Purpose

1. The purpose of this prospectus is to describe the current understanding of the goods and services that Highways England expects to procure as part the A2/M2 Connected Corridor pilot (herein after referred to as "the Pilot") and to invite interested parties to a market engagement day on Monday 11th December 2017 10:30 till 14:00 at London Transport Museum, Covent Garden Piazza, London, WC2E 7BB.
2. The purpose of the market engagement day is to:
   - Encourage prospective tenderers to network, find consortium partners and sub-contractors for the purposes of collaborating on delivery of the Pilot;
   - Meet the project team and ask clarification questions;
   - Provide insight on any key commercial principles and the procurement process; and
   - Establish what information prospective tenderers need in order to submit a diligent and robust tender.
3. Interested parties are requested to read this prospectus and to confirm their attendance at the market engagement day by emailing TechnologyProcurement@highwaysengland.co.uk by Monday 4th December 2017 13:00 should they wish to attend. Attendance is strictly restricted to 1 attendee per organisation. Lunch is provided. Interested parties should outline any specific dietary or accessibility requirements.
4. This prospectus is written and provided in good faith; Highways England reserves the right to alter any aspect of this document, or to not proceed with the procurement in any way.

General scope

5. The DfT has established a partnership with KCC, TfL and Highways England to pilot a connected corridor on the A102, A2, M2 and A229.
6. The Pilot will provide testbed infrastructure to enable sections of ITS-G5 and LTE wireless access infrastructure along parts of the A102, A2, M2 and A229. The Pilot infrastructure will be deployed in a phased approach, as outlined below:
   - Phase 0 – delivery of a standalone, scaled-down (preferably COTS) C-ITS system for a hybrid communications TESTFEST. For the purposes of the TESFEST, the C-ITS system shall consume both simulated and real-time traffic data, utilising cellular communications and ITS-G5 (with no connection to NRTS) to undertake basic cross boundary tests, using four Amsterdam Group Day One Services (RWW, IVI, PVD, GLOSA). It is expected that the TESTFEST C-ITS system will not be used as the platform for developing the subsequent phases, but used as a tool for capturing lessons learned in order to de-risk and inform the future deployments in the Pilot. Estimated delivery date of September 2018 (location TBC).
   - Phase 1 – delivery of a short section of ITS-G5 wireless access infrastructure on the SRN for testing and evaluation (4km – from the start of the M2 by Strood, continuing east until the M2 meets the A229 by Blue Bell Hill), including a development version of a hybrid service, delivered via a standard cellular APN. Within the TfL boundary, four Amsterdam Group Day One Services (RWW, IVI, PVD, GLOSA) will be trialled on the A2 and A102 using cellular communications. Within the KCC boundary, ITS-G5 will be trialled on the A229 and GLOSA will be trialled on 2-3 sets of traffic signals on the A229. Estimated delivery date of November 2018.
   - Phase 1a – delivery of a C-ITS system to evaluate four Amsterdam Group Day One Services (RWW, IVI, PVD, GLOSA), including development of cross boundary service interfaces, an extension of the ITS-G5 wireless access infrastructure on the

SRN (17km – starting by where the M2 meets the A229 by Blue Bell Hill, continuing east until the M2 meets the A249 by Sittingbourne), hybrid service deployment and LTE deployment in the Phase 1 area. Estimated delivery date of March 2019.

- Phase 2 – delivery of up to 54km (eastbound along the A2 from where Highways England responsibility begins just inside the M25, to the start of the M2 by Strood) of continuous ITS-G5 wireless access infrastructure and LTE deployment, combining with the TfL and KCC Phase 1 areas. Phase 2 is subject to funding availability and supplier performance, therefore the delivery date is TBC.
- Phase 3 – LTE deployment eastbound from where the M2 meets the A249 by Sittingbourne through to Dover. Phase 3 is subject to funding availability and supplier performance, therefore the delivery date is TBC.

7. Highways England, acting as the procurer for the Pilot on behalf of the UK consortium, plans to invite tenders and procure the full scope of the Pilot as a single contract via the CCS Traffic Management Technology 2 framework (reference RM1089), Lot 14 Intelligent Transport Systems.
8. The Pilot was confirmed in the Highways England Delivery Plan (para 3.1.6 "…*install Wi-Fi technology in the South East*") and was announced in the 2016 Budget by the Chancellor ("…*plans for a £15m "connected corridor" between Dover and London with infrastructure that could communicate directly with vehicles*").
9. The Pilot will trial four of the Amsterdam Group Day One Services (PVD, RWW, IVI, GLOSA), and will create a real-time test environment to allow industry to innovate and to test and evaluate emerging technologies and services.
10. Two feasibility studies relating to roadside infrastructure, services and in-vehicle applications have recently been completed. The feasibility studies recommendations are:
    - Use ITS-G5 wireless connectivity on the SRN sections of the A2/M2 Connected Corridor to support safety services;
    - Develop and implement a hybrid communications solution amongst the UK consortium members for long-range services;
    - Implement four of the Amsterdam Group Day One Services (PVD, RWW, IVI, GLOSA);
    - Ensure detailed specifications are developed in collaboration with InterCor partners, ensuring interoperability with other EU initiatives; and
    - Create detailed testbed specifications once the corridor design is finalised.
11. The Pilot forms part of InterCor; an EC co-funded C-ITS study of 1530 km which aims to streamline C-ITS implementation in four member states, linking the national initiatives towards a harmonized strategic rollout and common specification.
12. C-ITS implementation will take place in 4 member states:
    - The Netherlands (south, southeast and Utrecht);
    - France (extending SCOOP@F from Paris towards the North);
    - Belgium (several motorways linking France and the Netherlands); and
    - The UK (the Pilot).
13. The objectives of InterCor are to:
    - Demonstrate a large-scale interoperable deployment of C-ITS;
    - Foster four member states cross border interoperability by organising several TESTFESTs;

- Provide C-ITS services on a broader scale by hybrid communication;
- Extend the strategic cooperation between C-ITS front running countries and assist other member states to step-in (to be done by publishing roll out guidelines for other member states); and
- Evaluate the life benefits of C-ITS applications by reports on technical evaluation, impact assessment and user acceptance.

Geographic scope

Figure 1: Geographic scope of the Pilot

High level systems architecture

14. The consortium partners have designed the initial high level systems architecture, as outlined in Annex C. Please note the back office systems listed are indicative at this stage and subject to change.

High level requirements

15. The requirements to be delivered by the successful supplier can be split into 4 categories; End User Services, Communications Services, Integration Services, and Enabling Services.

16. The End User Services category consists of the following goods and services:

- Provision of the four Amsterdam Group Day One Services (RWW, IVI, PVD, GLOSA) applications and SaaS solutions;
- HMIs for the purposes of retro-fitting to vehicles.

17. The Communications Services category consists of the following goods and services:

- Central ITS stations;

- RSUs;
- OBUs for the purposes of retro-fitting to vehicles, trailers etc.;
- Cellular telecoms and consumables (e.g. modems, SIM cards);
- Advice regarding field device installation and maintenance assistance.

18. The Integration Services category consists of the following goods and services:
    - Software integration and data exchange services;
    - Software testing services;
    - Development and implementation of the Highways England integration platform (e.g. ESB, API);
    - Development and implementation of the PKI and security service in accordance with the InterCor PKI specification;
    - Development and implementation of a data provider service and a data consumer service;
    - Development of an information delivery service over cellular communications;
    - Development of an information delivery service over ITS-G5 communications;
    - Network integration.
19. The Enabling Services category consists of the following goods and services:
    - 3 classes of fleet, equipped with ITS-G5 and cellular capability (e.g. OBUs), and internal vehicle data systems integration (e.g. CANBUS);
    - Data management platform;
    - Data storage;
    - Physical test sites for off road testing and preparation for on road testing, plus any premises necessary for storing equipment, observing and conducting the Pilot;
    - Any equipment required for the purposes of evaluation and ground truthing;
    - Any compute hardware required for the purposes of the Pilot;
    - Hosting and platform services;
    - Service management of deployed systems;
    - Training;
    - PVD;
    - Administrative support of testing events (e.g. TESTFEST);
    - Pilot evaluation support functions (e.g. data collection, data mining, data presentation, reporting);
    - Traffic scenario and/or service simulation;
    - Creation and maintenance of Pilot operating procedures and documentation.
20. From Phase 1 onwards, the successful supplier must be able to demonstrate interoperability between control systems, RSUs and OBUs by using products from separate manufacturers, or by producing an open standard for interfacing with their equipment (which will be made publically available upon conclusion of the Pilot).
21. Services will need to be interoperable with each of the InterCor partner systems.

Capabilities required

22. Whilst the intention is to procure the Pilot as a single contract via the CCS Traffic Management Technology 2 framework (reference RM1089) Lot 14 Intelligent Transport Systems, Highways England recognises that there are a number of work streams that will require different skill sets and we therefore expect a number of sub-contracting and consortium opportunities.

23. We anticipate the following industries will be interested in this opportunity:

- Cloud computing providers;
- Software vendors;
- ITS providers;
- Travel information service providers;
- Network integrators;
- Systems integrators;
- Field engineers and maintainers;
- Roadside device manufacturers;
- Telecommunications providers;
- Automotive OEMs;
- FNOs and MNOs;
- Professional services companies;
- CAV network analytics providers;
- OBU, RSU and HMI manufacturers.

Assumptions

24. The UK consortium partners have made a number of assumptions when compiling this prospectus:

- Organisation specific roadside infrastructure installation and roadside works is out of scope of the Pilot contract, although the successful supplier will provide installation and maintenance advice to our asset maintainers;
- The C-ITS environment created under the Pilot may be retained for the purposes of further trials;
- Agile development techniques will be utilised and the contract terms will be structured to accommodate this methodology;
- The Connected and Autonomous Vehicle Pilots Implementation Partner (CAV-PIP) is precluded from tendering for this opportunity;
- Existing fixed and mobile networks will be used where feasible (e.g. NRTS);
- Any services or integration work will be built using cloud computing technologies (e.g. IaaS, PaaS, SaaS) and shared government IT solutions where feasible.

Current infrastructure and projects

25. In Annex B, a description of the current infrastructure and projects (which are likely to impact the Pilot) has been provided. This has been described for the following areas:

- Communications infrastructure;
- Electricity supply;
- Data centre infrastructure;

- Applications estate;
- Roadside infrastructure;
- Structural information and asset data;
- Operational traffic management environment;
- In-flight or planned civil construction or road maintenance projects;
- In-flight or planned technology projects;
- Opportunities; and
- Constraints.

Route to market

26. Highways England, acting as the procurer for the Pilot on behalf of the UK consortium, plans to invite tenders and procure the full scope of the Pilot as a single contract via the CCS RM1089 Traffic Management Technology 2 framework (reference RM1089), Lot 14 Intelligent Transport Systems.

Procurement programme

27. The indicative procurement pipeline is outlined below. Interested parties should note that the programme is immovable due to the interdependencies on InterCor milestones.

Date	Milestone
16.11.17	Publish OJEU PIN.
11.12.17	Market engagement event.
15.01.18	ITT published.
09.03.18	Deadline for tenders.
12.03.18 – 27.04.18	Assessment of tenders.
30.04.18 – 10.05.18	Standstill period.
11.05.18	Contract award.

Table 1: Procurement programme

Contract terms

28. The contract for the Pilot will be with Highways England, who shall commission Task Orders on behalf of TfL and KCC as necessary. The form of contract will be based on either a) the NEC3 TSC, using main pricing Option E (cost reimbursable contract) and secondary Option X19 (Task Order), or b) the NEC3 PSC, using main pricing Option G (Term contract).
29. The ethos of NEC is to stimulate good project management and relationships through both parties acting "*in a spirit of mutual trust and co-operation*". Changes to the contract are managed through the NEC compensation event process, and tasks are commissioned through the NEC Task Order process (which allows for tasks to be commissioned on either a fixed price or time basis). The contract allows for indexation to be applied for by the supplier on a yearly basis. Liabilities within the contract will be limited.
30. The IPR conditions for the Pilot are outlined in Annex D.

31. The proposed payment approach is to pay for additional Task Orders above the fixed scope on a time and materials basis since the tasks will likely span 12-18 months and require flexibility in order to comply with an agile development methodology. A fixed price approach will apply to specific, discrete Task Orders where this gleans better value for money through reduction of risk transfer.
32. The performance of the supplier will be managed and measured through the CPF toolkit, along with other NEC mechanisms for stimulating good project management.
33. The contract will operate for 2 years, with the option to extend up to a further 3 years in any increment, in order to utilise the implemented testbed for further pilots and trials (e.g. future Amsterdam Group services (day one+ services, day two services), new innovations from industry etc.).

Assessment of tenders

34. Quality and price shall be applied in the ratio of 80:20.

Quality

35. For the quality element of this tender, suppliers will provide a written response (of up to 100 A4 pages in total) to a set of quality questions. An initial set of questions has been provided below to demonstrate to interested parties what areas we will be seeking to evaluate (although these are subject to change). MTBF calculations for equipment may also feature in the assessment. Each of the questions will be awarded a mark between 1 to 10 (where 1 represents very poor and 10 represents excellent) by an assessment panel. There will be a quality threshold for each question of 5 pre-weighted marks and an overall quality threshold of 60% of the overall marks.

Question number	Question	Weighting
1	Please describe your approach to satisfying the End User Services requirements. Your response should include: ▪ An architectural diagram showing the components used in your solution; ▪ Any innovative aspects of the solution; ▪ Architectural understanding of integration; ▪ Human factors and usability considerations which are embedded into the solution; ▪ Use of any existing near-to-market, COTS or consumer technologies within the solution; ▪ A demonstration of how your solution is scalable and flexible in order to satisfy short and long term requirements.	5
2	Please describe your approach to satisfying the Communications Services requirements. Your response should include: ▪ An architectural diagram showing the components used in your solution; ▪ Any innovative aspects of the solution; ▪ Architectural understanding of integration;	3

	▪ A demonstration of how your solution is scalable and flexible in order to satisfy short and long term requirements.	
3	Please describe your approach to satisfying the Integration Services requirements. Your response should include: ▪ How you would organise the project to support the required agile development approach; ▪ An architectural diagram showing the components used in your solution; ▪ Any innovative aspects of the solution; ▪ Architectural understanding of integration; ▪ A demonstration of how your solution is scalable and flexible in order to satisfy short and long term requirements.	4
4	Please describe your approach to satisfying the Enabling Services requirements. Your response should include: ▪ An architectural diagram showing the components used in your solution; ▪ Any innovative aspects of the solution; ▪ Architectural understanding of integration; ▪ A demonstration of how your solution is scalable and flexible in order to satisfy short and long term requirements; ▪ A description of your service management processes for deployed systems.	2
5	Please provide a clear and easy to follow implementation plan and accompanying Gantt chart for delivery of Phase 0, Phase 1 and Phase 1a over the first 6 months of the project, including: ▪ Tasks that flow in succession; ▪ Clearly identified milestones which link to the implementation plan, and key UK and InterCor programme milestones; ▪ Input from stakeholders and third parties identified; ▪ Integration plan, specifically how you would organise the project to support the required agile development approach; ▪ Defined test schedule; ▪ A description of how the implementation will be managed, with particular reference to managing changes to scope or timescale; ▪ A description of how you will work with stakeholders to report progress and manage issues; ▪ Clarity of your governance arrangements during the	3

	implementation; ▪ Clarity of each dependency that you have on any third parties; ▪ A communications plan; ▪ A handover plan.	
6	Describe your approach to deliver successful interoperability between the components of your solution. Your response must include: ▪ Identification of third party systems; ▪ A clear integration approach; ▪ Recognition of the varied open standards each third party system requires; ▪ Interoperability between the sub-systems and products; ▪ Availability of data and services to internal and external subscribers; ▪ A statement on reducing vendor lock-in, e.g. availability of documentation, flexible licensing structures, use of open standards, third party cooperation etc.; ▪ A description of the features that have been incorporated into the design to enable it to adapt to technology changes and capability improvements, and describe the current functionality roadmap.	5
7	We acknowledge that the breadth of skills required to fulfil the Pilot will likely require a diverse supply chain to be managed by a single contractor. Please describe your supply chain management methodology, specifically explaining: ▪ Your approach to ensure the availability of resources (including succession planning) and obtaining the relevant expertise; ▪ How you will identify the most suitable party to undertake each Task Order; ▪ How you will ensure cohesion across your supply chain (including processes to prevent and address disputes and conflicts); ▪ The quality management processes you will employ to ensure "joined up" advice; ▪ How you will manage any conflicts of interest.	3
8	Describe your approach to overall management of the contract, including: ▪ Mobilisation; ▪ Management of the project team; ▪ An organogram with identification of key staff, sub-contractors and the roles they fulfil, including clear	2

	identification of the 'points of contact', where to raise issues, and the escalation procedures; ▪ Quality management approach; ▪ Business continuity approach; ▪ Knowledge transfer approach; ▪ Financial and expenditure management approach; ▪ Exit management approach.	
9	Please list out risks and opportunities in a table ("the Risk Register") identifying for each row: ▪ Reference number; ▪ Risk or opportunity description; ▪ Proposed action or processes to deal with or mitigate the risk or opportunity; ▪ Estimated effect of risk or opportunity on programme and cost. The table must not include any reallocation of risks. In addition, please outline your: ▪ Methodology for identifying and minimising the impact of risks; ▪ Realising and exploiting opportunities; and ▪ Methodology for identifying issues, assumptions and dependencies.	1
10	Describe your approach to maintaining high levels of health and safety throughout your organisation.	1
11	Identify the main stakeholders that need to be involved for successful delivery of the Pilot and explain how you will work in collaboration with them. In your response please describe your proposed stakeholder management plan which shall include: • A description of how you will work with the UK consortium to deliver the Pilot; • A description of how you will collaborate with third parties.	1
12	Please list out key staff in a table ("the key people schedule") identifying for each row: • Post; • Name; • Minimum period of availability. In order to demonstrate that your organisation has the staff resources that are qualified, experienced and competent enough to deliver the Pilot, your response must also include:	3

	▪ An organogram which is clear and easy to follow, with all parties (e.g. sub-contractors) identified clearly; ▪ A table identifying all sub-contractors ("the sub-contractors schedule"), identifying each sub-contractors: o Name; o Contact details and registered office; o Obligations in respect of the Pilot. ▪ Clear identification of individual roles and key staff within the team; ▪ A CV for each person (maximum 2 pages) emphasising their experience, skills, competence and qualifications relevant to their role, and reference to comparable previous projects with a proven track record.	

Table 2: Quality questions

Price

36. For the price element of this tender, suppliers will provide:

- A fixed price for implementing Phase 0, Phase 1 and Phase 1a over a 6 month period, including:
  - Equipment costs (e.g. ITS stations, OBUs, HMIs, fleet, data storage, software, hosting, cellular telecoms provision etc.);
  - A resource plan relating to the work breakdown structure, outlining the amount of days and individuals required to implement Phase 0, Phase 1 and Phase 1a (e.g. professional services required for network integration, software integration, project management etc.).
- A fixed monthly cost for operating Phase 1a over an 18 month period.
- An average day rate will be derived from the resource plan for Phase 0, Phase 1, and Phase 1a, which will be multiplied by 2,000 days for the purposes of assessment.

37. In addition, suppliers shall provide a list of catalogue items which may be drawn down from via Task Order for the Pilot (e.g. equipped fleet, professional services, OBUs, HMIs, RSUs etc.).

Annex A: Glossary

Term	Description
3G	The third generation of wireless mobile telecommunications technology.
4G	The fourth generation of wireless mobile telecommunications technology, succeeding 3G.
A2/M2 Connected Corridor	The Pilot; as defined in this prospectus.
Amsterdam Group	The Amsterdam Group is a strategic alliance of committed key stakeholders with the objective to facilitate joint deployment of C-ITS in Europe.
ANPR	Automatic number plate recognition is a technology for automatically reading vehicle number plates.
API	Application Programming Interface; specifies how software components interact and are used when programming graphical user interface components.
APN	Access Point Name is the name of a gateway between a mobile network and another computer network, frequently the public internet.
ATMS	Advanced Traffic Management System.
CANBUS	Controller Area Network; a robust vehicle bus standard designed to allow microcontrollers and devices to communicate with each other in applications without a host computer.
CAV	Connected and Autonomous Vehicles.
CAV-PIP	Connected and Autonomous Vehicle Pilots Implementation Partner; a Highways England contract with WSP, under contract reference TMTii 31.
CCS	Crown Commercial Service.
CCTV	Closed circuit television.
CHARM	Collaborative Highways Agency and Rijkswaterstaat Model is a collaboration between Highways England and Rijkswaterstaat (RWS) of the Netherlands. CHARM aims to implement a modern traffic management solution as part of an integrated suite of technologies to maximise network capacity.
C-ITS	Cooperative Intelligent Transport Systems are a group of technologies and applications that allow effective data exchange through wireless technologies among elements and users of the transport system, very often between vehicles (V2V) or between vehicles and infrastructure (V2I).

Term	Description
Cloud	Cloud computing is a type of internet-based computing that provides shared computer processing resources (e.g. data hosting, application hosting), rather than a local server.
COTS	Commercial off the shelf.
CPF	Collaborative Performance Framework; a toolkit used by Highways England to assess a suppliers performance against Pilot KPIs.
DATEXII	A data exchange standard developed for information exchange between TMCs.
Day One Services	V2I services (RWW, IVI, PVD, SPaT/MAP) and V2V services (hazardous location warning, slow vehicle warning, traffic jam ahead, stationery vehicle warning, emergency brake light, emergency vehicle warning, and motorcycle approach warning).
DfT	Department for Transport.
EC	European Commission.
ESB	An Enterprise Service Bus is a software architecture model used for designing and implementing communication between mutually interacting software applications in a service-oriented architecture.
ESN	Provided by the Home Office, the Emergency Services Network will provide the next generation of integrated critical voice and data services for the emergency services over LTE.
EU	European Union.
FNO	Fixed network operator.
GIS	Geographical Information Systems.
GLOSA	Green Light Optimized Speed Advice, see SPaT/MAP.
HATMS	Highways Agency Traffic Management System.
HMI	Human machine interface.
Hybrid communications	Hybrid communications (also referred to as meshed networks) is a network that contains two or more communications standards in one network design. An example of this is a network that combines wired and wireless technologies.
IaaS	Infrastructure as a service.
InterCor	A C-ITS project.
IP	Internet protocol.

Term	Description
IPR	Intellectual property rights.
ITS	Intelligent Transport Systems.
ITS-G5	Also known as WiFi-P, IEEE802.11p, and Dedicated Short Range Communications (DSRC), is a communications specification which has been specifically developed to support the requirements of ITS and CAV.
ITT	Invitation to Tender.
IVI	In-vehicle information. The services as defined in the Amsterdam Group's IVI Functional Description. IVI enables the driver to have on time access to all relevant information continuously, based on the time and location of the vehicle, but also based on the characteristics and type of the vehicle.
KCC	Kent County Council.
KPI	Key performance indicators.
LDIS	TfL's London Driver Information System.
LondonWorks	TfL'S roadworks planning system.
LTE	Long-Term Evolution is a standard for high-speed wireless communication for mobile phones and data terminals.
MIDAS	Motorway incident detection and automatic signalling is a distributed network of traffic sensors (mainly inductive loops) which are designed to alert the local TMC to traffic flow and average speeds, set VMS, advisory speed limits along with mandatory speed limits with little human intervention.
MNO	Mobile network operator.
MTBF	Mean time between failures is the predicted elapsed time between inherent failures of a mechanical system, during normal system operation.
NEC3	New Engineering Contract version 3.
NRTS	National Roads Telecommunications Services is the fibre-optic network of communication and control that Highways England uses to monitor the SRN.
NTIS	Highways England's National Traffic Information Service is responsible for providing accurate, historical, real-time and predictive traffic and incident information to businesses, the travelling public and Highways England's operations.
NTOC	National Traffic Operations Centre; Highways England's single,

Term	Description
	national, strategic TMC.
OBU	Onboard units; an in-vehicle C-ITS station.
OEM	Original equipment manufacturers, used in this context to refer to automotive OEMs.
OJEU	Official Journal of the European Union.
ORR	Office of Rail and Road.
OTS	Operational Technology Strategy.
PaaS	Platform as a service.
PIN	Prior Information Notice.
PKI	A public-key infrastructure is a set of roles, policies, and procedures needed to create, manage, distribute, use, store, and revoke digital certificates and manage public-key encryption.
PSC	NEC Professional Services Contract.
PVD	Probe Vehicle Dta (also known as Floating Car Data, Floating Vehicle Data or Floating Cellular Data) involves the collection of data from vehicles such as location, speed, direction of travel and time.
RIS	Road Investment Strategy.
RSUs	Roadside Units, also referred to as Roadside ITS station.
RWW	Roadworks Warning. The services as defined in the Amsterdam Group's RWW Functional Description. RWW informs drivers of road works, the corresponding parameters and associated obstruction (e.g. lane closed) on the route ahead. The purpose is to alert the driver in time to increase awareness and to inform of potentially dangerous conditions.
SaaS	Software as a Service.
SCOOP@F	A C-ITS project.
SCOOT	Split Cycle Offset Optimisation Technique is a tool for managing and controlling traffic signals in urban areas using UTC systems.
SFM	TfL's Site and Fault Management System.
Signal Phase and Time (SPaT) and Map Data (MAP)	The services as defined in the Amsterdam Group's SPaT/MAP Functional Description. SPaT will inform drivers about the current status and change of the traffic signal ahead as well as when the next signal stage change. It will also provide information about approaching traffic to optimize the signal system. MAP describes the physical

Term	Description
	geometry of one or more intersections.
SIM	Subscriber identity module.
SITS	Surface Intelligent Transport System is a programme to replace and upgrade many of TfL's systems.
SNMP	Simple Network Management Protocol is a network management protocol used for collecting information from network devices.
SRN	Strategic Road Network; the motorways and all-purpose trunk roads that are managed by the Highways England.
Task Order	Highways England's instruction to carry out a task, in accordance with NEC3 PSC or NEC3 TSC.
TCMS	Tunnel control and management system.
TESTFESTs	Testing events which enable ITS providers to run interoperability tests using test descriptions provided in approved guidelines.
TETRA	Terrestrial Trunked Radio is a mobile radio and two-way transceiver specification.
TfL	Transport for London.
TIMS	TfL's Traffic Information Management System.
TIS	TfL's Integration Service.
TMC	Traffic Management Centre.
TOC	Technology Operations Centre.
TOS	Highways England's Traffic Officer Service.
TSC	NEC Term Service Contract.
T-TOC	Tools for the Technology Operations Centre.
UTC	Urban Traffic Control (UTC) systems are used for urban traffic management.
UTMC	The Urban Traffic Management and Control standard is an English standard developed for information exchange between TMCs and roadside technology. Urban Traffic Management and Control (UTMC) systems are designed to allow the different applications used within modern traffic management systems to communicate and share information with each other.
V2I	Vehicle to infrastructure, also known as Infrastructure to vehicle (I2V) or I2V-V2I.

Term	Description
V2V	Vehicle-to-vehicle.
VMS	Visual message sign.

Annex B: Current infrastructure and projects

Topic	Highways England	KCC	TfL
Communications infrastructure	Highways England operates a private fibre optic wide area network called NRTS. There is NRTS connectivity along the M2, A229 and M20, but there is no NRTS connectivity along the A2. It is expected that the NRTS network could be used for resilience purposes, hybrid communications or backhaul-over-IP services on the M2, A229 and M20, but that public telecoms solutions would need to be used for the A2 since the cost of installing NRTS infrastructure is likely to be cost prohibitive.	KCC operates several British Telecoms (BT) private copper circuits and 3G connectivity for traffic signals, CCTV, cabinets and VMS, linking back to the TMC in Aylesford. Some fixed lines terminate at County Hall in Maidstone. Two VMS on over-head gantries on this route are operated by Highways England, using 3G. ANPR utilise fixed lines, in collaboration with Kent Police.	TfL has a leased fibre network, provided as a service by Interoute, which provides connectivity between their UTC system and their on-road traffic signals. TfL are currently undertaking trials for providing connectivity to traffic signals directly via public telecoms (e.g. 3G, 4G). For the purposes of the Pilot, TfL will communicate with vehicles over public cellular networks, with no additional infrastructure being installed.
Electricity supply	Highways England's road network has an electricity supply wherever there is NRTS connectivity, therefore there is no electricity supply for roadside infrastructure along the A2. It is expected that solar powered or other mobile power supply solutions would be deployed on the A2, since installing electricity supply would be cost prohibitive.	In addition to the above powered infrastructure, the route is street lit and it is not believed that they are on a switched circuit.	All of TfL's traffic signals have an active electricity supply and no additional infrastructure will be deployed as part of the Pilot.
Data centre infrastructure	Highways England has procured a leased private cloud hosting environment from Advanced 365 for its new ATMS, which consists of a primary and secondary data centre. Highways	KCC has an on premise data centre at the Aylesford TMC.	TfL has two physical data centres. TfL also utilise Amazon Web Services for Cloud data storage; it is likely that more data storage will transition from pre-existing data centres to the Cloud in the

Topic	Highways England	KCC	TfL
	England can also utilise publicly available Cloud hosting solutions, such as Amazon Web Services and Microsoft Azure.		near future.
Applications estate	Highways England currently uses the HATMS application to locate, select and control roadside technology assets. The HATMS subsystems include a signalling and message sign subsystem, a MIDAS subsystem, a meteorological subsystem, a tidal flow subsystem (for the A38M) and a hard shoulder monitoring subsystem. Additionally, the NTIS application (which is used in Highways England's national TMC (NTOC)) collects and distributes travel information (e.g. via DATEXII), and provides a platform for strategic traffic management (e.g. setting diversion routes, strategic signal setting). In the M25 and south east region, Highways England also operate a Siemens STRATOS UTC system, a Mott MacDonald Osprey UTMC system, and are currently deploying an Indra HORUS TCMS.	KCC currently use a Siemens UTC/SCOOT system for setting traffic signals on both signalised roundabouts, Lord Lees, Taddington and the 'T' junction on the link road through Bluebell Village. A Dynniq ImCity UTMC is used for setting VMS, UTC, and for the access and control of the CCTV through a desktop user interface.	TfL currently use an internally developed UTC system for controlling traffic signals, which utilises the SCOOT real time optimiser. The UTC system is split into five regions: centre, east, north, west, outer. Transport for London operates an ESB, entitled TfL Integration Service (TIS).
Roadside infrastructure	Highways England operates a multitude of roadside technology, including: • MIDAS;	The existing infrastructure on the route consists of a mixture of KCC owned and operated devices, street lighting, traffic signals, ANPR, and VMS.	TfL operates a variety of on-street digital infrastructure, including; • ANPR cameras;

Topic	Highways England	KCC	TfL
	• Induction loops; • ANPR cameras; • VMS; • Traffic monitoring units and equipment; • Traffic counters; • Fog detectors; • Anemometers; • Weather monitoring stations; • Lane enforcement cameras; • CCTV cameras; and • Emergency roadside telephones.	However, there are some devices on the route that KCC do not necessarily operate or own. Infrastructure includes: • 2 gantries; • 3 VMS; • 9 traffic signal sites; • 2 ANPR; and • 3 footbridges.	• Traffic signals; • Induction loops; • Magnetometers; • CCTV cameras; • VMS; • Bus countdown signs; and • Bus priority communications beacons. No on-street infrastructure will be modified as part of the Pilot and no direct connections will be made to this infrastructure.
Structural information and asset data	Highways England has a comprehensive lidar database of its structural data. NRTS also maintains a schematic of the entire network and the location of all the technology assets.	The KCC structural asset database is available online.	TfL has a system (Playbook) that saves all of the GIS mapping data and on-road asset data.
Operational traffic management environment	Highways England operates 8 TMCs, consisting of 7 regional centres, 1 national TMC in Birmingham (NTOC) and a number of satellite TMCs. The TMC in Godstone, Surrey is responsible for the region within which the Corridor Pilot is located. Highways England has a uniformed TOS who serve in TMCs	KCC operates a single TMC located at the Aylesford Highways Depot (operated Monday to Friday 6:30-18:30) with a total of 3 TMC operators, based within the ITS team for technical support and contract management. The team are in direct communication with the Highways England TMC at	TfL operates a single TMC located in Southwark (where they are co-located with the Metropolitan Police Service, bus operators and tunnel operators).

Topic	Highways England	KCC	TfL
	and patrol key areas of the SRN.	Godstone, Kent Police, the Port of Dover and all local Boroughs.	
In-flight or planned civil construction or road maintenance projects	A M2 J5 improvement scheme plans to be in construction in 2019.	KCC are designing a road widening scheme for the M2 junction 4 London-bound on-slip, planned for construction in financial year 2018-2019. In addition, the structures and soft landscaping on the A229 are annually inspected.	TfL will provide information on any planned construction or maintenance works nearer the time.
In-flight or planned technology projects	Highways England is currently in the process of replacing its entire traffic management application estate with a single integrated ATMS via the CHARM programme. Through its Operational Technology Strategy (OTS), Highways England aims to improve the performance of its roadside technology through the introduction of a Technology Operations Centre (TOC), enabled by a suite of new asset and service management tools acquired via the Tools for the Technology Operations Centre (T-TOC) contract with Mott MacDonald. The OTS aims to reduce roadside visits to repair roadside technology, by use of ubiquitous open standards (e.g. SNMP), enabling remote diagnostics. The re-procurement of the NRTS contract (NRTS2) is scheduled to	KCC is currently undertaking a technology refresh within the Aylesford TMC, replacing TMC operators' user interface, back office servers, CCTV in and out-station encoders. KCC is also reviewing their UTC and UTMC systems.	TfL is currently in the midst of its SITS programme which will replace or upgrade many of its traffic management systems, including UTC and LondonWorks.

Topic	Highways England	KCC	TfL
	conclude in the near future. Highways England will migrate from the Airwave TETRA network to ESN (based on LTE) during 2019. Through the M25 Collaborative Traffic Management programme, Highways England is currently replacing its UTC system (with Siemens' SCOOT), its UTMC system (with Mott MacDonald's Osprey), its TCMS (with Indra's HORUS) and trialling the second generation of ramp metering with Dynniq.		
Opportunities	• Trialling on a smaller section of road (e.g. M2) where infrastructure already exists; • Potential for ESN investment to expand LTE coverage, which in turn benefits the Pilot; • Take advantage of in-flight projects to combine deliverables (e.g. deploy invehicle devices at the same time as the TOS upgrades their Airwave in-vehicle kit to ESN-compliant kit).	• KCC's transportation and waste vehicle fleet could be used to trial services; • Civil contractors' vehicle fleet could potentially be utilised.	• Datasets that TfL hold that will allow the Pilot to provide Day One Services data via a web service: o RWW & IVS – TCMS; o GLOSA – UTC.
Constraints	• The programme of road improvement works which are outlined in the Road Investment Strategy;	• Kent lane rental charges and restrictions will apply to half of the KCC route.	• TfL operates a lane rental scheme. • Compliance with TfL security policy and data protection.

Topic	Highways England	KCC	TfL
	• Corporate KPIs which are agreed with the Office of Road and Rail (ORR) regulation; • Operational control systems that may need to interface with Pilot services will be replaced in the near future; • Health and safety regulations, namely those that apply to working at the roadside; • Information security policies and procedures, namely the NRTS Code of Connection process (which requires all services deployed on the network to obtain security accreditation to ISO27001); and • The absence of infrastructure along the A2.		

Annex C: Outline systems architecture

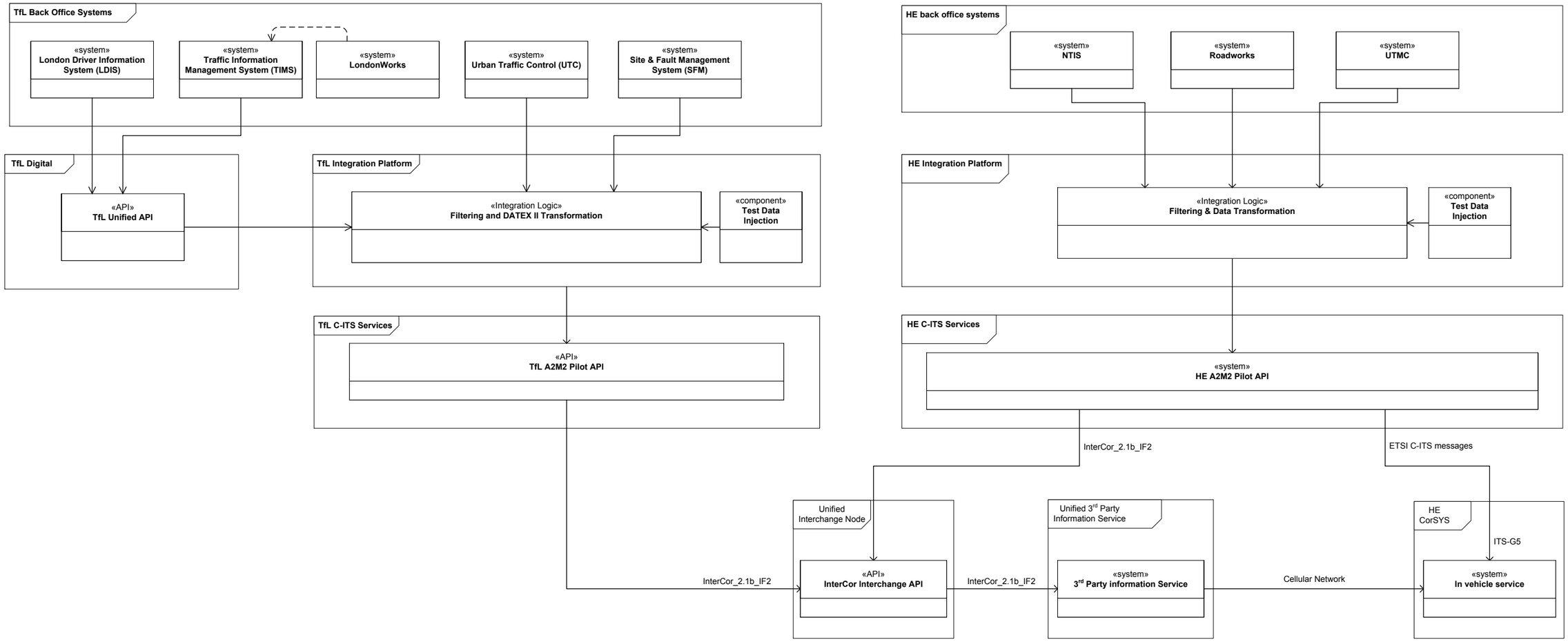

Figure 2: Outline systems architecture for the Pilot

Annex D: IPR conditions

Option 1

Clause Z48 **Intellectual Property Rights**

Z48.1 Intellectual Property Rights are any current and future legal and equitable interests in patents, trademarks, design rights, copyright, know-how and other similar rights, whether or not registered or capable of registration.

Z48.2 All Intellectual Property Rights in documents and other materials created by or on behalf of the *Employer* in connection with the contract are the property of the *Employer* or the Crown.

Z48.3 The *Consultant* hereby assigns to the *Employer* all present and future Intellectual Property Rights in all documents and other materials created by or on behalf of the *Consultant* or any Subconsultant in performing its obligations under, or otherwise in connection with, the contract. The *Consultant* obtains from Subconsultants equivalent rights over the documents and other materials prepared by the Subconsultant. This assignment takes effect either on the Contract Date or as a present assignment of future rights that will take effect immediately on the coming into existence of the relevant Intellectual Property Rights, as appropriate.

Z48.4 Background IPR means Intellectual Property Rights owned by the *Consultant,* a Subconsultant or a third party and which are not assigned to the *Employer* pursuant to clause Z48.3. In respect of Background IPR, the *Consultant* grants a non-exclusive, world-wide, perpetual, irrevocable, royalty free licence (including the right to sub-licence) to the *Employer* to use the Background IPR for all purposes of the *Employer*. Each licence granted under this clause Z48.4 by the *Consultant* survives the termination or expiry of this contract and cannot be terminated by the *Consultant* or its assignees. The *Consultant* obtains from the Subconsultants or third parties equivalent rights over Background IPR owned by the Subconsultants or third parties.

Z48.5 The *Employer* grants to the *Consultant,* or procures the direct grant to the *Consultant* of, a non-exclusive, non-transferable, revocable licence to use all Intellectual Property Rights and Background IPR owned (or capable of being so licensed or procured without cost) by the *Employer* and reasonably required by the *Consultant* in order to Provide the Service. Any such licence is granted for the duration of this contract solely to enable the *Consultant* to comply with its obligations under this contract.

Option 2

Clause Z48 **Intellectual Property Rights**

Z48.1 In this clause Z48:

Affiliate is in relation to a body corporate, any other entity which directly or indirectly Controls, is Controlled by, or is under direct or indirect common Control with, that body corporate from time to time.

Central Government Body is a body listed in one of the following sub-categories of the Central Government classification of the Public Sector Classification Guide, as published and amended from time to time by the Office for National Statistics:

- Government Department;
- Non-Departmental Public Body or Assembly Sponsored Public Body (advisory, executive, or tribunal);
- Non-Ministerial Department; or
- an Executive Agency of one of the above

and any body corporate that is a wholly owned subsidiary of one of the above.

Commission Date for a *relevant service* is the day on which the commissioning of a *relevant service* is successfully completed and its *relevant service conditions* are met.

Confidential Information is

- information, including all Personal Data, which (however it is conveyed) is provided by the disclosing Party in connection with this contract that relates to
    - the Disclosing Party Group or
    - the operations, business, affairs, developments, Intellectual Property Rights, trade secrets, know-how and/or personnel of the Disclosing Party Group,
- other information provided by the disclosing Party in accordance this contract that is clearly designated as being confidential or equivalent or that ought reasonably to be considered to be confidential (whether or not it is so marked) which comes (or has come) to the Recipient's attention or into the Recipient's possession in connection with this contract,
- discussions, negotiations, and correspondence between the disclosing Party or any of its directors, officers, employees, consultants or professional advisers and the Recipient or any of its directors, officers, employees, consultants and professional advisers in connection with this contract and all matters arising therefrom; and
- information derived from any of the above, but not including any information which
- was in the possession of the Recipient without obligation of confidentiality prior to its disclosure by the disclosing Party,
- the Recipient obtained on a non-confidential basis from a third party who is not, to the Recipient's knowledge or belief, bound by a confidentiality agreement with the disclosing Party or otherwise prohibited from disclosing the information to the Recipient,
- was already generally available and in the public domain at the time of disclosure otherwise than by a breach of this contract or breach of a duty of confidentiality or
- was independently developed without access to the Confidential Information.

Consultant Background IPR is IPR owned by the *Consultant* or a third party before the Contract Date or created by the *Consultant* or a

third party independently of this contract, which in each case is or will be used before or during the Contract Period for designing, testing, implementing or Providing the Services, but excluding IPRs owned by the *Consultant* subsisting in the Consultant Software or by any third party in Third Party Software.

Consultant Equipment is the hardware, computer and telecoms devices and equipment used by the *Consultant* or its Subconsultants (or any subconsultant of any tier to the *Consultant*) (but not hired, leased or loaned from the *Employer*) for the Providing the Services.

Consultant Software is software which is proprietary to the *Consultant* (or an Affiliate of the *Consultant*) and which is or will be used by the *Consultant* for the purposes of Providing the Services, including the software specified as such in the Software Schedule.

Consultant System is the information and communications technology system used by the *Consultant* in implementing and performing the *services* including the Software, the Consultant Equipment, configuration and management utilities, calibration and testing tools and related cabling (but excluding the Employer System).

Contract Period is the period commencing on the *starting date* and ending on the Completion Date or on the date of earlier termination of this contract.

Control is the possession by person, directly or indirectly, of the power to direct or cause the direction of the management and policies of the other person (whether through the ownership of voting shares, by contract or otherwise) and **Controls** and **Controlled** are to be interpreted accordingly.

Deposited Software is the Software the Source Code of which is to be placed in escrow as required by the *Employer* and notified to the *Consultant* from time to time including as identified in the Software Schedule.

Disclosing Party Group is where the disclosing Party is

- the *Consultant*, the *Consultant* and any Affiliates of the *Consultant*; and
- the *Employer*, the *Employer* and any Central Government Body with which the *Employer* or the *Consultant* interacts in connection with this contract.

Documentation is descriptions of the *services*, the *Consultant's services* solution, performance measures, details of the Consultant System (including (i) vendors and versions for off-the-shelf components and (ii) source code and build information for proprietary components), relevant design and development information, technical specifications of all functionality including those not included in standard manuals (such as those that modify system performance and access levels), configuration details, test scripts, user manuals, operating manuals, process definitions and procedures, and all such other documentation as

- is required to be supplied by the *Consultant* to the *Employer* under this contract,
- would reasonably be required by a competent third party

capable of Good Industry Practice contracted by the *Employer* to develop, configure, build, deploy, run, maintain, upgrade and test the individual systems that provide the *service* or make use of the *service*,

- is required by the *Consultant* in order to Provide the Services and/or
- has been or is generated in order to Provide the Services.

Employer Background IPR is IPR owned by the *Employer* before the Contract Date, or created by the *Employer* independently of this contract, and Crown Copyright which is not available to the *Consultant* otherwise than under this contract, but excluding IPRs owned by the *Employer* subsisting in the Employer Software.

Employer Software is software which is owned by or licensed to the *Employer* (other than under or pursuant to this contract) and which is or will be used by the *Consultant* in order to Provide the Services.

Employer System is the *Employer*'s computing environment (consisting of hardware, software and/or telecommunications networks or equipment) used by the *Employer* or the *Consultant* in connection with this contract which is owned by the *Employer* or licensed to it by a third party and which interfaces with the Consultant System or which is necessary for the *Employer* to receive the *service*.

Good Industry Practice is at any time the exercise of that degree of care, skill, diligence, prudence, efficiency, foresight and timeliness which would be reasonably expected at such time from a leading and expert supplier of services similar to the *service* to a customer like the *Employer*, such supplier seeking to comply with its contractual obligations in full and complying with any applicable laws.

Indemnified Person is the *Employer* and each and every person to whom the *Employer* (or any direct or indirect sub-licensee of the *Employer*) sub-licenses, assigns or novates any Relevant IPRs or rights in Relevant IPRs in accordance with this contract.

Intellectual Property Rights or **IPRs** are:

- copyright, rights related to or affording protection similar to copyright, rights in databases, patents and rights in inventions, semi-conductor topography rights, trade marks, rights in Internet domain names and website addresses and other rights in trade names, designs, know-how, trade secrets and other rights in Confidential Information;
- applications for registration, and the right to apply for registration, for any of the rights listed above that are capable of being registered in any country or jurisdiction; and
- all other rights having equivalent or similar effect in any country or jurisdiction**.**

IPRs Claim is any claim against any Indemnified Person of infringement or alleged infringement (including the defence of such infringement or alleged infringement) of any Relevant IPRs save for any such claim to the extent that it is caused by any use by or on behalf of that Indemnified Person of any Relevant IPRs, or the use of the Employer Software by or on behalf of the *Consultant,* in either case

for a purpose not reasonably to be inferred from the Scope or the provisions of this contract.

Object Code is software and/or data in machine-readable, compiled object code form.

Open Source Software is software that has its source code made available subject to an open-source licence under which the owner of the copyright and other IPRs in such software provides the rights to use, study, change and distribute the software to any and all persons and for any and all purposes free of charge.

OSS is the Open Source Software listed in the Software Schedule.

Recipient is the Party which receives or obtains directly or indirectly Confidential Information.

Relevant IPR is IPRs used to Provide the Service or as otherwise provided and/or licensed by the *Consultant* (or to which the *Consultant* has provided access) to the *Employer* or a third party in the fulfilment of the *Consultant*'s obligations under this contract including IPRs in the Specially Written Software, the Consultant Software, the Consultant Background IPRs and the Third Party Software but excluding any IPRs in the Employer Software and the Employer Background IPRs.

Software is Specially Written Software, Consultant Software and Third Party Software.

Software Schedule is the Software Schedule unless later changed in accordance with this contract.

Source Code is computer programs and/or data in eye-readable form and in such form that it can be compiled or interpreted into equivalent binary code together with all related design comments, flow charts, technical information and documentation necessary for the use, reproduction, maintenance, modification and enhancement of such software.

Specially Written Software is any software (including database software, linking instructions, test scripts, compilation instructions and test instructions) created by the *Consultant* (or by a Subconsultant (or any subconsultant of any tier to the *Consultant*) or other third party on behalf of the *Consultant*) specifically for the purposes of this contract, including

- any Consultant Background IPRs that are embedded in or which are an integral part of such software; and
- any modifications or enhancements to Consultant Software or Third Party Software created specifically for the purposes of this contract.

Third Party Software is software which is proprietary to any third party (other than an Affiliate of the *Consultant*) which in any case is, will be or is proposed to be used by the *Consultant* for the purposes of Providing the Services, including the software specified as such in the Schedule Software and including OSS.

Z48.2 All Intellectual Property Rights in:

- Employer Background IPR;

- Employer Software; and
- documents and other materials created by or on behalf of the Employer in connection with the contract

are and remain the property of the *Employer* or the Crown, and the *Consultant* does not acquire any right, title or interest therein or thereto.

Z48.3 All Intellectual Property Rights in:

- Consultant Background IPR,
- Consultant Software and
- Specially Written Software

are and remain the property of the *Consultant*, and neither the *Employer* nor the Crown acquire any right, title or interest therein or thereto.

Z48.4 The *Consultant* hereby assigns to the *Employer*, with full title guarantee, title to and all rights interest in all present and future Intellectual Property Rights in all documents and other materials (excluding Specially Written Software) created by or on behalf of the *Consultant* or any Subconsultant (or any subconsultant of any tier to the *Consultant*) in performing its obligations under, or otherwise in connection with, this contract, or procures that the first owner thereof assigns them to the *Employer* on the same basis. The *Consultant* obtains from Subconsultants (or any subconsultant of any tier to the *Consultant*) equivalent rights over all documents and other materials (excluding Specially Written Software) prepared by the Subconsultant (or any subconsultant of any tier to the *Consultant*). This assignment takes effect either on the Contract Date or as a present assignment of future rights that will take effect immediately on the coming into existence of the relevant Intellectual Property Rights, as appropriate.

Z48.5 The *Consultant* waives or procures a waiver of any moral rights in any copyright works assigned to the *Employer* pursuant to this contract.

Z48.6 The *Consultant* hereby grants, or procures the direct grant, to the *Employer* a perpetual, royalty-free, non-exclusive and irrevocable licences to use (to include the right to load, execute, store, transmit, display and copy (for the purposes of archiving, backing-up, loading, execution, storage, transmission or display)) the:

- Consultant Software;
- Consultant Background IPR; and
- Third Party Software

for any purpose relating to the *services* (or substantially equivalent services) or for any purpose relating to the exercise of the *Employer*'s (or any other Central Government Body's) business or function. The licence granted under this clause Z48.6 survives the termination or expiry of this contract and cannot be terminated by the *Consultant* or its assignees or any third party.

Z48.7 The *Consultant* hereby grants to the *Employer*, or procures the direct grant to the *Employer* of, a perpetual, worldwide, royalty-free, non-exclusive and irrevocable licence to use for any purpose (which

includes the right to load, execute, interpret, store, transmit, display, copy (for the purposes of loading, execution, interpretation, storage, transmission or display), modify, adapt, enhance, reverse compile, decode and translate)

- the Documentation, Source Code and the Object Code of the Specially Written Software; and
- all build instructions, test instructions, test scripts, test data, operating instructions and other documents and tools necessary for maintaining and supporting the Specially Written Software (together the "**Software Supporting Materials**".

The licence granted under this clause Z48.7 survives the termination or expiry of this contract and cannot be terminated by the *Consultant* or its assignees.

Z48.8 The *Consultant* delivers to the *Employer* the Specially Written Software in both Source Code and Object Code forms together with relevant Documentation and all related Software Supporting Materials as necessary to meet its obligations under the contract and upon request by the *Employer* at any time, and provides updates of the Source Code and of the Software Supporting Materials promptly following each new release of the Specially Written Software, in each case on media that is acceptable to the *Employer*. The *Consultant* acknowledges and agrees that the ownership of the media referred to in clause in this clause Z48.8 vests in the *Employer* upon their receipt.

Z48.9 The *Employer* is freely entitled to sub-license the rights granted to the *Employer* under clauses Z48.6 and Z48.7 to any third party on terms no broader than those granted to the *Employer*. Without prejudice to the generality of the foregoing, the terms of any sub-licence granted pursuant to this clause may, in the *Employer*'s absolute discretion, permit any sub-licensee to further sub-licence the sub-licensed rights. In respect of any sub-licence of the rights granted to the *Employer* under clauses Z48.6, if requested by the *Consultant* the sub-licensee executes a confidentiality undertaking in favour of the *Consultant* or third party owner of the relevant rights in such reasonable form as the *Consultant* requires and the *Employer* approves in writing.

Z48.10 The *Consultant* informs the *Employer* of all Specially Written Software that constitutes a modification or enhancement to Consultant Software or Third Party Software.

Z48.11The *Consultant* warrants that

- the Software does not contain any Open Source Software other than OSS and
- the OSS is licensed upon terms which permit the use of such Open Source Software by the *Consultant*, the *Employer* and the *Employer*'s end users for all purposes contemplated by this contract.

Z48.12 The *Consultant* warrants to the *Employer* that all components of the Software:

- are free from material design and programming errors,
- provide the functionality set out in, and perform in all material respects in accordance with, the relevant specifications

contained in

- the Scope,
- the Quality Statement,
- the Documentation and

- do not infringe any Intellectual Property Rights,

Z48.13 The *Employer* grants to the *Consultant,* or procures the direct grant to the *Consultant* of, a royalty-free, non-exclusive, non-transferable, revocable licence to use all Employer Software and Employer Background IPR reasonably required by the *Consultant* in order to Provide the Service. Any such licence is granted for the duration of this contract only and solely to enable the *Consultant* to comply with its obligations under this contract.

Z48.14 The *Consultant* at all times, during and after the Contract Period, indemnifies the *Employer* and each other Indemnified Person against all losses incurred by, awarded against or agreed to be paid by an Indemnified Person arising from an IPRs Claim.

Z48.15 If an IPRs Claim is made, or the *Consultant* anticipates that an IPRs Claim might be made, the *Consultant*, at its own expense and sole option, either

- procures for the *Employer* or other relevant Indemnified Person the right to continue using the relevant item which is subject to the IPRs Claim or
- replaces or modifies the relevant item with non-infringing substitutes provided that:
  - the performance and functionality of the replaced or modified item is at least equivalent to the performance and functionality of the original item,
  - the replaced or modified item does not have an adverse effect on any other services, or the Employer System or the Consultant System,
  - there is no additional cost to the *Employer* or relevant Indemnified Person (as the case may be) and
  - the terms and conditions of this contract apply to the replaced or modified *service*.

Z48.16 If the *Consultant*

- procures a licence or
- modifies or replaces an item

in accordance with clause Z48.15 but this has not avoided or resolved the IPRs Claim, then

- the *Employer* may treat this IPRs Claim as the *Consultant* having substantially failed to Provide the Services; and
- without prejudice to the indemnity set out in clause Z48.14, the *Consultant* is liable for all reasonable and unavoidable costs of the substitute items and/or services including the additional costs of

procuring, implementing and maintaining the substitute items.

Z48.17 The *Consultant* keeps the Software Schedule up to date to reflect the Software used to Provide the Service. The *Consultant* provides the *Employer* a copy of the updated Software Schedule within 5 days of any change to the Software.

Z48.18 The *Consultant* deposits, and procures that each owner of the Deposited Software deposits, not less than fourteen (14) days following the relevant Commissioning Date or at such other times as the *Employer* may require, the Source Code of such part of the software that consists of Deposited Software in escrow with the National Computing Centre ("NCC") (or equivalent approved by the *Employer*) on the basis of their standard single or multi licensee escrow agreement (as applicable) unless another form is stated in the Scope, modified as necessary, and where applicable, to be consistent with the provisions clause Z48.19. The *Consultant* ensures that (and procures that each owner of the Deposited Software ensures that) the deposited version of the Source Code is the current version of the Deposited Software and that the deposited version is kept up-to-date as the Deposited Software is modified or upgraded. [The *Consultant* pays, or procures that each owner of Deposited Software pays, the initial storage fees and any annual fees under the escrow agreement and the *Employer* pays any release fees.]

Z48.19 Where Deposited Software includes Specially Written Software, without prejudice to the provisions of clause Z48.8, the *Consultant* ensures there are no restrictions on the release to the *Employer* of Specially Written Software from escrow, which is released whenever required by the *Employer* and without payment of any release fee, unless the *Employer* has agreed otherwise.

Z48.20 Where the *Consultant* is unable to procure compliance with the provisions of clause Z48.18 in respect of any Third Party Software that is Deposited Software, it provides the *Employer* with written evidence of its inability to comply with these provisions and agrees with the *Employer* a suitable alternative to escrow that affords the *Employer* the nearest equivalent protection. The *Consultant* is excused from its obligations under clause Z48.18 only to the extent that the *Consultant* and the *Employer* have agreed on a suitable alternative.

Z48.21 In circumstances where the *Employer* obtains the release of the Source Code from escrow, the *Consultant* hereby grants (and procures that any owner of Deposited Software grants) to the *Employer* a perpetual, worldwide, assignable, royalty-free, irrevocable and non-exclusive licence to use and support (which includes the right to load, execute, interpret, store, transmit, display, copy (for the purposes of loading, execution, interpretation, storage, transmission or display), modify, adapt, enhance, reverse compile, decode and translate) the Source Code version of the Deposited Software to the extent necessary for the receipt of the *services* (or substantially equivalent services) or for any purpose relating to the exercise of the *Employer*'s (or any other Central Government Body's) business or function. The licence granted under this clause Z48.21 survives the termination or expiry of this contract and cannot be terminated by the *Consultant* or its assignees or any third party.