Highways England

Technical Surveys and Testing

Engineering and Construction Short Contract

561343 - Area 7 - Concrete Portal Frame Structures Testing

Works Information

CONTENTS AMENDMENT SHEET

Amend. No.	Revision No.	Amendments	Initials	Date
0	0	Original version issued with tender	DW	Insert

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LIST OF ANNEXES

1 DESCRIPTION OF THE WORKS

1.1 Project objectives

1.1.1 The principal objective of this project is to undertake concrete testing works to 2no. structures located on the Area 7 network. Information on the structures can be found below:

Number	Structure Key	Structure Name
1)	344	Cosby-Countesthorpe Road
2)	376	Coalville-Leicester Railway (Dis)

1) Cosby-Countesthorpe Road is an underbridge that was constructed in 1963 and carries the M1 over the local authority road Countesthorpe Road. The structure has a total of 86no. beams.
2) Coalville-Leicester Railway (Disused) is an underbridge that was constructed in 1963 and carries the M1 over a public footpath, which is maintained by Leicestershire County Council. The structure has a total of 67no. beams.

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) To carry out a visual inspection alongside destructive and non-destructive concrete testing to the structures. The testing shall be to determine the condition of the concrete beams and determine the locations requiring repair to be carried out. This testing will include:

- Half Cell: Full length of all beams noted on the provided drawings.
- Cover Survey: Full length of all beams noted on the provided drawings.
- Delamination Survey: Full length of all beams noted on the provided drawings.
- Chlorides: 2no. tests in each test area per structure.
- Carbonation: One test to be conducted in each test area per structure.
- Resistivity: One test at each end of each test area. 6no. tests per structure.
- Cement Content: One test to be conducted in each test area per structure.

1.3 Deliverables

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

(1) The *Contractor* is to produce individual reports for both of the tested structures, which are to include results of testing conducted, time-stamped photos of the testing, and be accompanied by computer generated drawings of the test areas. These drawings shall be provided to the *Client* in the native CAD file and a PDF copy.

2 EXISTING INFORMATION

2.1.1 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.

Drawing Number	Title	Revision / Date
M1/149.10	M1//149.10 Cosby Countesthorpe Road – Testing Locations	FINAL 17.12.2019
M1/160.60	M1//160.60 Coalville Leicester Railway – Testing Locations	FINAL 17.12.2019

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 determined by the local authorities in question for each structure. ***It is likely that for Cosby-Countesthorpe Road, this will be undertaken during night-time hours of 21:00 – 06:00***. ***It is likely that for Coalville-Leicester Railway, this will be undertaken during daylight hours of 09:00 – 15:00.*** Actual times of work will be confirmed to the *Contractor* by the *Client* when informed by Leicestershire County Council.

3.2.2 It should be noted that Coalville-Leicester Railway (Disused) now carries the M1 over a public footpath and right of way. As such, a system must be in place for the works to allow pedestrians to pass safely.

3.2.3 Traffic management, where required, will be arranged by the *Employer*.

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 relation to health and safety duties.

3.3.2 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. Details on the scheme can be found here: http://www.highwayssafetyhub.com/safety-passport.html

3.3.3 For details of the CDM duty holders, refer to the pre-construction information which can be found on the attached document *'M1 Concrete Portal Frames Testing – CDM PCI.'*

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)

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, a MS Project 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*, the *completion date,* and the *Contractor's* planned completion.
(ii) For each activity associated with the project; proposed resources (plant and labour requirements) expected in order to deliver each activity to be shown on the programme.
(iii) Review periods for any reporting requirements.
(iv) Key dates for the *Employer* to provide *services and other items.*
(v) Key dates for co-ordination.

4.1.5 The *Contractor* updates the programme every 4 weeks. 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:

- Cosby-Countesthorpe Road: Traffic management will be provided in the form of a full closure under the bridge, as it is not feasible to undertake the works under lane closures.

- Coalville-Leicester Railway (Disused): The *Employer* does not provide anything. There is a public right of way underneath the structure. Permission will be sought by the *Employer* of the *Local Authority* to place plant and undertake works on this right of way. The *Contractor* must ensure there is a safe system of work in place to protect members of the public wishing to pass by the work area.

6 SPECIFICATION FOR THE WORKS

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

TECHNICAL SPECIFICATION

PRE-AMBLE TO THE SPECIFICATION

1 The Specification referred to in the Tender shall be the `Specification for Highway Works', published by The Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, as modified and extended by the following:

(i) Appendix 0/1 : Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures;
(ii) Appendix 0/2 : Contract-specific minor alterations to existing Clauses, Tables and Figures;
(iii) The Numbered Appendices listed in Appendix 0/3;
(iv) Appendix 0/5 : Special national alterations of the Overseeing Department of Scotland, Wales or Northern Ireland.

2 The relevant publication date of each page of the Specification for Highway Works is given in the Schedule of Pages and Relevant Publication Dates.

3 An Additional Clause as indicated by a suffix `A' in Appendix 0/5 is an alteration originating from the Overseeing Department of Scotland, Wales or Northern Ireland. An Additional Clause as indicated by a suffix `AR' in Appendix 0/1 is a Contract-specific alteration.

4 A Substitute Clause, as indicated by a suffix `S' in Appendix 0/5 is an alteration originating from the Overseeing Department of Scotland, Wales or Northern Ireland. A Substitute Clause as indicated by a suffix `SR' in Appendix 0/1 is a Contract-specific alteration.

5 A Cancelled Clause as indicated by a suffix `C' in Appendix 0/5 is an alteration originating from the Overseeing Department of Scotland, Wales or Northern Ireland. A Cancelled Clause as indicated by a suffix `CR' in Appendix 0/1 is a Contract-specific alteration.

6 Insofar as any of the Numbered Appendices may conflict or be inconsistent with any provision of the Specification for Highway Works the Numbered Appendices shall always prevail. Additionally, Numbered Appendices 0/1 and 0/2 shall take precedence over Numbered Appendix 0/5.

7 Any reference in the Contract to a Clause number or Appendix shall be deemed to refer to the corresponding Substitute Clause number or Appendix listed in Appendix 0/1, 0/2 or 0/5.

8 Where a Clause is altered any original Table/Figure referred to in the Clause shall apply unless the Table/Figure is also altered. Where a Table/Figure is altered any reference in a Clause to the original Table/Figure shall apply to the altered Table/Figure.

9 Where a Clause in the Specification relates to work goods or materials which are not required for the Works it shall be deemed not to apply.

10 Any Appendix referred to in the Specification which is not used shall be deemed not to apply.

11 Where a Clause in the Specification is prefixed by an # this indicates that this particular Clause has a substitute National Alteration for one or more of the Overseeing Departments of Scotland, Wales or Northern Ireland. Substitute or additional National Clauses shall be used within countries to which they specifically apply and they are deemed to replace corresponding Clauses in the main text of the Specification or to be included within the

Specification as appropriate. The substitute National clauses are located at the end of the relevant Series together with the additional National Clauses of the Overseeing Departments.

12 Other than where references to the Overseeing Organisation are made in the context of the Overseeing Organisation granting statutory or type approvals, the roles and functions of the Overseeing Organisation shall be undertaken by the Engineer.

Where the Specification requires the provision of documentation to the Overseeing Organisation for statutory or type approval such documentation shall be provided to the Engineer.

13 If the Specification is used in conjunction with a Contract under which the Contractor is responsible for the design of any part of the Permanent Works, the delegations of the roles and functions of the Overseeing Organisation as stated in paragraph 12 shall be amended as follows:

(i) If any agreement, consent or approval required to be obtained from the Overseeing Organisation impacts on the health and safety of the general public, the environment or any property or equipment not owned or operated by the Contractor or the Design Build Finance and Operate concessionaire, such agreement, consent, approval shall be obtained from the Employer's Agent.

(ii) Where the Specification provides for the Overseeing Organisation to require a test, waive the requirement for a test or alter testing frequency, the party to whom the Overseeing Organisation's roles and functions have been ascribed by paragraph 12 above shall exercise such decisions in accordance with the Secretary of State's requirements stated in the Contract.

Specification for Highway Works
Schedule of Pages and Relevant Publication Dates

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000	1 3F 2	March 1998 May 2005 November 2006
100	2 W1F 12 to 14, 20F 1, 3 to 7, N1, N3 8 to 9, 11, 15 to 19, N2, N4 10, N5 to N6F	May 2001 May 2005 November 2005 May 2006 November 2006 November 2008
200	1, 3F 2	May 2001 May 2004
300	1 4 2 to 3, 5 to 6F	May 2001 November 2002 May 2008
400	1 to 6, 8, 10 to 13F 7, 9	November 2007 November 2008
500	23 to 24, 26 28F 3, 22, N1F 2, 5, 27 6, 25 1, 4, 7 to 21	November 2004 May 2005 May 2006 November 2006 November 2007 November 2009
600	33 2, 27 to 28, 30 to 32, 34 to 36, N1 25 to 26 42 to 49, 52 to 68F 37, 50 1, 3 to 24, 29, 38 to 41, S1 to S3F, N2 to N4F	November 2003 November 2005 November 2006 November 2007 November 2008 November 2009
700	2 to 3, 5 to 6, N1, N3 to N5F 4, N2 1, 7 to 32F	November 2006 August 2008 November 2009
800	1 to 25F	November 2009
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1300	N2F 3 to 4 1, 5 to 10, 12F 2, 11 and N1	November 2003 November 2004 November 2005 May 2006

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1600	1, 4 to 5, 9, 15, 17 to 18, 24 to 26, 29 to 31, 35, 38, 49F 2, 6 to 8, 10 to 14, 16, 19, 27 to 28, 32 to 34, 36 to 37, 39 to 42, 44 to 48 3, 20 to 23, 43	March 1998 November 2003 November 2005
1700	2 to 7, 10 to 15 8 to 9 1, 16 to 22F	May 2004 May 2005 May 2006
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2500	1 2, 8, 11F 10 6 to 7, 9 5 3 to 4	May 2001 November 2003 November 2004 May 2005 May 2006 November 2006
2600	1 2 to 4 5 6 7F	March 1998 November 2003 November 2004 May 2005 November 2006
3000	1, 4 to 7, 10, 12 to 17, 19, 22 to 27F 20 2 to 3 8 to 9, 11, 18, 21	May 2001 November 2004 May 2006 May 2008
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Appendix A	1 to 32F	May 2008
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Appendix C	1 2F	May 2005 November 2006
Appendix D	N1F	March 1998
Appendix E	1F	May 2005
Appendix F	1 to 55F	May 2009
Appendix G	1F	May 2004

Series / Appendix	Page Number	Publication Date
Appendix H	1 2, 6 to 8F 3 to 5	May 2004 November 2005 November 2006

APPENDIX 0/1 : CONTRACT-SPECIFIC ADDITIONAL, SUBSTITUTE AND CANCELLED CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

1701AR CONCRETE INVESTIGATIONS

All sampling and sampling should be carried out in accordance with 'BD35/90 Inspection and Repair of Highways Structures' by a specialist testing firm or laboratory approved by UKAS. The investigation shall comprise testing concrete in accordance with clauses 1701AR TO 1707AR.

The contractor is to provide suitable access equipment to testing location i.e. aluminium tower scaffold / MEWP.

1702AR DETAILED VISUAL AND DELAMINATION TESTING

A detailed visual and delamination survey of each test area shall be carried out on the areas directed by the Overseeing Organisation. The survey report will quantify the following:

a. Spalling – extent to be defined and dimensioned
b. Corrosion of steel or rust staining
c. Exposed reinforcement
d. Exposed inclusions in the concrete
e. Honeycombing
f. Cracks or crazing
g. Hollow surfaces and lamination
h. Varying or abnormal colour or texture
i. Existing remedial works
j. External contamination and surface deposits
k. Evidence of leaching
l. Wet or damp surfaces (related to current weather condition and a source of water)
m. Any other defects

The contractor shall show the extents of spalling and delamination within a hatched area drawn accurately to scale

Treatment of delaminated concrete during the survey

The Contractor shall advise the Overseeing Organisation representative on site of any delamination that is located over trafficked lanes at the time that they are detected. Subject to instructions from the Overseeing Organisation's representative, the Contractor shall be prepared to remove any delaminated concrete from site during the survey. The removal shall be undertaken to the extents agreed with the Overseeing Organisation's representative on site.

TABLE 17/02 AR VISUAL SURVEY - ABBREVIATIONS	
The following abbreviations and legend are to be used during the visual survey **:**	
Abbreviation/Legend	***Description***
BH	Blow Holes
Cg	Crazing
Cr	Crack
E	Efflorescence
ER	Exposed Reinforcement
H	Honeycombing
I.Sp	Incipient Spall
RN	Rusty Nails (or wire)
RS	Rust Spot
RSt	Rust Streak
Sev	Severe or Serious
Sl	Slight
Sp	Spall
St	Stalactite
WD	Water Deposits
WS	Water Stain
VF	Very Fine Crack, less than 0.15mm wide
F	Fine Crack, between 0.15mm and 0.3mm wide
0.4	Crack 0.4mm wide
E	Crack with efflorescence
*	Half-cell connection
Holl	Hollow surfaces and laminations
Dm	Delamination

1703AR COVERMETER SURVEY

1. Covermeter survey shall be undertaken on the areas directed by the Overseeing Organisation Representative on site. The depth of cover afforded by the concrete will need to be measured using a suitable covermeter. Measurements should be taken on a grid system, compatible with the reinforcement arrangement. An average site accuracy of about ±15 per cent may be expected with a maximum error of ± 5mm. A check to confirm that the instrument has been properly calibrated should be carried out at a convenient location on the structure before any field measurements are taken. This may be done using the covermeter to record the cover and then breaking out the concrete at the same location to expose the reinforcement so that a physical measurement of the actual cover can be recorded. If breakout of concrete is required then this should be done at half-cell potential break out location.

1704AR HALF CELL POTENTIAL TESTING

1. Half-cell potential testing shall be undertaken on the beams indicated on the drawings provided. Each beam shall have two half-cell nodes across its width, 500mm apart. Nodes shall also be spaced 500mm apart in the longitudinal direction.

2. The equipment shall be saturated copper sulphate or suitable equivalent placed on the concrete surface and connected with ASTM C879-09. Two readings are to be taken at each grid and the mean value shall be used.

3. Where the readings differ by more than 20mV a third reading shall be taken and the mean of the two closest reading shall be used. Ambient conditions and concrete surface temperature shall be recorded together with the details of the type of half-cell

and its most recent calibration check. Excavation to expose the reinforcement for electrical connection shall be made good in accordance with Series 1700 of the Specification for Highways Works.

4. Where appropriate, as directed by the Overseeing Organisation Representative on site, permanent connections shall be made to the reinforcement to facilitate future monitoring of changers in potential.

5. The results shall be presented as a grid of values marked on projected plans or elevation of the areas measured, at a scale of 1:50. Equipotential contours shall also be plotted with colour coding at a scale of 1:50 with an interval of 50mV. Colour block diagrams will not be an acceptable alternative to colour contours.

6. Breakouts in the concrete made to facilitate connections to the reinforcement shall be reinstated using an approved proprietary polymer low shrinkage cementitious repair material. Preparation, placing and curing of the reinstatement shall be undertaken in accordance with the manufacturer's instructions of the product used.

1705AR ELECTRICAL RESISTIVTY TESTING

1. Electricity resistivity testing shall be undertaken at two locations within each of the three testing regions per bridge, with specific locations to be agreed with the Overseeing Organisation Representative on site.

2. Electricity resistivity shall be measured using the wenner 4 probe system, or alternative equipment to the following specification typically at the most negative half cell reading:

   Probe array 4-probe array 5cm spacing or 2 probe array drilled into surface of concrete.

   Response/resolution: Display resolution 1 KΩ cm linear response up to 99 KΩ.cm.

3. The probe shall be held in position until the resistivity measured has stabilised. The reading shall then be recorded. The results shall be presented alongside the half-cell results in the report.

1706AR SAMPLING CONCRETE FOR CHLORIDES BY PERCUSSIVE DRILLING

1. The location of holes shall be marked on the structure. Prior to drilling a covermeter shall be used to locate the position of reinforcement steel. Some adjustment of the location may be necessary to avoid damage to the reinforcement bars. Guidance on frequency and location of sampling is give in BRE Information Pater IP 21/86.

2. The orientation of the drilling shall be perpendicular to the concrete surface. A masonry drill bit 20mm diameter with unworn fluted is to be used.

3. The following procedure shall be adopted for collecting dust samples: Drill into concrete to a depth of 5mm. Blow out the duct from the hole using compressed air and also surface around and discard this surface sample, collect duct samples from the following depths as specified below:

   5mm – 25mm, 25mm – 50mm, 50mm – 75mm, 75mm – 100mm.

   Blow out the hole between each successive depth of sampling. Encourage the drilling duct to the surface by withdrawing the drill frequently. Collect the duct by brushing onto a piece of paper and funnel into sample bags, 10g minimum is required from

each sample. The sample bags shall be clearly labelled with location, depth and structure or origin. The numbering sequence is to be agreed with the Overseeing Organisation Representative on site.

Drill holes shall be cleaned by blowing out with compressed air and reinstatement of holes shall be carried out with an approved proprietary polymer modified low shrinkage cementitious repair material.

1707AR CHLORIDE CONTENT TESTING

1. Chloride content shall be determined from dust samples of concrete as stated in clause 1796AR.

2. Chloride content shall be determined in accordance with the method described in BS 1881 : Part 124 : 1988.

3. The results of chloride content testing shall be reported in terms of total percentage chloride content by weight of cement.

1708AR CARBONATION TESTING

Carbonation depth shall be assessed using a solution of phenolphthalein indicator that appears purple in contact with alkaline concrete with pH values in excess of 9 and colourless at lower levels of pH in accordance with BS EN 14630, Determination of carbonation depth in hardened concrete by the phenolphthalein method.

1709AR CEMENT CONTENT TESTING

Cement content is to be determined by soluble and calcium oxide methods in accordance with BS1881:124:1988.

1712AR RESULTS AND REPORTING

1. For each bridge tested, one copy of a factual report and one electronic copy (pdf version) of the same shall be supplied to the Overseeing Organisation within three weeks of the completion of site testing.

2. The factual report shall contain the following information:

   (i) The locations of all on site testing.
   (ii) A description of the site and laboratory works carried out with a reference to the Standards used where appropriate.
   (iii) A description of the visual condition of the beams
   (iv) All results of the testing carried out in an agreed format.
   (v) Drawings of visual/delamination surveys.
   (vi) Photographs (using flood light where appropriate) of the bridge showing a general view of the site, all concrete spalls and delaminated areas and the concrete surfaces on which testing will be carried out.

   Digital photo shall be taken of each test area after all testing has been carried out and a 150mm by 100mm size print of each test area shall be included in the report.

   All test areas and spalled/delaminated areas shall be referenced with a legible chalk mark or similar when viewed on the photograph.

APPENDIX 0/2

CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES, TABLES AND FIGURES INCLUDED IN THE CONTRACT

PART A: VOLUME 1 SPECIFICATION

Clause No.	Alterations to be made
None	

PART B: VOLUME 2 NOTES FOR GUIDANCE ON THE SPECIFICATION FOR HIGHWAY WORKS

Clause No.	Alterations to be made
None	

APPENDIX 0/3 : LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT

This list is a complete list of the Numbered Appendices referred to in the Specification for Highway Works with those not adopted marked 'Not Used'.

List `A'

Volume No.	Completed by	Appendix No.	Title
			INTRODUCTION
Volume 1		**0/1**	**Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures Included in the Contract.**
	Not Used	0/2	Contract-specific Minor Alterations to Existing Clauses, Tables and Figures Included in the Contract.
Volume 1		**0/3**	**List of Numbered Appendices Referred to in the Specification and Included in the Contract.**
Volume 1		**0/4**	**List of Drawings Included in the Contract.**
	Not Used	0/5	Special National Alterations of the Overseeing Department of Scotland/Wales/Northern Ireland.
			PRELIMINARIES
Volume 1	*Not Used*	1/1	Temporary Accommodation and Equipment for the Overseeing Organisation.
	Not Used	1/2	Vehicles for the Overseeing Organisation.
	Not Used	1/3	Communication System for the Overseeing Organisation.
Volume 1	*Not Used*	**1/4**	Working and Fabrication Drawings.
		1/5	**Testing to be Carried out by the Contractor.**
	Not Used	1/6	Supply and Delivery of Samples to the Overseeing Organisation.
Volume 1	*Not Used*	**1/7**	Site Extent and Limitations on Use.
	Not Used	1/8	Operatives for the Overseeing Organisation.
Volume 1	*Not Used*	**1/9**	Control of Noise and Vibration.
	Not Used	1/10	Structures to be Designed by the Contractor.
	Not Used	1/11	Structural Elements and Other Features to be Designed by the Contractor
	Not Used	1/12	Setting Out and Existing Ground Levels.

Volume 1	*Not Used*	1/13	Programme of Works.
	Not Used	1/14	Payment Applications.
	Not Used	1/15	Accommodation Works.
	Not Used	1/16	Privately and Publicly owned Services & Supplies.
Volume 1	*Not Used*	1/17	Traffic Safety & Management.
	Not Used	1/18	Temporary Diversions for Traffic.
	Not Used	1/19	Routing of Vehicles.
	Not Used	1/20	Recovery Vehicles for Breakdowns.
	Not Used	1/21	Information Boards.
	Not Used	1/22	Progress Photographs.
Volume 1	*Not Used*	1/23	Risks to Health and Safety from Materials or Substances
	Not Used	1/24	Quality Management System.
			SITE CLEARANCE
	Not Used	2/1	List of Buildings, etc. to be Demolished.
	Not Used	2/2	Filling of Trenches & Pipes.
	Not Used	2/3	Retention of Material Arising from Site Clearance.
	Not Used	2/4	Explosives & Blasting.
Volume 1	*Not Used*	2/5	Hazardous Materials.

APPENDIX 0/3 : LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT (Continued)

List `A' (continued) :

Volume No.	Completed by	Appendix No.	Title
			FENCING AND ENVIRONMENTAL BARRIERS
	Not Used	3/1	Fencing, Gates and Stiles.
			SAFETY FENCES, SAFETY BARRIERS AND PEDESTRIAN GUARDRAILS
	Not Used	4/1	Safety Fences and Safety Barriers.
	Not Used	4/2	Pedestrian Guardrails.
			DRAINAGE AND SERVICE DUCTS
	Not Used	5/1	Drainage Requirements.
	Not Used	5/2	Service Duct Requirements.
	Not Used	5/3	Surface Water Channels and Drainage Channel Blocks.
	Not Used	5/4	Fin Drains and Narrow Filter Drains.
	Not Used	5/5	Combined Drainage and Kerb Systems.
	Not Used	5/6	Linear Drainage Channel Systems.
	Not Used	5/7	Thermoplastics Structural Wall Pipes and Fittings.
			EARTHWORKS
	Not Used	6/1	Requirements for Acceptability & Testing etc of Earthworks Materials.
	Not Used	6/2	Requirements for Dealing with Class U2 Unacceptable Material.
	Not Used	6/3	Requirements for Excavation, Deposition, Compaction (other than Dynamic Compaction).
	Not Used	6/4	Requirements for Class 3 Material.
	Not Used	6/5	Geotextiles Used to Separate Earthworks Materials.
	Not Used	6/6	Fill to Structures & Fill Above Structural Foundations
	Not Used	6/7	Sub-formation & Capping & Preparation & Surface Treatment of Formation
	Not Used	6/8	Top soiling, Grass Seeding and Turfing.
	Not Used	6/9	Earthworks Environmental Bunds, Landscape Areas, Strengthened Embankments.

	Not Used	6/10	Ground Anchorages, Crib Walling & Gabions.
	Not Used	6/11	Swallow Holes & Other Naturally Occurring Cavities & Disused Mine Workings.
	Not Used	6/12	Instrumentation & Monitoring.
	Not Used	6/13	Ground Improvement.
			ROAD PAVEMENTS - GENERAL
	Not Used	7/1	Permitted Pavement Options Sheets 1, 2 & 3.
	Not Used	7/2	Excavation & Reinstatement of Existing Surfaces.
	Not Used	7/3	Surface Dressing Sheets 1 & 2.
	Not Used	7/4	Bond Coats, Tack Coats and Other Bituminous Sprays.
	Not Used	7/5	In-Situ Recycling: The Remix and Repave Processes.
	Not Used	7/6	Breaking Up or Perforation of Existing Pavement.
	Not Used	7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1, 2 & 3).
	Not Used	7/8	Not used
	Not Used	7/9	Cold-Milling (Planing) of Bituminous Bound Flexible Pavement
	Not Used	7/10	Worksheet Pro-Forma for Results of Testing for Constituent Materials in Recycled Coarse Aggregate and Recycled Concrete
	Not Used	7/11	Overbanding and Inlaid Crack Sealing Systems
	Not Used	7/12	Arrester Beds
		7/13	Saw-Cut and Seal Bituminous Overlays on Existing Concrete Pavements
	Not Used	7/14	Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cutting and Seal of Bituminous Overlay
	Not Used	7/15	Saw-Cut and Seat Existing Jointed Concrete Pavements
	Not Used	7/16	Cracking and Seating of Existing Jointed Unreinforced Concrete Pavements and CBM Bases
	Not Used	7/17	Cracking Plant and Equipment Progress Report
	Not Used	7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
	Not Used	7/19	Site Specific Details and Requirements for Recycled Cement Bound Material
	Not Used	7/20	Site Specific Details and Requirements for Inducing Cracks
	Not Used	7/21	Surface Dressing – Recipe Specification (Sheets 1 & 2)
	Not Used	7/22	Repair to Potholes
			ROAD PAVEMENTS – CONCRETE AND CEMENT BOUND MATERIALS
	Not Used	10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface.
			KERBS, FOOTWAYS AND PAVED AREAS
	Not Used	11/1	Kerbs, Footways & Paved Areas.
	Not Used	11/2	Access Steps.
			TRAFFIC SIGNS
Volume 1	*Not Used*	12/1	Traffic Signs: General.
	Not Used	12/2	Traffic Signs: Marker Posts.
	Not Used	12/3	Traffic Signs: Road Markings & Studs.
Volume 1	*Not Used*	12/4	Traffic Signs: Cones, Cylinders, FTD's & Other Traffic Delineators.
	Not Used	12/5	Traffic Signs: Traffic Signals.
	Not Used	12/6	Traffic Signs: Special Sign Requirements on Gantries.
			ROAD LIGHTING COLUMNS AND BRACKETS
	Not Used	13/1	Information to be Provided When Specifying Lighting Columns & Brackets.
	Not Used	13/2	Column & Bracket Data Sheets 1 & 2.
	Not Used	13/3	Instructions for Completion of Column & Bracket Data Sheet.
	Not Used	13/4	Information to be Provided When Specifying CCTV Masts
	Not Used	13/5	Typical CCTV Mast Data Sheet

	Not Used	13/6	Instructions for Completion of CCTV Mast Data Sheet.
			ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS
	Not Used	14/1	Site Records.
	Not Used	14/2	Location of Lighting Units & Feeder Pillars.
	Not Used	14/3	Temporary Lighting.
	Not Used	14/4	Electrical Equipment for Road Lighting.
	Not Used	14/5	Electrical Equipment for Traffic Signs.
			MOTORWAY COMMUNICATIONS
	Not Used	15/1	Motorway Communications.
	Not Used	15/2	Cable Duct Requirements.
			PILING AND EMBEDDED RETAINING WALLS
	Not Used	16/1	General Requirements for Piling and Embedded Retaining Walls. Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced.
	Not Used	16/2	Concrete Segmental Piles.
	Not Used	16/3	Bored Cast-in Place Piles.
	Not Used	16/4	Bored Piles Constructed using Continuous Flight Augers and Concrete or Grout Injection through Hollow Auger Stems.
	Not Used	16/5	Driven Cast-in-Place Piles.
	Not Used	16/6	Steel Bearing Piles.
	Not Used	16/7	Reduction of Friction on Piles.
	Not Used	16/8	Non-Destructive Methods for Testing Piles
	Not Used	16/9	Static Load Testing of Piles.
	Not Used	16/10	Diaphragm Walls.
	Not Used	16/11	Hard/Hard Secant Pile Walls.
	Not Used	16/12	Hard/Soft Secant Pile Walls.
	Not Used	16/13	Contiguous Bored Pile Walls.
	Not Used	16/14	King Post Walls.
	Not Used	16/15	Steel Sheet Piles.
	Not Used	16/16	Integrity Testing of Wall Elements..
	Not Used	16/17	Instrumentation for Piles and Embedded Walls
	Not Used	16/18	Support Fluid
			STRUCTURAL CONCRETE
	Not Used	17/1	Concrete – Classification of Mixes.
	Not Used	17/2	Concrete – Impregnation Schedule.
	Not Used	17/3	Concrete – Surface Finishes.
	Not Used	17/4	Concrete – General
	Not Used	17/5	Buried Concrete
	Not Used	17/6	Grouting and Duct Systems for Post-Tensioned Tendons
			STRUCTURAL STEELWORK
	Not Used	18/1	Requirements for Structural Steelwork.
			PROTECTION OF STEELWORK AGAINST CORROSION
	Not Used	19/1	Form HA/P1 (New Works) Paint System Sheet
	Not Used	19/2	Requirements for Other Works
	Not Used	19/3	Form HA/P2 Paint Data Sheet
	Not Used	19/4	Form HA/P3 Paint Sample Despatch List, sheets 1 & 2
	Not Used	19/5	General Requirements
			WATERPROOFING FOR STRUCTURES
Volume 1	*Not Used*	20/1	Waterproofing for Concrete Structures.
			BRIDGE BEARINGS
	Not Used	21/1	Bridge Bearing Schedule.

		PARAPETS
Not Used	22/1	Parapet Schedule.
		BRIDGE EXPANSION JOINTS AND SEALING OF GAPS
Not Used	23/1	Bridge Deck Expansion Joint Schedule.
Not Used	23/2	Sealing of Gaps Schedule.
		BRICKWORK, BLOCKWORK AND STONEWORK
Not Used	24/1	Brickwork, Blockwork and Stonework.
		SPECIAL STRUCTURES
Not Used	25/1	Requirements for Corrugated Steel Buried Structures.
Not Used	25/2	Requirements for Reinforced Soil and Anchored Earth Structures.
Not Used	25/3	Requirements for Pocket Type Reinforced Brickwork Retaining Wall Structures.
Not Used	25/4	Environmental Barriers
Not Used	25/5	Requirements for Buried Rigid Pipes for Drainage Structures
		MISCELLANEOUS
Not Used	26/1	Ancillary Concrete.
Not Used	26/2	Bedding Mortar.
Not Used	26/3	Cored Thermoplastic Node Markers.
		LANDSCAPE AND ECOLOGY
Not Used	30/1	General, sheets 1, 2 & 3
Not Used	30/2	Weed Control
Not Used	30/3	Control of Rabbits and Deer
Not Used	30/4	Ground Preparation
Not Used	30/5	Grass Seeding, Wildflower Seeding and Turfing
Not Used	30/6	Planting, sheets 1 & 2
Not Used	30/7	Grass, Bulbs and Wildflower Maintenance
Not Used	30/8	Watering
Not Used	30/9	Establishment Maintenance for Planting
Not Used	30/10	Maintenance of Established Trees and Shrubs
Not Used	30/11	Management of Waterbodies
Not Used	30/12	Special Ecological Measures

List 'B'

Volume A	Completed By	Appendix No.	Title