National Asset Delivery
Technical Surveys and Testing

Works Information for
605071 M5 J15 Almondsbury IC Deck Concrete Testing

CONTENTS AMENDMENT SHEET

Amend. No.	Revision No.	Amendments	Initials	Date
0	0	Original version issued with tender	ET	22/09/21

TABLE OF CONTENTS

LIST OF ANNEXES

1 DESCRIPTION OF THE WORKS

1.1 Project objectives

1.1.1 The principle objective of this project is to undertake a concrete testing on the M4 structure (soffit over the M5) soffit deck to determine the extent of concrete repairs to the deck soffit. The results to be provided in the format as detailed in the specification.

1.1.2 The specification that applies to the *works* is included in Section 6

1.2 Scope of works

1.2.1 The *works* to be provided under this contract are:

(1) Completion of concrete testing in the M4 structure (soffit over the M5) deck soffit.

1.3 Deliverables

1.3.1 The *Contractor* is required to produce the following deliverables:

(1) A general comment on the condition of the concrete on the deck soffit.

(2) Concrete testing report including photos as detailed in section 6 – specification.

(3) Programme

(4) Risk Assessments and Method Statements

2 EXISTING INFORMATION

Almondsbury Interchange comprises four bridges forming a three-level interchange of the M4 and M5 motorways, located to the north of Bristol. The M5 underbridge forms the second level of the interchange at MP 131.00 and carries the M5 over the M4 on-slip roads and supports the M4 carriageway and two M5 on-slips above. OSGR: 361790E, 183750N

2.1.1 Asbestos Action Plan carried out in December 2010 (Report Ref MNV.INS.STR.SI.254) and reviewed in Jan 2012. New Asbestos Action Plan was carried out in 22nd June 2020 (no report number). Pre-Refurbishment Asbestos Survey completed by Lucion Environmental Ltd: Survey Date 28th July 2020. Project Reference: 416076. All the reports confirmed that no Asbestos containing materials has been identified on the Bridge deck.

2.1.2 Coal Tar Bound material testing have been completed by Lucion Environmental Ltd: Survey Date 28th July 2020. Project Reference: 416076 – No TAR present.

2.1.3 The Drawings and Documents 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.

Drawing Number	Title	Revision / Date
HE605071-KIER-SBR-M5_BR_1740_Z-DR-CB-010001 P01	Location Plan	P01
HE605071-KIER-SBR-M5_BR_1740_Z-DR-CB-010002 P01	Statutory Undertakers Information	P01
Plan view	Concrete Testing Plan	n/a
MNV.INS.STR.SI.254	Asbestos Action Plan 1	P1
no ref	Asbestos Action Plan 2	n/a
416076	Asbestos Pre-Refurbishment Survey Report	n/a

3 Constraints on how the Contractor Provides the Works

3.1 General

3.1.1 The *Contractor* Provides the Works in such manner as to minimise the risk of damage or disturbance to or destruction of third-party property.

3.1.2 The *Contractor* complies with the constraints and meets with the requirements outlined in Appendix 1.

3.1.3 The *Contractor* submits information detailing how the *Contractor* will provide the Works to the *Employer* prior to the *works* commencing. This information will include any lifting plans, risk assessments, method statements, the *Contractor's* staff training information and any other relevant Health and Safety requirements.

3.2 Working hours & site-specific constraints

3.2.1 The *Contractor's* working hours for site works shall be at nights between 2100 - 0500

3.2.2 Works to be undertaken under full closure of the M5 main line.

3.3 Health, Safety and Environment & Risk Management

Health and Safety requirements

3.3.1 In Providing the Works the *Contractor* meets the requirements of Annex 2 of the supplementary constraints in relation to health and safety duties.

3.3.2 When implemented, the *Contractor* 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.

3.3.3 For details of the CDM duty holders, refer to the pre-construction information which pre-construction information provided as part of the TST Pack.

3.3.4 Before commencing the construction phase of the *works*, the *Contractor* confirms to the *Employer* that adequate welfare facilities are in place. Where the facilities detailed in section 5 are not deemed adequate, the *Contractor* provides all necessary facilities to Provide the Works and to comply with the minimum requirements set out in HSE guidance document L153.

Environmental requirements

3.3.5 In Providing the Works the *Contractor* meets the requirements of Annex 2 of the supplementary constraints in relation to environmental duties.

Risk Management

3.3.6 The *Contractor* identifies, manages and mitigates risks in accordance with the principles of ISO31000.

3.3.7 The *Contractor* submits a risk register, which captures all risks associated with the delivery of the *works* including those identified by the *Employer*, with his tender and maintains it for the contract period.

4 REQUIREMENTS FOR THE PROGRAMME

4.1.1 The *Contractor* submits programme to the *Employer* with his tender.

4.1.2 The *Contractor* Provides the Works 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 *Employer* (see Section 5)

(iii) The timing of the works will be subject to the availability of road space, traffic management and any site-specific environmental constraints.

(iv) The survey report should be available within two weeks of the completion of the fieldwork.

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) 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.
(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 Client to provide 'services and other things.
(v) Key dates for co-ordination with Others.
(vi) When information will be provided back to Highways England

4.1.5 The *Contractor* updates the programme every week. The *Contractor* submits an updated programme to the *Employer* upon request.

5 SERVICES AND OTHER THINGS PROVIDED BY THE *EMPLOYER*

5.1.1 The following temporary traffic management will be provided by the *Employer* to allow the *Contractor* to Provide the Works:

(1) Works to be undertaken under full closure of M5 main line at nights. Working window will be between 2100 - 0500.
(2) Traffic management requirements will be confirmed during mobilisation with the allocated contractor.

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

(1) Welfare facilities will be provided by the principal contractor.

6 SPECIFICATION FOR THE WORKS

6.1.1 The *Contractor* shall undertake the works in accordance with:

MCHW Volume 5, Section 3, Part 4, Chapter 6 'Contract Documents for specialist activities – Ground Investigation – Specification – Pits and Trenches

6.1.2 Requirements for concrete investigation:

1) Hammer Tap Survey

The hammer tap survey shall cover 100% of concrete surface area of M4 Bridge deck that is directly above the M5 Bridge. The extent and nature of defects found shall be recorded, including delamination, crack widths and spalling. The contractor shall record the size and location of each defect and provide a copy to the Overseeing Organisation on completion of works.

2) Covermeter Survey

All covermeter surveys shall be carried out using an accurate meter and in accordance with BS1881-204. The 500mm x 500mm survey grid shall cover the whole area of the exposed concrete. It shall be marked out on the test surfaces and provided with a set of arbitrary grid coordinates. The covermeter shall be calibrated by measuring the cover at a location where the reinforcement is exposed, or by limited breakout and exposure of reinforcement.

3) Half-cell Electro-potential test

a. 12 No 2m x 1m areas shall be tested on a 500mm grid. Approximately locations of the 12 No area are shown on drawing HE605071-KIER-SBR-M5_BR_1740_Z-DR-CB-010003. Exact location to be agreed on site following initial hammer tap and cover meter survey.

b. Half Cell potential testing to be undertaken in accordance with ASTM C876-09, Concrete Society Technical Report 60 and ASTM C876-15 "Standard Test Method for Corrosion Potentials of uncoated reinforcing steel in concrete".

4) Chloride-ion content test.

a. One location in each of the 12 No areas described in 3) a above shall be tested for chloride ion content (4 depth increments 25mm per increment). The test location shall be the node with the lowest Half Cell potential.

b. In-situ testing for Chlorides to be undertaken in accordance with BSEN 14629.

c. Concrete dust samples to be taken from original construction concrete.

d. The concrete dust Sample positions should take into account the General Arrangement shown on contract drawings.

e. Of the 6 dust samples, it shall be ensured that sampled are taken at depth increments of 5mm to 25mm, 25mm to 50mm and 50mm to 75mm, with an additional deep drilling to 100mm depth for measurement of the background chloride.

f. The chloride-ion content results shall be stated in comparison to the mass of cement.

g. All holes on concrete deck to be filled with non-shrink, high strength cementitious grout.

5) Depth of Carbonation.

- Carbonation testing to be undertaken at two locations on each of the 12 No test areas. One of these areas will coincide with the node that recorded the lowest Half Cell potential.
- In-situ testing for Carbonation to be undertaken in accordance with BSEN 14630.
- Concrete dust samples to be taken from original construction concrete.
- The concrete dust Sample positions should take into account the General Arrangement shown on contract drawings.
- Of the 6 dust samples, it shall be ensured that sampled are taken at depth increments of 5mm to 25mm, 25mm to 50mm and 50mm to 75mm, with an additional deep drilling to 100mm depth for measurement of the background chloride.
- The chloride-ion content results shall be stated in comparison to the mass of cement.
- The testing laboratory shall hold appropriate UKAS accreditation for testing of the chloride-ion content in accordance with BS 1881: Part 124.
- All holes on concrete deck to be filled with non-shrink, high strength cementitious grout.

6) Cement Content Test, Sulfate content and alkali content shall be undertaken from 6 of the 12 No test areas.

- Concrete dust samples to be taken from original construction concrete.
- The testing laboratory shall hold appropriate UKAS accreditation for testing of the cement content in accordance with BS 1881: Part 124.
- All holes on concrete deck to be filled with non-shrink, high strength cementitious grout.

7) Concrete Resistivity Test

- Concrete resistivity shall be measured on site as a non-destructive test e.g. four-probe method/ two-probe method. Resistivity shall be measured in each of the 12 test areas.
- A minimum of five readings of resistivity should be taken at each test location. For locations refer to Principal Inspection Report Almondsbury Interchange (M4) STR_1741 20/M4//186.60//, 15 July 2021.
- In areas of concrete with high reinforcement probes should be positioned at right angles to the reinforcement.
- The testing laboratory shall hold appropriate UKAS accreditation for testing of concrete resistivity in accordance with BS 1881: Part 201 “Guide to the use of non-destructive methods of test for hardened concrete”.