**National Asset Delivery**

**Technical Surveys and Testing**

**Works Information**

**(Waterproofing Tensile**

**Adhesion Testing)**

**CONTENTS AMENDMENT SHEET**

|  |  |  |  |  |
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# **List of Structures**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Road** | **Km** | **Str.No.** | **Str.Key** | **Structure name** |
| A1 | 146.1 | A1/146.10 | 5332 | Wothorpe Railway |
| A1 | 150.3 | A1/150.30 | 5340 | Tickencote |
| A1 | 153.2 | A1/153.20 | 5341 | Bloody Oaks |
| A1 | 159.6 | A1/159.60 | 5342 | Stretton Underbridge |
| A1 | 162.4 | A1/162.40 | 5343 | South Witham Brick Arch |
| A1 | 162.4 | A1/162.40 | 5344 | South Witham (Box Beams) |
| A1 | 178.8 | A1/178.80 | 5355 | Harlaxton Road |
| A1 | 206.4 | A1/206.40 | 5380 | Flood Spans |

# **Description of the works**

## Project objectives

### The principle objective of this project is to undertake waterproofing tensile adhesion testing on the structures listed in section 1.0.

### The specification that applies to the *works* is included in Section 7.

## Scope of works

### The *Contractor* is required to undertake the following tests detailed in Table 1 below.

| **Table 1 – Summary of testing** | | |
| --- | --- | --- |
| **Test No.** | **Description** | **Testing Schedule** |
| 1 | Waterproofing Tensile Adhesion Testing | Over the surface of carriageway. (N/B and S/B) |

## 

## Deliverables

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

* + - * 1. Report on the findings of the investigation.
        2. Drawings detailing the results of the testing.
        3. Photographic record of the survey.

# **Existing INFORMATION**

## Wothorpe Railway (A1/146.10)

* + 1. Wothorpe Railway Bridge was constructed in 1960. It has three spans with a total length of 25.2m, through one of which runs the Peterborough-Stamford Railway. The bridge carries the A1 trunk road. The bridge is constructed of in-situ reinforcement concrete. The deck consists of reinforced concrete beams and slab. The superstructure, R.C. piers and abutments are monolithic and thus there are no bearings. The structure has precast piles to the abutments and mass concrete sheet piles to the other supports. The parapets are also in reinforced concrete. Not known Mastic asphalt waterproofing system applied to the bridge deck. Asphaltic and buried joints are provided over the bridge supports.
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| J958/2/019057 | General Arrangement | As built - Historic |
| A011/C/2/019057 | Elevation | As Built - Historic |
| 561336.10.09 | Indicative Testing Location and Location Plan | 2018 |

## Tickencote (A1/150.30)

* + 1. The Bridge carries the A1 Trunk Road over the B1081, and is located at A1 marker post 47/5. The single span structure comprises of two single Decks of inverted 'T' beams with in-situ concrete infill, each supporting one carriageway of the A1. The Decks are connected at the Central Reserve by precast concrete slabs. The Decks have a single clear skew span of 11.027m between abutments at a skew angle of 7 degrees, each deck is 15.875m wide and the overall width of the structure is 32.49m. The Decks are supported on in-situ reinforced concrete abutments with spread footing foundations. Drainage of the carriageway is by a gulley located off the deck on the west side of the northbound and the southbound carriageway is drained by a french drain in the Central Reserve. Waterproofing to the deck slab is spray applied membrane provided by Bayer (UK) Ltd. Movement joints at each end of the deck are asphaltic plug joints.
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| 220225/GA/01/Z | General Arrangement | As built - Historic |
| 561336.10.01 | Indicative Testing Location and Location Plan | 2018 |

## Bloody Oaks (A1/153.20)

* + 1. The Bridge carries the A1 Trunk Road, at marker post 50.0, over a minor road junction that links Empingham and the A606. It is situated 9km south from South Witham Crossroads. The Bridge Span consists of two decks each comprising 30no. inverted 'T' beams with an in-situ reinforced concrete infill slab. The decks are separated at the central reserve by 1m wide x 190mm thick precast concrete slabs. The end supports consist of reinforced concrete abutments and return cantilever wing walls founded on spread footings. A liquid/sprayed Colas Products Ltd Baytec waterproofing is provided. The abutments, soffit and parapet concrete surfaces are protected with Silane coatings. Asphaltic plug joints are provided over the A1 carriageway.
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.
    4. No drawings are available in HE inventory or records folder.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| 561336.10.02 | Indicative Testing Location and Location Plan | 2018 |

## Stretton Underbridge (A1/159.60)

* + 1. The structure was constructed in 1971, carries the A1 over the B668 junction at Stretton, at marker post 56.4. The single span simply supported structure has two decks which are joined at the central reserve. The bridge is aligned square with the A1 trunk road and has a clear span of 10.3m and an overall width of 30m. The bridge superstructure consists of in-situ solid infill reinforced concrete between two sets of 30 inverted precast pre-stressed T beams. The beams are separated at the centre reserve by 1m wide x 190mm thick precast concrete slabs. The decks are supported directly on the abutment bearing shelves via a 12mm layer of Flexcell. The asphalt carriageway under the structure, the B668, is 7.3m wide with 0.6m wide and 2.4m wide hard-standings. The abutments, soffit and parapet concrete surfaces are protected with a Silane coating. A liquid sprayed Stirling Lloyd Eliminator single coat and Bayer Ltd Baytec/Pmb waterproofing is provided over the deck. Asphaltic plug joints are provided over the A1 carriageway.
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| B100/3 | General Arrangement | As built - Historic |
| Unknown | Elevation | As Built - Historic |
| 561336.10.03 | Indicative Testing Location and Location Plan | 2018 |

## South Witham Brick Arch (A1/162.40)

* + 1. The structure was constructed in 1891 and carries the southbound carriageway of the A1 over the C431 South Witham to Castle Bytham road. The carriageway passes under the central arch. The bridge is located at road marker post 59.5 (162.4 on previous road marker posts). The structure comprises of a three span brick arch with masonry parapets, brick abutments and piers, and bears on to spread footings. Concrete protection has been cast around the base of the central brick piers. The side spans are approximately 7.92m and the centre span is 8.53, the deck width is approximately 11.4m. A waterproofed (bitumen sheet) reinforced concrete relieving slab was constructed over all three arches in 1977. The parapets are 1.1m high
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| A-3419-2 | General Arrangement | As built - Historic |
| A-3419-4 | Cross Section | As built - Historic |
| B-3419-13 | Elevation | As Built - Historic |
| 561336.10.04 | Indicative Testing Location and Location Plan | 2018 |

## South Witham- Box Beams (A1/162.40)

* + 1. The structure was constructed in 1971 and carries the Northbound carriageway of the A1 trunk road over the South Witham to Castle Bytham road (C431). The bridge is located at road marker post 59.5 (162.4 on previous road marker posts). The bridge is a single span simply supported structure, 29.9m long with a clear span of 18.27m and an overall width of 17.3m and zero skew. The deck is constructed from pre-stressed, pre-cast concrete box beams with an in-situ concrete infill slab. 18no. box beams are provided and are placed at approximately 1m centres. The box beams are transversely pre-stressed by 32mm diameter Macalloy H.T. steel bars. Either side of the bridge P2/113 1m high parapets are provided. The deck is supported on reinforced concrete abutments via laminated rubber bearings, with cantilever wing walls. The abutments are supported on reinforced concrete spread foundations. The revetments to the road under the bridge are in the form of mass concrete steps. Asphaltic plug joints have been provided over the north and south abutments. A liquid/sprayed waterproofing system has been applied to the bridge deck. Product: Bayer (UK) Ltd Baytec/Pmb
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| PC/50500/1000A | General Arrangement | As built - Historic |
| 561336.10.05 | Indicative Testing Location and Location Plan | 2018 |

## Harlaxton Road (A1/178.80)

* + 1. The bridge carries the A1 trunk road over the A607 near Grantham, at MP 178.80. The structure was commissioned in 1961 and was designed by Lincolnshire County Council. The structure comprises; 3 spans, simply supported. The three spans measure, 12.880m south, 21.335m centre and 12.880m north, and are at skew of 37 deg. The square span dimensions are 10.286m south, 17.038m centre and 10.286m north. The deck width is 26.9m between parapet faces. Waterproofing is provided over the whole of the deck in the form of Bayer Baytec Mastic Asphalt. The abutments and piers are founded on in-situ reinforced concrete piles. There are joints provided above the abutments and piers. There are buried joints provided above the north abutment, north pier and south pier. An Asphaltic plug joint is provided above the south abutment.
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| Unknown | General Arrangement | As built - Historic |
| Unknown | Elevation | As Built - Historic |
| 561336.10.08 | Indicative Testing Location and Location Plan | 2018 |

## Flood Spans (A1/206.40)

* + 1. Flood Spans Bridge has the Highways Agency structure reference A1/206.40. It was designed by Nottinghamshire County Council, constructed in 1964 and is a simply supported 9 span viaduct at a skew angle of zero degrees and having a width of 24.1m. It carries A1 trunk road over the surrounding flood plain. The superstructure comprises precast pre-stressed beams (inverted `T beams) and solid infill slab construction. There are 51no. beams per span with a reinforced concrete parapet edge beam each side. The waterproofing is mastic asphalt. There are asphaltic plug joints at both abutments and buried joints above each of the piers.
    2. Inspections have found areas requiring surfacing and waterproofing repairs on N/B and S/B of the carriageway.
    3. Please refer to the CDM preconstruction and site information which details access restrictions, known asbestos information & environmental constraints.

### The Drawings listed below apply to this contract. Copies can be found in Appendix 1.

|  |  |  |
| --- | --- | --- |
| **Drawing Number** | **Title** | **Revision / Date** |
| LCC010/001 | General Arrangement | As built - Historic |
| BR/3114/2 | Deck R.C Detail & Elevation | As built - Historic |
| 561336.10.10 | Indicative Testing Location and Location Plan | 2018 |

# **Constraints on how the Contractor Provides the Works**

## General

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

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

### 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.

## Working hours & site specific constraints

### The *Contractor’s* working hours for site works shall be Night-time working

### The *Contractor* must satisfy himself that he understands site access requirements and restrictions requirements prior to submitting his tender.

### Traffic management will be provided.

## Health, Safety and Environment & Risk Management

### Health and Safety requirements

### The Contractor will be required to undertake the CDM duty holder role of principal contractor. The pre-construction information can be found in CDM PCI documents.

### 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 6 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

### Please refer to the site information for details of known environmental constraints close to the site.

### Risk Management

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

### 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.

# **Requirements for the programme**

### The *Contractor* submitsprogramme to the *Employer* with his tender.

### The *Contractor* Provides the Works taking into account the following programme constraints:

1. the *starting date* and *completion date* and any post site works, reporting and review period
2. The services and other things provided by *Employer* (see Section 5)

### The programme and be in the form of an activity and time related bar chart produced as a result of a critical path analysis.

### The programme must be provided in a PDF or MS Project or MS Excel format and cover the full contract period including post site activities. All activities should be clearly defined and named and the following shall be shown on the programme:

1. the *starting date*, *completion date* & *Contractor’s* planned completion
2. for each activity, the proposed resources (plant & labour) expected to deliver each activity should be shown on the programme
3. review periods for any reporting requirements
4. key dates for co-ordination with Others

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

# **Services and other things provided by the *Employer***

### The *Employer* does not provide anything

# **Specification for the works**

* 1. **Testing Standards** 
     1. The *Contractor* shall undertake the works in accordance with Highways England Standards.
  2. **Preparation**

### Mechanically core a 300mm diameter hole in the surfacing at each test location to expose the waterproofing membrane.

### The thickness of surfacing at each core location shall be recorded.

* 1. **Testing Specifications**

### 3no. tensile adhesion tests will be carried out within each 300mm diameter cored test patch in accordance with the following procedure:

1. The test shall be carried out on a prepared clean sample of existing waterproofing material as directed by the Overseeing Organisation.
2. An Elcometer Model 106 Adhesion Tester is a suitable instrument to use. The Contractor shall supply evidence to show that the meter has been recently calibrated. The test piece or dolly shall be abraded and shall be clean. Any solvents used to clean the dolly must be dry prior to placing the dolly.
3. The area to be tested shall be thoroughly cleaned and solvent wiped with acetone or MEK (Stirling Lloyd Solvents Nos. 1 or 3). Any solvents used to clean the dolly must be dry prior to placing the dolly.
4. The base of the dolly shall be coated with a suitable adhesive for the type of waterproofing.
5. The dolly shall be placed onto the waterproofing material. The base of the dolly shall be placed so that it is parallel to the waterproofing sample to be tested.
6. The waterproofing around the dolly shall be cut with a hand held auger to produce a concentric disc of waterproofing with a 50 mm diameter.
7. When the adhesive has fully cured the Elcometer Model 106 Adhesion Tester shall be placed on top of the dolly.
8. The load on the dolly shall be increased slowly and uniformly until adhesion failure occurs.
9. The operative undertaking the test shall note the load applied at failure and inspect the dolly to identify the failure type, i.e. adhesive to waterproofing; waterproofing to substrate failure.
10. The operative shall record the type of failure, load applied at failure, thickness of waterproofing sample, ambient temperature and weather conditions at each test location.

### The thickness of waterproofing shall be recorded. Also the thickness of any different waterproofing shall be recorded if any lapping exists.

### Two options are available for reinstatement of the cored hole:

* 1. The core hole shall be backfilled with asphaltic plug joint material as detailed below:
     1. Clean out the recess using hot compressed air once clean tank the recess with hot asphaltic plug joint material to seal the joint and improve adhesion of the APJ to be installed.
  2. Alternatively:
     1. Where possible damage caused to the waterproofing material shall be made good with hand applied approved waterproofing membrane in accordance with series 2000 of the Specification for Highway Works and the manufacturers method statement which is compatible with the existing system, but ensuring a minimum 150 mm lap around a damaged section.
     2. Suitable primer shall be used between the waterproofing systems.
     3. The core hole can then be backfilled with a suitable hot applied bituminous surfacing material.
  3. **Photographic Record Inspection**

Photographic records are to be taken at each trial hole location at the following times:

1. Exposed waterproofing membrane prior to adhesion testing
2. Waterproofing after testing
3. Waterproofing after repair
   1. **Reporting**

The results of the integrity testing shall be contained within a brief report. All site records and photographs as described above shall be included within the report accompanied by brief descriptions of the waterproofing condition at each test patch. A location plan showing the exact areas tested should also be included.