

GCP Smart Programme

Report to: Greater Cambridge Partnership Joint Assembly

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1. Background

- 1.1 It has been a busy year for the Smart workstream. For example, the sensor network has expanded to over 100 sensors across Cambridge, collecting movement data to give organisations a better understanding of how the city moves. The Connector Autonomous Project is progressing, with vehicle testing already carried out at Cambridge West. A trial at the Cambridge Biomedical Campus is expected to launch in spring 2025. An extension has been granted until September 2025 with a funding bid submitted to extend the trial further. The workstream has also looked at how the developing Artificial Intelligence (AI) technology can be harnessed to improve how people move around Cambridge.
- 1.2 This report highlights progress to date and recommends the allocation of funding to several projects for the financial year ending March 2026, when the current Smart budget comes to an end. A further request for funding to continue the programme will be submitted to the November Executive Board.

2. Recommendations

- 2.1. The Joint Assembly is invited to consider and comment on the proposals to be presented to the Executive Board, in particular:
 - (a) Progress with the Smart workstream and its contribution to wider GCP objectives; and
 - (b) The proposed allocation of existing Smart budget to the three projects set out in section 4.2 of this report, to be delivered in the 2025/26 financial year.

3. Smart Workstream Progress to Date

- 3.1 The aim of the Smart workstream is to consider how both existing and emerging technologies can help to support the overall aims and objectives of the City Deal, and to progress initiatives to implementation where this is agreed.

3.2 Progress to date is summarised below under several key areas, namely:

- Better data for GCP and our partners.
- Make sustainable transport easier to use.
- Better operation of the highway.
- Enabling the next generation of public transport.

Better data for GCP and our partners

- 3.3 The availability of high-quality data underpins much of the work undertaken by the GCP and its partners, enabling investment decisions to be made based on sound and consistent evidence and enabling monitoring of scheme benefits post-delivery.
- 3.4 To enable this the Smart workstream has deployed a network of sensors as previous data about movement on the transport network was based on short survey windows and where longer-term monitoring has been in place, it lacked granularity on how people were moving. After several trials, we now use sensors supplied by Vivacity, to monitor movement 24/7, 365 days a year and classify and count 10 classes and up to 32 sub-classes of road users including vehicles of all sizes, pedestrians and cyclists as well as the ability to monitor, vehicle path detection, median journey time, speed, zonal speed and near misses for road safety work.
- 3.5 In 2022 a framework agreement was established to deploy a core network of sensors in the first instance and to allow public sector partners to easily procure and deploy additional sensors that become part of the wider network over a longer period. The GCP has funded 57 sensors, however the network has now grown to over 100 sensors and continues to expand. Other organisations such as the University of Cambridge, the Cambridge Biomedical Campus and developers are also beginning to deploy sensors which can become part of the wider network with suitable data sharing agreements put in place.
- 3.6 Due to the amount of data being produced and to allow other data sources to be utilised when evaluating movement in the region, a transport data platform has been procured which allows data to be cleaned, structured and collected into one place. The platform currently contains data from the sensor network, bus movements, Tag Master (traffic movement), Inrix (vehicle trips), Voi scooters and bikes and parking data. To make this information easy for officers to use the platform has been integrated into several tools such as power BI which allows the building of simple dashboards to display data clearly. The Business Intelligence team have built a number of these allowing members of the public to interrogate the data and can be found on the Cambridgeshire Insights open data site - [Cambridgeshire & Peterborough Insight – Roads, Transport and Active Travel – Traffic Flows](#)
- 3.7 The data is being used by the GCP to help develop schemes and business cases, monitor and evaluate schemes and for pieces of data analysis such as identifying bus pinch points and has helped to answer questions about e-scooter usage at Cambridge North station. Colleagues from Cambridgeshire County Council are using sensors to monitor near miss data at the Dutch Roundabout and to see the impact of developments such as Northstowe on the road network.
- 3.8 Further examples of innovative uses of data are noted in other sections of this report.

Making sustainable transport easier to use

- 3.9 A key focus for Smart is to make sustainable modes of transport easier for travellers by supporting people to access accurate real time data through several channels, travel screens, the station travel totem and journey planners.
- 3.10 Real Time Data Audit – Real-time bus information is integral to the passenger experience. It helps travellers to plan journeys in advance, to know when the bus will be at the stop, to re-plan journeys when issues arise and to give them comfort a bus is coming when they are waiting at a bus stop. This information is displayed at bus stops on digital screens and feeds journey planning apps. If the system provides inaccurate information, it quickly falls into disrepute with travellers losing trust in the information displayed.
- 3.11 The audit looked at four different areas: Underpinning data, Generation, transmission and receipt of the real-time data, Bus operator actions and Reliability of the hardware on street. The report sets out a number of actions to improve the quality of the data and therefore the experience for the commuter:
- Improve the data base of bus stops (NaPTAN) – the Cambridgeshire and Peterborough Combined Authority (CPCA) have started work on improving this data set.
 - Time between location signals to be reduced from the current 20/30 seconds to five seconds – this will require engagement with operators.
 - Improve network coverage - Whippet were having issues but have recently changed from Vodafone to O2 which has improved coverage.
 - Improve the back-office processes of operators to ensure cancellations and disruptions are inputted in a timely manner.

Several of the proposed improvements relate to the VIX real-time system and the on-street signs. The CPCA will be reprocurring the real time system in 2025/26 and several of the recommendations will inform the specification to ensure the new system improves the real time data provided.

- 3.12 Real time bus data is being used to feed journey planning tools that help travellers to plan their journeys and give real time information to build confidence in the public transport system. To do this Smart works with a company called ITO World who support:
- Journey planning applications – real time data is being fed into a number of journey planning applications including Google Transit, Apple Maps and City Mapper which is currently available in Cambridge. Motion Map, an application developed by the programme offered multi-modal and multi-operator information as well as innovative features such being able to see your bus moving on a map. These features have now been included in app's available in the market and the MotionMap app has been closed having served its purpose.
 - Transport information lobby screens – the University maintains a network of travel screens across the University and in organisations such as the Royal Society of Chemistry on our behalf. At the request of the British Antarctic Survey, we are currently supporting them to deploy a new screen. In total 43 screens are currently live.

- Travel information totem – the totem at the central station was recently refreshed and shows real time bus and train data as well as visitor information. Following feedback, we have redesigned the screens to make them easier to read but have kept the feature which gives the next bus to the City Centre and Cambridge Biomedical Campus.
- 3.13 The next step in supporting travellers to use sustainable modes of transport and encourage them out of private cars is an emerging concept called ‘Mobility as a Service’ or MaaS which offers a seamless, one-stop digital solution for planning, booking, and paying for multi-modal travel. By integrating diverse transport modes within a single platform, MaaS simplifies access to sustainable travel alternatives, providing users with real-time information, disruption alerts, and tailored recommendations and is usually accessed via a mobile phone app.
- 3.14 In partnership with the CPCA, an options appraisal and business case have been developed for the deployment of MaaS. The options appraisal included a market sizing study, which found by 2030 MaaS approximately 2.73 million journeys in the region could be facilitated via a MaaS platform out of an addressable market of 7.1 million trips. This uptake would support CPCA and GCP’s goals by increasing public transport ridership and boosting the financial sustainability of local transit providers.
- 3.15 The options appraisal looked at several different delivery models and recommended the GCP and CPCA look to partner with another local authority to scale their MaaS offering into Cambridgeshire which would drive the cost of deployment down as well as help manage the risks involved with deployment.
- 3.16 Having engaged with several authorities who have deployed MaaS, their current contractual arrangements prohibit them scaling into other areas.
- 3.17 Having established this, the business case looks at the costs of the GCP deploying MaaS as a standalone product. A financial model was developed, assuming GCP would pay a capital “sign-on fee” to access the platform, covering integration, customer service, transactional fees, staff resources, and marketing. Over a five-year period, the operational cost is estimated at approx. £1.6m, offset by an anticipated commission of approx. £500,000, resulting in a net cost of £1.1m.
- 3.18 There are several ways to potentially reduce the costs and risks associated with delivering an at scale solution funded by the GCP:
- **Align MaaS Development with Bus Franchising:** if the CPCA proceeds with bus franchising, a MaaS-based app could be incrementally developed as the franchised network would need a travel planning and ticketing platform and other features could be subsequently added such as loyalty rewards and mobility credits.
 - **Seek Additional Revenue Streams:** the CPCA and GCP could explore funding options to support MaaS deployment, including developer contributions from new housing developments (e.g. S106 payments), sponsorships from companies and universities for employee and student use, and funding from other organisations seeking to promote sustainable transport.
 - **Partner with other Local Authorities:** engaging and building a partnership with additional local authorities not yet tied to a MaaS contract could reduce deployment costs and distribute risks. Collaborative procurement efforts could increase buying power and result in a more robust and scalable platform.

- 3.19 The Smart Team is working with the CPCA to look at MaaS could be aligned with bus franchising should it proceed and continue to engage with other Local Authorities.

Better operation of the highway

- 3.20 Using road-space efficiently and in ways that encourage the use of sustainable transport is vital to GCP's aims. Smart is working closely with Cambridgeshire County Council to ensure the systems and operational aspects of highways management make appropriate use of technology to meet the needs of local transport partners as these develop. In addition, Smart has undertaken projects to advance this work.
- 3.21 Smart Signals Pilot - Hills Road/Brooklands Ave/Cherry Hinton Road and at the edge of the city at the junction of Cherry Hinton/Queen Edith's Way. The trial assessed various detection and optimisation technologies with the goal of improving journey times and prioritising different road users at specific times of the day.
- 3.22 The technologies compared included induction loops and VivaCity sensors for detection, and VA (Vehicle Actuation), MOVA (Microprocessor Optimised Vehicle Actuation), SCOOT (Split Cycle Offset Optimisation Technique) and VivaCity's 'Smart Junction' Optimiser for optimisation. The focus of the trial was a direct comparison with VivaCity's optimiser against MOVA at the Robin Hood junction in Cambridge.
- 3.23 Data collected during the trial was analysed to evaluate the detector and optimiser effectiveness. This led to improved journey time reduction (1%) and a larger benefit for pedestrians whose waiting times at crossings were reduced by up to 30%.
- 3.24 Smart Crossing Trial – Smart provided (non-financial) support to a trial of pedestrian crossing technology. The trial used overhead visual detection and machine learning to better understand who was likely to cross enabling more efficient operation of the crossing which led to a reduction in waiting times of 36%. It also allowed crossing times to be extended where needed to accommodate larger groups, or those who needed longer to cross safely. There was no impact on the flow of traffic.
- 3.25 Use of Data and AI to understand the impact of roadworks - A nine month Innovate UK-funded project, in collaboration with Alchera and Oxfordshire County Council. The project looked at three areas:
- Scheme Monitoring: improved data analytics for teams who design, deliver and monitor transport schemes.
 - Roadwork Triage and Comms: supporting highways teams to more effectively and efficiently approve roadwork permits.
 - Roadwork Monitoring: supporting the Integrated Highways Management Centre to better monitor roadworks and respond to disruptions to sustainable transport modes.

Enabling the next generation of public transport – automated buses

- 3.26 The Smart workstream has been working to explore how autonomy can support and improve the public transport system giving residents more transport options and providing potential guidance technology for the new busways. The work has been funded by the Centre of Connected and Autonomous Vehicles (CCAV) a

government body set up to develop the UK's capability in this sector and industry partners. Early work included a feasibility study to look at potential opportunity areas, the development of an Autonomous Vehicle (AV) strategy and in 2021 a trial deployment of three automated shuttles on Cambridge West.

- 3.27 Smart were successful in bidding into a further round of CCAV funding to build on the work at Cambridge West. In April 2023, Connector kicked off aiming to deploy vehicles in two locations, linking Madingley Park and Ride to Cambridge West and Trumpington and Babraham Park and Rides to the Cambridge Biomedical Campus (CBC). The original project was due to complete in March 2025 however three significant issues arose:
- In November 2023 the lead partner was terminated from the project due to issues with match funding. Following a process to select a new partner Fusion Processing were brought into the project along with Alexander Dennis Limited.
 - The University requested a licence to test and operate on Cambridge West which has taken a number of months to negotiate.
 - In November 2024, the Stagecoach board confirmed they were re-focusing fully on delivering core bus services across the UK and were pulling out of the automated bus projects they were involved in across the UK. They plan to continue following and supporting the emerging industry and to re-engage with deployments when technology and regulations mature.
- 3.28 A re-scope of the project has been carried out and an extension granted to September 2025 to allow three vehicles (rather than the four originally planned) to be deployed and operated by a new operator across both sites. Vehicle testing has already been carried out at Cambridge West and will continue in the first quarter of this year while a new operator is onboarded to the project. We anticipate a passenger trial will begin at Cambridge West by the spring 2025, with an ambition to start on CBC ahead of the summer. The project extension means we will be able to run as originally intended with the Cambridge West trial for at least six months and the CBC trial for three months.
- 3.29 To date the project has delivered:
- Initial human factors work including a deliberative workshop to gather resident's views on Automated Buses.
 - Safety case work validated by Horiba Mira for the Cambridge West site and started on CBC.
 - Virtual testing of vehicles on both sites.
 - Pre-work on the deployment of a 5G network and charging infrastructure.
- 3.30 A further round of CCAV funding to allow enhancement of existing projects closed in January and the Connector consortium have bid for a further £1m to:
- Extend the deployment of vehicles to January 2026.
 - Trial the autonomy technology to verify suitability and commercial cases for future deployment on existing busways.
 - Trial the autonomy technology on a test track to simulate future busway infrastructure and inform roll-out of this technology as a guidance system.
 - Extend the Human Factors work to look at how we can ensure access for specific groups with protected characteristics.

3.31 It is anticipated we will hear whether we have been successful for this funding in March 2025.

Other areas of work

3.32 Smart is working with Connecting Cambridgeshire to implement County Council policy to install new fibre ducting under schemes such as busways, cycleways and road improvements. 5.16km of ducting has so far been delivered in schemes such as Milton Road with more worked planned for other schemes. This initiative improves digital connectivity for new and existing communities in the area and means that GCP schemes are delivering improved connectivity to local residents and businesses.

4. Next Steps and Recommendations

4.1 The nature of Smart means some projects can be predicted and planned in detail, whereas others arise due to the emergence of new technologies, new opportunities, funding competitions and new requirements from the GCP and its partners. This section identifies the key projects expected to form the basis of the programme to March 2026:

- The continued delivery of the Connector project to September 2025 and potentially to March 2026 dependant on the enhancement bid submitted in January.
- Work with the CPCA on the deployment of MaaS and support the delivery of the recommendations from the Real Time Bus Data audit within the re-procurement of the real time bus data system.
- Delivery of a recommendation within the freight strategy to deliver a feasibility study and trial looking at the dynamic management of the kerb.
- Continue to maintain the sensor network, real time data into travel planning tools, data platform, travel screens and totem at the station.

4.2 The Joint Assembly is asked to consider and comment on the proposed allocation of funding from the existing Smart budget to deliver the following projects:

- Expansion of the pedestrian crossing trials to understand how they can support the pedestrian experience (approx. £25,000).
- Initial trials of using overground detection for bus priority to improve the flow and reliability of bus journeys. (£25,000).
- Work with the joint planning service to look at how their work on using AI in consultations could shorten the response times making engagement within the GCP more efficient (£25,000).

4.3 The current agreed Smart workstream funding ends in March 2026 and we will return to the Executive Board in November 2025 with a proposal for funding beyond this period.

5. Consultation and Engagement

5.1 Consultation and engagement for Smart is typically undertaken for individual projects rather than the programme as a whole. Where consultation and

engagement are undertaken, the aim is to fully align with the approaches used by all other parts of the GCP.

- 5.2 In addition, Smart conducts an underpinning, wider engagement activity with other public bodies, private sector companies and markets more generally to ensure we remain in touch with wider innovations and developments. This ensures that GCP takes advantage of new opportunities including access to funding and avoids 'reinventing the wheel' where solutions already exist and can be applied to our area.
- 5.3 This engagement activity also allows us to demonstrate that we are a successful, forward-thinking and innovative region which in turn helps to attract investment to the area.

6. Alignment with City Deal Objectives

- 6.1 The Smart workstream explores the use of technology and innovative approaches to support travellers using more sustainable modes of transport, a key objective of the city deal. A crucial part of this work is supporting customers using the bus network by giving real-time information at key points. The programme is also exploring how new technologies can support walking and wheeling journeys and can expand the public transport offering through trials of those technologies, including autonomy.
- 6.2 A data infrastructure has been developed that supports the development of GCP schemes and the monitoring and evaluation of investments which is important evidence for how the City Deal is achieving its objectives.

7. Citizen's Assembly

- 7.1 Smart is using technology to support a number of aspects of the Citizen's Assembly vision. Examples include:
- Be people centred: for example, work on smart signals has the potential to significantly improve prioritisation of pedestrians and cyclists.
 - Be managed as one coordinated system: work to support the further development of the highway management function enables the network to be managed as a coordinated system.
 - Educate people about different options: information provision aims to address this point.
 - Use technology to be responsive to demand: information provision aims to address this point.
 - Enable predicable journey times: the work to identify bus pinchpoints aims to improve bus reliability.
- 7.2 Smart is also using technology to address the Citizen's Assembly supporting measures, for example:
- Optimising traffic signals: work on smart signals trials has the potential support County Council efforts to optimise signals.

8. Financial Implications

8.1 The funding allocated to Smart in the 2022/2023 budget round is as follows:

- Financial year 2023/2024: £919k (including carry forward from previous years).
- Financial year 2023/2024: £645k.
- Financial year 2024/2025: £600k.
- Financial year 2025/2026: £592k.

8.2 Smart has been adept at bringing in external funding. As part of preparation for the previous gateway review, it was identified that £6.3 had been leveraged for every £1 of actual spend on Smart, and it was noted that this ratio did not take into account significant benefits in the form of know-how which are harder to quantify.

8.3 Our ability to attract funding depends on:

- The competitions being run by funding bodies that are sufficiently well aligned to GCP's aims.
- The willingness of the private sector to invest.
- The relative importance placed on attracting further external funding compared to implementation work.
- The time/resource we have available to focus on progressing these given that they can be very time consuming and highly competitive.

To encourage the private sector to invest in our area, Smart Cambridge works with the Connecting Cambridgeshire team to improve digital connectivity to make the area more appealing for trials and deployments of new smart solutions.

Have the resource implications been cleared by Finance: Yes.

Name of Financial Officer: Mike Faulkner.

9. Next Steps and Milestones

9.1 It is anticipated that the forward programme post March 2026 will be submitted to GCP Joint Assembly and GCP Executive Board in November 2026. Progress will be reported via the Quarterly Progress Report.

Background Papers

Source Documents	Location
GCP Smart Cambridge website	Greater Cambridge Partnership
Smart section of the Connecting Cambridgeshire website	Smart - Connecting Cambridgeshire
Updates provided in previous GCP Quarterly Reports	GCP EB Papers