

# Funding for Innovation: Connected Vehicle Data



Department  
for Transport

## Application Form

The level of information provided should be proportionate to the size and complexity of the scheme proposed. As a guide, we would suggest around 10 to 15 pages including annexes would be appropriate.

**A separate application form should be completed for each scheme.**

### **Applicant Information**

**Local authority name(s)\*: City of York Council**

*\*If the bid is a joint proposal, please enter the names of all participating local authorities and specify the lead authority*

**Bid Manager Name and position: Darren Capes, Transport Systems Manager**

*Name and position of officer with day to day responsibility for delivering the proposed scheme.*

**Contact telephone number: 01904 551651 Email address: Darren.Capes@york.gov.uk**

**Postal address:** City of York Council, Transport Service  
Directorate of Economy and Place, West Offices  
Station Rise  
York  
YO1 6GA

When authorities submit a bid for funding to the Department for Transport, as part of the Government's commitment to greater openness in the public sector under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004, they must also publish a version excluding any commercially sensitive information on their own website within two working days of submitting the final bid to the Department for Transport. The Department for Transport reserves the right to deem the business case as non-compliant if this is not adhered to.

**Please specify the web link where this bid will be published: [www.york.gov.uk](http://www.york.gov.uk)**

## **SECTION A - Scheme description and funding profile**

### **A1. Scheme name: Pergamentum**

### **A2. Headline description:**

Please enter a brief description of the proposed scheme (in no more than 250 words)

City of York Council (COYC) has a typical Local Authority challenge of providing safe and maintained highway assets on a restricted budget. Tools to support early identification of issues cost effectively would enable new ways of targeting asset intervention, and developing greater intelligence on the state of and changes to assets.

Data from connected vehicles may provide a key tool to assist this. In the "pothole spotter" project, COYC has already proven the value of vehicle mounted cameras to identify defects. This project aims to extend this investment using cameras with live telemetry to detect asset changes and defects. These will be fitted to a refuse collection vehicle and bus which traverse all of the streets of York.

We will use image recognition to identify and geolocate road signs to identify changes / missing signs / partially hidden, to investigate effectiveness of camera detection and image recognition / matching algorithms. It will links to and from the York Asset Management System via the database established in the Eboracum project, developing standards for asset change detection by cameras to link vehicles and asset management processes to obtain value from new data.

The project will analyse the robustness of the tool for efficiently monitoring COYC road sign asset stock; and investigate potential for other asset types and defects. Care will be taken to ensure no duplication of the "pothole spotter" project.

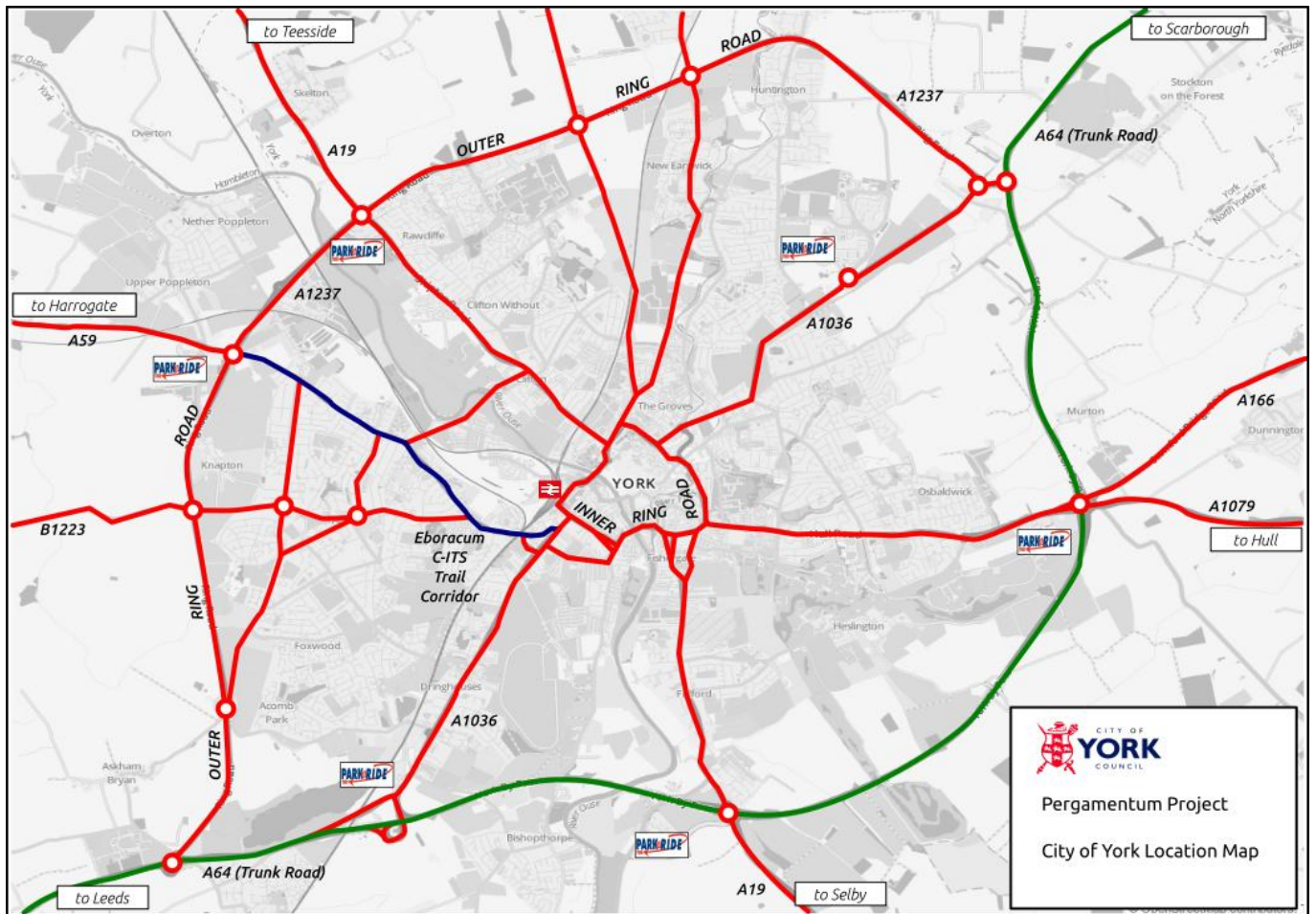
The connected vehicle data will be part of the emerging STEP programme in York and lever off communications pilots undertaken in Eboracum.

### **A3. Geographical area:**

Please provide a short description of area covered by the bid (in no more than 50 words)

City of York inside ring road

The project involves vehicles travelling over the entire York road network. The fitted bus will traverse routes within the north west of the City, providing regularly updated data for a small sample of the network. The refuse collection vehicle will travel the majority of the City's network during its bi-weekly duty cycle.



OS Grid Reference: **SE573526**

Postcode: **YO266AN**

Please append a map showing the location (and route) of the proposed scheme, existing transport infrastructure and other points of particular interest to the bid e.g. development sites, areas of existing employment, constraints etc.

**A5. Equality Analysis**

Has any Equality Analysis been undertaken in line with the Equality Duty?  Yes  No

## **SECTION B – The Business Case**

### **B1. The Scheme – Summary/History (Maximum 300 words)**

Please outline what the scheme is trying to achieve – indicate what data you expect to collect and your technological approach, what applications you will deliver from the connected data etc.

This should also provide a clear statement on data privacy and security.

The scheme is aiming to build on knowledge gained in the pothole spotter project to monitor and identify COYC's road sign stock. These are vital to traffic management in York, to road safety and will increasingly become important as camera equipped vehicles emerge.

Our technological approach is to add commercial off the shelf fleet management cameras from Trakm8 to the pothole spotter vehicle and a bus. By using vehicles that traverse all York's roads we will compare the added value of sign capture from vehicles with known pothole capability.



*Figure 2: Levering existing pothole spotter investment*



*Figure 1: Trakm8 Roadhawk 600 integrated camera*

Vehicles will collect geo-located digital images. On-board image processing will identify road sign assets, creating an exportable standardized list of road sign assets plus key digital images. We will use 4g and city fibre to communicate with vehicles.

Off-board processing will then support comparison of newly captured assets with previous collections. This will present a list of candidates of changed assets to support to identify changes / missing signs / obscuration.

Initially complete records of captured road signs will be compared to asset records in the York asset management system. Later iterations will provide change data. The exact integration of this data into the York asset management system will require detailing as part of this project but is a key outcome. It is vital that the data is not just collected (as is possible from many vehicles) but must be fully integrated into asset management processes/ data to derive value.

COYC has already examined the implications of using image data as part of the pothole spotter project and is comfortable that this extension to road signs can be made with no threat to data privacy. Using Trakm8 off the shelf cameras adds additional data security.

## **B2. The Strategic Case** (Maximum 350 words)

This section should set out the rationale for making the investment and evidence of the existing transport problems.

In particular please provide evidence on the relevant questions/issues in the accompanying Competition guidance.

Supporting evidence may be provided in annexes – if clearly referenced in the strategic case. This may be used to assist in judging the strength of your strategic case arguments but is unlikely to be reviewed in detail or assessed in its own right. So, you should not rely on material included only in annexes being assessed.

What are the current problems to be addressed by your proposal?

The Council as highway authority has a limited understanding of roadside assets such as signs, and this is primarily from manual inspections. To date, this has been acceptable but as we place more emphasis on economic asset management it is unsustainable and as we move towards vehicles with capability to 'read' road signs, it is important that signs are clean and well maintained.

The pilot will enable COYC to identify of assets and changes in them as a strong complement to existing methods and processes (potentially replacing them, when sufficiently proven). This will enable COYC highway safety and maintenance duties in a highly-cost effective manner. It is an opportunity for increased responsiveness in remedial actions by close integration with asset management systems and opportunities to increase system automation encapsulating asset and defect records.

We considered use of the pothole spotter reconfigured for sign capture but this is unlikely to give a good test. Instead we will compare a road sign and a pothole camera in the same vehicle. Another alternative was to use public vehicles but this does not build on the knowledge from pothole spotter.

The impact will be reduced reliance on manual inspection and improve road sign asset condition, (reducing unplanned maintenance). Longer term, it will ensure COYC has an asset database ready for the requirements of CAVs, and helps us become a trusted supplier of the road infrastructure data that CAVs will require.

To turn data into intelligence, digital imagery with appropriate processing will create candidate asset inventory and asset defect record inputs into the York Asset Management System. Any record will initially continue to require human verification, but will improve process automation.

As it is the intention of commercial partners to provide similar capabilities to other Authorities, it is important that outputs are provided to the York Asset Management System in a non-proprietary way. No commonly agreed standards exist for this so we will develop documented data structures aligned with industry best practice including alignment with BIM codes that can be proposed as future standards.



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**B3. The Financial Case – Project Costs**

Before preparing a scheme proposal for submission, bid promoters should ensure they understand the financial implications of developing the scheme (including any implications for future resource spend and ongoing costs relating to maintaining and operating the asset), and the need to secure and underwrite any necessary funding outside the Department for Transport’s maximum contribution.

Please complete the following tables. **Figures should be entered in £000s** (i.e. £10,000 = 10).

**Table A: Funding profile (Nominal terms)**

<b>£000s</b>	<b>2018-19</b>	<b>Total</b>
<i>DfT Funding Sought</i>	<i>72</i>	<i>72</i>
<i>LA Contribution</i>	<i>20</i>	<i>20</i>
<i>Other Third Party Funding</i>		

Notes:  
(1) Department for Transport funding must not go beyond 2018-19 financial year.  
(2) A local contribution of 5% (local authority and/or third party) of the project costs is required.

**B4. The Financial Case - Local Contribution / Third Party Funding**

Please provide information on the following points (where applicable):

- a) The non-DfT contribution may include funding from organisations other than the scheme promoter. Please provide details of all non-DfT funding contributions to the scheme costs. This should include evidence to show how any third party contributions are being secured, the level of commitment and when they will become available.

This project will build on activities to establish multi-layered communications across the City, as part of the ‘Full Fibre City’ and ‘City Wi-Fi’ Initiatives, for which CYC and its commercial partner Pinacl Solutions Ltd are providing capital installation funding. In the initial phase, this will involve £20k of City of York Council capital contribution. This will support communication to vehicles.

- b) Where the contribution is from external sources, please provide a letter confirming the body’s commitment to contribute to the cost of the scheme. The Department for Transport is unlikely to fund any scheme where significant financial contributions from other sources have not been secured or appear to be at risk.

Have you appended a letter(s) to support this case?       Yes       No       N/A

- c) Please list any other funding applications you have made for this scheme or variants thereof and the outcome of these applications, including any reasons for rejection.

**B5. The Financial Case – Affordability and Financial Risk** (maximum 200 words)

This section should provide a narrative setting out how you will mitigate any financial risks associated with the scheme.

Please provide evidence on the following points (where applicable):

a) What risk allowance has been applied to the project cost?

We have allowed a 10% risk allowance in the cost based on our experience of this kind of project

b) How will cost overruns be dealt with?

The scheme will be managed and monitored as part of the Council's wider, £6m annual transport capital programme. It will be incorporated into the PRINCE2 based methodology the Council uses to manage this programme and will be monitored through the existing progress and budgetary forecasting and monitoring procedures the Council employs.

The Council use flexibility in resource allocation within this programme to ensure that were potential over-runs and delays are identified, re-profiling of resources can be used to mitigate them and if needed, bring individual schemes back onto track.

In cases were significant delays or additional costs occur, the PRINCE2 based approach the Council uses will allow these to be identified sufficiently early for remedial action to taken and scheme objectives or deliverables recast, consultation with partner or deliverer organisations to be held and revised programming to be developed.

c) What are the main risks to project delivery timescales and what impact this will have on cost?

Use of TrakM8's Roadhawk 600 digital camera, a commercially available and robust product reduces risk. However, the image process algorithms have not been deployed to perform the proposed usage – there is therefore a risk that the success rate of asset recognition and asset defect identification may fall below levels that achieve operational meaningful levels. This exploration is a key feature of the project.

The project schedule and allocation of funds makes allowance for processes to configure, calibrate and tune the image processing algorithms. These are not expected to impact the project schedule or costs.

## **B6. The Economic Case – Value for Money** (maximum 200 words)

Bidders are requested to provide qualitative description of the data that will be collected from the project and how these could provide potential benefits going forward.

This should also capture any examples which generate revenue from the data collected and an indication on the number of users that benefits.

The equipped vehicles will collect geo-located digital imagery data which will be processed on-board to identify road sign assets, and create an exportable standardized list of geo-located road sign assets plus key digital images. Off-board processing supports comparison of newly captured road sign assets with earlier similar collections and this will present a list of candidates of changed assets to support to identify changes / missing signs / obscuration. Data will be integrated into the York asset management system, providing an invaluable cheaply sourced critical data set.

This project will result in significantly improved asset data being collected on the condition of road signs and will demonstrate the potential of this system for wider deployment. This will allow the authority to reduce reliance on manual inspection regimes and improve the road sign asset condition, (so reducing the need for unplanned maintenance). In the longer term, it will ensure the authority's asset database is ready for the requirements of CAVs, and helps the authority secure its place as trusted data supplier of the road infrastructure data that CAVs will require.

Ultimately, this will become a valuable data resource for the Council.

## **B7. The Commercial Case** (maximum 200 words)

This section should set out the procurement strategy that will be used to select a contractor and, importantly for this fund, set out the timescales involved in the procurement process to show that delivery can proceed quickly.

What is the preferred procurement route for the scheme? For example, if it is proposed to use existing framework agreements or contracts, the contract must be appropriate in terms of scale and scope.

Most of the elements of the Scheme are being delivered through existing framework contracts and work is already underway to procure Trakm8 cameras.

For any other elements of the scheme that require procurement, the Council will adhere to its financial standing orders and said procurements will be undertaken in accordance with standard authority practice. Generally, as the work required for this scheme is broadly similar in nature to the existing traffic technology activities of the council, this will be using existing tendered arrangements or framework agreements. A view of the delivery programme will be undertaken at the start of the scheme to identify any areas where open procurement might be needed and if any such cases arise, it is likely that standard process restricted OJEU procedures will be used.

For the deployment of partner technology in the city for the duration of the project, the council will not seek ownership, but will enter into a standard agreement for its use. This will formalise the requirement for delivery of technology within the timescales identified in the scheme programme and for the duration required, but will leave ownership and IPR with the partner organisations. The council will, in return for this arrangement seek to ensure the best possible



terms for ongoing use or purchase of said technology with York for the good of the city are reached.

\*It is the promoting authority's responsibility to decide whether or not their scheme proposal is lawful; and the extent of any new legal powers that need to be sought. Scheme promoters should ensure that any project complies with the Public Contracts Regulations as well as European Union State Aid rules, and should be prepared to provide the Department for Transport with confirmation of this, if required.

An assurance that a strategy is in place that is legally compliant is likely to achieve the best value for money outcomes is required from your Section 151 Officer below.

**B8. Management Case - Delivery** (maximum 200 words)

Deliverability is one of the essential criteria for this Competition and as such any bid should set out if any statutory procedure are needed before it can be delivered.

An outline project plan (typically in Gantt chart form) with milestones should be included as an annex, covering the period from submission of the bid to scheme completion. The definition of the key milestones should be clear and explained. The critical path should be identifiable and any contingency periods, key dependencies (internal or external) should be explained.

The annex shows the Gantt chart and critical path. We assume a start in mid-March 2018 and have key milestone and deliverable “products” in:

- MS0 – Inception: Deliverable is inception report
- MS1 – Detailed Design: Deliverable is a design report
- MS2 – Process definition – deliverable is an overview document
- MS3 – Trial complete – Deliverable is a report
- MS4 – Benefit analysis – deliverable is a report
- MS5 – Reporting – final report is a key deliverable

These align to workpackages:

- WP0: Inception
- WP1: Design
- WP2: Sensor tuning
- WP3: Trials
- WP4: Benefits capture and report
- WP5: Dissemination
- WP6: Project management

The only external dependency are cameras but these are off the shelf. All other supplies or installations are within COYC control. Internal dependency is access to the York asset management system but this is secured.

This plan contains float within the Sensor Tuning and Trialling recognising that this by its very nature is iterative.

Andy Graham will act as overall project manager to oversee deployment and share learning with the connected vehicle community, while Jon Harrod Booth will disseminate findings to the asset management community.

No statutory procedures are needed as we build on the experience of pothole spotting vehicles and as the equipment is off the shelf.

Has a project plan been appended to your bid?

Yes

No

a) A statement of intent to deliver the scheme within this programme from a senior political representative and/or senior local authority official.

**Please see attached document ‘Project\_Pergamentum\_Statement.DOCX’**

### **B9. Management Case – Governance** (maximum 300 words)

Please name who is responsible for delivering the scheme, the roles (Project Manager, SRO etc.) and set out the responsibilities of those involved and how key decisions are/will be made. An organogram may be useful here. This may be attached as an Annex.

The project will be overseen by a project board composed of:

**Senior Responsible Owner – Tony Clarke**, who as Head of Transport has overall responsibility for provision and management of the capital programme.

**Project Director - Darren Capes**, who leads the Council’s Transport Technology Team and is responsible for maintenance, procurement and operation of all traffic technology. He has many years’ experience in research and grant funded activities including UTMC, RTPI, the Freeflow project and EV provision.

**Project Manager - Andy Graham**, who brings extensive experience in co-operative vehicles, working with CCAV and DfT. He has also managed Freeflow project in York and works with COYC and Trakm8 on many projects.

**Corporate IT Support – Roy Grant**, As Head of ICT, (Information and Communications Technology) with City of York Council will ensure the communications and linkages to corporate IT systems are managed and delivered in accordance with the programme plan.

**Finance Support - Jayne Close**, who is lead accountant for the Directorate of City and Environment Services. She has wide experience in revenue and capital elements of local government finance and grant funding.

Asset management work will be led by;

**Advisor – Dr Jon Harrod Booth**, who brings extensive experience of standardisation – chairing the BSI ITS standards committee, and has an on-going engagement spanning 15 years with Highways England and TfL concerning asset management systems and data.

Supporting partners include GAIST, Soenecs and Pinacl Solutions specifically to avoid duplication of pothole spotter investment

## **B10. Management Case - Risk Management**

Risk management is an important control for all projects but this should be commensurate with cost. A risk register covering the top 5 (maximum) specific risks to this scheme should be attached as an annex.

Has a risk register been appended to your bid?       Yes       No

Risk register for Purgamentum										
Risk type	risk	risk before mitigation			Risk register for Purgamentum			residual risk		
		impact	likelihood	product	mitigated by	impact	likelihood	product		
strategic	cost overrun	5	5	25	COYC has established a track record of delivering research on small budgets. Andy Graham has been appointed as specialist project manager to co-ordinate activity with Eboracum and STEP projects to avoid duplication and obtain maximum value	5	2	10		
	duplication of other works already funded eg pothole spotter technology doesn't work	4	4	16	The pothole spotter team have specific time allocated on the project to allow us to build on their developments and for them to lever off this work	4	2	8		
	lack of access to vehicles	5	4	20	We have chosen a supplier (Trakm8) with an off the shelf commercial product , extensive experience in this area and have realistic targets . However, we still expert to learn a great deal which we will share	5	3	15		
		5	4	20	We will use COYC fleet vehicles already equipped with equipment	5	2	10		
technical	poor image quality will not support image processing	4	5	20	We have chosen the Roadhawk 600 camera with HD imagery	4	3	12		
	not enough technical resource	4	4	16	We have planned the scope of work to fit available staff - no recruitment is needed	5	4	12		
	Comms costs may be excessive	4	4	16	Our advanced data compression technology means we can provide up to 250 videos plus 125 still images plus 10 minutes of live streaming each month on our basic data tariff so, despite its 4G capabilities, the RoadHawk 600's running costs will be even lower than 3G cameras.	4	2	8		
	interfaces to vehicles not understood	5	3	15	Use of off the shelf cameras reduces risk but some workarounds may be needed	5	2	10		
operations	We don't understand what asset customers want	5	5	25	Specific task to integrate with COYC asset management systems as a start for attribute capture	5	2	10		
	COYC only solution	5	4	20	Use of Jon Harrod Booth's links to BSI supports standards development	5	2	10		
	not enough incidents to locate and measure	5	4	20	We will capture a set of "test" events during the image processing learning as a baseline set and actively seek additional events eg via dummy test events	5	3	15		
managerial	delivery delay	5	4	20	A project manager (Andy Graham) will be assigned to ensure delivery is on time and within budget.	4	2	8		
	Team takes time to work together	4	4	16	COYC, Trakm8 and its advisors have worked together since 2006	4	2	8		
<b>Key to risk rating</b>										
Risk likelihood X impact <=10 = green, 11-19 = amber , 20> =red										

## SECTION C – Monitoring, Evaluation and Benefits Realisation

### **C1. Benefits Realisation (maximum 250 words)**

The Competition is seeking to build up the business case for the relevant technologies and use cases. Please provide details on the profile of benefits, and of baseline benefits and benefit ownership and explain how your will lead to the outputs/ outcomes. This could be achieved by logic maps, text descriptions, etc.

We also request that your bid clearly articulates how you are expecting to use the data collected and the expected benefits for both road users and road operators. Please also outline how you could measure the expected benefits from the application of the harvested data.

It is difficult to quantify benefits at this early stage of but nevertheless we have considered how to maximise value of the data by actioning roadside change to the asset that could occur as a result of it. Our baseline is annual sign stock surveys and ad hoc reporting, and we will assess the benefits of continuous condition surveys against this. The benefit will accrue to road users in terms of safety and congestion caused by missing signs (height limits say), COYC in terms of network management and enforcement proof, and in terms of reduced costs for surveys.

We will measure benefits in terms of:

- reduced time to identify missing or damaged assets;
- changes in costs of asset capture to COYC
- the use of that asset (why is it there functionally) and benefit it brings (compliance with road safety, traffic management;
- the safeguarded benefit by replacing the asset quickly and reduced risk resulting

We will also consider the safety implications of damaged assets, the reduced revenue from not being able to legally enforce compliance e.g. of bus lanes and the impact of missing TRO signs on our network (e.g. missing weight and height limits). Specifically, this will be done by a log of:

- when a missing sign is captured and the subsequent downstream replacement / repair
- the implications of not having that repair
- the reduced time

We will use data from the asset management system as a benchmark for improvement.

**C2. Monitoring and Evaluation** (maximum 150 words)

The Department intends to evaluate the competition and bidders are requested to support our evaluation activities through the provision of information.

For example, we may ask you to complete a survey or take part in an interview. In particular we will be interested to gather your views on; the delivery process (e.g. have you delivered your proposal to cost and schedule and whether you have encountered any barriers to delivery); the technology implemented (eg did it work as intended); the data collection process (e.g. do you have confidence in the data collected?); and how the data has been used/how are you planning to use it?

Please include a statement of the monitoring data you can access and an indication of the authority to monitor.

City of York Council fully supports evaluation activities of the Department and will make data available as required. Specifically, data relating to procurement processes, finance and expenditure in relationship to the project can be provided from the Council's corporate contract register and financial management system.

For technical delivery of the project, the Council will produce detailed written outputs describing the delivery and outcomes of the project and these will be available for analysis, as will the data and information used to produce them.

The outcomes of this project will form a part of the ongoing development of the Council's transport technology (ITS) strategy and asset management plans. These will also be available and will clearly identify areas in which the outcomes of this project have been influential.

We will fully support any user groups established by DfT and fully share our work on standards development and links to asset management.



## **SECTION D: Declarations**

### **D1. Senior Responsible Owner Declaration**

As Senior Responsible Owner for Pergamentum I hereby submit this request for approval to DfT on behalf of City of York Council and confirm that I have the necessary authority to do so.

I confirm that City of York Council will have all the necessary powers in place to ensure the planned timescales in the application can be realised.

Name:

Tony Clarke

Position:

Head of Transport

Signed:



### **D2. Section 151 Officer Declaration**

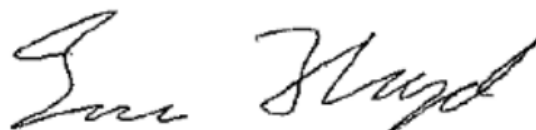
As Section 151 Officer for City of York Council I declare that the scheme cost estimates quoted in this bid are accurate to the best of my knowledge and that City of York Council

- has allocated sufficient budget to deliver this scheme on the basis of its proposed funding contribution
- will allocate sufficient staff and other necessary resources to deliver this scheme on time and on budget
- accepts responsibility for meeting any costs over and above the DfT contribution requested, including potential cost overruns and the underwriting of any funding contributions expected from third parties
- accepts responsibility for meeting any ongoing revenue requirements in relation to the scheme
- accepts that no further increase in DfT funding will be considered beyond the maximum contribution requested
- has the necessary governance / assurance arrangements in place
- has identified a procurement strategy that is legally compliant and is likely to achieve the best value for money outcome
- will ensure that a robust and effective stakeholder and communications plan is put in place.

Name:

Ian Floyd

Signed:



### **Submission of bids:**

The deadline for bid submission is **23.59 on 16 February 2018**.

An electronic copy only of the bid including any supporting material should be submitted to:  
Traffic.Comp@dft.gsi.gov.uk

