included within the model run. The scale of the package is smaller

² Additional Analysis of Existing GCSP Local Plan Runs TN_v0.5, Atkins, October 2021.

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and less granular than the package initially identified by Stantec in the December 2020 report entitled “Cambridge East: Transport Appraisal and Emerging Transport Strategy” submitted as part of the Local Plan consultation and subsequently reported in the February 2022 document entitled “Cambridge East: Delivering Planned Growth Transport Strategy” submitted as part of the local plan in March 2022. The CSRM modelling approach does not, at this stage, constrain car parking at the site.

The CSRM modelling undertaken is considered to be the most appropriate and defensible modelling tool at this stage of the plan making process. It provides direct comparison to the performance of other sites being considered and can consider the impact of development on the Greater Cambridge road network. However, the strategic nature of the model means that, whilst it is suitable for early testing, there is the potential for refinement as more evidence is prepared for the site.

Nevertheless, the modelling undertaken that supports the current stage of plan³ concludes in paragraph 15.1.3 on page 200 that:

*“There is further work needed to refine the mitigation package for inclusion in the draft Local Plan, but there is **nothing in the modelling results to suggest that the development locations and quantum included in the Preferred Option cannot be accommodated on the transport network and achieve high levels of travel by sustainable modes**”*

Therefore, accepting of this interim conclusion, the level of impact reported so far from the CSRM modelling provides a starting point for establishing a trip budget for Cambridge East, and will be subject to refinement through more detailed work as the local plan and testing progresses.

Stantec has therefore used the Local Plan CSRM external vehicular trip generation as the benchmark for acceptable traffic impacts at this first stage of developing a trip budget at Regulation 18 stage. These peak hour highway trips are reported in Table 4-5 of Atkins Note entitled Additional Analysis of Existing GCSP Local Plan Runs TN_v.05 and reproduced in Table 1 below.

Table 1 – “Range Stage” External Peak Hour Highway Trips Reported in CSRM Modelling

External Car Driver Trips		Source
AM Peak Hour	PM Peak Hour	
1,500	1,800	Atkins Note “Additional Analysis of Existing GCSP Runs”

³ ‘Greater Cambridge Local Plan Transport Evidence Report Preferred Option Update (October 2021)’

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7. Next Steps

Stage 2 – exploring an optimum development quantum and mix that delivers a credible and defensible car driver mode share

With a starting point established as a guide for the level of peak hour vehicular trips that can be accommodated with appropriate mitigation, the next question is what development quantum and mix can be delivered within this threshold and can be shown to have a resulting credible and defensible car driver mode share. Just as the modelling will need to become more refined as the Plan progresses, so will the granularity of the answer to this question.

Stantec has undertaken technical analysis to understand the transport implications of different balances between homes and jobs, to identify an 'optimal' ratio. This technical work is reported in Topic Paper 3 and used Stantec's Spreadsheet Tool. It should be noted that the definition of 'optimal' at this stage is narrow.

There are clearly very many other considerations that should come into the thinking of decision makers to determine the appropriate and definitive number of jobs and homes in this location. For example, and from a transport perspective, the concentration and type of jobs in a single urban location, rather than dispersed around the district, has significant advantages in terms of public transport viability, the extent of the solutions that can be afforded and the reduced vehicular (and therefore carbon) impacts. These further considerations are not appraised as part of the spreadsheet tool but are in terms of the broader spatial analysis undertaken using CSRM as part of its role in plan making.

Stage 3 – Contextualising the external trip generation in terms of target mode shares, to understand deliverability of development scenarios.

With the better performing mix identified, to understand what scale of development is deliverable in light of the trip budget within this note, the external vehicular trips are then contextualised. This stage has three parts:

- a) Contextualising the external vehicular trip generation using international / national / local comparisons and precedents on modal share to help understand potential deliverability. This is reported in Topic Paper 4 – Low Car Living and Mode Share Precedents.
- b) With an understanding of development mix and quantum, the benchmarked vehicular trips can be used to derive a target car driver mode share for the development which can be cross compared with the outcomes of (a) to inform deliverability. These results are summarised in Topic Paper 5 – Transport Scenario Testing Results and Deliverability.
- c) Based on the assessments to date, key mitigation to deliver the scenarios tested can be identified which would underpin this delivery. These mitigation schemes are also set out in Topic Paper 5 - Transport Scenario Testing Results and Deliverability.

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8. Summary

On this basis, at this early stage of testing this note has considered that:

- CSRM modelling to date by GCSP and CCC has concluded there's no modelling evidence to suggest the Local Plan Option cannot be accommodated on the network with mitigation. This level of trip making and mitigation package forms the basis for the emerging early aggregate trip budget.
- The demand for external car trips shown in Table 1 (1,500AM trips and 1,800 PM trips) provides a proportionate first stage trip budget benchmark. This trip budget benchmark will be subject to further modelling refinement, so will be subject to change.
- Modelling evidence concludes, the impacts of this scale of vehicular trips, at this early stage, are not severe, however the precise trip budget will be established with progressive accuracy as the planning process develops. The trip budget may increase or decrease in future as a result. For the purposes of this paper, the work to date in CSRM establishes a high level budget, allowing a benchmark to be set beyond which sensitivities can be explored for site capacity and mix, car driver mode shares and precedents elsewhere.

Further observations are as follows:

- Refinement of the accesses within the CSRM for the Local Plan option alongside extant trip making is required to refine the trip budget so that the impact of the full forecast of car driver trips can be assessed and reviewed.
- Further site site-specifics including further mitigations and for Cambridge East (i.e. 15 minute neighbourhoods, constrained car parking) should also be captured.
- Further refinement on development quanta and transport mitigation will be defined in accordance with the trip budget benchmark. This will be informed by the following emerging work:
 - o Modelling of additional vehicular access points.
 - o Updated job assumptions for the existing Airport Zones to reflect the findings of the Employment Topic Paper.
 - o Sustainable transport mitigation package defined in Stantec's February 2022 report entitled "Cambridge East: Delivering Planned Growth Transport Strategy" and Topic Paper 4.

TRANSPORT TOPIC PAPER 3

Date: 19th December 2022

Job Number: 332210903

Subject: Understanding the transport implications of different mixes of Homes and Jobs at Cambridge East

Prepared by: M Nejad / K Stannard / E Page

Purpose

This topic paper is one of a number which seeks to explore different topics which have a transport implication. The aim of topic papers is to set out succinctly the variations, different considerations, and resulting implications of different approaches within that specific topic. Topic papers will be refreshed and updated at each stage of the Local Plan review process to ensure the latest information / position is available.

The intention of the topic papers is to provide background information; they do not contain any policies, proposals or site allocations.

The main issues covered by this Topic Paper are:

- How the mix of homes and jobs influence travel patterns
- How the mix of homes and jobs can benefit sustainability
- The interface between development mix and trip budget
- The performance of different homes and jobs mixes at Cambridge East.

This topic paper should be read alongside the other Topic Papers for the Cambridge East site, in particular:

- Topic Paper 2 – Establishing and working within a trip budget
- Topic Paper 4 - Low Car Living and Mode Share Precedents
- Topic Paper 5 - Transport Scenario Testing Results and Deliverability

How does the mix of homes and jobs influence site-level travel patterns and sustainability?

The sustainability benefits of achieving a good mix between homes and jobs within a site are that this can facilitate low carbon living, can reduce the need to travel off-site (including by car) and therefore congestion and emissions, and can make best use of on and off-site transport infrastructure networks.

It should be noted that this approach to finding an appropriate mix between the number of jobs and homes within a site, only considers the transport patterns for the site itself, rather than the role the provision of each can individually play in positively influencing travel behaviour beyond the site boundary.

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As stated, there are clearly very many other considerations that should come into the thinking of decision makers as part of a Local Plan to determine the appropriate and definitive number of jobs in this location. For example, and from a transport perspective, the concentration of jobs in a small number of accessible urban locations, rather than dispersed around the district, has significant advantages in transport and carbon terms. This supports public transport viability, the extent of the solutions that can be afforded and the reduced vehicular (and therefore carbon) impacts associated with this growth if it were to happen elsewhere. These further considerations are not appraised as part of the analysis reported in this note, but are considered through the broader spatial analysis undertaken using CSRM as part of its role in plan making.

Ignoring this wider context of the role that homes and jobs play beyond the site boundary, if only considering trips to and from a site:

- A good mix within the site would result in
 - o Ability for day to day needs to be largely met within the site and thus reduced draw on surrounding transport network capacity (internalisation).
 - o Shorter distances (average distance for all trips) for fulfilling day to day needs, resulting in greater opportunities for low carbon travel (mode share).
 - o A relatively even number of trips travelling in and out of the site during the busy peak periods (balanced tidality).
- A poor mix within the site would therefore result in:
 - o Longer journey distances as people need to travel off-site for some of their day to day needs (increased time, potential worse mode share, increased emissions)
 - o Higher car driver modal shares as fewer opportunities exist within the site to meet their day to day needs.
 - o A significant imbalance in the number of incoming and outgoing trips, creating peaks in pressure on external network capacity and potentially resulting in significant in- or out-commuting that impacts on the type of transport mitigation package required. However, this imbalance is not solely negative as when considering beyond the site boundary, it can also act as a catalyst and strengthen the business case for city-wide transport schemes that would have wider benefits.

The key metrics for maximising sustainable trip making within a site are therefore as follows:

- that a high proportion of trip making occurs within the site;
- that trip lengths are shorter (thus being able to be undertaken by sustainable modes); and
- tidal balance of trip making is relatively balanced – as an overall indicator of whether the trip distribution is still appropriate for the transport mitigation package supporting the scheme.

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What ratios have been tested at Cambridge East and what is the conclusion?

Stantec has undertaken technical analysis to understand the transport implications of different mixes between homes and jobs, to identify a range of mixes at a site level that maximise sustainable trip making within the site. This technical work is reported in this section and used Stantec's Spreadsheet Tool¹. For the purposes of testing, the following scenarios have been included:

- Number of homes kept constant at 7,000 homes and the number of jobs varied between 0.1 to 2 times the number of homes.
- Number of jobs kept constant at 9,000 jobs and the number of homes varied between 0.5 to 2 times the number of jobs.
- Ratio of jobs to homes kept constant at 1:1 and the number of jobs/homes varied between 1,000 to 15,000.

The above scenarios have been tested across the AM peak period (07:00 – 10:00), PM peak period (16:00 – 19:00), interpeak period (10:00 – 16:00) and 24 hour period.

The impact of the overall mix between homes and jobs on trip making depends on the proportion of overall trips occurring during that time period that are commuting trips. The National Travel Survey (2019) data indicates that the proportion of commuting, business, work and personal business trips happening during the AM, PM and 24 hour periods are 49%, 48% and 41%, respectively. As such, the impact of different jobs and homes mixes will be more evident when analysing internalisation during the AM and PM peak hours than over a 24 hour period.

It should be noted that the definition of 'best performing' mixes at this stage is narrow. It only relates to the sustainable trip making possible within the site, rather than any benefits beyond the site boundary. It only includes considerations set out below and does not account for many other aspects which would be material to plan making and whereby comparative analysis against other potential sites is needed.

The performance of different homes and jobs mixes has been considered against the following metrics:

- Whether the mix reduces the need to travel off-site to meet day to day needs
 - Metric 1: proportion of trips that stay within the site – i.e. internalisation
 - Metric 2: total level external trips generated from the site
- Whether the mix can reduce the need for longer distance journeys which are most likely to be made by car
 - Metric 3: average journey distance
 - Metric 4: proportion of trips that are within 8km – i.e. trips that stay within Cambridge City

¹ The "Stantec Spreadsheet Tool" has been reviewed by Cambridgeshire County Council as part of other planning applications for robustness and is considered to give a good preliminary indication of trip generation and trip distribution, pending further testing at subsequent stages. The tool generates detailed forecasts of the number of person trips generated by different land-uses and uses a gravity-based function to forecast levels of trip making within and beyond the site, based on the purpose of the trip.

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- Whether the mix maximises the benefits from the transport mitigation packages proposed and makes efficient use of available capacity within a peak hour or other period
 - o Metric 5: the degree of balance between incoming and outgoing trips (Tidality).

Tidality is a metric as previous work in December 2020 by Stantec found when there was a significant mismatch in tidality, this is an indicator for a change in trip distribution (as jobs and homes have different distributions). Therefore tidality is an indicator as to how well the mix is met by the current transport strategy and mitigation package.

Tables 1 – 3 summarise the findings of the three scenarios tested against the five metrics set out above. The results are summarised in the pages that follow.

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Table 1: Homes Fixed to 7000 and Ratio of Jobs to Homes Increased

Homes	Jobs	Jobs per home ratio	Homes per job ratio	Internalisation	Tot. Ext. Trips	Ave. Dist. (km)	% of trips within 8km	Ext. trip balance
<i>AM Peak Period (0700 – 1000)</i>								
7000	700	0.1	10	42.10%	12190	5.8	94.06%	-19.60%
7000	3500	0.5	2	44.70%	13688	7.2	94.04%	-3.00%
7000	4200	0.6	1.67	45.20%	14068	7.4	94.03%	0.50%
7000	4900	0.7	1.43	45.70%	14448	7.7	94.02%	3.80%
7000	5600	0.8	1.25	46.20%	14830	8	94.00%	6.80%
7000	6300	0.9	1.11	46.60%	15212	8.2	93.98%	9.70%
7000	6580	0.94	1.06	46.80%	15365	8.3	94.34%	10.70%
7000	7000	1	1	47.10%	15594	8.4	93.96%	12.30%
7000	8750	1.25	0.8	48.00%	16549	8.9	93.91%	18.40%
7000	9000	1.29	0.78	48.10%	16686	9	93.90%	19.20%
7000	10500	1.5	0.67	48.90%	17502	9.4	93.85%	23.60%
7000	14000	2	0.5	50.30%	19392	10.1	93.71%	32.10%
9500	9000	0.95	1.06	49.60%	19539	8.1	94.37%	10.80%
<i>PM Peak Period (1600 – 1900)</i>								
7000	3500	0.5	2	29.70%	16498	7.9	79.40%	6.10%
7000	4200	0.6	1.67	29.50%	16891	8	78.70%	4.30%
7000	4900	0.7	1.43	29.30%	17285	8	78.00%	2.60%
7000	5600	0.8	1.25	29.00%	17680	8	77.40%	1.10%
7000	6300	0.9	1.11	28.80%	18075	8.1	76.80%	-0.40%
7000	6580	0.94	1.06	28.70%	18233	8.1	76.60%	-1.00%
7000	7000	1	1	28.50%	18470	8.1	76.20%	-1.80%
7000	8750	1.25	0.8	27.80%	19598	8.2	74.80%	-5.40%
7000	9000	1.29	0.78	27.80%	19598	8.2	74.80%	-5.40%
7000	10500	1.5	0.67	27.40%	20441	8.3	73.80%	-7.80%
7000	14000	2	0.5	26.30%	22392	8.5	71.90%	-12.50%
9500	9000	0.95	1.06	31.70%	23144	7.7	77.70%	-1.50%
<i>24 Hour Period</i>								
7000	700	0.1	10	35.20%	61406	7.5	87.60%	-2.20%
7000	3500	0.5	2	35.70%	66781	8	86.20%	0.10%
7000	4200	0.6	1.67	35.80%	68135	8.1	85.80%	0.60%
7000	4900	0.7	1.43	35.80%	69490	8.2	85.50%	1.00%
7000	5600	0.8	1.25	35.80%	70846	8.4	85.20%	1.50%
7000	6300	0.9	1.11	35.90%	72202	8.5	84.90%	1.90%
7000	6580	0.94	1.06	35.90%	72744	8.5	84.70%	2.10%
7000	7000	1	1	35.90%	73557	8.6	84.50%	2.30%
7000	8750	1.25	0.8	35.80%	76935	8.8	83.80%	3.30%
7000	9000	1.29	0.78	35.80%	77416	8.8	83.70%	3.40%
7000	10500	1.5	0.67	35.80%	80296	9	83.10%	4.20%
7000	14000	2	0.5	35.60%	86951	9.4	81.80%	5.70%
9500	9000	0.95	1.06	38.90%	91738	8.1	85.70%	1.90%
<i>Interpeak Period (1000 – 1600)</i>								
7000	700	0.1	10	36.10%	24056	8	87.90%	-4.60%
7000	3500	0.5	2	36.50%	25592	8.3	87.20%	-2.80%
7000	4200	0.6	1.67	36.50%	25974	8.3	87.00%	-2.30%
7000	4900	0.7	1.43	36.60%	26354	8.4	86.80%	-1.90%
7000	5600	0.8	1.25	36.70%	26732	8.4	86.70%	-1.50%
7000	6300	0.9	1.11	36.70%	27110	8.5	86.50%	-1.10%
7000	6580	0.94	1.06	36.70%	27260	8.5	86.40%	-0.90%
7000	7000	1	1	36.80%	27485	8.6	86.30%	-0.70%
7000	8750	1.25	0.8	36.90%	28418	8.7	85.90%	0.20%
7000	9000	1.29	0.78	36.90%	28566	8.7	85.80%	0.40%
7000	10500	1.5	0.67	36.90%	29340	8.9	85.50%	1.10%
7000	14000	2	0.5	37.00%	31154	9.1	84.80%	2.60%
9500	9000	0.95	1.06	39.50%	34041	8	87.50%	-1.70%

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Table 2: Jobs Fixed to 9000 and Ratio of Jobs to Homes Increased

Homes	Jobs	Jobs per home ratio	Homes per job ratio	Internalisation	Tot. Ext. Trips	Ave. Dist. (km)	% of trips within 8km	Ext. trip balance
<i>AM Peak Period (0700 – 1000)</i>								
18,000	9000	0.5	2	52.00%	28743	6.4	95.00%	-6.10%
15,000	9000	0.6	1.67	51.40%	25557	6.8	94.90%	-1.40%
12,850	9000	0.7	1.43	50.80%	23237	7.2	94.70%	2.70%
11,250	9000	0.8	1.25	50.30%	21485	7.6	94.60%	6.20%
10,000	9000	0.9	1.11	49.80%	20098	7.9	94.40%	9.40%
9,500	9000	0.95	1.06	49.60%	20098	7.9	94.40%	9.40%
9,000	9000	1	1	49.60%	20098	7.9	94.40%	9.40%
7,000	9000	1.29	0.78	48.10%	16686	9	93.90%	19.20%
6,000	9000	1.5	0.67	47.30%	15512	9.5	93.60%	23.30%
4,500	9000	2	0.5	45.70%	13704	10.4	93.00%	31.00%
<i>PM Peak Period (1600 – 1900)</i>								
18,000	9000	0.5	2	39.20%	34843	6.8	82.90%	6.00%
15,000	9000	0.6	1.67	37.20%	30758	7	81.50%	4.00%
12,850	9000	0.7	1.43	35.40%	27804	7.2	80.30%	2.20%
11,250	9000	0.8	1.25	33.80%	25589	7.4	79.20%	0.60%
10,000	9000	0.9	1.11	32.40%	23845	7.6	78.10%	-0.80%
9,500	9000	0.95	1.06	31.70%	23143	7.7	77.70%	-1.50%
9,000	9000	1	1	31.00%	22440	7.8	77.20%	-2.20%
7,000	9000	1.29	0.78	27.80%	19598	8.2	74.80%	-5.40%
6,000	9000	1.5	0.67	25.90%	18156	8.5	73.30%	-7.50%
4,500	9000	2	0.5	22.40%	15958	9.1	70.50%	-11.20%
<i>24 Hour Period</i>								
18,000	9000	0.5	2	44.20%	138560	6.9	88.90%	-1.10%
15,000	9000	0.6	1.67	42.80%	122268	7.2	88.10%	-0.30%
12,850	9000	0.7	1.43	41.60%	110455	7.5	87.40%	0.40%
11,250	9000	0.8	1.25	40.40%	101570	7.7	86.70%	1.00%
10,000	9000	0.9	1.11	39.30%	94561	8	86.00%	1.60%
9,500	9000	0.95	1.06	38.90%	91738	8.1	85.70%	1.90%
9,000	9000	1	1	38.30%	88903	8.2	85.70%	2.10%
7,000	9000	1.29	0.78	35.80%	77416	8.8	83.70%	3.40%
6,000	9000	1.5	0.67	34.20%	71565	9.2	82.60%	4.20%
4,500	9000	2	0.5	31.10%	62604	10	80.20%	5.70%
<i>Interpeak Period (1000 – 1600)</i>								
18,000	9000	0.5	2	39.40%	37456	8.8	85.60%	2.30%
15,000	9000	0.6	1.67	39.40%	35980	8.6	86.10%	1.20%
12,850	9000	0.7	1.43	39.30%	34907	8.4	86.50%	0.30%
11,250	9000	0.8	1.25	39.20%	34100	8.3	86.80%	-0.40%
10,000	9000	0.9	1.11	39.20%	33465	8.2	87.00%	-0.90%
9,500	9000	0.95	1.06	39.10%	33210	8.2	87.10%	-1.10%
9,000	9000	1	1	39.10%	32954	8.2	87.20%	-1.40%
7,000	9000	1.29	0.78	38.90%	31926	8	87.60%	-2.40%
6,000	9000	1.5	0.67	38.80%	31409	7.9	87.80%	-2.90%
4,500	9000	2	0.5	38.70%	30631	7.8	88.20%	-3.70%

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Table 3: Jobs Fixed to 9000 and Ratio of Jobs to Homes Increased

Homes	Jobs	Jobs per home ratio	Homes per job ratio	Internalisation	Tot. Ext. Trips	Ave. Dist. (km)	% of trips within 8km	Ext. trip balance
<i>AM Peak Period (0700 – 1000)</i>								
1,000	1,000	1	1	30.60%	3978	11.4	88.50%	21.60%
5,000	5,000	1	1	44.10%	12035	8.7	93.40%	12.80%
10,000	10,000	1	1	50.30%	20613	8.1	94.40%	12.30%
15,000	15,000	1	1	54.10%	28378	7.9	94.90%	12.80%
<i>PM Peak Period (1600 – 1900)</i>								
1,000	1,000	1	1	11.80%	5279	12.5	64.10%	-0.60%
5,000	5,000	1	1	25.20%	14337	8.6	74.80%	-1.40%
10,000	10,000	1	1	32.10%	24374	7.6	77.50%	-2.30%
15,000	15,000	1	1	36.10%	33653	7.2	78.70%	-3.10%
<i>24 Hour Period</i>								
1,000	1,000	1	1	17.30%	22131	12.9	71.70%	6.50%
5,000	5,000	1	1	32.50%	57552	9.1	83.20%	2.70%
10,000	10,000	1	1	39.40%	96377	8.1	85.70%	2.10%
15,000	15,000	1	1	43.30%	132225	7.7	86.70%	1.90%
<i>Interpeak Period (1000 – 1600)</i>								
1,000	1,000	1	1	18.10%	9268	13.7	72.30%	9.00%
5,000	5,000	1	1	33.50%	21802	9.2	84.80%	0.40%
10,000	10,000	1	1	40.00%	35625	8	87.60%	-1.60%
15,000	15,000	1	1	43.60%	48504	7.5	88.70%	-2.40%

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Scenario 1 – Varying Job Numbers (Homes Fixed to 7,000)

The testing of scenario 1 shows:

- In terms of internalisation (metric 1), jobs to homes ratios between 0.5 – 1.00 result in similar internalisation levels (within 2%) across all time periods. Overall, when the ratio of jobs to homes is increased, internalisation increases during the AM peak period, decreases slightly during the PM peak period and stays relatively constant during the interpeak and 24 hours.
- The total number of external trips (metric 2) increases as the ratio of jobs to homes is increased across all time periods. This is primarily the result of increased development quantum rather than changes in the mix between jobs and homes.
- The difference in the average trip distances (metric 3) between job to home ratios of 0.5 – 1.0 are minimal (1km and under) across all time periods. The same is true for the percentage of trip distances that are within 8 km (metric 4) where the difference is 3% or less for job to home ratios of 0.5 – 1.0. This is expected since even trip external to the site will not be travelling far due to the size of Cambridge as a whole.
- When the balance between incoming and outgoing trips (tidality – metric 5) is considered, ratios between 0.5 – 1.0 result in tidality which is within 12% and relatively stable during all time periods. At the extremes of job provision (high and low), there is a significant imbalance between incoming and outgoing trips. This is because the trip distribution created by homes, and those created by jobs is significantly different. Stantec's work in 2020 and in 2022 indicate that the benefit of additional jobs within the site is that it can attract people from a much wider geography, thus creating a catalyst for a more transformative cross-city connectivity transport mitigation strategy. In contrast, the trip distributions with significant homes on-site rely on accessibility to local jobs and increase demand for jobs off-site where the ability to access sustainably is mixed, creating the same challenges for sustainability.

Scenario 2 – Varying Dwelling Numbers (Jobs Fixed to 9,000)

The testing of scenario 2 shows:

- When job numbers are kept constant and number of homes are increased, both the internalisation (metric 1) and trip distance (metrics 3 & 4) metrics show favourable outcomes across all time periods tested except for the interpeak where results stay broadly similar: internalisation increases substantially, and the average trip distance reduces.
- These improved outcomes are predominantly due to the changes in home numbers and its associated effect on trip generation as opposed to changes in the homes to jobs ratios. The overall site trips are more sensitive to changes in

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home numbers compared to job numbers, since the level of education trips generated from the site is directly related to the number of homes.

- In terms of the total number of external trips (metric 2), as before, the higher the total development quantum, the higher the resulting total external trips.
- In terms of tidality (metric 5), similar to Scenario 1, ratios of jobs to home between 0.5 – 1.00 result in tidality which is within 10% and relatively stable during all time periods.

Scenario 3 – Testing the Impact of Development Quantum (Ratio of Jobs/Homes fixed at 1:1)

The testing of scenario 3 shows:

- When the development quantum is increased, internalisation also increases substantially (metric 1), the average trip distance (metric 3) reduces substantially and tidality (metric 5) also reduces across the ratio ranges tested. The changes are most drastic between the lower ranges of development quantum and start to level off at higher levels of development.
- In terms of the total number of external trips (metric 2), as before, the higher the total development quantum, the higher the resulting total external trips.
- As expected, increasing the development quantum results in a bigger 'pull' of trips towards the site, from both within and external. However, its impact on the internal trips is greater (metric 4).
- In terms of tidality (metric 5), between the ranges of 5000 - 15000 homes and jobs, tidality remains constant at approximately 13% during the AM period and under 5% during all other time periods tested.

Results Summary

It is concluded that:

- The overall quantum of development has a much more significant impact on the performance metrics compared to changes in the mixes between jobs and homes.
- Within the ranges of jobs to homes ratios of 0.5 – 1.0, there are minor differences in performance in the key indicators and there is no mix that results in favourable outcomes across all time periods. The performance metrics are generally stable within this range, internalisation levels are high and the average trip distance is within 9km.
- Higher levels of development quantum result in significantly higher internalisation and shorter trip distances. This must be balanced against the

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overall external trip generation which will go up with higher levels of development quantum.

How does the mix of homes and jobs interface with trip budget?

With an understanding of development mix and quantum and the impact this has on external vehicular trip generation, the benchmarked vehicular trips identified in Topic Paper 2 on Trip Budget can be used to derive a target car driver mode share for the development.

This can then be contextualised using international / national / local comparisons and precedents on modal share to help understand potential deliverability.

Topic Paper 4 “Low Car Living and Mode Share Precedents” sets out international, national and local comparisons for car driver mode share. Topic Paper 5 “Transport Scenario Testing Results and Deliverability” sets out the car driver mode share targets arising from key development scenarios to conclude on potential deliverability.

Summary

On this basis, at this early stage of testing it is considered that:

- A mix of 1.11 homes to jobs produces a set of outcomes, that in a site-specific sense, can be considered to produce better on-site metrics to the 0.8 homes to jobs ratio within the Local Plan testing to date.
- However, this ratio is a narrow definition of sustainability in a plan-making sense as it reflects the site-level mix that results in sustainable travel patterns within the site only. Furthermore, it has been shown through this Topic Paper that the quantum of development has a more significant impact on the sustainable trip making metrics compared with the mix of jobs and homes, with a higher quantum of development resulting in favourable trip making metrics.
- The mix between jobs and homes should not be used as a sole indicator of sustainability in transport terms for Cambridge East given the significant impact of quantum on sustainability metrics. The ability of the site to support and deliver public transport improvements should also be a key consideration. A higher quantum of development and an increased density of employment at Cambridge East presents significant advantages in terms of the public transport schemes it could support and the extent of sustainable transport infrastructure solutions that could be afforded. These advantages would be even more drastic when compared to a dispersed strategy of homes and jobs across the district which also requires consideration holistically.

These further considerations are not appraised as part of the work set out in this note but should be considered as part of the broader spatial analysis undertaken using CSRM as part of its role in plan making.

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Date: 19th December 2022

Job Number: 332210903

Subject: Low Car Living and Mode Share Precedents

Prepared by: J Welch / S Young

1. Purpose

This topic paper is one of a number which seek to explore different topics which have a transport implication. The aim of topic papers is to set out the variations, different considerations, and resulting implications of different approaches within that specific topic. Topic papers will be refreshed and updated at each stage of the Local Plan review process to ensure the latest information / position is available.

The intention of the topic papers is to provide background information; they do not contain any policies, proposals or site allocations.

The main issues covered by this Topic Paper are:

- The meaning of Low Car Living and the benefits associated with it.
- Successful precedents from elsewhere in achieving Low Car Living.
- Low Car Living in the context of Cambridge East.

This topic paper will demonstrate that aligning the car driver mode share with the trip budget for Cambridge East will be ambitious yet achievable.

This topic paper should be read alongside the other Topic Papers for the Cambridge East site including:

- Topic Paper 2 – Establishing and working within a trip budget
- Topic Paper 3 - Understanding the transport implications of different mixes of Homes and Jobs at Cambridge East; and
- Topic Paper 4 - Low Car Living and Mode Share Precedents.

2. What is Low Car Living?

Low Car Living (LCL) refers to a way of life in which sustainable transport modes are both prioritised and preferable over the use and ownership of the private car. LCL is aided and encouraged by the location and design of sustainable developments which are built to facilitate the use of sustainable transport. LCL developments are intentionally created to reduce or minimise driving, creating opportunities for healthier modes of transportation.

Developments in which LCL is prioritised use a combination of 'push' measures to discourage private car use, and 'pull' measures to improve the attractiveness of walking, cycling, wheeling, public transport, and various types of shared vehicle use. These typically include:

- Designing neighbourhoods for walking and cycling.
- Providing high-quality, high-frequency, affordable public transport.
- Creating compact and permeable mixed-use areas with short distances.
- Increasing mobility by regulating parking and road use.
- Marketing and promoting sustainable transport choices.

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LCL developments function best in places where the wider policy and transportation context can support them. Access control zones, priced and limited parking at destinations, high fuel prices, strong permeability, and high-quality public transport all influence modal choice. In LCL developments, private car ownership is discouraged in favour of sustainable transport. In LCL developments, car ownership is low as the alternative travel options are more convenient.

With the aim of understanding potential for LCL in Cambridge East, the following section provides an overview of successful precedents from elsewhere, exploring measures and 'ingredients' that have proved successful.

3. Successful Precedents from Elsewhere

The following examples highlight characteristics of other developments that have achieved LCL. They illustrate best practice in relation to specific measures and the benefits these have had on creating sustainable travel patterns.

Greenwich Millennium Village, London, United Kingdom

Greenwich Millennium Village (GMV) is a mixed-use brownfield redevelopment on the Greenwich Peninsular, comprising approximately 10,000 residential units, leisure and retail facilities, as well as educational and health centres. The development is well-served by public transport, with strict parking regulations and a layout which limits through car traffic. It is worth noting that GMV is not served by underground, rail or tram services despite being within London.



GMV has incorporated several transportation demand management strategies aimed at reducing car dependency and promoting other, more sustainable forms of transport. These include:

- Parking at GMV is restricted and generally located away from individual properties. Parking spaces are unbundled from apartment units such that residents who choose to have a parking space must pay for it separately. Parking spaces are only available for 80% of units.
- Cycling and pedestrian routes run throughout the village and beyond, connecting the development to the surrounding areas.
- Car sharing vehicles are located on the periphery of GMV.
- A dedicated busway runs through the development and is separated from car lanes.
- An annual travel monitoring study is conducted across GMV, including analysis of mode split and parking demand of residents, in addition to a strategy for reducing car use. New residents are also given a sustainable living information pack.

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IMPACT: GMV achieves a car mode share of just 18%, a public transport mode share of 49% (with a public transport commuter mode share of 79%), a walking mode share of 29% and a cycling mode share of 4%.

GWL Terrein, Amsterdam, The Netherlands

GWL Terrein is a brownfield redevelopment of approximately 600 residential units in the Amsterdam West District. Local residents were involved in the design and development of the site from initial conception, wanting to push forward a new approach to development focussed on car-free living, reuse of resources, conservation of energy and water, and community cohesion.

GWL Terrein has implemented a number of urban design features to ensure focus on sustainability, reduced car use and social interaction. These include:



- The inner area of the development is car-free, with only emergency vehicles allowed on site. The development is also raised from street level so that cars do not have access.
- Mixed use pathways shared by both pedestrians and cyclists are provided throughout.
- The site is well served by public transport in the form of Tram Line 10 which runs at 10-minute intervals and is segregated from vehicular traffic.
- Parking for the development is extremely limited, with no on-site parking spaces provided for the residential units.
- Car sharing vehicles are located on the border of the development, with over a quarter of households subscribing to a carsharing membership.
- The initial residents of GWL Terrein were asked to sign a non-obligatory declaration to support the car-free nature of the site. This declaration did not require residents to live car-free but informed them of the aims of the development.

IMPACT: As a result of the measures implemented above, GWL Terrein achieves a cycling mode share of 50% (with a cycling commuter mode share of 63%), a walking mode share of 30%, a public transport mode share of 14%, and a car mode share of just 6%.

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Vauban, Freiburg, Germany

Vauban is arguably one of the most celebrated 'model sustainable districts,' comprising approximately 2,000 low-energy homes on the southern edge of Freiburg, south-west Germany. It is a car-reduced brownfield redevelopment with parking-free residential streets.



A key principle of the Vauban masterplan was that car use should be less convenient than alternative transport modes. Measures implemented include:

- Although Vauban is fully accessible to private motorised traffic approaching from the east, parking is not permitted on the streets serving residences. Instead, these streets are used as a social space. In addition, vehicles must be driven at walking pace, giving priority to other road users, and may only stop to pick up or drop off.
- Residents of the parking-free residential blocks must either sign a legal contract with a specially created Car-free Living Association, agreeing not to own a car, or purchase a space in one of the two garages on the edge of the district.
- An extension to Freiburg's existing tram system to Vauban opened in 2006, meaning that no home is more than 400m from a tram stop, all trams offer step-free access and operate at frequencies as high as every 4-6 minutes at peak times, 7-8 minutes off peak. Residents of the first parking-free block were given free annual tram passes and discounted national rail passes on moving in.
- The district has been designed to make access by non-car modes safe and pleasant, with a dedicated network of streets that are free of motorised traffic.
- Car sharing vehicles are available across Vauban.

As a result of the measures implemented above, Vauban achieves a combined walking and cycling mode share of 64%, a public transport mode share of 19%, and a car mode share of just 16%.

In addition to the above sites, **Table 1** highlights other examples of LCL sites and their respective mode shares. Although these case studies are not all directly comparable to Cambridge East, they do highlight some of the effects of measures and resulting impacts that can be achieved in LCL developments. The car driver mode shares (**Table 1**) can give confidence that Cambridge can deliver a LCL community akin to best practice elsewhere.

Table 1: Mode share and car ownership rates for a selection of study sites compared to their local reference areas

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Location	Mode share (proportion of all trips)				Cars per 1,000 residents
	by car	by transit	by bicycle	on foot	
Greenwich Millennium Village	18%	49%	4%	29%	350
Greenwich District	44%	29%	1%	26%	350
GWL Terrein	6%	14%	50%	30%	190
Amsterdam West	20%	18%	32%	30%	310
Hammarby Sjöstad	21%	52%	9%	18%	210
Stockholm Reference District	35%	50%	7%	8%	n/a
City of Houten	34%	11%	28%	27%	415
City of Zeist (The Netherlands)	46%	11%	29%	14%	530
Sihlcity: visitor trips	30%	70% (transit, cycling, walking combined)			—
Letzipark: visitor trips	n/a	n/a	n/a	n/a	—
Stellwerk 60	21%*	53%*	31%*	29%*	60
Nippes District	61%*	33%*	3%*	3%*	309 ⁺
Västra Hamnen	23%	17%	31%	29%	440
City of Malmö	41%	16%	23%	20%	480
Vauban [#]	16%	19%	64% (bicycle/walking combined)		160
City of Freiburg [#]	30%	18%	28%	24%	393

Source: *Europe's Vibrant New Low Car(bon) Communities*, Institute for Transportation and Development, (2021)

Cambridge Context

While the concept of LCL is not common practice across existing developments in Cambridge, several have evidenced or outlined their intention to encourage sustainable travel modes and reduce the use of the private car. Such sites include:

- **Cambridge Biomedical Campus** – The CBC's 2018 "Transport Strategy and 5 Year Implementation Plan" includes a long-term target of no more than 20% car driver mode share for journeys to and from the CBC.
- **North East Cambridge** – This proposed site includes a target car driver mode share of 19% for residential and 29% for employment¹.
- **Central Cambridge** – The 2011 Census shows a car driver mode share for its residents of 21% and a walk, cycle and public transport mode share of 77%.
- **Trumpington** - The car driver journey to work mode share for residents whose workplace is in Cambridge is 23%.

The case studies outlined in this section demonstrate that:

¹ Source: Table 52 - <https://greatercambridgeplanning.org/media/1234/nec-aap-transport-evidence-base.pdf>

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- locating developments close to day to day destinations in existing urban areas is likely to enable the most effective use of sustainable modes of travel and also supports reduction in parking provision;
- careful design of sites is required to ensure sustainable modes of travel become the natural choice and car use is secondary;
- co-ordinating multiple measures that are known to contribute to sustainable travel patterns increases their effectiveness;
- positively influencing travel behaviours depends on human choice, so a range of measures that 'push' and 'pull' people towards desirable travel modes is required;
- infrastructure investment is vitally important, accompanied by behavioural measures to help people make more sustainable travel choices;
- infrastructure and measures within the site will need to be supported by infrastructure and services outside the site to deliver the best results.

4. Cambridge East in Context

When compared against the examples outlined in Section 3, Cambridge East is well placed in terms of meeting ambitious target car driver mode shares. The site is already starting from a favourable position with regards to the surrounding areas exhibiting particularly strong cycling mode shares (Abbey Ward 29%, Cherry Hinton Ward 24%)², a number of key employment destinations are also within walking / cycling distance and are accessible by public transport (**Table 2**).

Table 2: Walking and Cycling Journey Times from Cambridge East

Destination	Walking Journey Time	Cycling Journey Time
Cambridge Station	~ 35 Minutes	~ 10 Minutes
Addenbrooke's Hospital / Cambridge Biomedical Campus	~ 45 Minutes	~ 10 Minutes
City Centre	~ 45 Minutes	~ 12 Minutes
Cambridge Science Park	~ 60 Minutes	~ 20 Minutes

The design concept for the site is likely to include provision for the following which are elements common to many of the above precedents:

- '20-minute neighbourhoods' and '15 minute cities' with 5-10 minutes' walk to and from services and facilities are commonplace.
- Areas of higher density development to promote shorter distances between day-to-day activities.
- A mix of homes and jobs to enable many work trips to be internal and undertaken by sustainable modes.
- Vehicle access is limited and designed to be slower and less convenient than walking and cycling.
- Roads designed to minimise the need for direct car access and on-street parking.
- Vehicular parking is minimised with parking ratios suitable for city living, with the principle that the majority of parking is located away from homes, or underground with low levels of on-plot parking.
- Public spaces are carefully designed to integrate with streets and allow them to be part of key movement corridors.

² Source: Nomis: QS703EW - Method of Travel to Work (2001 specification)

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- High quality, high frequency public transport runs directly through the site to key destinations. High quality interchanges / hubs with secure cycle parking and high-quality waiting facilities such as cafes and WIFI equipped workspace also provided.
- Cost-effective pricing through efficient ticketing.
- Real time information and on-board facilities such as WIFI is provided.
- Residential and public buildings designed to enable home and hybrid working.
- Pedestrian and cycle routes are safer, direct, convenient, attractive, comfortable and more visible than motor traffic.
- High quality, secure cycle parking for all sizes and types will be provided, with electric charging capability.
- Cycle maintenance facilities provided at key hubs.
- High profile use of Travel Plans and marketing to ensure residents, visitors and employees always have access to information on sustainable modes.
- The use of car clubs / car sharing for those who need to drive;
- Home deliveries by smaller EV vehicles / micro mobility modes.

However, in addition to the list of attributes that Cambridge East and LCL sites require or benefit from, there are also a number of other external factors influencing mode share, many of which are governed by local policies, organisations or partnerships. For example:

- The impact of the GCP scheme 'Making Connections' which includes plans to introduce a sustainable travel zone in Cambridge by 2027/2028, discouraging car use across Cambridge as a whole.
- External public transport infrastructure with connectivity and services specification to Cambridge Station, City Centre, Addenbrookes / Cambridge Biomedical Campus, and other employment areas.
- Footway and cycle way continuity, quality and management across the wider city, matching the quality of provision at Cambridge East.
- The commercial attractiveness of 'last mile' deliveries by EV vehicles / cargo bikes / other micro mobility modes and growth of 'last mile' hubs in Cambridge.

Cambridge East presents an incredible opportunity to maximise the benefits afforded by LCL. There is huge opportunity for Cambridge East to be an exemplar development for the UK, and, arguably, Cambridge is the best city to be tasked with setting this precedent.

5. Summary

This topic paper has provided examples low-car living elsewhere, identifying key ingredients for success and the car driver mode shares achieved at these developments. This demonstrates Cambridge East presents significant potential for ambitious yet achievable car driver mode shares based on the components of the site and from experiences from elsewhere.

Car ownership is the primary determinant of car use, with convenience of alternatives and location of site being key determinants of car ownership. Making sustainable modes more attractive is the key aim of LCL developments. Providing a mix of homes and jobs within the site as well as a range of other day to day services will encourage internal short trips by sustainable modes. In addition, destinations within Cambridge are within walking or cycling distance (with a huge cycling culture that already exists), or a short journey by public transport from the site, thus the site is well placed to achieve Low Car Living.

Whilst the adoption of the trip budget will require an ambitious step change in the use of sustainable modes, experiences from elsewhere suggest that this would be achievable if the

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necessary sustainable transport investments are made, and if the site is built out at to an appropriate design, scale, density and mix.

DRAFT

TRANSPORT TOPIC PAPER 5

Date: 19th December 2022

Job Number: 332210903

Subject: Transport Scenario Testing Results and Deliverability

Prepared by: K Stannard / E Page

1. Purpose

This topic paper is one of a number that seek to explore different topics which have a transport implication. The aim of topic papers is to set out the variations, different considerations, and resulting implications of different approaches within that specific topic. Topic papers will be refreshed and updated at each stage of the Local Plan review process to ensure the latest information / position is available.

The intention of the topic papers is to provide background information; they do not contain any policies, proposals or site allocations.

The main issues covered by this Topic Paper are:

- A summary of the transport outputs from the following two transport scenarios:
 - o 7,000 homes and 9,000 jobs
 - o 9,500 homes and 9,000 jobs
- A summary of the key mitigation associated with these scenarios

This topic paper should be read alongside the other Topic Papers for the Cambridge East site, in particular:

- Topic Paper 1 - Site structuring features and principles, including accesses, public transport and neighbourhood design approach.
- Topic Paper 2 – Establishing and working within a trip budget
- Topic Paper 3 - Understanding the transport implications of different mixes of Homes and Jobs at Cambridge East; and
- Topic Paper 4 - Low Car Living and Mode Share Precedents.

2. Transport Scenario Testing – Target Car Driver Mode Shares

The 'Greater Cambridge Local Plan Preferred Option Transport Evidence Report' (October 2021) contains an assessment of the potential traffic impacts of 7,000 homes and 9,000 jobs against a 2041 baseline (i.e. referred to hereafter as 'Local Plan Option').

As set out in Topic Paper 2, Stantec has used the Local Plan CSRM external vehicular trip generation (for 7,000 homes and 9,000 jobs) as the benchmark for acceptable traffic impacts at this first stage of developing a trip budget at Regulation 18 stage. These peak hour highway trips are reproduced in Table 1 below.

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Table 1 – “Range Stage” External Peak Hour Highway Trips Reported in CSRM Modelling

External Car Driver Trips		Source
AM Peak Hour	PM Peak Hour	
1,500	1,800	Atkins Note “Additional Analysis of Existing GCSP Runs”

With a starting point established as a guide for the level of peak hour vehicular trips that can be accommodated with appropriate mitigation, the next question is what development quantum and mix can be delivered within this threshold and can be shown to have a resulting credible and defensible car driver mode share. Just as the modelling will need to become more refined as the Plan progresses, so will the granularity of the answer to this question.

Stantec has undertaken technical analysis to understand the transport implications of different mixes between homes and jobs. This technical work is reported in Topic Paper 2 and used Stantec’s Spreadsheet Tool¹.

This work concluded a mix of circa 1.11 homes to 1 job (0.9 jobs per home) produced better outcomes than the 0.8 homes per job ratio assumed within the Local Plan testing to date. This conclusion was arrived at by testing a range of mixes and assessing the outcomes against a range of sustainability metrics. However, this work also showed that quantum has a more significant impact on the sustainability metrics than mix, with higher development quantum resulting in more favourable metrics.

It should be noted that the approach to finding an appropriate mix between jobs and homes is narrow and only based on site specific metrics. As stated, there are clearly very many other considerations that should come into the thinking of decision makers to determine the appropriate and definitive number of jobs in this location. For example, and from a transport perspective, the concentration and type of jobs in a single urban location, rather than dispersed around the district, has significant advantages in terms of public transport viability, the extent of the solutions that can be afforded and the reduced vehicular (and therefore carbon) impacts. These further considerations are not appraised as part of the spreadsheet tool but are in terms of the broader spatial analysis undertaken using CSRM as part of its role in plan making.

Using the 1.11 homes to jobs ratio, Stantec has assessed the impact of increasing the overall quantum (both homes and jobs) whilst maintaining this ratio. Stantec has then assessed the credibility of the car driver mode shares with reference to local

¹ The “Stantec Spreadsheet Tool” has been reviewed by Cambridgeshire County Council as part of other planning applications for robustness and is considered to give a good preliminary indication of trip generation and trip distribution, pending further testing at subsequent stages. The tool generates detailed forecasts of the number of person trips generated by different land-uses and uses a gravity-based function to forecast levels of trip making within and beyond the site, based on the purpose of the trip.

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examples and ensured that the level of public transport movements generated by the combined quantum can be accommodated within a sensible network capacity.

These results are reported in the remainder of this Topic Paper 5.

Assessing car driver mode shares output from the scenario testing

As set out earlier, Stantec has used the Stantec Spreadsheet Tool to test the performance of increasing development quanta, using the optimum ratio of 1.11 homes to each job, starting at 7,000 homes, increasing to 12,000 homes.

Stantec has used the vehicle trip benchmark for acceptable traffic impacts as set out in Topic Paper 2. Stantec extracted the external person trip generation for the AM and PM peak hours from the Spreadsheet tool for each scenario and used the benchmarked vehicular trips to derive a target car driver mode share for each scenario.

This shows the level of car driver mode share that would be required to keep the impacts within the same threshold as tested for the Local Plan Option and prior to further refinements during the next stages of the process.

The mode shares are summarised in Table 2 for the range of scenarios including the Local Plan Option and an alternative scenario (9,500 homes and 9,000 jobs) which has been put forward and assessed by Marshall previously within the report entitled “Cambridge East: Delivering Planned Growth Transport Strategy” (dated February 2022).

Table 2 – Scenario Testing Car Driver Mode Share Summary

Homes	Jobs	Car Driver Mode Share (peak hour)		Source
		AM Peak Hour	PM Peak Hour	
7,000	9,000	18%*	22%*	Atkins Note “Additional Analysis of Existing GCSP Runs”
8,000	7,200	18%	23%	Spreadsheet Tool
9,000	8,100	17%	22%	Spreadsheet Tool
9,500	8,550	16%	20%	Spreadsheet Tool
9,500	9,000	16%	20%	Spreadsheet Tool
10,000	9,000	15%	20%	Spreadsheet Tool
11,000	9,900	14%	18%	Spreadsheet Tool
12,000	10,800	13%	17%	Spreadsheet Tool

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Deliverability of Car Driver Mode Shares

Comparisons with Elsewhere

The mode shares contained in Table 2 can be considered at this stage as a range whereby through the refinement stage a more definitive share can be reached. The ability to achieve and improve upon the mode shares shown in Table 2 will require a focus on low car living, especially where highway access is constrained. The key ingredients and precedents are set out in Topic Paper 4.

Trip Distances

Of all trips forecast in the AM Peak around 90% are under 5km. This reduces to ~70% in the PM peak. This high level of local trip making again gives confidence that the car driver modes shares can, with further refinement, be achieved via development mix alongside good quality active travel and public transport and other measures.

Public Transport

Stantec has also verified whether the scenarios above result in credible and achievable public transport trips as part of an overall low car living package. This is as important to consider at this stage as it also relies heavily on capacity, compared to active travel, which rely mainly on location and infrastructure.

The Local Plan CSRM results consistently showed around 10% of all external trips across the time periods by public transport. Stantec generated public transport movements for the scenarios by applying the 10% public transport mode share to the external hourly person trips produced by the Stantec Spreadsheet Tool.

This forecast number of bus trips was then compared against an estimate of the hourly public transport capacity using assumptions on bus seats, occupancy and service patterns for both the Newmarket Road Park and Ride service to the north of the site and the future Cambridge Eastern Access Phase 2 service which will run through the site.

The service patterns and assumptions and estimated capacity ranges are summarised in Table 3 and indicate that scenarios generating public transport movements between 700 and 1400 movements per hour give a credible range of potential outcomes.

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Table 3 – Potential Public Transport Capacity

Service Pattern	Buses per hour	Peak Hour Estimated Capacity (inclusive of both directions)
15 Minute Frequency of both P&R and CEAP2	8	c.700
10 Minute Frequency of both P&R CEAP2	12	c.1,050
15 Minute Frequency of P&R and 5 minute frequency for CEAP2	16	c.1,200
10 Minute Frequency of P&R and 5 minute frequency for CEAP2	18	c.1,400

Notes - * 70 seat capacity assumed at Newmarket Park and Ride as there are no height restrictions along the service route on Newmarket Road. 40 seat capacity assumed for CEAP2 service if services route via height restricted Coldhams Lane bridge and can thus only accommodate single decker. Capacity could be higher if alternative off-site PT route is used via Barnwell Lane or bridge height limitation is addressed. 80% occupancy assumed.

The assumptions above are used only to verify the credibility of public transport trip generation of the development scenarios tested, they do not represent a transport strategy as further work is required to define the full mitigation package to support Cambridge East.

To provide a benchmark, the CSRM modelling for the Local Plan Option (7,000 homes and 9,000 jobs) resulted in an estimated 830 public transport trips in a single hour² which is credible in light of the ranges and associated frequencies above.

For both the Local Plan and alternative scenarios the range of public transport trips produced by Cambridge East is summarised in Table 4 below. These all fall within the ranges of credibility set out in Table 3 and therefore this demonstrates that public transport has the potential to make a significant contribution to ensure car mode shares are achievable.

Table 4 – Public Transport Capacity Appraisal

Homes	Jobs	External PT Trips AM Peak Hour	Within Range? (Y/N)	External PT Trips AM Peak Hour	Within Range? (Y/N)
7,000	9,000	830	Y	820	Y
8,000	7,200	810	Y	740	Y
9,000	8,100	840	Y	795	Y
9,500	8,550	950	Y	870	Y
9,500	9,000	950	Y	870	Y
10,000	9,000	990	Y	910	Y
11,000	9,900	1065	Y	980	Y
12,000	10,800	1140	Y	1050	Y

² Derived by applying 10% mode share to the external

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3. Key Mitigation

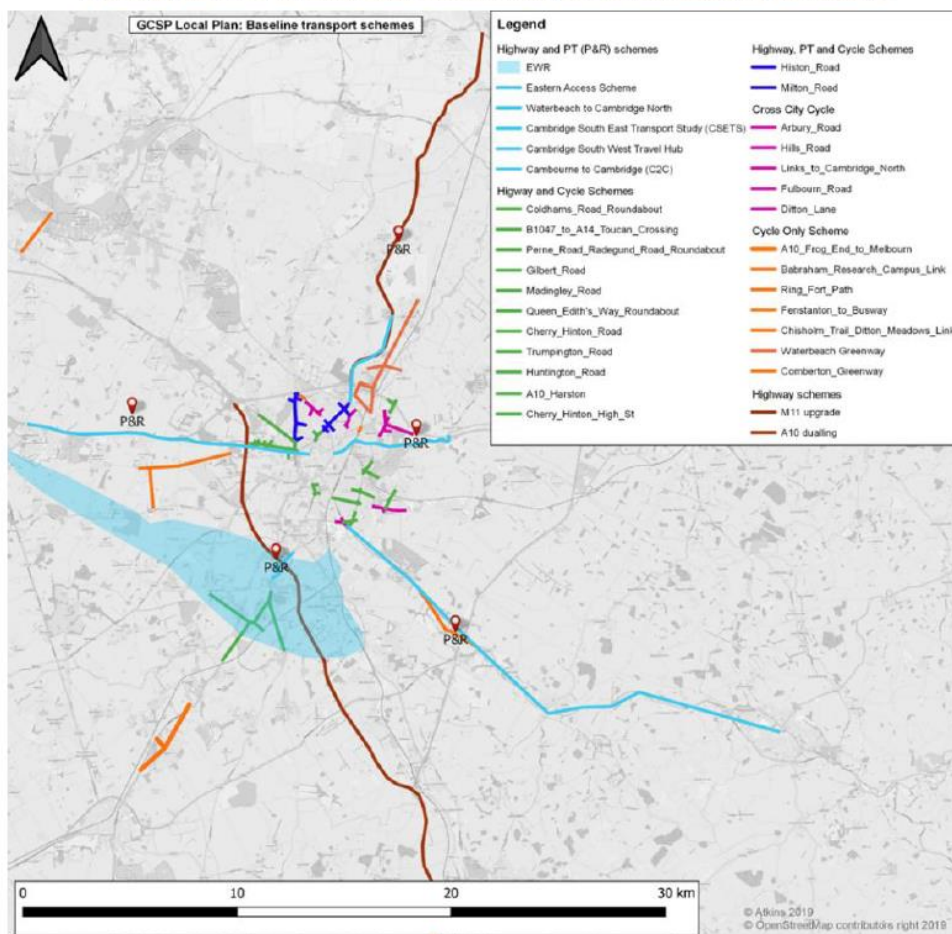
CSRM modelling to date by GCSP and CCC includes the following schemes within the 2041 baseline:

- Greater Cambridge Partnership (GCP) schemes:
 - Cambourne to Cambridge
 - Cambridge South East Transport Study
 - Cambridge South West Travel Hub
 - Waterbeach to Cambridge
 - Cambridge Eastern Access – Phase A
 - City Access
 - Foxton Rural Travel Hub
 - GCP Cycle Schemes (Greenways)
- A428 Black Cat to Caxton Gibbet
- Cambridge South Station
- A10 (Ely to Cambridge) Highway Improvements

These schemes are illustrated on Figure 1, reproduced from Figure 24 of CCC's "Greater Cambridge Local Plan Transport Evidence Report: Preferred Option Update" dated October 2021.

Figure 1 | Transport Schemes included in 2041 Future Baseline

Note that the East West Rail Central Section is shown in this figure but is not included in the 2041 Baseline.



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Cambridge Eastern Access Phase B is tested within the modelling as mitigation for Cambridge East. This is the key piece of transport mitigation that has a specific inter-relationship with Cambridge East.

Marshall and their consultants have worked closely with the Greater Cambridge Partnership with regard to the progression of the Eastern Access Phase A and B schemes. Phase A is not dependent upon the redevelopment of the airport but would see Newmarket Road improved for public transport, walking and cycling alongside enhanced landscape and environmental schemes. Whilst not dependent on the airport being redeveloped, Phase A will have significant benefits for Cambridge East by delivering infrastructure that will enable a positive modal shift for both the existing and any new community. The Phase A Business Case has been approved and detailed scheme designs are currently being prepared by the GCP. Delivery of Phase A is anticipated to be by around 2025. Phase A is funded with the current GCP budgets.

Phase B requires the redevelopment of the airport to enable a segregated corridor between a new Travel Hub to the east of Airport Way and Barnwell Road or Coldhams Lane. Marshall have made all necessary commitments to the GCP at this stage to make available, at the earliest opportunity, the necessary land and to deliver the link. The land required sits whole within the ownership of Marshall and the onward connection to the city centre is in highway ownership meaning that there is the risk to delivery is small and consenting more straightforward. Phase B funding is to be confirmed once a scheme is further progressed, and developer contributions are assumed.

There are many transport schemes currently planned and committed which will influence network performance and sustainable travel behaviour at Cambridge East between today and when the site is fully built out and mitigation in place. As time progresses, certainty about the timing of these schemes will increase and the potential impacts on the network will be better understood. Expectations for the trip budget will need to adjust to this increasing granularity of information.

As set out above, committed schemes relevant to Cambridge East include the GCP's Making Connections study (formerly City Access) and GCP's Cambridge Eastern Access Study amongst others.

The impact of these schemes is included for within the CSRM modelling and therefore taken into account so far at a high level, but further work is likely to be required as the local plan preparation progresses and at the planning and post-planning stages to appreciate and take into account the effects of surrounding network capacity that results from these significant policy and physical changes.

Other, as yet unknown, schemes or policy initiatives at local and national level are likely to come forward over time that will influence the trip budget setting process. Whilst details cannot be known now, it is likely that the effect of any 'unknowns' will reduce the attractiveness of car journeys within the site and urban area especially.

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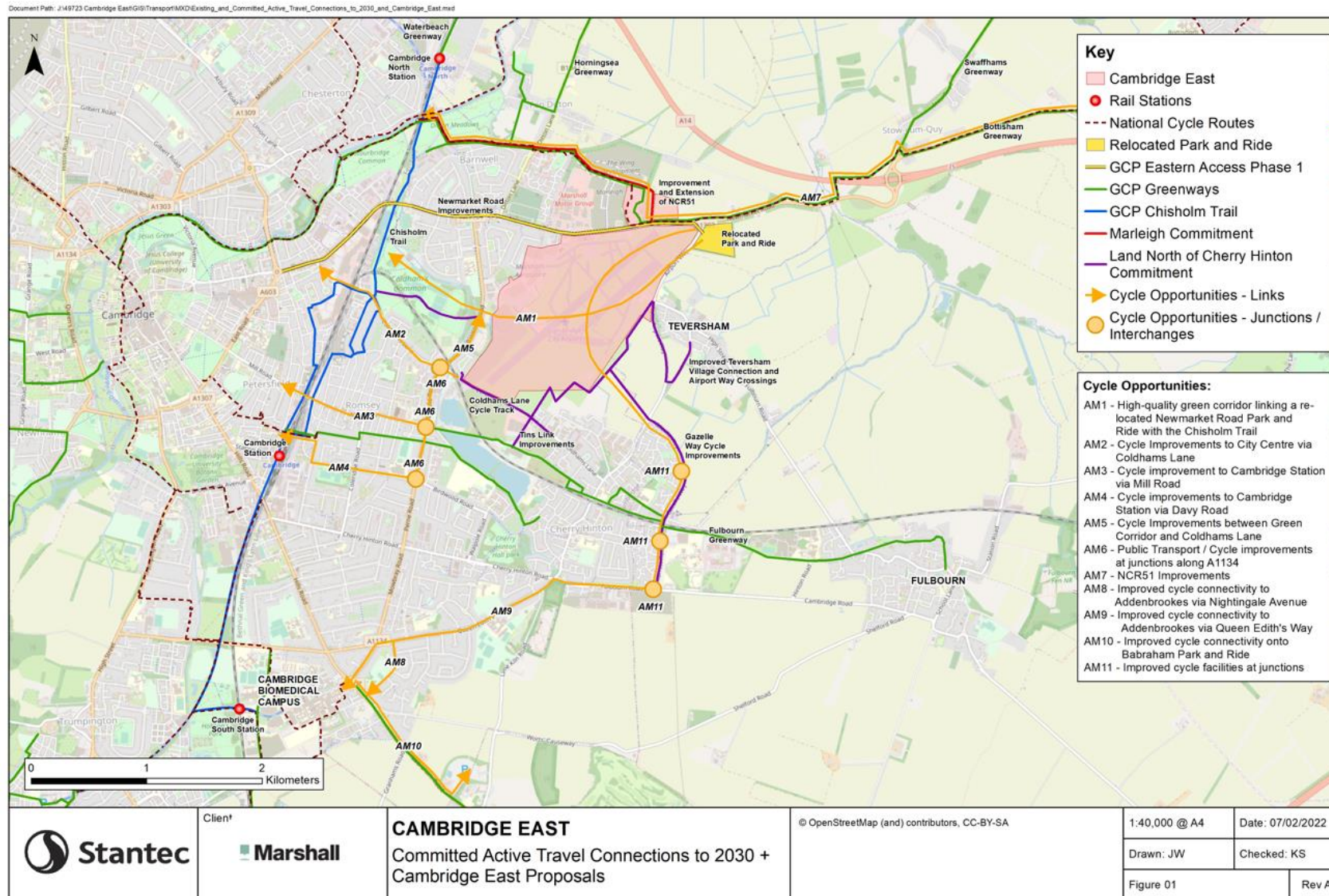
Developer-led off-site mitigation

Furthermore, the CSRM modelling only considers the key mitigation at this stage, it does not take account of future design decisions and off-site mitigation measures that any future planning application will be required to include. As above it is likely that the effect of any 'unknowns' will reduce the attractiveness of car journeys within the site and improve sustainable travel opportunities off-site.

Section 6 of Marshall's report entitled "Cambridge East: Delivering Planned Growth" dated February 2022 identifies an off-site public transport and active mode strategy for Cambridge East. The transport strategy specifically focuses on complementary measures that are deliverable alongside the existing commitments by the GCP and authorities.

Figure 6.2 of the Marshall Report (reproduced overleaf) summarises the complementary active travel measures for Cambridge East. Section 6.3 of the report outlines complementary public transport services (in addition to the services to the City Centre and Station provided by the Cambridge Eastern Access Project) which includes high quality surface public transport connections to Cambridge North Station (either via Coldham's Lane or Newmarket Road), Cambridge Biomedical Campus and a complementary service to Cambridge Station – potentially via Mill Road or Davy Road (if East West Rail delivers an eastern access to the station).

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As mentioned, this complementary active mode strategy and public transport strategy would supplement and boost the existing accessibility commitments identified by the GCSP and GCP. Furthermore, these interventions are within the control of the developer and/or local authority to deliver.

On this basis, based on the outputs from the topic papers, the evidence to date indicates the development location and quantum can be accommodated on the transport network and achieve high levels of travel by sustainable modes. Furthermore, with the committed transport schemes proposed, this growth is supported by credible, deliverable transport mitigation package.

4. Summary

On this basis, at this early stage of testing, it is concluded that:

- CSRM modelling to date by GCSP and CCC has concluded there's no modelling evidence to suggest the Local Plan Option cannot be accommodated on the network with mitigation. This level of trip making forms the basis for the emerging early aggregate trip budget. (Topic Paper 2)
- A ratio of 1.11 homes to jobs produces a set of outcomes, that in a narrow site-specific sense, can be considered preferable. (Topic Paper 3)
- Cambridge East presents significant potential for ambitious yet achievable car driver mode shares based on the components of the site and from experiences from elsewhere (Topic Paper 4)
- The resulting mode shares from spreadsheet model testing of the Local Plan Option and Additional Option (9,500 homes and 9,000 jobs) are ambitious but consistent with successful schemes in the UK and Europe as set out in Topic Paper 4.
- Of the development scenarios tested in this note, all result in credible public transport trips when compared with seat capacities and service frequencies.
- On this basis, based on the outputs from the topic papers, the evidence to date indicates that the development location and quantum can be accommodated on the transport network and achieve high levels of travel by sustainable modes. Furthermore, with the committed transport schemes proposed, this growth is supported by credible, deliverable transport mitigation package.
- The GCP is progressing designs for the Eastern Access Phase A scheme. Funding is in place. Phase B is being progressed and Marshall have provided all assurances that early delivery will be supported through their land holdings. Single land ownership will make consenting and delivery more straightforward.

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Further observations are as follows:

- The car driver mode shares vary greatly depending on whether the known highway constraints for vehicular trips from the Local Plan option are capable of being mitigated. This gap will be closed through the further coding of additional accesses.
- The mode shares are expressed as a proportion of all external trips (not just journey to work).
- Refinement of the accesses within the CSRM for the Local Plan option (and other quanta tested) alongside extant trip making is required to refine part 1 of the trip budget so that the impact of the full forecast of car driver trips can be assessed and reviewed.
- Further site site-specifics including further mitigations and for Cambridge East (i.e. 15 minute cities, constrained car parking) should also be captured.
- Based on what is currently known, over and above the Local Plan modelling in the region of around 9,500 homes and 9,000 jobs still reflect a sensible balance of credible car driver mode shares when taking into account the application of the trip limits within the Local Plan Option CSRM testing. These are not however the only quanta or mix worthy of consideration when, or if, other material matters are brought into consideration.

5. Next Steps

Further refinement on development quanta and transport mitigation will be defined in accordance with the trip budget benchmark and be fed back into site capacity work.

It is recommended this review of the trip budget be informed by the following:

- Additional vehicular access points.
- Updated job assumptions for the existing Airport Zones to reflect the findings of the Employment Topic Paper.
- Sustainable transport mitigation package defined in Stantec's February 2022 report entitled "Cambridge East: Delivering Planned Growth Transport Strategy" and Topic Paper 4.
- Any relevant updates on the GCP's projects in the area.

Engagement will continue with the GCP regarding the interface with the Cambridge Eastern Access Phase A and B and the Making Connections study.