

**National Asset Delivery  
Technical Surveys and Testing**

**Scope for 570122**

**M4 J22-21 Including J22 Eb Entry Slip  
EB & WB MP 195.6 – 190.4 RS**

**GPR Survey**



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**LIST OF ANNEXES**

**Appendix 1** **Supplementary Constraints**

FOR INFORMATION ONLY

## **1 PURPOSE OF THE SERVICES**

### **1.1 Project objectives**

- 1.1.1 The principle objective of this project is to determine the nature and depth of pavement construction thickness, defects and condition in existing pavement.
- 1.1.2 The specification that applies to the *services* is included in Section 6

### **1.2 Scope of services**

- 1.2.1 The *services* to be provided under this contract are:
- (1) 3D Ground-Penetrating Radar (GPR) – The survey is to be carried out on all lanes of the main carriageway (and slip roads if applicable), including the hard-shoulder.
  - (2) The GPR survey is intended to determine the likely pavement construction thicknesses, the location of the underlying concrete slab joints transversely and longitudinally, voids, cracks & moisture content as well as an indication of any potential structural issues that might become apparent in the foreseeable future.
  - (3) It is recommended that the GPR output be calibrated using the cores taken at the site.

### **1.3 Deliverables**

- 1.3.1 The *Consultant* is required to produce the following deliverables:
- (1) 3D GPR Survey
  - (2) A PDF factual report to include depths of layer construction, voiding and moisture content

## 2 EXISTING INFORMATION

- 2.1.1 All relevant existing information including C2 STATS searches can be found within the Pre-Construction Information Pack (PCIP) document. Individual STATS plans provided as part of the handover documents.
- 2.1.2 The Drawings listed below apply to this contract. Refer to the site information for details of existing site conditions including ground conditions, limitation on access, position of existing structures etc. Proposed works requirements are as detailed in Section 6. The core location drawing is attached with PCIP.

Drawing Number	Title	Revision / Date
001	187 – M4 J22-21 Incl J22 Eb Entry Slip EB MP 195.6 – 190.4 RS Defect & Treatment Plan	Rev A
001	187 – M4 J22-21 WB MP 195.6 – 190.4 RS Defect & Treatment Plan	Rev A

### **3 CONSTRAINTS ON HOW THE CONSULTANT PROVIDES THE SERVICES**

#### **3.1 General**

- 3.1.1 The *Consultant* Provides the Services in such manner as to minimise the risk of damage or disturbance to or destruction of third party property.
- 3.1.2 The *Consultant* complies with the constraints and meets with the requirements outlined in Appendix 1.
- 3.1.3 The *Consultant* submits information detailing how the *Consultant* will provide the Services to the *Client* prior to the *services* commencing. This information will include any lifting plans, risk assessments, method statements, the *Consultant's* staff training information and any other relevant Health and Safety requirements.

#### **3.2 Working hours & site specific constraints**

- 3.2.1 Access to the site for undertaking works will not be possible without the provision of traffic management – This will be provided by the Employer under the Construction Works Frameworks.
- 3.2.2 Due to the requirement for Traffic Management (TM) and specialist access, it is envisaged that works will be restricted to night-time shifts. Temporary Traffic Management (TTM) shall not be implemented prior to the hour of 20:00 hrs nor removed later than 06:00 hrs. Late installation / early removal of Traffic Management or alteration to the length of closure may occur subject to the recorded on-site traffic flow. It is anticipated that in most cases, Traffic Management removal will commence at 04:00 hrs to allow sufficient time for removal.
- 3.2.3 Traffic Management layout to be confirmed by Construction Works Frameworks Contractor. Layout provided to be in accordance with Traffic Signs Manual (TSM) Chapter 8.
- 3.2.4 Any site and task-specific lighting shall be directed away from dense vegetation and shall be positioned such that it does not cause a hazard to on-coming road users.
- 3.2.1 Multiple surveys being undertaken concurrently on site. Surveys to be planned to combine traffic management and to not affect the undertaking of other surveys.

#### **3.3 Health, Safety and Environment & Risk Management**

##### Health and Safety requirements

- 3.3.1 In Providing the Services the *Consultant* meets the requirements of Annex 2 of the supplementary constraints relation to health and safety duties.
- 3.3.2 The *Consultant* shall comply with the requirements of Highways England's safety passport scheme and ensure that all of his employees, and any of his subcontractor's, are registered in accordance with the implementation of the scheme. Details on the scheme can be found here:  
<http://www.highwaysafetyhub.com/safety-passport.html>
- 3.3.3 For details of the CDM duty holders, refer to the Pre-construction Information Pack (PCIP), which is issued as part of this package of work.
- 3.3.4 Before commencing the construction phase of the *services*, the *Consultant* confirms to the *Client* that adequate welfare facilities are in place. Where the facilities detailed in section 5 are not deemed adequate, the *Consultant* provides all necessary facilities to Provide the Services and to comply with the minimum requirements set out in HSE guidance document L153.

#### Environmental requirements

- 3.3.5 In Providing the Services the *Consultant* meets the requirements of Annex 2 of the supplementary constraints in relation to environmental duties.

#### Risk Management

- 3.3.6 The *Consultant* identifies, manages and mitigates risks in accordance with the principles of ISO31000.
- 3.3.7 The *Consultant* submits a risk register, which captures all risks associated with the delivery of the *services* including those identified by the *Client*, with his tender and maintains it for the contract period.

#### 4 REQUIREMENTS FOR THE PROGRAMME

- 4.1.1 The *Consultant* submits programme to the *Client* with his tender.
- 4.1.2 The *Consultant* Provides the Services taking into account the following programme constraints:
- (i) the *starting date* and *completion date* and any post site works, reporting and review period
  - (ii) The services and other things provided by *Client* (see Section 5)
- 4.1.3 The programme should be in the form of an activity and time related bar chart, produced as a result of a critical path analysis.
- 4.1.4 The programme should preferably be provided in either a PDF or MS Excel format and cover the full contract period including post site activities. Activities should be clearly defined and named, and the programme should detail the following:
- (i) The starting date, completion date & Contractor's planned completion
  - (ii) For each activity, the proposed resources (plant & labour) expected to deliver each activity should be shown on the programme
  - (iii) Review periods for any reporting requirements
  - (iv) Key dates for the Employer to provide 'services and other things'
  - (v) Key dates for co-ordination with Others
  - (vi) Dates and times associated with the project, including the *starting date*, *completion date* & *Contractor's* planned completion, and any other dates or times that will specifically impact the delivery of the project
  - (vii) Activities associated with delivering the project
- 4.1.5 The *Consultant* should provide details of the proposed resources (plant, labour, subcontractors etc.) expected to deliver each activity. This information can either be shown on the programme itself or provided in an associated resource statement included in the Proposal for Providing the Services.
- 4.1.6 The *Consultant* updates the programme every week. The *Consultant* submits an updated programme to the *Client* upon request.

## 5 SERVICES AND OTHER THINGS PROVIDED BY THE *CLIENT*

5.1.1 The following temporary traffic management will be provided by the *Client* under the *Construction Works Framework* to allow the *Consultant* to Provide the Works:

(1) It is assumed, based on site constraints/traffic flow data that off-peak lane closures will be the preferred traffic management for these works. It shall be assumed that this will consist of:

- M4 J22 Eb Entry Slip Road Closure
- M4 EB Lane 1 Closure
- M4 EB Lane 2 Closure
- M4 WB Lane 1 Closure
- M4 WB Lane 2 Closure

These closures will be undertaken separately to ensure the carriageway remains open with one lane running.

5.1.2 The other things that will be provided by the *Client* are as follows:

(1) Welfare Facilities (to be provided by the Principal Contractor).

## 6 SPECIFICATION FOR THE SERVICES

6.1.1 The *Consultant* shall Provide the Services in accordance with:

- (1) Section 1(1) of Wireless Technology Act 1949 makes it an offence for any person to operate any equipment for wireless telegraphy if not used in accordance with the license granted by the Office of Communications (OFCOM). All GBR operators operating in the UK must hold an OFCOM license and operate as required in respect of the EuroGPR Code of Good Practice.
- (2) The use of GPR on roads near radio astronomy sites requires specific permission from OFCOM.
- (3) Accurate location referencing is fundamental to the collection of good quality ground-penetrating radar data particularly as thicknesses will have to be calibrated or checked against pavement cores. All GPR surveys carried out on the HA network must be referenced against network sections to an accuracy of better than +/- 5m.
- (4) If the surveys are carried out at traffic speed, then particular care will need to be taken to achieve the above requirements, the use of an automatic location referencing system may well be needed, such as sophisticated GPS and inertial guidance system as used with TRACS.
- (5) GPR surveys must not be carried out when it is raining or when standing water is present on the surface of the pavement. This is because a thick film of surface water may affect the radar signal making interpretation of the data more difficult. Calibration of the radar may also be less certain as explained in Annex 6B of this Part.
- (6) GPR surveys must not be carried out on salted (de-iced) roads in case there is significant penetration of salt water into the subsurface materials beneath the road. Salt increases the conductivity of the pavement materials and the transmission of ground radar signals is heavily dependent on the pavement's conductivity. High conductivity will lead to an attenuation of the radar signal and therefore, reduces considerably the depth of penetration of the radar.
- (7) Direct evidence of construction changes must be confirmed by coring. Ideally, this must be carried out after the GPR survey has been carried out at locations of homogenous construction (determined from the GPR) and where the GPR interpretation is unclear.
- (8) A GPR result indicating the presence of voids must not be used, on its own, to justify treatment. Other evidence must be obtained that

- voids exist and are causing problems, such as deterioration of joints or movement of slabs, before maintenance treatment is considered.
- (9) When cracks depths surveys are carried out, the equipment must be used in accordance with the manufacturer's instructions and operated by a technician who has attended the equipment manufacturer's training course.
  - (10) The GPR Contractor must prepare a Survey Plan and comply with it at all times during the contract. This is to ensure that the information produced by a GPR survey is sufficiently accurate and reliable for use by the highway/pavement engineer.
  - (11) The Survey Plan must include the following information in the submission: - equipment specification; serial number of GPR equipment; calibration of the radar system; quality control procedures for both survey and analysis; work programme; survey procedure; risk assessment of the site work; and form of presentation of the GPR results.
  - (12) The results from a GPR survey must be presented by the GPR Contractor in a format, which can be readily understood by the highway/pavement engineer and referenced to the network sections to allow easy comparison with other pavement condition data from the same site. In addition, the data must be provided in electronic form such that it can be easily used with the commonly available types of spreadsheet programs.
  - (13) The GPR survey report must include: - a text section summarising the results of the survey, assumptions used to interpret the radar data, measurement accuracy achieved, problems encountered etc; a graphical display of the survey results; tabulation of the survey results; and core logs where appropriate.
  - (14) PDF colour-copy factual report required within two weeks of agreed completion on site to detail the above results.