SCOTTISH MINISTERS' REQUIREMENTS

SCHEDULE 9 PART 2

SPECIFICATION FOR OPERATIONS (2)

CONTENTS **Page No.**

SCOTTISH MINISTERS' REQUIREMENTS

SCHEDULE 9 PART 2

SPECIFICATION FOR OPERATIONS (2)

NUMBERED APPENDICES

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

Appendix 0/3 is comprised of two lists, A and B, of Numbered Appendices as follows:

List A is a complete list of Numbered Appendices referred to in the Specification for Highway Works with those not adopted marked 'NOT USED'. List B is a list of Contract-specific numbered Appendices devised for this Contract.

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
			<u>INTRODUCTION</u>
N/A (See Sch9P1)		0/1	Contract-Specific Additional Substitute and Cancelled Clauses and Tables included in this Contract
N/A (See Sch9P1)		0/2	Contract-specific Minor Alterations to Existing Clauses and Tables included in this Contract
1		0/3	List of Numbered Appendices Referred to in the Specification and included in this Contract
9		0/4	List of drawings included in this Contract
14		0/5	Special National Alterations of the Overseeing Department of Scotland Wales or Northern Ireland
			<u>PRELIMINARIES</u>
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
NOT USED		1/4	Working and Fabrication Drawings
15		1/5	Testing to be carried out by the Operating Company
NOT USED		1/6	Supply and delivery of Samples to the Overseeing Organisation
NOT USED		1/7	Site Extent and Limitations on Use
NOT USED		1/8	Operatives for the Overseeing Organisation

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
17		1/9	Control of Noise and Vibration
NOT USED		1/10	Structures to be Designed by the Operating Company
NOT USED		1/11	Structural Elements and Other Features to be Designed by the Operating Company
NOT USED		1/12	Setting Out and Existing Ground Levels
NOT USED		1/13	Programme of Works
NOT USED		1/14	Payment Applications
NOT USED		1/15	Accommodation Works
18		1/16	Privately and Publicly Owned Services or Supplies
19		1/17	Traffic Safety and Management
27		1/17A	Mobile Lane Closure Risk Assessment Checklist
32		1/17B	Temporary Traffic Regulatory Orders
NOT USED		1/18	Temporary Diversions for Traffic
NOT USED		1/19	Routeing of Vehicles
41		1/20	Recovery Vehicles for Breakdown
NOT USED		1/21	Information Boards
NOT USED		1/22	Progress Photographs
NOT USED		1/23	Risks to Health and Safety from Materials or Substances
NOT USED		1/24	Quality Management System
NOT USED		1/25	Temporary Closed Circuit Television (CCTV) System for the Monitoring of traffic
NOT USED		1/26	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Roadworks (TASCAR)
NOT USED		1/27	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Roadworks (TASCAR) – Particular Requirements
			SITE CLEARANCE
NOT USED		2/1	List of Buildings etc to be Demolished or Partially Demolished
NOT USED		2/2	Filling of Trenches and Pipes
51		2/3	Retention of Material Arising from Site Clearance
NOT USED		2/4	Explosives and Blasting
NOT USED		2/5	Hazardous Materials
			FENCING
52		3/1	Fences Gates and Stiles

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
			ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)
54		4/1	Road Restraint Systems (Vehicle and Pedestrian)
57		4/2	Information Required to Demonstrate Compliance of Road Restraint Systems to BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4: 2002
			DRAINAGE AND SERVICE DUCTS
63		5/1	Drainage Requirements
68		5/2	Service Duct Requirements
69		5/3	Surface Water Channels and Drainage Channel Blocks
70		5/4	Fin Drains and Narrow Filter Drains
71		5/5	Combined Drainage and Kerb Systems
NOT USED		5/6	Linear Drainage Channel Systems
72		5/7	Thermoplastics Structural Wall Pipes and Fittings
			EARTHWORKS
74		6/1	Requirements for Acceptability and Testing etc of Earthworks Materials
83		6/2	Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials
84		6/3	Requirements for Excavation Deposition Compaction (Other than Dynamic Compaction)
NOT USED		6/4	Requirements for Class 3 Material
85		6/5	Geotextiles Used to Separate Earthworks Materials
NOT USED		6/6	Fill to Structures and Fill Above Structural Foundations
`NOT USED		6/7	Sub-formation and Capping and Preparation and Surface Treatment of Formation
86		6/8	Topsoiling
NOT USED		6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
87		6/10	Ground Anchorages, Crib Walling and Gabions
NOT USED		6/11	Swallow Holes and Other Naturally Occurring Cavities and Disused Mine Workings
NOT USED		6/12	Instrumentation and Monitoring
NOT USED		6/13	Ground Improvement

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
88		6/14	Limiting Values for Pollution of Controlled Waters
89		6/15	Limiting Values for Harm to Human Health and the Environment
			ROAD PAVEMENTS – GENERAL
90		7/1TS	Flexible Pavement Options (Schedules 1, 2, 3, 4 and 5)
100		7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
101		7/3	Surface Dressing – Performance Specification (Sheets 1, 2 and 3)
106		7/4	Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)
NOT USED		7/5	In Situ Recycling: The Remix and Repave Process
109		7/6	Breaking Up or Perforation of Existing Pavement
110		7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1, 2 and 3)
NOT USED		7/8	Not Used
115		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 Aggregate and Recycled Concrete Aggregate
NOT USED		7/11	Overband and Inlaid Crack Sealing Systems
116		7/12	Arrester Beds
117		7/13	Saw-Cut and Seal Bituminous Overlays on Existing Jointed Concrete Pavements
118		7/14	Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cut and Seal of the Bituminous Overlay
NOT USED		7/15	Saw-Cut, Crack and Seat Existing Jointed Reinforced 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 Record
119		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

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
NOT USED		7/20	Site Specific Details and Requirements for Inducing Cracks
NOT USED		7/21	Surface Dressing – Recipe Specification (Sheets 1, 2, and Binder Data Sheet)
120		7/22	Repairs 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
123		11/1	Kerbs Footways and Paved Areas
139		11/2	Access Steps
			TRAFFIC SIGNS
140		12/1	Traffic Signs: General
143		12/2	Traffic Signs: Marker Posts
145		12/3	Traffic Signs: Road Markings and Studs
NOT USED		12/4	Traffic Signs: Cones, Cylinders, FTDs, and Other Traffic Delineators
146		12/5	Traffic Signs: Traffic Signals
NOT USED		12/6	Traffic Signs: Special Sign Requirements on Gantries
			ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS
NOT USED		13/1	Information to be Provided when Specifying Lighting Columns and Brackets
147		13/2	(Specification for Highway Works) Typical Lighting Column and Bracket Data Sheets 1 and 2
151		13/3	Instructions for Completion of Lighting Column and Bracket Data Sheets
NOT USED		13/4	Information to be Provided When Specifying CCTV Masts
NOT USED		13/5	(Specification for Highway Works) Typical CCTV Mast Data Sheet
NOT USED		13/6	Instructions for Completion of CCTV Mast Sheets
NOT USED		13/7	Information to be Provided When Specifying Cantilever Masts
NOT USED		13/8	(Specification for Highway Works) Typical Cantilever Masts Data Sheets 1 and 2
NOT USED		13/9	Instructions for Completion of Cantilever Masts Data Sheets
			ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS
NOT USED		14/1	Site Records

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
NOT USED		14/2	Location of Lighting Units and 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
NOT USED		16/2	Precast Reinforced and Prestressed Concrete Piles and Precast Reinforced 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
153		17/1	Schedule for the Specification of Designed Concrete
157		17/2	Concrete – Impregnation Schedule
158		17/3	Concrete – Surface Finishes
159		17/4	Concrete – General
161		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

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
			PROTECTION OF STEELWORK AGAINST CORROSION
166		19/1	(Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet
NOT USED		19/2	Requirements for Other Work
168		19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
170		19/4SE	(Specification for Highway Works) Form SEDD/P3 Paint Sample Despatch List: Sheets 1 and 2
NOT USED		19/5	General Requirements
			WATERPROOFING FOR CONCRETE STRUCTURES
173		20/1	Waterproofing for Concrete Structures
			BRIDGE BEARINGS
NOT USED		21/1	Bridge Bearing Schedule
			BRIDGE EXPANSION JOINTS AND SEALING OF GAPS
NOT USED		23/1	Bridge Deck Expansion Joints Schedule
NOT USED		23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints)
			BRICKWORK
174		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 and Grouted – Cavity Reinforced Brickwork Retaining Wall Structures
NOT USED		25/4	Environmental Barriers
NOT USED		25/5	Requirements for Buried Rigid Pipes for Drainage Structures
			MISCELLANEOUS
176		26/1	Ancillary Concrete
NOT USED		26/2	Bedding Mortar
NOT USED		26/3	Cored Thermoplastic Node Markers
			LANDSCAPE AND ECOLOGY
177		30/1	General, sheets 1, 2 and 3
181		30/2	Weed Control
183		30/3	Control of Rabbits and Deer
184		30/4	Ground Preparation
185		30/5	Grass Seeding, Wildflower Seeding and Turfing
190		30/6	Planting

List 'A': List of Numbered Appendices Referred to in the *Specification for Highway Works*			
Page No	**To Be Completed By The Operating Company***	**Appendix No**	**Title**
200		30/7	Grass, Bulbs and Wildflower Maintenance
202		30/8	Watering
203		30/9	Establishment Maintenance for Planting
205		30/10	Maintenance of Established Trees and Shrubs
208		30/11	Management of Waterbodies
209		30/12	Special Ecological Measures
			MAINTENANCE PAINTING OF STEELWORK
224		50/1	(Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet
NOT USED		50/2	Requirements for Other Work
227		50/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
229		50/4SE	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
232		50/5	General Requirements

* For individual Operations Instructions the Operating Company shall compile the appropriate numbered Appendices giving specific information appropriate to the Instruction in accordance with the other provisions of this Contract.

List 'B': List of Contract-Specific Numbered Appendices devised for this Contract		
Page No.	**Appendix No.**	**Appendix Title**
		PRELIMINARIES
46	1/75	Operating Company Vehicle Liveries
48	1/76	Incident Support Unit and Trunk Road Incident Support Service Operatives' Uniforms
49	1/77	Specification for TRISS Vehicle Mobile CCTV System
50	1/78	Specification for Vehicle Mounted Variable Message Signs
		STRUCTURAL CONCRETE
162	17/70	Schedule for the Specification of an Alternative Designed Concrete.
		STRUCTURAL STEELWORK
164	18/70	Weld Repairs on Orthotropic Steel Decks
		INCIDENT RESPONSE OPERATIONS
210	32/1	Incident Response
		SITE INVESTIGATION
216	33/1	Structural Investigations Test Requirements
		PROFESSIONAL SERVICES
233	62/1	Requirements for Professional Services

APPENDIX 0/4 – LIST OF DRAWINGS INCLUDED IN THIS CONTRACT

1 CONTRACT-SPECIFIC DRAWINGS SUPPLIED TO EACH TENDERER

1.1 None.

2. STANDARD DRAWINGS

2.1 Supplied to Each Tenderer

2.1.1 Standard Drawings for this Contract listed below are contained in Schedule 9 Part 3.

Drawing No.	Title
400/15/001	Pedestrian Guard Rail Type G1
500/01/337-379	Drainage and Service Ducts – Duct Groups D1 - D4
500/05/160-166	Drainage and Service Ducts – Drawpits DP1- DP2
500/05/169-178	Drainage and Service Ducts – Gully Types G1- G4
500/06/001	Headwall Type 1 – Brickwork
500/06/010	Headwall Type 1 – Mass Concrete
500/06/019	Headwall Type 3 – Reinforced Concrete
500/16/001-012	Protection of Public Utility Apparatus and Drainage – Protection Type P1 – P4
1100/01/001-019	Kerb Types K1 to K4
1100/01/025-037	Kerb Types K5 to K7
1100/01/040	Kerb Types K8 and K9
1100/01/043	Kerb Types K10 and K11
1100/01/046	Kerb Types K12 and K13
1100/01/052	Kerb Types K16 and K17
1100/01/061-082	Kerb Types K20 to K24
1100/01/085-115	Channel Types C1-C6
1100/01/118	Edging Type E1
1100/01/136-139	Kerb Type Quadrants Q1 and Q2
1100/02/124-127	Combined Kerb and Drainage System Types DK1 and DK2
1100/02/130	Combined Kerb and Drainage System Types DK3
1100/02/133	Combined Kerb and Drainage System Outfall Types DK4
1100/05/001-010	Footways, Footpaths, Paved Areas and Cycleways Types F1 to F4
1100/05/013-016	Footways, Footpaths, Paved Areas and Cycleways Types F5 and F6
1100/05/019-028	Footways, Footpaths, Paved Areas and Cycleways Types F7 to F10
1100/05/031-040	Footways, Footpaths, Paved Areas and Cycleways Types F11 to F14
1100/05/043-052	Footways, Footpaths, Paved Areas and Cycleways Types F15 to F18

Drawing No.	Title
1100/05/055-064	Footways, Footpaths, Paved Areas and Cycleways Types F19 to F22
1100/05/067-073	Footways, Footpaths, Paved Areas and Cycleways Types F23 to F25
1100/05/085 & 088	Recessed Gullies GS1 and GS2 with Kerb Surround
1200/07/001	Precast Concrete Bollard Type B1
1200/08/001	Verge hazard marker posts Type VM1
1200/08/002	Verge hazard marker posts Type VM2A and VM2B
1200/09/001	Edge of Carriageway Hazard Markers Type ECB1
1200/10/1	Details for Sign Post Foundation Sheet 1 of 2
1200/10/2	Details for Sign Post Foundation Sheet 2 of 2
MCX 0138 (Modified)	Typical Access Steps

2.2 **Inspected by Tenderer**

2.2.1 None.

2.3 **Brought into this Contract by Reference**

Highway Construction Details published by the Stationary Office (formerly HMSO) as Volume 3 of the Manual of Contract Documents for Highway Works contains the following drawings brought into this Contract by reference. Unless otherwise stated below the whole drawing is brought into this Contract.

Drawing No.	Title	Date	Aspect/Alternative(s) required if whole Drawing is not included in Contract
F1	Surface Water Drains – Trench and Bedding Details	Dec 91	
F2	Filter Drains – Trench and Bedding Details	Nov 03	
F3	Type 1 Chamber (Brick or In Situ Concrete Manhole)	May 06	
F4	Type 2 Chamber (Precast Concrete Manhole)	May 06	
F5	Type 3 Chamber (Precast Concrete Manhole)	May 06	
F6	Type 4 Chamber (Precast Concrete Manhole)	May 06	
F7	Type 5 Chamber (Precast Concrete Manhole)	May 06	
F9	Type 5 Chamber Grating Details	May 01	
F10	Chamber Fittings – Ladder, Handhold and Safety Chain	Nov 03	
F11	Type 7 Chamber (1050 Catchpit)	May 06	
F12	Type 8 Chamber (600 Catchpit)	May 06	

Drawing No.	Title	Date	Aspect/Alternative(s) required if whole Drawing is not included in Contract
F13	Precast and In Situ Cast Gullies	May 06	
F14	Sumpless Gully Chamber and Alternative Rising Section	May 06	
F15	Drainage Channel Blocks Types A, B and C	Nov 04	
F16	Drainage Channel Blocks Types D, E and F	Nov 04	
F17	Detail of Keyways and Keys for Manhole Tops and Kerb Type Gully Tops	Mar 98	
F18	Edge of Pavement Drains – Fin Drains and Narrow Filter Drains	Dec 91	
F19	Edge of Pavement Drains – Installation of Fin Drains	Dec 91	
F20	Edge of Pavement Drains – Installation of Narrow Filter Drains	Dec 91	
F25	Type 9 Chamber (Brick or In Situ Concrete Shallow Inspection Chamber)	May 06	
F26	Type 10 Chamber (Brick or In Situ Concrete Shallow Inspection Chamber)	May 06	
F27	Type 9 Chamber (Precast Concrete Deep Inspection Chamber)	May 06	
F28	Chamber Fittings – Guardrail	Nov 03	
H1	Temporary Fences Types 1 and 2	May 04	
H2	Temporary Fences Types 3 and 4	May 04	
H3	Motorway and Accommodation Works Timber Post and 4 (or 5) Rail Fences	May 04	
H4	Motorway and Accommodation Works High Tensile Strained Wire Deer Fences 135	May 04	
H5	Motorway and Accommodation Works High Tensile Strained Wire Deer Fences 180	May 04	
H6	Motorway and Accommodation Works High Tensile Strained Wire Deer Fences 210	May 04	
H7	Turning Posts Strained Wire Fences	Dec 91	
H8	General Details Strained Wire Fences Sheet 1	May 01	
H9	General Details Strained Wire Fences Sheet 2	Dec 91	

Drawing No.	Title	Date	Aspect/Alternative(s) required if whole Drawing is not included in Contract
H10	General Details Strained Wire Fences Sheet 3	Dec 91	
H11	Accommodation Works Chain link Fences	May 04	
H12	Accommodation Works Rectangular Wire Mesh and Hexagonal Wire Netting Fences	Aug 93	
H13	Accommodation Works Strained Wire Fences (General Pattern)	May 04	
H14	Accommodation Works Timber Palisade and Close Boarded Fences	May 04	
H15	Accommodation Works Wooden Post and 3 Rail Fences	May 04	
H16	Accommodation Works Woven and Lap Boarded Panel Fences	May 04	
H17	Steel Single Field Gate	May 04	
H18	Steel Half Mesh Single Field Gate	May 04	
H19	Steel Extra Wide Single Field Gate	May 04	
H20	Steel Double Field Gate	May 04	
H21	Timber Single Field Gate	May 04	
H22	Timber Double Field Gate	May 04	
H23	Timber Wicket Gate Type 1	May 04	
H24	Timber Wicket Gate Type 2	May 04	
H25	Timber Kissing Gate	May 04	
H26	Hinges for Steel Field Gates	May 01	
H27	'D' Latch for Steel Single Field Gates	Dec 91	
H28	Sliding Bolt Latch Type B for Steel Single Field Gates	Dec 91	
H29	Tubular Steel Latch for Steel Double Field Gate	Dec 91	
H30	Hinges for Timber Field Gates	Dec 91	
H31	Spring Catch for Single Timber Field Gates	Dec 91	
H32	Latch and Drop Bolt for Timber Double Field Gate	Dec 91	
H33	Standard Gate Stops	Dec 91	
H34	Timber Stile Type 1	May 04	
H35	Timber Stile Type 2	May 04	
H36	Diagrammatic Methods of Attaching Fencing to Structures	Nov 06	
H37	Rules for the Selection of Non Structural Timber for Use in Environmental Barriers – Sheet 1	Dec 91	

Drawing No.	Title	Date	Aspect/Alternative(s) required if whole Drawing is not included in Contract
H38	Rules for the Selection of Non Structural Timber for Use in Environmental Barriers – Sheet 2	Mar 98	
H39	Planting Works Fencing Rabbit and Deer Fencing Types 1 and 2	May 01	
H40	Planting Works Fencing Rabbit and Deer Fencing Types 3, 4 and 5	May 01	
H41	Planting Works Fencing Gate	May 01	
H42	Planting Works Fencing Stile Types 3, 4 and 5	May 01	
H43	Planting Works Fencing Fenced Tree Guards Types 1, 2 and 3	May 01	
H44	Planting Works Fencing Urban Area Fencing	May 01	
H45	Badger Gate	May 01	
H46	Attachment of Wire Mesh to Fencing (Sheet 1 of 3)	May 01	
H47	Attachment of Wire Mesh to Fencing (Sheet 2 of 3)	May 01	
H48	Attachment of Wire Mesh to Fencing (Sheet 3 of 3)	May 01	
K4	Typical Trench Reinstatement Details for Bituminous and Concrete Pavements	May 04	Bituminous aspect only
K5	Planting Details for Planting Large Trees	May 01	

APPENDIX 0/5 – SPECIAL NATIONAL ALTERATIONS OF THE OVERSEEING DEPARTMENT OF SCOTLAND

Page No.	Appendix No.	Appendix Title
		ROAD PAVEMENTS – GENERAL
Page No	7/1TS	Flexible Pavement Options (Schedules 1, 2, 3, 4 and 5)
		PROTECTION OF STEELWORK AGAINST CORROSION
Page No	19/4SE	(Specification for Highway Works) Form SEDD/P3 Paint Sample Despatch List: Sheets 1 and 2
		MAINTENANCE PAINTING OF STEELWORK
Page No	50/4SE	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2

APPENDIX 1/5 – TESTING TO BE CARRIED OUT BY THE OPERATING COMPANY

1 The Operating Company shall carry out sampling and testing as required in this Contract.

The Operating Company shall include sampling and testing as described in Notes for Guidance for the *Specification for Highway Works* Table NG 1.1 for the Operations in its Management System including the Quality Plan as an Inspection and Test Plan, which shall include similar sampling and testing for products not included in Table NG 1.1 but proposed by the Operating Company.

Once the Overseeing Organisation has given its written consent to the Inspection and Test Plan the Operating Company shall adhere to this plan for all Operations unless a revised plan is subsequently consented to by the Overseeing Organisation. The Inspection and Test Plan shall also include the Operating Company's sampling and testing frequencies for Operations, to ensure that the frequency and type of testing across the Unit shall be compatible with this Specification and shall be acceptable to the Overseeing Organisation.

Operations falling below the minimum testing frequency shall be tested at a frequency consented to by the Overseeing Organisation which may include the aggregating of quantities of materials at individual Sites. The Operating Company shall produce supplements to the Inspection and Test Plan consented to by the Overseeing Organisation to cover such Operations.

APPENDIX 1/9 – CONTROL OF NOISE AND VIBRATION

1 The Operating Company shall comply with the following requirements:

(i) All Plant used for constructional and operations shall be the quietest of its type practical for carrying out the work required and shall be maintained in good condition to minimise noise output.

(ii) All Constructional Plant shall be operated and maintained in accordance with the manufacturer's written recommendations including the use and maintenance of any specific noise reduction measures.

(iii) Best practicable means shall be employed including as a minimum the positioning of Constructional Plant and activities to minimise noise at sensitive locations, the use of mufflers on pneumatic tools, the use of non-reciprocating Constructional Plant and the use, where practical, of effective sound reducing enclosures to ensure all Constructional Plant used in connection with Works operates with the minimum of noise.

(iv) Mechanical plant with directional noise characteristics shall be positioned to minimise noise at adjacent receptors.

(v) Static machines shall be sited as far away as practicable from receptors.

(vi) In built-up areas where it is necessary to provide power for the running of traffic signals, pumps and other powered plant at any time outwith Normal Working Hours the source of such power shall be mains electricity.

2 During Normal Working Hours the equivalent continuous sound level (Leq) shall not exceed the following measured 1 metre outside the facades of any adjacent occupied buildings:

(i) 70 dB(A) 12 hour value of Leq,

(ii) 73 dB(A) six hour value of Leq (provided the six hours fall within the period 0800 to 1600 hours),

(iii) 76 dB(A) three hour value of Leq (provided the three hours fall within the period 0900 to 1300 hours), and

(iv) 85 dB(A) at any instant (slow response).

3 The limit of 12 hour value of Leq shall always be met so that when the higher levels occur the levels permitted throughout the remainder of the Normal Working Hours shall become progressively lower than the overall limit imposed.

4 The Operating Company shall arrange for leaflets to be delivered to residents within 200 metres of the proposed work, giving a full description of the proposed work, their duration, and of the sources, character and levels of noise expected to arise, including a named contact to respond to any noise or vibration concerns or nuisance.

5 In addition to the foregoing noisy activities shall be avoided at night (between 1 hour before dusk and 1 hour after dawn) during the post-breeding/ passage period for terns (between 15 August and 31 October). If it is unavoidable that noise limits will be breached between 15 August and 31 October, then Port Edgar and Long Craig Island

shall not be simultaneously impacted as one can be used as a refuge for roosting terns if the other is disturbed.

6 The Operating Company shall employ a ‘soft-start’ to all noisy activities. Each time the activity is started up after any period of inactivity, the noise levels will be gradually increased over a period of 30 minutes to allow birds (and other animals) to relocate. This shall apply year round. For the first seven days after the commencement of each noisy activity, the soft-start shall be applied each time the machinery is stopped, even if this is only for very short periods.

7 The Operating Company shall use best practicable means to maintain noise levels below 75 dBLAeq day and night: at: (i) Long Craig Island at all times of day and night during the tern breeding season (01 May until 15 August in any given year) and (ii) Long Craig Island and the Port Edgar tern roost site at night (between 1 hour before dusk and 1 hour after dawn) during the post-breeding/ passage period for terns (between 15 August and 31 October in any given year).

APPENDIX 1/16 – PRIVATELY AND PUBLICLY OWNED SERVICES OR SUPPLIES

1 Generally motorways do not contain any privately or publicly owned services or supplies other than:

(i) cabling for the Overseeing Organisations' communication systems,

(ii) cabling for road lighting and lit signs on the Unit,

(iii) overhead power lines crossing the motorways, and

(iv) a small number of major pipelines and cables which cross the motorways in ducts.

Subject to the other provisions of this Contract, Trunk Roads may contain in addition to all types of Undertakers' equipment and services, cabling for communications systems, variable message signs, automatic traffic counters, closed circuit television systems, road ice prediction sensors, road lighting systems, lit signs and other cabled equipment.

There may be overhead power and communication cables.

The Operating Company shall co-ordinate Operations with work required to be carried out by Undertakers or their contractors or other third parties.

The Operating Company shall maintain a register of apparatus installed following the grant of permission in writing pursuant to *Section 109* of the *New Roads and Street Works Act*, showing details of the location and nature of the apparatus, the persons to whom permission has been granted, and any conditions to which the granting of permission shall be subject.

The Operating Company shall update the register with any such apparatus and relevant associated information that it becomes aware of in the course of its Operations.

The Operating Company shall make arrangements with the Undertakers and others concerned for the phasing of any disconnections and diversion of private services affected by the Site activities.

APPENDIX 1/17 – TRAFFIC SAFETY AND MANAGEMENT

1 RESPONSIBILITY FOR TRAFFIC MANAGEMENT MEASURES

1.1 The Operating Company shall identify, provide, maintain and survey all traffic management measures necessary for its own Operations.

It shall examine proposals for and inspect installations of traffic management for activities by others on the Unit for compliance with relevant Legislation and the standards referred to in this Contract and shall immediately report any failings to the organisation concerned and notify the Overseeing Organisation in writing of significant failings.

Where practicable, a photographic record of any failings shall be maintained.

1.1.1 Such activities by others include as a minimum:

(i) major work for resurfacing, reconstruction and bridgework on any part of the Unit,

(ii) work for improvement work on any part of the Unit,

(iii) maintenance of Traffic Scotland Equipment and the Traffic Scotland Systems Contractor equipment,

(iv) installation, maintenance, removal, of emergency telephones and hazard warning signals, variable message signs for snow gates, matrix signals and variable message signs, automatic data collection systems and closed circuit television systems,

(v) technical surveys and minor specialist activities,

(vi) installation, maintenance, removal, of Undertakers' equipment and apparatus,

(vii) landscape maintenance for Works Contracts,

(viii) installation, maintenance, removal of Trafficmaster equipment or the equipment of any alternative or replacement company notified by the Director,

(ix) authorised work being undertaken on the Trunk Road by private developers, and

(x) galas and Special Events.

1.2 The Operating Company shall complete Mobile Lane Closure Risk Assessment Checklists as contained in Annex 1/17A. The checklists shall be held within the Central Office.

1.3 All vehicles engaged in Operations, Inspections or Works shall conform to *Traffic Signs Manual Chapter 8* Part 2 Section 5.

Vehicles shall have a sign board reading 'Motorway Maintenance' or 'Road Maintenance' (to Diagram 7404 of Schedule 12 Part V of *The Traffic Signs Regulations and General Directions 2002*) fixed at the rear.

The lettering shall be 150 mm 'x height' except that for light vans and cars it shall be the largest 'x height' that can be accommodated out of the followings heights 37.5, 50, 62.5 or 100 mm.

The lettering shall be black capital letters from the alphabet described in *The Traffic Signs Regulations and General Directions 2002* Schedule 13 Part II on a yellow non-reflectorised background in accordance with BS 381C colour No 355.

All vehicles engaged in Operations, Inspections or Works shall be provided with roof-mounted beacons as specified in *Traffic Signs Manual Chapter 8* Part 2 Section O5.3.

The roof-mounted beacons shall be switched on:

(i) when the vehicle or Constructional Plant is manoeuvring into or out of the Site of the Operations or operating at low speed on a carriageway or hardshoulder open to vehicles, and

(ii) when the vehicle or Constructional Plant is standing on a carriageway or hardshoulder open to vehicles.

1.4 All vehicles and Constructional Plant operating within any Site between sunset and sunrise and during periods of poor visibility and fog shall have mandatory lights illuminated and shall travel in the same direction of flow as the adjacent traffic.

Vehicles travelling within any Site against the adjacent traffic flow shall not have headlights on or be similarly illuminated and shall keep as far away as possible from the Lanes open to vehicles.

1.5 The Operating Company shall have clear method statements covering all relevant closure types used on the Unit.

The method statements confirmed in the Management System shall be in accordance with Sector Scheme 12 as referred to in Appendix A.

1.6 In addition to the requirements of Schedule 3 Part 7 the Operating Company shall notify and consult with all parties directly affected by any Operations, Works and or work carried out by others.

1.7 The Operating Company shall consult the appropriate roads authority regarding any diversion routes and shall comply with the reasonable requirements of the roads authority.

Should the roads authority stipulate any requirements for which the Operating Company considers that an Order is required to meet such requirements, or considers the requirements to be unreasonable, the Operating Company shall immediately refer such requirements to the Overseeing Organisation in writing. The Operating Company shall not undertake any Operations or Works in respect of the requirements unless required to do so by the Overseeing Organisation.

2 TRAFFIC SAFETY AND MANAGEMENT REQUIREMENTS

2.1 Layouts for traffic safety and management shall be in accordance with:

(i) the advice and plans contained in Chapter 8 of the *Traffic Signs Manual* published by *The Stationery Office*.

Where constraints of the Trunk Road network or other roads do not allow full compliance with Chapter 8, alternative proposals, fully supported with risk assessments, shall be submitted for written consent by the Overseeing Organisation,

(ii) Departmental Standards and Advice Notes as set out in the DMRB, and

(iii) codes of practice in the case of work carried out pursuant to the *New Roads and Street Works Act.*

2.2 When planning Operations, Works or co-ordinating with work by others all traffic safety and management shall comply with the Code of Practice *The Reduction of Traffic Delays at Roadwork's* published by the Scottish Office and the County Surveyor's Society in Scotland 1992.

2.3 When planning Operations, Works or co-ordinating with work by others the Operating Company shall ensure that when safe access to central reservations is available the area of the central reservations protected by traffic management, including carriageway channels, is restored to a clean and tidy condition with a minimum standard of Grade B as stated in the *Code of Practice on Litter and Refuse* before traffic management measures are removed.

2.4 Operations shall take account of local events and shall be planned and carried out in accordance with any standing local agreements.

2.5 Guidance on the permissions, planning and organisation of galas can be obtained from http://www.scotland.gov.uk/Publications/2005/07/14155315/53182. or its equivalent.

2.6 The Operating Company shall optimise all traffic management measures for Operations, Works and work carried out by others to minimise overall disruption to traffic.

2.7 The Operating Company shall liaise and co-operate with Traffic Scotland Operations and Infrastructure Service Contractor, local roads authorities and Emergency Services to ensure that traffic diverted from Trunk Roads on to the non-trunk road network and vice versa has the minimum impact on both networks and shall not adversely affect the performance of the Emergency Services.

2.8 Where others undertake work within the Unit the Operating Company shall ensure that the organisation responsible for carrying out such work erects information signs as defined in the *Traffic Signs Regulations and General Directions (2002)* sign reference 7008.

2.9 The Operating Company shall provide temporary mandatory speed restrictions at any Site involving a Type A closure as defined in Chapter 8 of the *Traffic Signs Manual* published by *The Stationery Office* subject to approval of the Overseeing Organisation and the relevant Temporary Traffic Order being in place.

The extent and temporary speed limit proposed by the Operating Company shall take cognisance of the existing speed limit, the surrounding environment (urban and rural) and the nature of the Operations.

2.10 The Operating Company shall employ methods of working within the Unit such that wherever practicable all obstructions can be removed from a carriageway and that traffic Lanes or hardshoulders can be re-opened to vehicles within 30 minutes of a requirement to have the traffic management removed.

2.11 Traffic management measures shall be monitored and modified by the Operating Company to ensure traffic delays are minimised.

When traffic signals are in use queue lengths shall be monitored to ensure that the phase settings result in equal queue lengths and shall be adjusted appropriately to accommodate varying flows.

2.12 The Operating Company shall make good any damage or disturbance to temporary signs or other traffic management measures within 30 minutes on motorways and dual carriageways and 2 hours on single carriageways of the Operating Company becoming aware of such damage or disturbance.

3 TEMPORARY TRAFFIC REGULATION ORDERS

3.1 Where the Operations or work by others require the promotion of Temporary Traffic Regulation Orders (TTROs) the Operating Company shall provide all such information as is identified in Annex 1/17B to this Appendix to the Overseeing Organisation.

Where such TTROs can be used by both the Operating Company and other bodies this shall form part of the traffic management arrangements.

Where an individual TTRO is required for the specific work or operations promoted by others these shall be subject to an Order.

3.2 A TTRO will be promoted by the Scottish Ministers to allow one carriageway of motorways or dual carriageways to be closed when a contra-flow is installed and the adjacent carriageway is used as the alternative route.

The closure of only one Lane including a hardshoulder will not require a TTRO provided that the remainder of the carriageway is still available for traffic.

3.3 Where a carriageway or slip road is to be closed, other than due to an Incident, and the diversion involves any road other than the adjacent carriageway then a TTRO is required.

Where the Operating Company requires a TTRO for such Operations, the Operating Company shall inform the Overseeing Organisation during the planning of the Site activities that a TTRO is required for the Operations being undertaken.

3.4 Where the Operating Company requires a TTRO to impose a speed limit for an Operation the Operating Company shall inform the Overseeing Organisation during the planning of the Site activities that a TTRO is required for the Operations being undertaken.

3.5 Where the Overseeing Organisation agrees with the Operating Company that a TTRO is so required, the Overseeing Organisation will arrange for the publication and making of suchyl TTROs.

The minimum notice required from receipt of all the information identified in sub-clause 3.6 to support the draft TTRO by the Overseeing Organisation to the making or amending of such TTRO is six weeks.

3.6 The Operating Company when submitting information to promote a TTRO shall complete a TTRO1 Form, a draft TTRO, a press notice, a method statement and a plan of the roads affected.

The TTRO1 form, draft TTRO, press notice, and Operating Company checklist shall follow the format given in Annex 1/17B.

3.7 In the case of carriageway closures required as a result of an Incident, the Operating Company shall notify the Overseeing Organisation as soon as is reasonably practicable following the installation of an emergency closure.

3.8 If the Operating Company requires to carry out any remedial or other Site activities and requires a TTRO to be promoted, it shall give the required notice and provide all such information identified in Annex 1/17B to allow the Overseeing Organisation to promote the TTRO and any costs incurred by the Overseeing Organisation shall be recoverable from the Operating Company.

4 RESTRICTIONS ON TRAFFIC MANAGEMENT MEASURES – ERECTION OPERATION AND REMOVAL OF TRAFFIC MANAGEMENT

4.1 Due to the nature of the Trunk Road network and variable traffic flows, restrictions on the hours of working shall apply to parts of the Unit.

4.2 The erection, operation and removal of traffic management may be undertaken by the Operating Company at any time except within the restricted working hours referred to in Table 1/17 in this Appendix.

4.3 With the exception of Operations carried out in respect of Winter Service and Incidents, restricted working hours as referred to in Table 1/17 of this Appendix 1/17 shall apply to all Site activities and Works Contracts in so far as it is practicable.

4.4 The extent of any traffic management layouts shall be limited to single Lane Closures except in extreme circumstances where written consent for different arrangements shall be obtained from the Overseeing Organisation.

4.5 The Operating Company shall seek prior written consent from the Overseeing Organisation before undertaking Site activities or overseeing Works which are inconsistent with the constraints set out in Table 1/17 in this Appendix.

4.6 The Operating Company shall plan Site activities in such a way that traffic management measurements can be removed at the end of each day when work has been carried out in so far as is practicable.

4.7 All signs erected for traffic management purposes which are not relevant to a situation shall be removed or covered immediately.

5 PROXIMITY OF TRAFFIC MANAGEMENT MEASURES

5.1 The minimum distance between Sites, Works or work shall be as specified in paragraph D3.5 in Chapter 8 of the *Traffic Sign Manual* and the following.

The minimum distance from a hardshoulder closure to any other closure upstream or downstream including contraflow shall be 1.0 kilometre.

In this respect:

(i) the distance between such Sites shall be measured from the roadworks 'End' sign of the first Site to the commencement of coning at the second Site,

(ii) traffic management shall not be installed upstream or downstream of an existing layout and then extended to or from the existing layout.

An existing layout may be extended downstream.

6 DRIVER INFORMATION SIGNS

6.1 Information signs forming part of the traffic management arrangements shall be provided.

7 DIVERSION ROUTES

7.1 Standard Incident Diversion Routes

7.1.1 Standard Incident Diversion Routes have been developed for use on the network. These routes are set out in protocol documents, controlled copies of which are held by all the roads authorities and the police within or adjacent to the Unit. The Operating Company shall assume responsibility for the operation, management and updating of Standard Incident Diversion Routes established for use in any response to an Incident in accordance with the protocol documents and the requirements of Schedule 7 Part 3.

7.1.2 The Operating Company shall take action to ensure that all Standard Incident Diversion Routes documentation and protocols be kept under regular review and shall be modified to ensure the requirements of this Contract are met at all times. The Operating Company shall arrange and attend meetings of all the relevant roads authorities and the police to discuss any amendments required to the Standard Incident Diversion Routes or their operation in accordance with the requirements of Schedule 7 Part 3. The Operating

Company shall only make amendments to routes, procedures or signing in consultation with the roads authorities and police authorities affected by the Standard Incident Diversion Routes and with the prior consent of the Overseeing Organisation as set out in Schedule 7 Part 3. The Operating Company shall provide copies of any amendments to Standard Incident Diversion Routes to the holders of controlled copies.

7.2 **Non-Standard Incident Diversion Routes**

7.2.1 If non-standard incident diversion routes are proposed by the Operating Company, the Operating Company shall fully liaise with all relevant roads authorities and the police. A full set of plans and schedules for each non-standard incident diversion route shall be prepared and copies of these distributed to the appropriate authorities.

7.3 Traffic Orders for Diversion Routes

The Overseeing Organisation will arrange all associated Traffic Orders required on the Trunk Road network.

TABLE 1/17 – Working Hours Restrictions for Operations Affecting One Lane Only

Route No.	**Section**	**General Restrictions (Dates Days and Hours)**	**Additional Restrictions and Comments (Dates Days and Hours)**
From Commencement of Service Date 1 to Commencement of Service Date 2			
M90	between M9 J1A at Humbie and Scotstoun Junction	Monday to Saturday 0600 to 2000 Sunday 0900 to 2000	Closures may be of restricted duration or will not be permitted during or immediately prior the following events: The Royal Highland Show, T in the Park, British Touring Car Championship at Knockhill, British Superbike Championship at Knockhill and other events as notified.
M90/A90	between Dalmeny and M90 Junction 3 Halbeath excluding Forth Road Bridge	Monday to Saturday 0600 to 2000 Sunday 0900 to 2000	Closures may be of restricted duration or will not be permitted during or immediately prior the following events: The Royal Highland Show, T in the Park, British Touring Car Championship at Knockhill, British Superbike Championship at Knockhill and other events as notified.

A823 (M)		Monday to Friday 0600 to 0930 and 1530 to 1930 Saturday 1200 to 1930	
	Forth Road Bridge (between A90 Echline Junction and A90 Ferrytoll Junction)	Monday to Friday 0400 to 2130 Saturday 0800 to 2130 Sunday 0900 to 2130	Closures may be of restricted duration or will not be permitted during or immediately prior the following events: The Royal Highland Show, T in the Park, British Touring Car Championship at Knockhill, British Superbike Championship at Knockhill and other events as notified.
A90	West footpath across Forth Road Bridge	Monday to Sunday 0000 to 2359	
A90	East footpath across Forth Road Bridge	Monday to Sunday 0000 to 2359	
Commencement of Service Date 2 until Service End Date			
M90	between M9 J1A at Humbie and Scotstoun Junction	Monday to Saturday 0600 to 2000 Sunday 0900 to 2000	Closures may be of restricted duration or will not be permitted during or immediately prior the following events: The Royal Highland Show, T in the Park, British Touring Car Championship at Knockhill, British Superbike Championship at Knockhill and other events as notified.
M90/A90	between Dalmeny and M90 Junction 3 Halbeath including the Queensferry Crossing (but excluding Forth Road Bridge)	Monday to Saturday 0600 to 2000 Sunday 0900 to 2000	Closures may be of restricted duration or will not be permitted during or immediately prior the following events: The Royal Highland Show, T in the Park, British Touring Car Championship at Knockhill, British Superbike Championship at Knockhill and other events as notified.
A823 (M)		Monday to Friday 0600 to 0930 and 1530 to 1930 Saturday 1200 to 1930	

A90	West footpath across Forth Road Bridge	Monday to Sunday 0000 to 2359	
A90	East footpath across Forth Road Bridge	Monday to Sunday 0000 to 2359	

ANNEX 1/17A – MOBILE LANE CLOSURE RISK ASSESSMENT CHECKLISTS

1 Checklist: Advance Planning For a Mobile Lane Closure

(All questions should be answered and comments provided where answer is No or supportive information is considered necessary)

In Column P "X" Denotes – Do not proceed with mobile Lane closure if answer is "No".

"G" Denotes – Refer to general guidance information before deciding to proceed with the mobile Lane closure.

No.	Question	Yes	No	Comments	P
1	Is mobile Lane closure suitable for the Operations				X
2	Are traffic flows likely to be below specified levels in Table 6.8 of Chapter 8, Part 1				X
3	Can normal (15 – 20%) heavy goods vehicle flows be expected				G
4	Do sight stopping distances conform to the distances stated in the Highway Code				X
5	Will you be prepared to abort the work during poor visibility				G
6	Will the Site activities avoid introducing a near-side Lane closure on a left hand bend				G
7	Is there a hardshoulder				G
8	Is the hardshoulder continuous				G
9	If no hardshoulder, can advance sign vehicles/trailers be located on verge or close to near-side Lane of carriageway without blocking the near side Lane				X
10	If no hardshoulder, are suitable places on the verge available to site warning vehicles within 1 km before the Site activities				X
11	Will the sun be in a position such that it does not blind drivers throughout				X
12	Will all the Site activities be done so as to avoid dawn / dusk				X
13	Will the mobile Lane closure allow more than one lane to remain open				G
14	Will the Site activities avoid the need for a near-side Lane closure				G
15	Can the Site activities avoid being slow moving				G

No.	Question	Yes	No	Comments	P
16	Will traffic flows be monitored regularly throughout by the team leader / supervisor				G
17	Are uphill gradients less than 4%				G
18	Are downhill gradients less than 4%				G
19	Is the length of Site activities free of junctions				G
20	Are the Site activities to be carried out over a long distance				G
21	Can all the Site activities be carried out from vehicles				G
22	Are variable message signs available and able to be used				G
23	For a 3 Lane carriageway involving a 2 Lane closure can Lanes 2 and 3 be closed to avoid slow moving traffic changing Lanes				G
24	Will the Site activities not take place (or be suspended) if there is a risk of vehicles skidding				G
25	Has there been consultation with the police				G
26	Has the proposed closure been included in the weekly closure notification to Transport Scotland				G
27	Is the team leader clear that mobile Lane closures shall only proceed or remain in place if traffic checks show that flow rates are well within limits				G
28	At night if hardshoulder is less than 3.3 metres wide has this been considered in planning / accepting the Site activities				G
29	If verge marker posts have not been provided, has consideration been given to how vehicles will maintain positions				G
30	Will the Site activities last less than the time required to set up and dismantle the necessary advance signs and taper required for the static closure(s) that would otherwise be required to complete the Operations.				G
31	Are there any other special conditions applying to these Site activities				

Checklist – For Use At Start Of Mobile Lane Closure

No.	Question	Yes	No	Comments
1	Are all vehicle drivers trained and fully competent in the mobile Lane closure technique			
2	Will everyone working on the carriageway have high visibility clothing			
3	Are all advance sign and block vehicles painted yellow and in clean condition			
4	Are operational vehicles fitted with amber warning beacons			
5	Are lorry mounted crash cushions fitted to block vehicles			
6	Is the weight of the block vehicles (including ballast) in the range 7.3 – 17 tonnes			
7	Are head restraints fitted to the drivers and other occupants seats in advance sign and block vehicles			
8	If additional equipment/switches have been provided in the block vehicles cab has a safety survey been carried out			
9	Has a reliable 2-way communications system been provided			
10	Does the communications system include contractors' vehicles			
11	Is it possible to use a dedicated radio channel			
12	Has a contingency plan for failure of communications been made			
13	Are all signs to appropriate standards			
14	Will all signs on the carriageway be vehicle or trailer mounted and attended at all times			
15	Can you confirm that signs will not be manually changed when the vehicle is standing in a live traffic Lane			
16	Do the vehicles rear lights, reflectors and number plates remain clearly visible when the backing board for the sign is fitted			
17	Can you confirm that signs can/will be covered or removed from view when not in use or normal driving of sign vehicle has been resumed			

No.	Question	Yes	No	Comments
18	Are working and block vehicle drivers aware of the minimum/maximum separation distances			
19	Have additional block vehicles been provided where the Site activities require them			Refer to appropriate layout(s)
20	Are variable message signs available and able to be used			
21	For a 3 Lane carriageway involving a 2 Lane closure can Lanes 2 and 3 be closed to avoid slow moving traffic changing Lanes			
22	Where the working vehicle/personnel are operating on the hard shoulder has a block vehicle with a lorry mounted crash cushions been provided and correctly positioned			NB for this work if Site activities vehicle is substantial e.g. gully cleaner / sweeper and is fitted with a lorry mounted crash cushions block vehicle may be dispensed with.
23	If no hardshoulder, can advance sign vehicles/trailers be located on verge or close to n/s of carriageway without blocking the n/s Lane			
24	If no hardshoulder are suitable places on the verge available to site warning vehicles within 1 km of the start of the Site activities			
25	For Site activities on foot can worker remain within the area on the non-trafficked side between the front of the leading vehicle and 10 metres in front of the second vehicle			Refer to appropriate layout(s)
26	For Site activities on foot on a central reserve to prevent traffic passing between the block vehicle and the central reserve safety fence is an additional block vehicle required			Refer to appropriate layout(s)
27	Will suitable high visibility clothing be provided and worn			
28	Can all advance sign display and covering for mobile Lane closure be carried out on the hard shoulder (if available) or on a lightly trafficked road			NB. The establishment or covering of vehicle mounted signs should never be undertaken on an on-slip or off-slip road.
29	Has a team leader(s) been appointed and made known to all drivers including contractors			
30	If circumstances require has an additional supervisor been provided and responsibilities clearly established			

No.	Question	Yes	No	Comments
31	Has the need for a relief driver fully trained and capable of replacing any other driver been considered and provided if required			
32	Can you confirm that all personnel have received adequate training			
33	If heavy goods vehicle levels are 30% have vehicle flow levels been decreased by 10%			See traffic count
34	For Site activities at night where there is an occasional short discontinuity of the hardshoulder has the maximum traffic flow been reduced by 10%			

ANNEX 1/17B – TEMPORARY TRAFFIC REGULATION ORDERS

Sample Request Form for Temporary Traffic Regulation Order Request [TTRO1]

A TTRO request in the following format shall be completed by the Operating Company and sent by e-mail to the relevant Area Manager and Network Administrator in TRBO with a draft Order, Press Notice and Method Statement (hard copies shall follow by post together with completed Operating Company checklist).

(i) Name and Route Number of Trunk Road

_____

(ii) Type of Order

Temporary Prohibition of Traffic	(Full Temporary Order)
Temporary Restriction of Traffic	(Full Temporary Order)
Blue Notice – Danger	(Maximum 21 days)
Blue Notice – Works	(Maximum 5 days)
Other (Specify type of Traffic Order)	

_____

(iii) State the reason(s) for requesting the Traffic Order

_____

(iv) Give a full description of length(s) of Trunk Road over which traffic is to be prohibited

_____

(v) Give full descriptions of prohibited turns (if applicable)

_____

(vi) If request is for a Prohibition of Traffic or Specified Turns (or both) state the alternative route(s)

_____

(vii) If the Traffic Order is to Prohibit or Restrict traffic (or a particular manoeuvre) please state types of vehicles, which may be excepted from the terms of the Order, e.g. Police, Fire, Ambulance, Works

_____

(viii) If request is for a Full Temporary Order please give names of suitable newspapers (indicate if daily or weekly) in which Press Notices can be published

_____

(ix) Give start and finish dates for the Traffic Order or Notice _____ to _____

(x) Any other information or instructions

_____

(xi) Please sketch below the alternative route(s) in relation to the affected section of road(s) or attach a plan

(xii) Please state the name, address and telephone number of the Operating Company official who can be contacted if any additional information is required

_____

[A copy of the made Traffic Order will be sent to this official. He/she shall also arrange for the display of Blue Notices locally and advise the Emergency Services of road closures etc authorised by a Blue Notice.]

Form completed by:

NAME IN BLOCK CAPITALS _____

Designation _____ Telephone No _____

Signature _____ Date _____

Operating Company – Roads and Traffic Order Checklist

	Checked by Area Engineer (initial & date)	Checked by Journey Time Reliability Coordinator (initial & date)
Order and Press Notice		
1 Has the correct template been used		
2. Is the title of the Traffic Order exactly the same as in Article 1 of the Traffic Order *Note: The **title** of the Traffic Order shall only refer to the number of the Trunk Road, e.g. "A96 Trunk Road" and shall not include any place names at the beginning or end of the road in question.*		
3. Is the Traffic Order title identical to the heading of the Press Notice		
4. Is the date quoted in the Traffic Order identical to the date quoted in the Press Notice		
5. Is the description of the affected lengths of road in the Press Notice identical to that in the Schedule to the Traffic Order *The name(s) of Trunk Road(s) shall be quoted in the descriptions, e.g. A96 Aberdeen – Inverness Trunk Road.*		
6. Does the information in the TTRO1/PTRO1/Method Statement correspond with the details in the Order and Press Notice		
7. Have the alternative routes been checked to ensure they are accurate and easily understood *The numbers and names of roads shall be quoted.*		
8. If certain vehicles are to be excluded from the terms of the Traffic Order, have they been mentioned in the Press Notice		
9. Where a Traffic Order includes a contingency period to take account of weather or other unforeseen problems does the Press Notice also describe the anticipated duration of the work *e.g. It is anticipated that the work will be carried out over two weekends during the above period*.		

	Checked by Area Engineer (initial & date)	Checked by Journey Time Reliability Coordinator (initial & date)
Plan 10. For temporary Traffic Orders, has the plan of the alternative routes been checked for accuracy and does it correspond with the descriptions contained in the Press Notice 11. For all permanent Traffic Orders, has the plan been checked for accuracy and does it correspond with the descriptions in the Schedule to the Traffic Order 12. Are the names of roads/reference points referred to in the Schedule clearly marked on the plan In the case of Roads (Scotland) Act Orders, are the title of the plan, the plan number and the numbers allocated to the affected lengths of road consistent with the Schedule to the Traffic Order		

Template for Press Notice

THE [ ] UNIT TRUNK ROADS AREA (TEMPORARY PROHIBITIONS OF TRAFFIC, TEMPORARY PROHIBITIONS OF OVERTAKING AND TEMPORARY SPEED RESTRICTIONS) ([ ]) ORDER 200

The Scottish Ministers give notice that they propose to make the above Order temporarily prohibiting traffic, temporarily prohibiting overtaking and temporarily restricting the speed of vehicles on the lengths of road identified in the Schedule to this Notice during the periods corresponding to those lengths of road specified in the Schedule to this Notice.

The Order, which is required because work is being or is proposed to be executed on or near the lengths of road for certain purposes in relation to the lengths of road stated in the Schedule to this Notice, will be in operation from [ ] until midnight on [ ], but will only have effect in relation to such part or parts of the lengths of road as are indicated by the appropriate traffic signs and during the periods corresponding to those lengths of road specified in the Schedule to this Notice. The provisions relating to temporary prohibitions of traffic do not apply to vehicles being used in an emergency for fire brigade, ambulance, police or coastguard purposes or vehicles used for carrying out the work. There are no exemptions for those vehicles in respect of temporary prohibitions of overtaking and temporary speed restrictions unless otherwise provided by law.

Where the closure of a carriageway on a dual carriageway road is involved the alternative route for traffic will be the adjacent carriageway by means of contraflow working. Other alternative route or routes for traffic in relation to the lengths of road affected by the Order during a prohibition will be signposted. Detailed descriptions can also be obtained [ ].

Network Manager, Network Management Directorate
A member of the staff of the Scottish Ministers
Transport Scotland
Buchanan House
58 Port Dundas Road
Glasgow
G4 0HF

SCHEDULE

(a) Description of road: The following length of the [ ] Trunk Road:

1. [ ]

(b) Duration:

(c) Purpose:

(d) Alternative route or routes for traffic will be signposted.

Template For Traffic Order

Scottish Statutory Instruments

[ ] No.

ROAD TRAFFIC

The [ ] Unit Trunk Roads Area (Temporary Prohibitions of Traffic, Temporary Prohibitions of Overtaking and Temporary Speed Restrictions) (No. [ ]) Order 200

Made – – – [ ]

Coming into force – – [ ]

The Scottish Ministers, in exercise of the powers conferred by sections 14(1) and 14(4) as read with sections 2(1) and 2(2) of the Road Traffic Regulation Act 1984([1]), and of all other powers enabling them in that behalf, being satisfied that the traffic on the lengths of road specified in the Schedule to this Order should be restricted or prohibited as hereinafter provided because work is being or is proposed to be executed on or near the said lengths of road and having had regard to the existence of alternative routes suitable for the traffic which will be affected by this Order, hereby make the following Order:

Citation, commencement and cessation

1 This Order may be cited as the [ ] Unit Trunk Roads Area (Temporary Prohibitions of Traffic, Temporary Prohibitions of Overtaking and Temporary Speed Restrictions) ([ ]) Order [ ], shall come into force on [ ] and shall cease to have effect at midnight on [ ].

2. In this Order a reference to a numbered column is to the column in the Schedule to this Order bearing that number.

---

(1) 1984 c.27, section 14 was substituted by the Road Traffic (Temporary Restrictions) Act 1991 (c.26), section 1(1) and Schedule 1. Section 2 was amended by the New Roads and Street Works Act 1991 (c.22), Schedule 8, paragraph 18. The Scottish Ministers are the traffic authority by virtue of section 121A of the Road Traffic Regulation Act 1984 (inserted by the New Roads and Street Works Act 1991 (c.22), Schedule 8, paragraph 70 and amended by the Scotland Act 1998 (Consequential Modifications) Order 2001 (S.I. 2001/1400)) as read with section 151(1) of the Roads (Scotland) Act 1984 (c.54). The functions of the Secretary of State were transferred to the Scottish Ministers by section 53 of the Scotland Act 1998 (c.46).

Temporary prohibition on use of a road

3. Subject to Article 6, no person shall use, or permit the use of, any vehicle on each length of road specified in column 1 during the period corresponding to that length of road specified in column 2 when a prohibition is identified as applying to a part or parts of that length of road by means of traffic signs prescribed by the Traffic Signs Regulations and General Directions 2002([2]).

4. (1) Subject to paragraph (2) of this Article, no person shall use, or permit the use of, any vehicle in such a way that it overtakes any other moving vehicle on each length of road specified in column 1 during the period corresponding to that length of road specified in column 2 when a prohibition is identified as applying to a part or parts of that length of road by means of a traffic sign prescribed in Diagram 632 of the Traffic Signs Regulations and General Directions 2002.

(2) Nothing in paragraph (1) of this Article shall prohibit any person from using, or permitting the use of, any vehicle in such a way that it overtakes a cycle, motorcycle, tricycle or any other vehicle not being a motor vehicle in accordance with section 140 of the Road Traffic Regulation Act 1984([3]).

Temporary speed restriction

5. (1) Subject to paragraph (2) of this Article, no person shall drive any vehicle on the lengths of road specified in column 1 of Parts 2 and 3 of the Schedule to this Order during the period corresponding to that length of road specified in column 2 at a speed exceeding that specified in column 3 when a restriction is identified as applying to a part or parts of that length of road by means of a traffic sign prescribed in Diagram 670 of the Traffic Signs Regulations and General Directions 2002.

(2) When convoy working is in operation and indicated by one or more of the signs shown in Diagrams 7025, 7026, 7027, 7028 and 7029 of the Traffic Signs Regulations and General Directions 2002, no person shall drive any vehicle on the length of road specified in column 1 of Part 3 of the Schedule at a speed exceeding 10 mph when a restriction is identified as applying to a part or parts of that length of road by means of a traffic sign prescribed in Diagram 670 of the Traffic Signs Regulations and General Directions 2002.

---

(2) S.I. 2002/3113.

(3) 1984 c.27, section 140 was amended by the Road Traffic (Consequential Provisions) Act 1988 (c.54), Schedule 3, paragraph 25(9).

Exemption for emergency and work vehicles

6. Nothing in Article 3 of this Order shall apply to a vehicle being used in an emergency for fire brigade, ambulance, police or coastguard purposes or a vehicle while being used for carrying out the work.

Network Manager, Network Management Directorate
A member of the Staff of the Scottish Ministers
Transport Scotland,
Buchanan House
58 Port Dundas Road
Glasgow G4 0HF

SCHEDULE

PART 1 Articles 3 and 4

1	2
Description of particular lengths of road	Duration of restriction or prohibition

PART 2 Articles 3, 4 and 5 (1)

1	2	3
Description of particular lengths of road	Duration of restriction or prohibition	Speed restriction

PART 3 Articles 3, 4, 5 (1) and (2)

1	2	3
Description of particular lengths of road	Duration of restriction or prohibition	Speed restriction

APPENDIX 1/20 – RECOVERY VEHICLES FOR BREAKDOWN

SHEET 1

1 Recovery Vehicles to be Provided

1.1 The heavy recovery vehicles provided by the Operating Company may be provided by a different recovery organisation to the light recovery vehicles, motorcycle recovery facilities and impact protection vehicles.

1.2 The Operating Company shall provide the number of heavy recovery vehicles, light recovery vehicles, motorcycle recovery facilities and impact protection vehicles required to achieve the response times for recovery of vehicles as set out in Appendix 32/1 for the Vehicle Recovery Service. Heavy recovery vehicles shall not be provided for Service Delivery Period 2.

1.3 Subject to an Order by the Overseeing Organisation the Operating Company shall provide the number of heavy recovery vehicles, light recovery vehicles, motorcycle recovery facilities and Impact Protection Vehicles for Works within the Unit.

2 Locations for Recovery Vehicles

2.1 When not engaged in recovery Operations the recovery vehicles shall be positioned at locations such that they can meet the response times set out in Appendix 32/1.

2.2 Subject to an Order by the Overseeing Organisation the Operating Company shall position recovery vehicles at locations stated in the Order.

3 Limits of Service

3.1 The Vehicle Recovery Service Operations required for the Forth Road Bridge during Service Delivery Period 1 shall be the A90 between Echline Junction and Ferrytoll Junction.

3.2 The Vehicle Recovery Service Operations required for Service Delivery Period 2 for the Forth Road Bridge will be the A90 between Echline Junction and Ferrytoll Junction and for the Queensferry Crossing the M90 between Queensferry Junction and Ferrytoll Junction.

3.3 Subject to an Order by the Overseeing Organisation the limits of the vehicle recovery Operations for Works at other locations within the Unit will be as stated in the Order.

4 Locations for Vehicle Removal

4.1 The Operating Company shall carry out a risk assessment of possible locations on the hardshoulder or hardstrip adjacent to an operational emergency telephone, or off the Trunk Road at an interchange and shall obtain the written consent of the Overseeing Organisation to these locations not less than 14 days before the commencement of vehicle recovery provision.

4.2 Any broken down or accident damaged vehicles on the operating carriageway within the limits of the vehicle recovery Operations shall be moved immediately to a pre-identified location consented to by the Overseeing Organisation.

5 Records

5.1 The Operating Company shall complete record sheets as referred to in Cl 120.26 in the format shown in Sheets 2 to 4 of this Appendix 1/20.

SHEET 2 – Information to be provided by the Operating Company

Form For 'Recovery Vehicle Daily Check Sheet'

RECOVERY VEHICLE DAILY CHECK SHEET							
				Week Commencing:			
Driver's Name:		Vehicle Type/Registration No:			Mileage:		
Driver to initial against check list below:							
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
OIL LEVEL							
WATER							
ENGINE							
CLEANLINESS – interior							
CLEANLINESS – exterior							
WIPER/WASHERS							
TYRES							
LIGHTS							
Driver's Report (detail any problems): Action Taken (to solve above problems):							
Date:			Supervisor's Signature:				
COMPLETED SHEET TO BE RETURNED TO OVERSEEING ORGANISATION EACH WEEK							

SHEET 3 – Information to be provided by the Operating Company

LEAFLET FOR ISSUE BY RECOVERY VEHICLE OPERATIVES TO DRIVERS OF ALL BROKEN–DOWN OR ACCIDENT DAMAGED MOTOR VEHICLES

Name of Scheme:

[Operating Company: Insert Forth Bridges Unit or accurate name of the Scheme]

.....……

Vehicle Recovery Service – Explanatory Leaflet authorised by the Scottish Government for issue to drivers of broken-down and accident-damaged motor vehicles within the above Unit or work.

Leaflet to be distributed by recovery vehicle operatives of the appointed recovery firm on behalf of the Scottish Government.

1. The roadworks commence at the "Roadworks Ahead – 2 miles" sign and end at the "Roadwork End" sign*. [Operating Company: See Note 1 below]*
2. The recovery service provided over the length of both the Forth Road Bridge and Queensferry Crossing or along the extent of the roadworks is free.
3. Vehicles will be recovered clear of the Forth Road Bridge, Queensferry Crossing or the roadworks to ……unless otherwise directed by the police. *[Operating Company: See Note 2 below]*
4. It will then be at the discretion of individual drivers of broken-down or accident-damaged vehicles requiring assistance to arrange for assistance or the removal of their vehicle to a garage of their choice. The operators of the free recovery service do not make such arrangements.

Useful contact numbers are given below:

Local Garage……

AA……...

RAC……

Greenflag……...

Assistance will also be given by telephoning …….. *[compiler: See Note 3 below]*

If a motorway emergency telephone is used, the police will assist.

Notes to compiler:

(1) If different, replace with the appropriate limits of service for the Works(2) The chosen location should take into account safety, security and the availability of a telephone, see IAN 65/05.

(3) The telephone number should be agreed with the police prior to the commencement of the Contract or the Works.]

SHEET 4 (1 of 2) – Information to be provided by the Operating Company

LAYOUT FOR 'VEHICLE RECOVERY LOGSHEET'

VEHICLE RECOVERY LOGSHEET (1 of 2) [Scheme name]	Recovery vehicle: ……	Week Ending: ……	Sheet No: ……

Date	Time			Where	Dir	Lanes Closed					Police etc Present*	Incident		Recovery	Vehicle Type#	Q'ing	Weather	Road Surface		Remarks
	Call Out	Arrival at Scene	Road Clear	Marker Post No.		HS	1	2	3	4		Acc	B/d	Tow** Y/N		Y/N		Dry	Wet	

*P – Police
F – Fire Service
A – Ambulance

**Y – Tow/Lift
R – Restart
F – False Call

#C – Car
V – Van
HGV – Heavy Goods Vehicle
M/C – Motorcycle

SHEET 4 (2 of 2)

VEHICLE RECOVERY LOGSHEET (2 of 2) [Scheme name]	Recovery Vehicle: …….	Week Ending: …../……./……..	Sheet No: …….

Date & Time	Type of Vehicle	Registration No.	Name & Address of driver or organisation	Location of Breakdown	Nature of Breakdown	Recovery Operator's Name

APPENDIX 1/75 – OPERATING COMPANY'S VEHICLE LIVERIES

1 LOGO REQUIREMENTS

1.1 Transport Scotland Logo

The Transport Scotland logo is Transport Scotland's official brand and is aimed at customers so they can recognise and access its services as well as identify accountability and credit for these services.

The logo consists of two elements: the first is a graphical representation of a road and railway line, and the second is the text "TRANSPORT SCOTLAND" using the typeface Gill Sans.

The main elements to Transport Scotland's logo and branding requirements are detailed in the *Transport Scotland Identity Guidelines.*

2 LIVERY REQUIREMENTS

2.1 General

This livery is to be applied to all Operating Company fleet vehicles used for operational duties on the Unit.

The *Transport Scotland Identity Guidelines* addresses the issues of branding and style for a selection of different vehicle types. The Operating Company shall ensure that individual vehicles comply with the requirements for vehicle base colour, safety markings and conspicuity requirements in this Contract, the relevant national guidelines and Legislation.

Seven general vehicle classes have been selected as the basis for illustrating the vehicle livery scheme to be applied. These are:

(i) estate car,

(ii) gritter,

(iii) Trunk Road Incident Support Service van,

(iv) small car,

(v) van,

(vi) mini-van, and

(vii) goods vehicle.

These vehicle types have been selected to provide a spread of livery options that can be readily adapted to cover the majority of vehicle body types that may be employed by the Operating Company during the course of Operations.

Should the Operating Company wish vehicles to have a fleet number present then it shall be small and inconspicuous, and placed in an area outwith that of the specified livery scheme markings.

Where this livery scheme has identified the need for chevrons these shall meet the road visibility requirements laid out in Chapter 8 of the *Traffic Signs Manual*, published by the Government's Department for Transport. These chevrons shall conform to the latest industry standards and Legislation and be made from industry recognised vinyls and materials.

If the Operating Company is unable to apply a livery scheme to a vehicle type without a significant departure from the prescribed scheme, the Operating Company shall submit an alternative proposal to the Director for approval.

2.2 Vehicle Markings

The type and style of permitted Transport Scotland markings to be used on Operating Company vehicles is detailed in the *Transport Scotland Identity Guidelines*. All markings are available as graphics files from the Director in an "eps" or "jpeg" format.

The aspect ratio must be preserved when re-sizing the Transport Scotland marking to suit different vehicles.

Should a departure from the prescribed scheme be required the Operating Company shall submit an alternative proposal to the Director for consent.

Care shall be taken when placing markings to avoid any vehicle features such as door slides, handles and non-body coloured trim that would conflict with the clarity of the marking.

APPENDIX 1/76 – ISU AND TRISS OPERATIVES' UNIFORMS

Incident Support Unit and Trunk Road Incident Support Service operatives shall be suitably attired with appropriate uniform style clothing and personal protection equipment.

Uniforms and personal protection equipment shall be appropriately badged.

APPENDIX 1/77 – SPECIFICATION FOR TRISS VEHICLE MOBILE CCTV SYSTEM

1 The Trunk Road Incident Support Service (TRISS) vehicles shall be equipped with a small and rugged pan tilt zoom (PTZ) camera, as described below, mounted on a pneumatic mast which can be raised and lowered from the vehicle via a remote control device located in the vehicle. The pneumatic mast shall be extendable to a height of approximately 6 metres above vehicle floor level and shall retract so that the camera height above the vehicle roof is minimal.

2 A 6.8" LCD/TFT Colour monitor shall be provided within the vehicle cab to provide an onsite confirmation of camera operation.

3 The camera shall connect to an encoder unit with a minimum of 4 video feeds which enables onward transmission of the video signal to the Traffic Scotland National Control Centre and resilience rooms, Events control rooms, silver command centres and police control rooms. The Traffic Scotland National Control Centre operators will be able to control the camera pan and tilt functions without assistance from the TRISS operatives.

4 The system shall allow multiple users viewing access.

5 The Operating Company may view the images at their depot with the written approval of the Director.

6 The transmitted image must be able to be displayed on the Traffic Scotland MOSAIC System. The images sent to the Traffic Scotland National Control Centre shall be able to be recorded at high resolution onto a plug in hard drive, to allow historical viewing of footage at full resolution and at a rate of 5 images a second when the vehicle returns to base.

7 The host server will be the server provided by the Traffic Scotland Operations and Infrastructure Service Contractor, which is compatible with the Traffic Scotland MOSAIC System. The Operating Company's chosen equipment shall be compatible with this server. Subject to the Director's consent, the Operating Company may provide its own host server, which is compatible with its chosen equipment, and which shall be integrated with the Traffic Scotland MOSAIC system.

8 The vehicle mounted pan, tilt and zoom (PTZ) camera shall have the following features:

(a) 1/3" colour/monochrome, charge coupled device (CCD), high resolution, 480 television lines (TVL),

(b) High Resolution – 4CIF Display Capability, 2CIF for Transmission,

(c) provide good quality Images in all weather conditions,

(d) built-in optical auto zoom lens - magnification of 18:1,

(e) be waterproof with a lens wiper,

(f) be vandal resistant, and

(g) be operable remotely by Traffic Scotland National Control Centre staff only.

APPENDIX 1/78 – SPECIFICATION FOR VEHICLE MOUNTED VARIABLE MESSAGE SIGNS

The vehicle roof mounted variable message signs shall:

(a) have a power lift system and be suitable for the vehicle,

(b) display legible messages under all conditions,

(c) automatically detect and correct errors and faults,

(d) be of robust, weather resistant construction with excellent rust and corrosion protection,

(e) be easy to maintain and repair,

(f) be capable of being deployed and operating while vehicle travels at low speed,

(g) be battery powered and charged from the vehicle system with status display,

(h) have a spare battery, and

(i) work while the vehicle engine is off.

The message panel shall have:

(a) a panel size approximately 2m wide x 1.2m,

(b) a matrix size approximately 27 x 48 pixels,

(c) a pixel size approximately 33mm x 30mm,

(d) a minimum of 12 characters per line,

(e) a minimum of 3 lines,

(f) a minimum of 6 available fonts,

(g) full matrix graphics capability, and

(h) LED display technology.

The message panel control consol shall have:

(a) ultra low powered solid state console circuitry,

(b) a waterproof, backlit, alphanumeric console keyboard,

(c) a LCD 8 line x 40 character with graphics back lit console display,

(d) proprietary, field upgradeable programming software,

(e) pre-programmed and user programmed minimum 50 message capacity,

(f) minimum 2 messages each sequence capacity,

(g) real time clock and calendar time and date control,

(h) user-selectable (0.1 to 60 seconds) message display time,

(i) instantaneous display update time,

(j) separate backup battery non-volatile memory,

(k) user selectable, multi level password protection, and

(l) easy to use menus for operator interface.

APPENDIX 2/3 – RETENTION OF MATERIAL ARISING FROM SITE CLEARANCE

The Table below shall be completed for an individual Order when required.

Description of material	Location	Delivered to	Requirements

Equipment which is not to be immediately re-erected shall be transported to a Depot and stored.

The equipment shall remain the property of the Scottish Ministers.

APPENDIX 3/1 – FENCES GATES AND STILES

1 Fencing for the protection of planted areas shall be hexagonal wire netting fencing complying with BS 1722-2 Section 8 and in accordance with Highway Construction Details (HCD) Drawing Number H39 Fencing Type 1.

2 Where required, wire mesh shall be attached to permanent or existing fencing in accordance with HCD Drawing Numbers H46 or H47.

3 Mammal proof fencing shall as a minimum:

(a) Badgers,

(b) Otters, and

(c) rabbits.

4 Any defective and damaged parts of any existing or temporary mammal proof fencing shall be immediately repaired by the Operating Company. The specification for the repair or replacement of mammal proof fencing shall be as follows:

Badger fencing shall be in accordance with the following specification:

Post and mesh fences in accordance with British Standard 1722 part 2: 1989 *Specification for rectangular wire mesh and hexagonal wire netting fences* with a rectangular steel wire mesh having maximum openings of 25 millimetres X 50 millimetres and wires of not less than 3 millimetres diameter in accordance with British Standard 4102: 1990 “Specification for steel wire and wire products for fences” and galvanised to British Standard BS 729: 1971 (1994) *A specification for hot dip galvanised coatings for iron and steel articles*. The mesh shall be securely stapled to the posts and (where present) rails of the highway boundary fences installed along the scheme roads. Where the highway boundary fence is post and wire, stobs shall be spaced no more than 1.8 metres apart. The mesh shall extend a minimum of 1.0 metre above ground level and be buried vertically to between 300 millimetres and 500 millimetres below ground and turned at right angles from the bottom of the buried section towards the direction from which badgers are expected to approach for a further 300 millimetres. The return shall consist of a separate roll of mesh attached with clips to the bottom of the vertical mesh. The vertical mesh shall be secured at ground level by a galvanised wire not less than 5 millimetres in diameter. The fencing shall also include a wire mesh overhang of at least 300 millimetres at the top of the fence positioned in the direction from which badgers are expected to approach and should protrude at an angle of between 45 degrees and 90 degrees. Fixings for attachment to Structures shall use a resin fixed replaceable bolt system.

Badger Gates shall be constructed in accordance with the RSPCA publication *Problems with Badgers* All badger gates shall incorporate concrete sills to prevent digging or erosion.

Otter Fencing shall be in accordance with the following specification:

Post and mesh fences in accordance with British Standard 1722 part 2: 1989 *Specification for rectangular wire mesh and hexagonal wire netting fences* with a rectangular steel wire mesh having maximum openings of 50 millimetres X 100 millimetres and wires of not less than 3 millimetres diameter in accordance with British Standard 4102: 1990 *Specification for steel wire and wire products for fences* and

galvanised to British Standard 729: 1971 (1994) *A specification for hot dip galvanised coatings for iron and steel articles*. The mesh shall be securely stapled to the posts and (where present) rails of the highway boundary fences installed along the scheme roads. Where the highway boundary fence is post and wire, stobs shall be spaced no more than 1.8 metres apart. The mesh shall extend a minimum of 1.2 metres above ground level and be buried vertically to a depth of between 250 and 350 millimetres and turned at right angles from the bottom of the buried section towards the direction from which otters are expected to approach for a further 250 to 350 millimetres. In areas of uneven ground or soft soil, the buried section of the fence should extend to a depth of 500 millimetres and include a horizontal return of 500 millimetres. The return shall consist of a separate roll of mesh attached with clips to the bottom of the vertical mesh. The fencing shall also include a wire mesh overhang of at least 300 millimetres at the top of the fence positioned in the direction from which otters are expected to approach and should protrude at an angle of between 45 degrees and 90 degrees. The vertical mesh shall be secured at ground level by a galvanised wire not less than 5 millimetres in diameter and a galvanised barbed wire shall be securely stapled to the posts of the fence 25 millimetres above the top of the mesh. Fixings for attachment to Structures shall use a resin fixed replaceable bolt system.

A higher specification fencing featuring taller fence netting (1450 millimetres) as recommended in DMRB Otter Revised Advice Note HA 81/99 should be used where otter activity is higher and there is an increased likelihood of fence breaches and road traffic accidents, around culverts, underpasses and watercourses.

Where there is a requirement for combined badger and otter fencing, the fence shall be built to the height specifications of the otter fencing but shall have the smaller rectangular steel mesh specified for the badger fencing.

5 Should there be a need to install additional bat bridges then they shall be in accordance with the following specification:

The bat bridge shall be composed of six stainless steel wire cables, with a minimum diameter of six millimetres, suspended over the carriageway between two timber poles. The cables shall be arranged in three rows over the carriageway, with each row separated vertically by 1000 millimetres. The top row of cables shall be separated horizontally by 900 millimetres, the middle row of cables by 1450 millimetres and the bottom row of cables horizontally by 2000 millimetres to create a triangular bridge profile. Two timber poles supporting the steel cables shall be provided, 2000 millimetres apart, on each side of the road beyond the verge. The timber poles shall include anti-climbing measures. Each timber pole shall be set in concrete and anchored using six stainless steel wire cables with a minimum diameter of 12 millimetres. Anchor cables for the timber poles shall be set into concrete anchor blocks. The minimum height above the carriageway of the cables, including sag, shall be higher than the maintained headroom of the route. Plastic spheres, with a minimum diameter of 200 millimetres, shall be located approximately 2000 millimetres apart horizontally on each cable. These will be offset on each row vertically by 700 millimetres. Planting shall be provided around the base of the timber poles and around anchor cables as shown on the Indicative Landscape Design drawings as listed in Appendix 0/4 to the Specification.

APPENDIX 4/1 – ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)

1 Location

1.1 Vehicle Restraint Systems

1.1.1 The location, Containment Level, Impact Severity Level (ISL), Working Width Class, maximum height that allows the required visibility, and the Length of Need requirements for safety barriers and transitions shall be determined by the Operating Company in accordance with this Contract.

1.1.2 The location, Containment Level, Impact Severity Level (ISL) and Working Width Class requirements for vehicle parapets shall be determined by the Operating Company in accordance with this Contract.

1.1.3 The location, Performance Class, Impact Severity Level (ISL), Permanent Lateral Displacement Zone (PLDZ) Characteristic, Exit Box Class (D), and maximum height that allows the required visibility requirements for terminals shall be determined by the Operating Company in accordance with this Contract.

1.1.4 The location, Performance Level, confirmation of whether a redirective (R) or non-redirective (NR) type of crash cushion, Impact Severity Level (ISL), Redirection Zone Class (Z), Permanent Lateral Displacement Zone Class (D) and maximum height that allows the required visibility requirements for crash cushions shall be determined by the Operating Company in accordance with this Contract.

1.2 Vehicle Restraint Systems

1.2.1 Where Annual Average Daily Traffic (AADT) exceeds 25,000 vehicles/day, or it is estimated that this level of traffic will be reached on the relevant part of the Trunk Road within 20 years, the Operating Company shall so inform the Overseeing Organisation in writing. The Overseeing Organisation will inform the Operating Company if concrete safety barrier complying with clause 401.2 is required in the relevant location, and if it is required the Operating Company shall provide such, subject to an Order.

1.3 Pedestrian Restraint Systems

1.3.1 The location for pedestrian parapets and pedestrian guardrails shall be determined by the Operating Company in accordance with this Contract.

1.4 Anti-glare Screens

1.4.1 The location for anti-glare screens shall be determined by the Operating Company in accordance with this Contract.

2. Other Details

2.1 Safety Barriers, Terminals, Transitions and Crash Cushions

2.1.1 Any special requirements shall be determined by the Operating Company in accordance with this Contract.

2.1.2 Specific connection requirements to existing safety barriers, vehicle parapets or other structures shall be determined by the Operating Company in accordance with this Contract.

2.2 Vehicle Parapets Including Anchorages and Attachment Systems

2.2.1 Any special requirements including any aesthetic requirements shall be determined by the Operating Company in accordance with this Contract.

2.3 Pedestrian Restraint Systems

2.3.1 Any special requirements shall be determined by the Operating Company in accordance with this Contract.

2.4 Temporary Safety Barriers

2.4.1 When necessary to ensure the safety of the users of the Unit pending permanent repair of a Defect, temporary safety barriers shall be installed in accordance with TD 19/06 and the manufacturers' latest instructions and drawings.

The Operating Company shall have immediate access to at least 90 metres of temporary safety barrier and the necessary plant and qualified personnel to commence erection of the barrier as soon as practicable but within 24 hours of the need for the barrier being known to the Operating Company.

Records of temporary safety barrier use including risk assessments shall be held within the Management System.

Schedule of Road Restraint Systems (Vehicle and Pedestrian)

[To be completed by the Operating Company]

Location & Start Chainage * (m)	Finish Chainage (m)	Position on Cross-Section +	Type of Road Restraint System** (Safety barriers, vehicle parapets, transitions, terminals, crash cushions, pedestrian parapets, pedestrian guardrails)	Set-back (m)	Containment Level** (Safety barriers, vehicle parapets, transitions) Performance Class (P)** (Terminals)	Impact Severity Level (ISL) ** (Safety barriers, vehicle parapets, transitions, terminals, crash cushions)	Working Width Class** (Safety barriers, vehicle parapets, transitions)	Performance Level and whether Redirective (R) or Non-redirective (NR) (Crash Cushions)	Permanent Lateral Displace-ment Zone (PLDZ) Characteristic**(Terminals) Permanent lateral Displacement Zone Class (D) Crash Cushions)	Exit Box Class** (Terminals) Redirection Zone Class (Z) (Crash Cushions)	Other Requirements/ Comments ** ++ +++

NOTES:* e.g. Road name, verge, central reserve, slip road etc. ** Enter temporary safety barrier where required.

\+ e.g. LH verge, central reserve, RH hand verge etc. ++ Height requirements etc. +++ Anti-glare Screens

APPENDIX 4/2 – INFORMATION REQUIRED TO DEMONSTRATE COMPLIANCE OF ROAD RESTRAINT SYSTEMS TO BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 AND DD ENV 1317-4:2002

The Operating Company shall submit the following supporting information demonstrating compliance with British Standard EN 1317-1, British Standard EN 1317-2, British Standard EN 1317-3 and DD ENV 1317-4:2002 to the Overseeing Organisation for acceptance:

EUROPEAN COMMITTEE FOR STANDARDISATION (CEN) COMPLIANCE [1]

Initial submission documents to be supplied for consideration of initial type test shall be as follows:

1 Test report in accordance with British Standard EN 1317-1, clause 9 (and including any additional test data required under British Standard EN 1317-3, clauses 7.3 and 7.4 and DD ENV 1317-4:2002, clauses 7.3 and 7.4).

2 Video/high speed film of test annotated showing date, test number and performance class.

3 Still photographs of complete installation including anchorage points.

4 Still photographs of vehicle before and after impact.

5 Full drawings of tested items.

6 Certification from the manufacturer that the item tested complies with drawings supplied.

7 Certificate from test house accredited in accordance with the requirements of Series 400 (MCHW 1.400).

Additional information which will be required on acceptance of initial type test prior to installation:

8 Manufacturer's specification.

9 Installation drawings.

10 Manufacturer's installation instructions including foundation requirements and test methods to verify their performance.

11 Manufacturer's repair and maintenance manual.

12 Certificate of compliance with the Quality Management Scheme 1 for the Manufacture of Fencing Components.

13 Compliance with the Quality Management Sector Scheme 2 – Supply and Installation of Fences:

(i) Sector Scheme 2B for Vehicle Restraint Systems.

14 Certificate of compliance for the Quality Management Sector Scheme 5 for the Fabrication and Installation of Bridge Parapets and Cradle Anchorages.

(i) Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems.

(ii) Sector Scheme 5B for The Installation of Parapets for Road Restraint Systems.

15 Nominal loads (direct forces, moments and co-existent shears) to be transferred from the parapet to the structure or foundation.

Notes:

1 All documents, which are not in English, shall have an English translation.

If they are in a language other than French or German the promoter will be required to supply a full translation.

2 Items 12 and 13 are required for safety barrier systems and transitions.

3 Items 14 and 15 are required for vehicle parapets.

Sheet 1 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002
TYPE OF VEHICLE RESTRAINT SYSTEM:
CONTAINMENT PERFORMANCE CLASS/PERFORMANCE LEVEL/PERFORMANCE CLASS (*):
TEST REPORT NUMBER: (Test of)
Test Type: (Primary/Complementary Test) (*)
TEST NUMBER: TEST DATE: (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel:/Fax:/E-mail: PRODUCT NAME:	

Initial submission documents to be supplied for consideration of Initial Type Test (ITT).

Item		Comment	Item Received (Y or N)	Date requested
1	Test report	In accordance with BS EN 1317-1, clause 9 (and including any additional test data required under BS EN 1317-3, clauses 7.3 and 7.4 and DD ENV 1317-4:2002, clauses 7.3 and 7.4).		
2	Video/high speed film	Of test coverage as specified in relevant part of BS EN 1317 or DD ENV 1317-4:2002. Annotated showing date, test number and performance class.		
3	Still photographs	Of complete installation including anchorage points.		
4	Still photographs	Of vehicle before and after impact.		
5	Drawings	Fully detailed drawings of tested item.		
6	Certification from the manufacturer	Confirming that the item tested complies with drawings supplied.		
7	Confirmation from test house	That the test conforms to the relevant requirements of BS EN 1317-1 (and including and additional test data required under BS EN 1317-2, BS EN 1317-3 and DD ENV 1317-4:2002).		
Additional information, which will be required on acceptance of initial type test prior to installation.				
8	System specification	Manufacturer's specification.		
9	Installation details	Manufacturer's drawings.		
10	Installation procedures	Manufacturer's installation instructions		
11	Maintenance Manual	Manufacturer's inspection, repair, and maintenance instructions.		
12	Certificate of compliance	With the Quality Management Scheme 1 for Manufacture of Fencing Components. [2]		
13	Certificate of compliance	With the Quality Management Sector Scheme 2B for the Supply and Installation of Vehicle Restraint Systems. [2]		
14	Certificate of compliance	With the Quality Management Sector Schemes 5A and 5B for the Manufacture and Installation of Bridge Parapets and Cradle Anchorages. [3] (i)Sector Scheme 5A for The Manufacture of Parapets for Road Restraint Systems, and (ii)Sector Scheme 5B for The Installation of Parapets for Road Restraint Systems.		
15	Support loads	Nominal loads (direct loads, bending moments and shear forces) that have to be transferred from the vehicle restraint system to the supporting structure or foundation. [3]		

Notes:

1. All documents, which are not in English, will have to be translated. If they are in a language other than French or German the promoter will be required to supply a full translation.
2. Items 12 and 13 are required for safety barrier systems and transitions.
3. Items 14 and 15 are required for vehicle parapets. See also Note 1 under Sector Scheme B in Appendix A of the Specification for Highway Works.

Signature: Name:

Date:

Sheet 2 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1, BS EN 1317-2, and DD ENV 1317-4:2002
TYPE OF VEHICLE RESTRAINT SYSTEM: Safety Barrier, Vehicle Parapet or Transition (*)
CONTAINMENT PERFORMANCE CLASS/LEVEL(*)
TEST REPORT NUMBER: (Test of)
Test Type: (Primary/Complementary Test) (*)
TEST NUMBER: TEST DATE: (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel:/Fax:/E-mail: PRODUCT NAME:	

			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1	Vehicle Details	Impact Condition(s) Total vehicle mass (kg) Speed (km/h) Angle (degrees)	 .....(+) ……(0,+7%) …….(-1,+1.5)			
		Centre of Gravity Vertical height (m) Longitudinal (m) Lateral (m)	 .....(± 10%) ……(± 10%) ± …….			
		Model				N/A
BS EN 1317-2, Clause 4.2	Vehicle Restraint System (VRS) Behaviour	1)The VRS shall contain and redirect the vehicle without breakage of principal longitudinal elements of the system. 2)No major part of the VRS shall become totally detached or present an undue hazard to other traffic, pedestrians or personnel in a work zone. 3)Elements of the VRS shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into the passenger compartment that can cause serious injuries are not permitted. 4)Ground anchorages and fixings shall perform according to the design of the VRS.				
BS EN 1317-2, Clause 4.3	Vehicle Behaviour	1)The centre of gravity (CG) of the vehicle shall not cross the centreline of the deformed system. 2)The vehicle shall remain upright during and after impact, although moderate rolling, pitching and yawing are acceptable. 3)The vehicle shall leave the VRS after impact, so that the wheel track does not cross a line parallel to the initial traffic face of the VRS, at a distance A (2.2m) plus vehicle width + 16% of the length of the vehicle within a distance B (10m) from the final intersection (break) of wheel track with the initial traffic face of the VRS.				
BS EN 1317-2, Clause 5.3.2	Installation	1)The length of the VRS shall be sufficient to demonstrate the full performance characteristics of the system. 2)If the VRS has to develop tension, end anchorages shall be provided in accordance with the VRS specification. Post foundation shall meet the design specification.				
BS EN 1317-2, Clause 4.4.	Severity Indices	SPECIFIED THIV Limit 33 km/h Limit 33 km/h PHD Limit 20 g ASI Limit 1.4 Limit 1.4	ACTUAL THIV….. km/h km/h PHD….. g g ASI….. .			
BS EN 1317-2, Clause 5.7, Figure 3	Photographic coverage	1)Photographic coverage shall be sufficient to clearly describe behaviour and vehicle motion during and after impact. 2)High speed cameras shall be operated at a minimum of 200 frames per second and stills. 3)As recommended in clause 5.7 and Figure 3.				
	Drawings	Drawings included			N/A = Not Applicable	

FULLY COMPLIES WITH STANDARD: BS EN 1317-1, BS EN 1317-2, DD ENV 1317-4:2002	
Signature:	Name:
Date:	

Sheet 3 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1 and BS EN 1317-3
TYPE OF VEHICLE RESTRAINT SYSTEM: Crash Cushion (Redirective [R] or Non-redirective [NR](*)
TEST REPORT NUMBER: TEST TYPE: (Primary/Complementary Test) (*)
PERFORMANCE LEVEL: VELOCITY CLASS: (Test of)
TEST NUMBER: TEST DATE: (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel:/Fax:/E-mail: PRODUCT NAME:	

			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1	Vehicle Details	Impact Condition(s) Total vehicle mass (kg) Speed (km/h) Angle (degrees)	 .....(+ …) ……(0,+7%) ……(-1,+1.5)			
		Centre of Gravity Vertical height (m) Longitudinal (m) Lateral (m)	 .....(± 10%) ……(± 10%) ±…….			
		Model				N/A
BS EN 1317-3, Clause 6.2	Crash Cushion Behaviour	1)Elements of the crash cushion shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. 2)No major element of the crash cushion, having a solid mass greater than or equal to 2.0 kg, shall become totally detached, unless this is required by the working of the crash cushion. No major element of the crash cushion shall impede the path of adjacent traffic. The final position of the detached element shall be considered to determine the displacement classification.				
BS EN 1317-3, Clause 6.3	Vehicle Behaviour	1)The vehicle shall remain upright during and after the collision although yawing and moderate rolling and pitching are acceptable. The post-impact trajectory of the test vehicle shall be controlled by means of the exit box shown in Figure 2 and specified as detailed in Tables 11 and 12.				
BS EN 1317-3, Clause 7.3.2	Installation	1)The installation of the crash cushion for the test shall comply with the structural design details and the on-road system details as given in the design specification.				
BS EN 1317-3, Clause 5.4. and Table 4	Impact Severity Levels	SPECIFIED Level A:THIV ≤ 44km/h (Tests 1, 2 & 3) THIV≤ 33km/h (Tests 4 & 5) ASI≤ 1.0 Level B:THIV≤ 44km/h (Tests 1, 2 & 3) HIV ≤ 33km/h (Tests 4 & 5) ASI≤ 1.4 Levels A & B: PHD ≤ 20g	ACTUAL			
BS EN 1317-3, Clause 7.7 Figure 4	Photographic coverage	1)High speed cameras and/or high speed video cameras shall be operated at minimum of 200 frames per second. 2)Stills 3)As recommended in clause 7.7 and Figure 4.				
	Drawings	Drawings included				
					N/A = Not Applicable	

FULLY COMPLIES WITH STANDARD: BS EN 1317-1 and BS EN 1317-3	
Signature:	Name:
Date:	

Sheet 4 of 4

SUBMISSION FOR COMPLIANCE WITH BS EN 1317-1 and DD ENV 1317-4:2002
TYPE OF VEHICLE RESTRAINT SYSTEM: Terminal
PERFORMANCE CLASS: (Test of)
Test Type: (Primary/Complementary Test) (*)
TEST TYPE NUMBER:
TEST NUMBER: TEST DATE: (*) delete as appropriate

COMPANY NAME: CONTACT: ADDRESS: Tel:/Fax:/E-mail: PRODUCT NAME:	

			Specified	Actual	Satisfactory (Yes or No)	Compliance
BS EN 1317-1, Table 1, DD ENV 1317-4:2002, Clauses 7.4 & 7.5	Vehicle Details	Impact Condition(s) Total vehicle mass (kg) Speed (km/h) Angle (degrees)	 .....(± …) ……(0,+7%) ……(-1,+1.5)			
		Centre of Gravity Vertical height (m) Longitudinal (m) Lateral (m)	.....(± 10%) ……(± 10%) ± …….			
		Model				N/A
DD ENV 1317-4:2002, Clauses 5.4 &5.5.2	Terminal Behaviour	1)Elements of the terminal shall not penetrate the passenger compartment of the vehicle. Deformations of, or intrusions into, the passenger compartment that could cause serious injuries are not permitted. 2)No major part of the terminal shall become totally detached and come to rest outside the permanent lateral displacement zones defined in clause 5.4. 3)Anchorages and fixings shall perform to the terminal design specifications and other specified requirements as listed in the test report.				
BS EN 1317-4,:2002 Clause 5.5.3	Vehicle Behaviour	1)The vehicle shall not overturn, although rolling, yawing and moderate pitching may be accepted. For the Performance Class P1 rolling onto a side may be accepted. 2)The exit box values for the specified test are as defined in Figures 5.6 and 7 (as appropriate).				
DD ENV 1317-4:2002, Clause 7.3.2	Installation	1)The terminal shall conform to the structural design details and with the system installation details as given in the design specification of the manufacturer.				
BS EN 1317-4:2002, Clause 5.5.4 & Table 5	Impact Severity Levels	SPECIFIED Level A: THIV ≤44km/h (Tests 1,2 &3) THIV ≤33km/h (Tests 4 &5) ASI ≤ 1.0 Level B: THIV ≤ 44km/h (Tests 1,2&3) THIV≤ 33km/h (Tests 4 & 5) ASI ≤ 1.4 Levels A & B: PHD≤ 20g	ACTUAL			
DD ENV 1317-4:2002, Clause 7.7. & Figure 7	Photographic coverage	1)Photographic coverage shall be sufficient to describe clearly terminal and vehicle motion during and after impact. 2)High speed cameras and/or high speed video cameras at a minimum of 200 frames per second. 3)Stills				
	Drawings	Drawings included				
					N/A = Not Applicable	

FULLY COMPLIES WITH STANDARD: BS EN 1317-1 and DD ENV 1317-4:2002	
Signature:	Name:
Date:	

APPENDIX 5/1 – DRAINAGE REQUIREMENTS

1 **The Design for new drainage systems shall be in accordance with other provisions of this Contract.**

The permitted alternative pipe/trench options for carrier drains shall be as given below:

Permitted Alternative Pipe/Bedding Combinations												
Pipe Diameter (mm)	Pipe Group No.	Vitrified Clay					Pre-cast Concrete			Ductile Iron	GRP	Thermoplastic (Structured Wall)
		L	95	120	160	200	Class L	Class M	Class H			
100	1				ASBFN	ASBFN				S	S	ST
100	2				ASBFN	ASBFN				S	S	ST
100	3				ASBFN	ASBFN				S	S	ST
100	4				ASBFN	ASBFN				S	S	ST
100	5				ASBFN	ASBFN				S	S	ST
100	6				ASBFN	ASBFN				S	S	ST
100	17				Z	Z				Z	Z	Z
150	1				ASBFN	ASBFN	ASBFN	ASBFN		S	S	ST
150	2				ASBFN	ASBFN	ASBFN	ASBFN		S	S	ST
150	3				ASBFN	ASBFN	ASBFN	ASBFN		S	S	ST
150	4				ASBFN	ASBFN	ASBFN	ASBFN		S	S	ST
150	5				ASBFN	ASBFN	ASBF	ASBFN		S	S	ST
150	6				ASBFN	ASBFN	ASBF	ASBFN		S	S	ST
150	17				Z	Z	Z	Z		Z	Z	Z
225	1				ASBFN	ASBFN	ASBF	ASBFN		S	S	ST
225	2				ASBFN	ASBFN	ASBF	ASBFN		S	S	ST
225	3				ASBFN	ASBFN	ASBF	ASBF		S	S	ST
225	4				ASBFN	ASBFN	ASBF	ASBF		S	S	ST
225	5				ASBFN	ASBFN	ASB	ASBF		S	S	ST

Permitted Alternative Pipe/Bedding Combinations												
Permitted Alternative Pipe/Bedding Combinations												
Pipe Diameter (mm)	Pipe Group No.	Vitrified Clay					Pre-cast Concrete			Ductile Iron	GRP	Thermoplastic (Structured Wall)
		L	95	120	160	200	Class L	Class M	Class H			
225	6				ASBF	ASBFN	ASB	ASBF		S	S	ST
225	17				Z	Z	Z	Z		Z	Z	Z
300	1				ASBFN	ASBFN	ASBF	ASBF		S	S	ST
300	2				ASBFN	ASBFN	ASB	ASBF		S	S	ST
300	3				ASBFN	ASBFN	ASB	ASBF		S	S	ST
300	4				ASBFN	ASBFN	ASB	ASB		S	S	ST
300	5				ASBFN	ASBFN	ASB	ASB		S	S	ST
300	6				ASBFN	ASBFN	AS	ASB		S	S	ST
300	17				Z	Z	Z	Z		Z	Z	Z
375	1				ASBFN	ASBFN	ASB	ASBF	ASBFN			
375	2				ASBFN	ASBFN	ASB	ASBF	ASBF			
375	3				ASBFN	ASBFN	AS	ASBF	ASBF			
375	4				ASBFN	ASBFN	AS	ASBF	ASBF			
375	5				ASBFN	ASBFN	A	ASB	ASBF			
375	6				ASBFN	ASBFN	A	ASB	ASBF			
375	17				Z	Z	Z	Z	Z			
450	1			ASBF	ASBFN		AS	ASBF	ASBFN			
450	2			ASBF	ASBFN		AS	ASBF	ASBF			
450	3			ASBF	ASBFN		A	ASBF	ASBF			
450	4			ASBF	ASBFN			ASB	ASBF			
450	5			ASBF	ASBFN			ASB	ASBF			
450	6			ASBF	ASBFN			ASB	ASB			
450	17			Z	Z		Z	Z	Z			
600	1	ASB	ASBF					ASBF	ASBFN	S	S	ST
600	2	ASB	ASBF					ASBF	ASBF	S	S	ST
600	3	AS	ASBF					ASBF	ASBF	S	S	ST
600	4	AS	ASBF					ASBF	ASBF	S	S	ST

Permitted Alternative Pipe/Bedding Combinations												
600	5	A	ASB					ASB	ASBF	S	S	ST
600	6	A	ASB					ASB	ASB	S	S	ST
Permitted Alternative Pipe/Bedding Combinations												
Pipe Diameter (mm)	Pipe Group No.	Vitrified Clay					Pre-cast Concrete			Ductile Iron	GRP	Thermoplastic (Structured Wall)
		L	95	120	160	200	Class L	Class M	Class H			
600	17	Z	Z					Z	Z	Z	Z	Z
750	1						ASB	ASBF	ASBFN			
750	2						ASB	ASBF	ASBF			
750	3						AS	ASB	ASBF			
750	4						AS	ASB	ASBF			
750	5						A	ASB	ASBF			
750	6						A	ASB	ASB			
750	17						Z	Z	Z			
900	1						ASB	ASBF	ASBFN	S	S	ST
900	2						ASB	ASBF	ASBFN	S	S	ST
900	3						AS	ASBF	ASBF	S	S	ST
900	4						AS	ASB	ASBF	S	S	ST
900	5						A	ASB	ASBF	S	S	ST
900	6						A	ASB	ASBF	S	S	S
900	17						Z	Z	Z	Z	Z	Z

Note 1 Bed Types shall be in accordance with Drawings F1 and F2 of the Highway Construction Details.

Note 2 Replacement pipes in an existing system shall match the existing where practicable.

2 Covers to Chambers and Gullies: Covers to chambers and gullies shall comply with the loading category of British Standard EN 124 as follows:

2.1 Chambers

2.1.1 Ductile heavy duty double triangular three point suspension non rock cover Class D400. Opening to be square.

2.1.2 Ductile medium duty double triangular three point suspension non rock cover Class B225.

2.1.3 Triple two piece gully type gratings Class D400 with waterway area 3330 cm².

2.2 Gullies

2.2.1 Single piece hinged gully grating Class C250 with waterway area 1240 cm².

2.2.2 Double triangular two piece non rock gully grating Class D400 with waterway area 1870 cm².

2.3 Rodding Eyes

2.3.1 Ductile non-rocking cover Class D400, B225 or C250 as appropriate to the location. The required loading category shall be determined by the Operating Company in accordance with this Contract.

3 Adjustment of level to covers and frames

3.1 Manhole and chamber covers shall be set or reset to the final levels prior to the laying of the uppermost wearing course or, if no surfacing Site activities are being undertaken, to the level of the surrounding ground surface.

3.2 Gully frames shall be set 6 mm below the level of the adjacent surface.

3.3 Covers and frames together with any shims, tiles, brick or other authorised material used to adjust the level shall be bedded using polyester epoxy or ultra-rapid hardening cementitious mortar applied in accordance with the manufacturer's written instructions.

4 Joints

4.1 The requirement for watertight joints shall be determined by the Operating Company in accordance with this Contract.

4.2 Use of rigid joints shall be determined by the Operating Company in accordance with this Contract.

5 Saddles

5.1 Use of saddles on existing pipes shall be permitted except where otherwise determined by the Operating Company in accordance with this Contract.

6 Connections

6.1 Requirements for connections to existing drains shall be determined by the Operating Company in accordance with this Contract.

7 Chambers

7.1 Chambers shall be constructed in accordance with HCD Drawings F3, F4, F5 and F11.

8 Gullies

8.1 Gullies shall be trapped or un-trapped as determined by the Operating Company in accordance with this Contract.

9 Cleaning

9.1 All existing drainage systems within the Unit shall be cleaned in accordance with clauses 520 and 521, Series 6100 and Schedule 7 Part 1.

APPENDIX 5/2 – SERVICE DUCT REQUIREMENTS

1 The permitted alternative design groups for service ducts shown on HCD I2 shall be types D1 to D4 as shown on drawing number 500/01/337-379 in Schedule 9 Part 3.

2 Depth to top of ducts shall be 600 mm in all cases.

3 Chambers shall be constructed with 225 mm thick walls of bricks complying with clause 2406 set in Class 1 mortar laid on a base slab 150 mm thick of mix ST4 concrete.

4 Covers and frames shall be bedded on Class 1 mortar.

5 Drawpits Types DP1 and DP2 shall be constructed in accordance with drawing number 500/05/160-166 in Schedule 9 Part 3.

6 Service ducts shall be built into the walls of the chambers.

7 Draw ropes for service ducts shall be secured by tying/fixing the draw rope to stoppers as detailed on drawing number 500/01/337-379 in Schedule 9 Part 3. Two metres of slack rope shall be provided at both ends of every duct.

APPENDIX 5/3 – SURFACE WATER CHANNELS AND DRAINAGE CHANNEL BLOCKS

Surface Water Channels and Drainage Channel Blocks shall be constructed as shown on drawing number 1100/01/085-115 in Schedule 9 Part 3.

APPENDIX 5/4 – FIN DRAINS AND NARROW FILTER DRAINS

Details of permitted types of fin drains and narrow filter drains together with any specific performance criteria shall be determined by the Operating Company in accordance with this Contract.

APPENDIX 5/5 – COMBINED DRAINAGE AND KERB SYSTEMS

Combined drainage and kerb systems shall be type DK1 to DK4 inclusive as referred to on drawing numbers 1100/02/124-127, 1100/02/130 and 1100/02/133 in Schedule 9 Part 3.

APPENDIX 5/7 – THERMOPLASTICS STRUCTURAL WALL PIPES AND FITTINGS

Information to be provided by the Operating Company

The Operating Company shall provide the following information in accordance with sub-clause 518.2 for the range of pipes and fittings (to be verified by the Certification body – see sub-clause 518.15).

1. Technical drawings showing dimensions and tolerances including sealing rings and weight per metre, together with properties, as specified in sub-clauses 518.3 and 518.5.

2. Material specification shall be in accordance with sub-clause 518.2:

Table 1 – Unplasticised polyvinyl-chloride (PVC-U)

Property	**Test method reference**	**Specification**
Tensile Properties	BS EN ISO 6259, BS EN ISO 527-1	
Vicat	BS EN 727	
Longitudinal reversion	BS EN ISO 2505	
K-value	BS EN 922	
PVC content	BS EN 1905	
Density	BS EN ISO 1183-3,	
Heat Reversion	ISO 12091	
Effects of heating (injection moulded fittings only)	BS EN ISO 580	

Table 2 – Polyethylene (PE)

Property	**Test method reference**	**Specification**
Tensile Properties	BS EN ISO 6259, BS EN ISO 527-1	
Oxygen induction time	BS EN 728	
Melt Flow Rate	BS EN ISO 1133	
Density	BS EN ISO 1183-3	
Melt Flow Rate	ISO 1133:2005	
Heat Reversion	ISO 12091	
Effects of heating (injection moulded fittings only)	BS EN ISO 580	

Table 3: Polypropylene (PP)

Property	**Test method reference**	**Specification**
Tensile Properties	BS EN ISO 6259, BS EN ISO 527-1	
Oxygen induction time	BS EN 728	
Melt Flow Rate	BS EN ISO 1133	
Density	BS EN ISO 1183-3	
Heat Reversion	ISO 12091	
Effects of heating (injection moulded fittings only)	BS EN ISO 580	

APPENDIX 6/1 – REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC OF EARTHWORKS MATERIALS

1 The acceptability of earthworks materials shall be determined by compliance with the Specification, including Table 6/1, as amended by this Appendix.

2 The Operating Company shall be responsible for the assessment and selection of materials in earthworks and shall be responsible for the classification of materials on Site, or off Site, as appropriate. Fill materials shall be assessed at the place of excavation or deposition, as required by the Operating Company.

3 Class 3 material shall not be used.

4 Material for disposal shall be removed to a licensed disposal facility.

Table 6/1 – Acceptable Earthworks Materials: Classification Requirements (see footnotes)

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:					
									Lower	Upper				
GENERAL GRANULAR FILL	1	A	–	Well graded granular material	General Fill	Any material	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	1	A	–
							(ii) uniformity coefficient	See Note 5 (OE)	10	–				
							(iii) mc	BS 1377: Part 2	Omc - 2%	Omc + 2%				
	1	B	–	Uniformly graded granular material	General Fill	Any material	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	1	B	–
							(ii) uniformity coefficient	See Note 5	–	10				
							(iii) mc	BS 1377: Part 2 (OE)	Omc - 2%	Omc + 1%				
	1	C	–	Coarse granular material	General Fill	Any material	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 5	1	C	–
							(ii) uniformity coefficient	See Note 5	5	–				
							(iii) Los Angeles coefficient	Clause 635	–	50				

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)			Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:				
									Lower	Upper			
GENERAL COHESIVE FILL	2	A	–	Wet cohesive material	General Fill	Any material	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 1 except: – i) for materials with liquid limit greater than 50, determined by BS 1377: Part 2, only deadweight tamping or vibratory tamping rollers or grid rollers shall be used. ii) for chalk all types of vibratory rollers of Categories over 1800 kg shall not be used.	2	A	–
							(ii) plastic limit (PL)	BS 1377: Part 2 (OE)	–	–				
							(iv) MCV	Clause 632	8	15				
	2	B	–	Dry cohesive material	General Fill	Any material	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2	B	–
							(ii) plastic limit (PL)	BS 1377: Part 2 (OE)	–	–				
							(iii) mc	BS 1377: Part 2 (OE)	–	PL – 4%				
							(iv) MCV	Clause 632	8	15				
	2	C	–	Stony cohesive material	General Fill	Any material	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2	C	–
							(ii) plastic limit (PL)	BS 1377: Part 2 (OE)	–	–				
							(iii) MCV	Clause 632	8	15				
	2	D	–	Silty cohesive material	General Fill	Any material	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	2	D	–

							(iii) MCV	Clause 632	8	14				
	2	E	–	Reclaimed pulverised fuel ash cohesive material	General Fill	Reclaimed material from lagoon or stockpile containing not more than 20% furnace bottom ash	(i) mc	BS 1377: Part 2 (OE)	To enable compaction to Clause 612		End product 95% of maximum dry density of BS 1377: Part 4 (2.5 kg rammer method)	2	E	–
							(ii) bulk density	BS 1377: Part 9	App 6/1	App 6/1				

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:					
									Lower	Upper				
	4	–	–	Various	Fill to Landscape Areas	See Appendix 6/1	(i) grading	BS 1377: Part 2 (OE)			See clause 620	4	–	–
							(ii) MCV	Clause 632	8	15				
TOPSOIL	5	A	–	Topsoil, or turf, existing on Site	Topsoiling	Topsoil or turf designated as Class 5A in this Contract	(i) grading	Clause 618	–	Clause 618	–	5	A	–
	5	B	–	Imported topsoil	Topsoiling	General purpose grade complying with BS 3882	–	–	–	–	–	5	B	–

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)			Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within: Lower	Acceptable Limits Within: Upper				
SELECTED GRANULAR FILL	6	A	–	Selected well graded granular material	Below water	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil or any combination thereof.	(i) grading	BS 1377: Part 2 (On-site) (OE)	Tab 6/2	Tab 6/2	No compaction	6	A	–
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity	See Note 5	10	–				
							(iii) plasticity index	BS 1377: Part 2 (OE)	Non-plastic					
	6	B	–	Selected coarse granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof.	(i) grading	BS 1377: Part 2 (OE) (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 5	6	B	–
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) plasticity index	BS 1377: Part 2 (OE)	Non-plastic					
							(iii) Los Angeles Coefficient	Clause 635	–	50 kN				

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	C	–	Selected uniformly graded granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. (	(i) grading	BS 1377: Part 2 (OE) (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	6	C	–
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	–	10				
							(iii) plasticity index	BS 1377: Part 2 (OE)	Non-plastic					
							(iv) Los Angeles Coefficient	Clause 635	–	50				
							(v) mc	BS 1377: Part 2 (OE)	Optimum mc -2%	Optimum mc +1%				
	6	F	2	Selected granular material (coarse grading	Capping	Any material, or combination of materials, other than unburnt colliery spoil and argillaceous rock. Property (iv) in the next column shall not apply if Class A (asphalt) content is 20% or less.	(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F	2
							(ii) optimum mc	BS 1377: Part 4 (vibrating hammer method) (OE)	–	–				
							(iii) mc	BS 1377: Part 2(OE)	Optimum mc -2%	Optimum mc				
							(iv) Los Angeles Coefficient	Clause 635	–	50				
							(v) Class A asphalt content	Clause 710	–	50%				
							(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	–	2.0%				

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	G	–	Selected granular material	Gabion filling	Natural gravel, crushed rock, crushed concrete or any combination thereof. None of these constituents shall include any argillaceous rock.	(i) grading	BS 1377: Part 2 (On-site) (OE)	Tab 6/2	Tab 6/2	None	6	G	–
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) Los Angeles Coefficient	Clause 635	–	50				
	6	N	–	Selected well graded granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, well burnt colliery spoil, or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt.	(i) grading	BS 1377: Part 2 (On-site) (OE)	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377: Part 4 (vibrating hammer method)	6	F	2
								BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5				
							(ii) uniformity coefficient	See Note 5	10	–				
							(iii) Los Angeles Coefficient	Clause 635	–	40				
							(v) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	To be determined by the Operating Company	–				

Class				General Material Description	Typical Use	Permitted Constituents (all subject to requirements of Class 601 and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Class 601 and testing in Clause 631)				Compaction Requirements in Clause 612	Class		
							Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:					
									Lower	Upper				
SELECTED GRANULAR FILL	6	N	–	Selected well graded granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, well burnt colliery spoil, or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt.	(vi) permeability	Clause 640	To be determined by the Operating Company	–		6	N	–
							(vii) mc	BS 1377: Part 2 (OE)	To be determined by the Operating Company	To be determined by the Operating Company				

Footnotes to Table 6/1

1 App = Appendix

2. Tab = Table

3. Where in the Acceptable Limits column reference is made to Appendix 6/1, the Operating Company shall submit the proposed acceptance limits to the Overseeing Organisation for its consent.

4. Where BS 1377: Part 2 is specified for mc, this shall mean BS 1377: Part 2 or BS EN 1097-5 as appropriate.

5. Uniformity coefficient is defined as the ratio of the particle diameters

   D60 to D10 on the particle-size distribution curve, where:

   D60 = particle diameter at which 60% of the soil by weight is finer

   D10 = particle diameter at which 10% of the soil by weight is finer

6. The limiting values for Class U1B material are given in Appendix 6/14 and Appendix 6/15

7. Table 6/1 contains details of materials that are considered to be those most commonly encountered on the network. However, this does not preclude the use of other materials, which use shall be determined by the Operating Company in accordance with other provisions of this Contract.

APPENDIX 6/2 – REQUIREMENTS FOR DEALING WITH CLASS U1B AND CLASS U2 UNACCEPTABLE MATERIALS

For specific Schemes where Class U1B or Class U2 unacceptable material is encountered the Operating Company shall submit its proposals for dealing with the material to the Overseeing Organisation for its consent.

APPENDIX 6/3 – REQUIREMENTS FOR EXCAVATION, DEPOSITION, COMPACTION (OTHER THAN DYNAMIC COMPACTION)

1 The use of a nuclear moisture/density gauge is permitted for measuring field dry densities of fill to Structures and fill above structural foundations where an end product compaction requirement is specified in Table 6/1.

2 Embankments shall be constructed in general with side slopes not steeper than 1 in 2.

APPENDIX 6/5 – GEOTEXTILES USED TO SEPARATE EARTHWORKS MATERIALS

Geotextile Type 1 shall be a general purpose woven or non-woven geotextile of nominal weight 100 g/m^2.

APPENDIX 6/8 – TOPSOILING

1. The thickness of topsoil to be deposited shall be determined by the Operating Company in accordance with this Contract.

2. Tracked vehicle shall not be used to spread topsoil.

3. The use of topsoil class 5B shall be determined by the Operating Company in accordance with this Contract.

APPENDIX 6/10 – GROUND ANCHORAGES, CRIB WALLING AND GABIONS

1. Unless stated otherwise in an Order gabions shall be constructed using a cage of 80 mm nominal mesh opening filled with Class 6G material of grading 100 mm to 200 mm.

   Any variation in nominal mesh opening together with overall cage dimensions to suit specific Scheme requirements shall be determined by the Operating Company.

2. Where a plastic geomesh is proposed the properties shall determined by the Operating Company.

APPENDIX 6/14 – LIMITING VALUES FOR POLLUTION OF CONTROLLED WATER

1. The Operating Company shall determine for each Scheme the limiting values in a material for pollution of controlled waters.

   These values may be expressed as total concentrations in the material or preferably as concentrations of cumulative leached amounts in standard leaching tests carried out on the materials.

2. The Operating Company shall through consultation with the Scottish Environment Protection Agency establish generic guideline values for given soil conditions or shall undertake Scheme specific risk assessments in order to derive such values. Any values established in this manner shall be approved by Scottish Environment Protection Agency.

3. The Operating Company shall include for all testing requirements in relation to this Appendix in the Management System as part of its Inspection and Test Plan in accordance with the requirements of Appendix 1/5.

4. In addition to the above requirements the Operating Company shall comply with the schedule of commitments given in the Environmental Statement for the Forth Replacement Crossing insofar as they relate to operations. These are re-stated in Annex 5.8/A of Schedule 5 Part 8.

APPENDIX 6/15 – LIMITING VALUES FOR HARM TO HUMAN HEALTH AND THE ENVIRONMENT

1. The Operating Company shall determine for each Scheme the limits on the amount of contaminants in a material which if exceeded shall lead to a significant possibility of significant harm to human health or the environment.

2. The Operating Company shall through consultation with the Scottish Environment Protection Agency establish generic guideline values for given soil conditions or shall undertake Scheme specific risk assessments in order to derive such values. Any values established in this manner shall be approved by Scottish Environment Protection Agency.

3. The Operating Company shall include for all testing requirements in relation to this Appendix in the Management System as part of its Inspection and Test Plan in accordance with the requirements of Appendix 1/5.

APPENDIX 7/1 – TS – FLEXIBLE PAVEMENT OPTIONS

1 Permitted Pavement Options – Schedule 1 – Not Used.

2 General Requirements – Schedule 2

Schedule 2: General Requirements – All Areas		
Grid for checking surface levels of pavement courses (702.4)	Longitudinal Dimension	5 metres
	Transverse Dimension	Crown Middle of lane 300mm from channel
Surface Regularity (702.7)	Category of Road:	A
Interval for measurement of longitudinal regularity		Continuous in any line or lines parallel to the edge of pavement.
Interval for measurement of transverse regularity		2 metres
Surface texture is required* * The requirement for a surface macrotexture shall be determined by the Operating Company in accordance with the other provisions of this Contract. Surface macrotexture for clause 911 HRA in accordance with clause 921 shall always be required.		In accordance with clause 921
Measurement of surface texture is required*		Yes
Full documentation of the manufacturer's design shall be supplied to the Overseeing Organisation for its written consent before the commencement of laying of any material designed in accordance with MCHW.		

3 Permitted Construction Materials – Schedule 3

Schedule 3: Permitted Construction Materials		
Pavement Options		
Pavement Layer	Material Reference	Thickness (mm)
Surface Treatment	HFS	Scheme Specific*
Surface Course	SCT, SCH, SCM, SCS	Scheme Specific*
Binder Course	BCa, BCb, BCc, BCR, BEMa, BEMb, BSCH	Scheme Specific*
Base	Ba, Bb, Bc, BEMa, BEMb	Scheme Specific*
Subbase	SB1, SB2	Scheme Specific*
Regulating	RCa, RCb	Varies
Total Thickness*		Scheme Specific

* Scheme Specific Information shall be determined by the Operating Company in accordance with the other provisions of this Contract.

4. General Requirements for Construction Materials – Schedule 4

Schedule 4: General Requirements for Construction Materials	
Clause	Requirement
801.2 and 801.3	Limiting distance for deposition of unbound mixtures shall be 500mm
801.7	All materials shall be non frost susceptible
802.4	Materials up to 225mm thickness shall be spread and compacted in one layer
900 Series	All supplies of Asphalt materials shall be approved under Sector Scheme 14, "Quality Assurance of the Production of Asphalt Mixes".
901.3 and 942.5	In addition to the requirements of clauses 901.3 and 942.5 the coarse aggregate in all base and binder course materials shall be crushed rock. Blast furnace slag and steel slag are not permitted as coarse aggregate.
901.9 and 903.27	In addition to the requirements of Cl 901.9, temporary running surfaces shall have a minimum PSV of 55. Where binder course and base are to be trafficked, limestone aggregates shall not be used.
903.25	Sealant shall be applied to any freestanding edge of the finished pavement.

(i) The minimum PSV and maximum AAV requirements for the permitted surface course materials listed in Schedule 5 of this Appendix shall be Scheme specific and shall be determined in accordance with Tables 3.1 and 3.2 of HD 36/06 or equivalent of the DMRB respectively.

The required values for each Scheme shall be determined by the Operating Company in accordance with the other provisions of this Contract.

(ii) Individual layer thicknesses shall be Scheme specific and the required values for each Scheme shall be determined by the Operating Company in accordance with the other provisions of this Contract.

(iii) Cement and other Hydraulically Bound Mixtures complying with clauses 810 to 880 shall only be permitted for use with the prior written consent by the Overseeing Organisation.

The requirements for these materials when proposed for use shall be determined by the Operating Company in accordance with the other provisions of this Contract.

5 Requirements for Construction Materials – Schedule 5

Schedule 5: Requirements For Construction Materials				
Material Ref.	Clause	Description	Grade of Binder	Requirement
HFS	924	High Friction Surface		Minimum PSV: 70 Classification: Type 1– to be determined by the Operating Company in accordance with the other provisions of this Contract. Min PSV and Max AAV: See note (i) in Schedule 4 above . Coloured surfaces may be required in some areas.
SCT	942	Thin Surface Course System Note: The use of this material shall be subject to written consent by the Overseeing Organisation on a Scheme specific basis with the exception of small areas of repair to existing surface courses where clause 942 material has been used.	Nominated by supplier to meet requirements	The following parameters shall be determined by the Operating Company in accordance with the other provisions of this Contract: 1. Traffic count in cvd/l/day 2. Site Classification 3. Minimum wheel-tracking level required on BBA HAPAS Roads and Bridges Certificate 4. Resistance to permanent deformation. Level 3 shall apply unless otherwise stated on the order, or otherwise agreed 5. Road/tyre noise level relative to HRA required on BBA HAPAS Roads and Bridges Certificate 6. Macrotexture shall be in accordance with clause 942.13 and Cl 942.14 unless stated on the Order or otherwise agreed. 7. Clause 942.15 and 942.16 shall apply unless otherwise stated on the Order, or otherwise agreed. Note: Where repairs require to be carried out to a surface of area less than 100m^2 which shall be composed of a Thin Surface Course System the material used shall be of type previously used.

Schedule 5: Requirements For Construction Materials				
Material Ref.	Clause	Description	Grade of Binder	Requirement
SCS	974AR	Transport Scotland SMA (2010)	Nominated to suit requirements	As clause 974AR.
SCM	971AR	SMA	Nominated to suit requirements	As clause 971AR.
SCH	911TS	Hot Rolled Asphalt Surface Course (Design Mix)	40/60	HRA 35/14 C surf 40/60. HRA 35/14 F surf 40/60. 14/20 Pre coated chippings to Cl 915 shall be used. Min PSV and Max AAV of chippings: See note 4.1 of this Appendix. Surface Macrotexture is required in accordance with clause 921.
Ba Bb Bc	929	Base Asphalt Concrete	As Requirement	Sub clauses 945.1 and 945.2 shall apply. Void content at refusal is to be monitored in the permanent work in accordance with clause 929.3 Deformation resistance is required in accordance with Class 2, Table D2 of PD 6691 Deformation resistance shall be monitored in accordance with clause 929.5 Ba : AC32 HDM base 40/60 des. Bb : AC32 dense base 40/60 des. Bc : AC32 HMB base 30/45 des.
BCa BCb BCc	929	Binder Course Asphalt Concrete	As Requirement	Sub clauses 945.1 and 945.2 shall apply. Void content at refusal is to be monitored in the permanent work in accordance with clause 929.3 Deformation resistance is required in accordance with Class 2, Table D2 of PD 6691

Schedule 5: Requirements For Construction Materials				
Material Ref.	Clause	Description	Grade of Binder	Requirement
				Deformation resistance shall be monitored in accordance with clause 929.5 BCa : AC20 HDM bin 40/60 des. BCb : AC20 dense bin 40/60 des. BCc : AC20 HMB bin 30/45 des.
BCR	906	Dense Binder Course Asphalt Concrete (Recipe)	100/150 40/60	AC20 dense bin 100/150 rec. AC20 dense bin 40/60 rec. AC32 dense base 100/150 rec. AC32 dense base 40/60 rec.
BSCH	943	Binder Course (Hot Rolled Asphalt)		Wheel tracking to comply with Class 2 to Table C3 to PD 6691:2007;
BEMa BEMb	930	EME Base and Binder Course Asphaltic Concrete	As Requirement	BEMa: AC 10 EME2 bin/base 15/25 des. BEMb: AC 14 EME2 bin/base 15/25 des.
RCa RCb	907	Regulating	As Requirement	Tolerance: Laid to achieve the appropriate horizontal tolerances to clause 702. Stone Mastic Asphalt to Cl 937 shall be used where thicknesses are less than 55mm. Cl 929 binder course shall be used where thicknesses exceed 55 mm. RCa : AC20 dense bin 40/60 des. RCb : Appropriate binder/aggregate size from Cl 937. Max coarse agg size 14mm.
SB1	803	Type 1 Granular Material		Crushed Gravel Coarse Aggregate - shall be permitted with the written consent by the Overseeing Organisation. Minimum CBR – 30%. Trafficking Trial – Not Required.

Schedule 5: Requirements For Construction Materials				
Material Ref.	Clause	Description	Grade of Binder	Requirement
SB2	804	Type 2 Granular Material		Minimum CBR – 30%. More than 50% asphalt arisings – Not permitted.

6 Thin Surface Course Systems: Information to Be Provided By The Operating Company - Schedule 6

The Operating Company shall provide the following information:

(i) A copy of the British Board of Agreement HAPAS Roads and Bridges Certificate or Certificates or equivalent for the Thin Surface Course System or Systems that shall be proposed for use in the Scheme, together with a copy of the quality plan and Installation Method Statement associated with each Certificate.

(ii) For any Certificate that covers several variants of one Thin Surface Course System, proposed variant or variants of the system to be used in the Scheme *[variants of a system occur from any option that results in different values being reported on the Certificate for one or more properties, and could involve changes in nominal maximum aggregate size, aggregate type, aggregate grading, binder type, binder content, fibres or other additives, type and rate of spread of bond coat]*.

(iii) If required or if the Thin Surface Course System shall not be produced under a Sector Scheme, the proposed component materials to be used in the Thin Surface Course System and their proportions for each proposed System.

(iv) Proposed source or sources of coarse aggregate together with statement of properties including Polished Stone Value, Aggregate Abrasion Value, Los Angeles Coefficient and flakiness index.

(v) If regulating material shall be used, evidence of its deformation resistance either independently or in combination with the Thin Surface Course System.

7 Modified Binder and Mixture Data Requirements - Schedule 7

The following data shall be provided to the Overseeing Organisation for modified binders as required in sub-clause 937.4, and for materials the subject of a Design in accordance with 911, 929 and 930 in respect of the proposed binder [note: all these clauses cover materials that shall be designed by the supplier].

The data shall not be more than 26 weeks old. Appendix 7.1/Table 7/1 in which the binder data may be recorded is given at the end of this section.

7.1 Binder Samples

Bituminous binders shall be sampled from the delivery according to British Standard EN 58. For modifiers blended with the other component materials of the mixture at the mixer a simulated binder shall be prepared. Such modifiers are generally less intimately mixed with the bitumen and less well dispersed throughout the mixture than when pre-blended. Evidence that the simulated binder offers the same performance as the binder produced when the modifier is added at the mixer shall be provided to the Overseeing Organisation.

7.2 Penetration

Binder penetration at 25°C (British Standard EN 1426), 100g 5secs and at 5°C 200g 60secs, before and after hardening in the Rolling Thin Film Oven Test in accordance with British Standard EN 12607-1, or alternatively after RTFOT and Ageing in accordance with clause 955.

7.3 Product Identification Test and Rheological Properties

Results for the binder(s) proposed shall comprise rheological data for each binder in the form of complex shear (stiffness) modulus (G*) and phase angle (δ) determined in accordance with clause 956 for binder as supplied, after RTFOT and Ageing in accordance with clause 955.

7.4 Storage Stability Test

All binders shall be stored strictly in accordance with the manufacturer's instructions. Polymer modified binders claimed to remain homogeneous in storage without agitation shall be tested for storage stability in the manner described in clause 958. The mean of the differences in softening point between the top and bottom samples, of not less than five pairs of such samples shall not exceed 5°C. Manufacturers of pre-blended modified binders shall state in writing what precautions shall be necessary to ensure that adequate homogeneity shall be maintained during storage.

7.5 Photomicrograph

A typical photomicrograph of the modified binder and binder using ultra-violet or other technique to provide maximum contrast of the polymer structure to the binder before modification shall be supplied together with details of sample preparation techniques.

7.6 Cohesion

Vialit Pendulum cohesion test curve of the binder, in accordance with clause 957 for the binder as supplied, after RTFOT and after RTFOT and Ageing in accordance with clause 955.

7.7 **FRAASS Brittle Point (IP 80)**

FRAASS brittle point measured using British Standard EN 12593 shall be provided on the binder as supplied, after RTFOT and Ageing in accordance with clause 955.

Table 7/1 - Modified Binder and Mixture Data Requirements

Manufacturer of Binder	Product Name		
Binder Type		Batch Reference	
Binder source			
Softening point difference in storage stability test			
Test	Supplied Binder	After RTFOT	After Ageing
Penetration at 25°C 0,1 mm (100g and 5secs)			
Penetration at 5°C 0,1 mm (200g and 60secs)			
Vialit pendulum cohesion See clause 957 maximum peak value J/cm^2	#	#	#
Fraass brittle point			
Other properties the Operating Company considers useful and/or necessary			

Where indicated with # the Operating Company shall attach a graphical output to this schedule.

8 Mixture Data Requirements - Schedule 8

The following data shall be provided to the Overseeing Organisation for materials designed in accordance with clause 901.17, clause 911, clause 929, and clause 930 in respect of the proposed mixture:

(i) Saturation Ageing Tensile Stiffness (SATS) ratio – as described in clause 953.

9 **EME2 Base and Binder Additional Requirements for Joints**

9.1 Joints in EME2 shall when possible be formed "hot to hot".

9.2 "Hot to hot" joints shall be formed by multiple pavers working in echelon. The distance between the pavers shall be as short as possible to ensure the open joint between the two pavers is kept hot. The screed of the second paver shall overlap the first by a minimum of 20mm.

9.3 "Hot to cold" joints shall be well compacted, free from cracks and angled at a minimum ratio of 1:2. This angle shall be produced by a joint former on the paver screed and a compaction pinch wheel on the roller.

9.4 During the first pass of the roller, along the longitudinal joint, the edge shall be compacted and shaped by the compaction pinch wheel. The compaction pinch wheel shall be mounted on the front roller on a tandem crab steer roller.

9.5 If the paver does not form the joint correctly, the defective area must be removed in a straight line. The new joint shall be cut in hot material only and checked with a suitable straightedge and marked to the full extent of the defective area.

9.6 Open joints shall be cut and shaped using the following methods:

- Cut while hot with a cutting disk on the roller.
- Milling off with a planer.
- By hand shaping with a shovel or rake (Small areas only).

9.7 To protect the joint, the cut-away waste material shall be left in place, until the new EME2 is to be laid. After removal of the cut-away material, the joint shall be cleaned and prepared as in the paragraph below.

9.8 The joint shall be cleaned of all deleterious material and specialised hot polymer modified bitumen complying with British Standard EN 14188-1:2004, Grade N2 shall be applied to all inclined faces of EME2. It shall be hot sprayed over the entire inclined face of the joint at a rate of 0.2 litres/m per 40mm depth and the runoff shall collect on the existing base or binder. Adjustments to spread rate shall be made for deeper layers on a pro-rata basis.

9.9 Where there is a vertical joint between existing and new materials that have different characteristics, hot applied joint materials complying with BS EN 14188-1:2004, Grade N1 or polymer modified bitumen sealing strips shall be used in accordance with the manufacturer's instructions.

9.10 Transverse day joints shall be kept to a minimum and constructed in the same way as longitudinal "Hot to Cold" joints.

APPENDIX 7/2 – EXCAVATION, TRIMMING AND REINSTATEMENT OF EXISTING SURFACES

1 The cross sectional diagram of a typical trench reinstatement shall be as shown in HCD Drawing K4.

APPENDIX 7/3 – SURFACE DRESSING – PERFORMANCE SPECIFICATION

SHEET 1

1 The design for surface dressing shall be carried out by the Operating Company in accordance with clause 922 and *TRL Road Note 39* (6th Edition) together with the requirements of this Appendix.

The *Code of Practice for Surface Dressing* (RSDA 2004) is referred to within *TRL Road Note 39* and shall be complied with for this work.

Where there is conflict between the requirement of clause 922 and *Road Note 39, Road Note 39* shall take precedence.

2 Patching and crack repair of the existing carriageway shall be carried out at least 21 days in advance of the surface dressing.

Patching with a high stone content material shall have a similar hardness to existing adjacent surfacing and shall not have horizontal sealing strip applied.

3 Seasons and Weather Conditions – in accordance with TRL *Road Note 39* Table 14.3.

4 Permitted options shall be restricted to 'racked-in' surface dressing systems and double surface dressing systems.

5 Binder shall be modified Premium Grade. Both cut-back bitumen and bitumen emulsion are permitted.

6 Binder cohesivity shall be a minimum of 1.2 J/cm^2.

7 Binder Rate of Spread – in accordance with *TRL Road Note 39* adjusted where appropriate for local conditions and experience. Accuracy of binder sprayer shall be as Table NG 9/14 Category 2*.

8 Chippings Rate of Spread – in accordance with TRL *Road Note 39* Section 9. Accuracy of chipping spreader shall be as Table NG 9/15. Category 2.

9 Values for PSV and AAV shall be determined in accordance with this Contract (HA DMRB).

10 Maximum pavement temperature – in accordance with *TRL Road Note 39* Table 14.3.

11 The Operating Company shall obtain an independent measurement of surface texture using the high speed texture meter or the high speed road monitor and shall submit details of the results to the Overseeing Organisation.

Measurement of sensor measured texture depth shall be made in the nearside and offside wheel tracks of all Lanes.

The texture depth shall be measured after 11 months and before 13 months following initial trafficking and finally after 22 months and before the end of the guarantee period.

The minimum average sensor measured texture depth at any time up to 2 years after opening to traffic shall be 1.05 mm for every 100 metre Lane length.

In addition the percentage decrease in sensor measured texture depth between 1 and 2 years shall not exceed 40 per cent.

In the case of non-compliance detailed examination of the printout and the areas in question shall be undertaken by the Operating Company.

Remedial work shall be for a minimum length of 100 metres and full Lane width.

Surface dressings shall be visually monitored by the Operating Company for 2 years after opening to traffic and if, the following values are exceeded, remedial measures shall be undertaken:

(i) Fatting up, tracking, and bleeding: Table NG 9/20.

(ii) Scabbing and tearing: Table NG 9/21.

(iii) Fretting: Table NG 9/22.

(iv) Streaking: Table NG 9/23.

12 The Operating Company shall determine the extent of failures and undertake remedial measures.

The Overseeing Organisation's written consent for proposed remedial measures shall be obtained prior to remedial work taking place.

13 The speed of traffic allowed onto new surface dressing shall be limited to 15 mph by a suitable temporary traffic management scheme including the use of slow moving control vehicles.

The surface dressing shall be designed such that by the end of each work shift the surface dressing is stable and all excess chippings shall be removed by suitable suction sweeper with no requirement for further sweeping.

In addition to the design proposal and binder data sheet the Operating Company shall keep, compile and maintain the Records required by TRL *Road Note 39* clause 8.4 together with the following:

(i) type of surface dressing,

(ii) site sample peak binder cohesivity and the temperature range over which the specified minimum applies,

(iii) weather condition including humidity measurement,

(iv) road surface temperature, and

(v) Sensor measured texture depth measurements (12 and 24 months).

SHEET 2 – Information to be provided by the Operating Company

The Operating Company shall provide the following information to the Overseeing Organisation, upon request:

1 A copy of British Standard EN ISO 9001 Certificate showing at least the name of the company, the name of the certification body and the reference number and date of the Certificate.

A copy of the relevant part of the company Quality Assurance document showing the appropriate scope and limitations of the certification.

The Overseeing Organisation may wish to inspect all or any of the company's Quality Assurance documentation as part of the vendor assessment system and may wish to satisfy itself on the nature of the Quality Assurance systems of the company's material suppliers.

2. Proposed binders together with their data sheets, product identification data and cohesivity data as specified.

3. Proposed source or sources of chippings together with statement of properties including target grading, target flakiness, minimum declared PSV and AAV.

4. A method statement for each Site or group of similar Sites showing how it shall be proposed to carry out the Site activities in conformance with the Specification.

5. Proposals for traffic control and aftercare for each Site and reaction times for carrying out remedial measures and sweeping.

6. Contingency plans in the event of any breakdown of plant or failure of the dressing and provision for dusting.

7. A Type Approval Installation Trial Certificate within the *Sector Scheme for the Production of Surface Dressing* or in the event of no Certificates being issued, a statement of any previous applications on roads similar in site type and road hardness, containing the same data as listed in Sheet 3 of this Appendix.

8. A statement of relevant experience and expertise, naming managers, supervisors and teams responsible for and allocated to this Contract.

9. Design proposal for surface dressing for each location.

10. Estimated design life of the surface dressing for each location.

11 For the performance specification the results of any other tests or other data the Operating Company considers would assist the Overseeing Organisation in assessing the technical merit of the design.

12. An 'As Built Manual' as specified in sub-clause 922.18.

Binder Data Sheet – Appendix 7/3 Surface Dressing – Performance Specification			
Manufacturer of Binder:	Product Name:		
Binder type:	Batch no:		
Binder Grade (highlight as required)	Conventional	Intermediate	
	Premium	Super-premium	
Binder source:	Supplied Binder	Aged Binder	Recovered Binder
Test	As supplied to Site	Recovered in accordance with clause 955	Age Binder in accordance with clause 955
Penetration at 25˚C 0,1 mm (100g and 5 secs)			
Penetration at 5˚C 0,1 mm (200g and 60 secs)			
Manufacturer's Quality Assurance viscosity test for supplied cutback binder within temperature range 100˚C to 160˚C or alternatively penetration at 5˚C 0,1 mm (100g and 5 secs)	†		
Vialit pendulum cohesion, see clause 957 maximum peak value J/cm²	†#	#	#
Product identification test sub-clause 922.6. Complex shear (stiffness) modulus (G*) and phase angle (δ) data. See clause 956.			#
Minimum viscosity STV 4 mm cup at 40˚C or Redwood II at 85˚C, (required to prevent binder flow on road – normal camber)	‡		
Other properties this Operating Company considers useful and/or necessary			
Weather limits – information from binder manufacturer: road or air temperatures, humidity, wind chill adjustment, tolerance of surface dampness and other weather related factors	Temperature max: Temperature min: Other:		

Where indicated with # this Operating Company shall attach a graphical output to this schedule.

† Cutback binders only.

‡ Emulsions only.

Shaded cells do not require data.

SHEET 3 –Type Approval Installation Trial Certificate Information to Be Provided By The Operating Company

The Operating Company shall provide the Type Approval Installation Trial Certificate containing at least the following information for each Scheme:

Company Name and Address:

Quality Assurance reference number and certifying body:

TAIT reference number:

Date of TAIT:

Self-certified within the Sector Scheme for the Production of Surface Dressing or certified by British Board of Agreement (BBA):

Proprietary Name:

Description of material:

Design procedure or method:

Material thickness (if applicable):

Macrotexture depth at 1 year (as measured and as a percentage of the initial value):

Colour retention (if applicable):

Other optional claims as declared by the installer (e.g. Profile improvement, reduced tyre-road noise emission or RSI, ability to accommodate a variable substrate, skid resistance if greater than PSV and macrotexture would indicate, etc.)

Expected life (Estimated Design Life):

Field of application for the particular material:

Traffic – maximum commercial vehicles per Lane per day

Traffic – total traffic per Lane per day

Traffic – Speed limit

Degree of Site difficulty, see HD 36 (DMRB 7.5.1) or equivalent for categories.

Constraints on application for the particular material:

Time of year

Temperature

Variability of existing surface hardness or type

Other as declared by the installer.

Name and signature of company representative responsible for the TAIT.

APPENDIX 7/4 – BOND COATS, TACK COATS AND OTHER BITUMINOUS SPRAYS

SHEET 1

1 Polymer modified bond coats shall be used beneath all bituminous layers on bridge decks.

2 All street furniture, ironwork and drop-kerbs shall be masked.

SHEET 2 – Information to be provided by the Operating Company

The Operating Company shall compile the following information prior to the commencement of Operations and shall obtain the following information prior to the commencement of Works:

1 The product or products proposed, together with their data sheets, product identification data, cohesivity data as specified.

2 For each product, a copy of the British Standard EN ISO 9001 Certificate showing the name of the manufacturer the name of the certification body and the reference number and date of the Certificate.

3 The spraying equipment proposed and a test Certificate.

4 The source or sources of blinding material proposed.

5 Contingency plans in the event of any breakdown.

6 The results of any other tests or other data the Operating Company considers would assist the Overseeing Organisation in assessing the technical merit of the treatment such as:

(i) Tackiness test and/or trafficability time and methods of test,

(iii) Breaking time test results for different weather conditions and substrates, and

(iv) Test results for bond to newly laid concrete. The data supplied shall be not more than 26 weeks old.

Binder Data Sheet – Appendix 7/4	Bond Coats, Tack Coats and Other Bituminous Sprays	
Manufacturer of Binder:	Product Name:	
Binder type:	Batch no:	
Binder Grade (highlight as required)		
Conventional Intermediate Premium Super-premium Non-tack Other		
Binder Source →	Recovered Binder	Recovered Binder after Ageing Test
Test	Recovered in accordance with clause 955	Aged in accordance with clause 955
Penetration at 25˚C 0,1 mm (100g and 5 secs)		
Penetration at 5˚C 0,1 mm (200g and 60 secs)		
Vialit pendulum cohesion see clause 939 maximum peak value J/cm²	The Operating Company shall attach a report and graphical output to this schedule as specified in clause 957	The Operating Company shall attach a report and graphical output to this schedule as specified in clause 957
Product identification test. The provision of data for identification and ageing is optional for unmodified bituminous emulsions to BS 434 and for bitumen to BS EN 12591 and cutback bitumen to BS 3690. Complex shear (stiffness) modulus (G*) and phase angle (δ) data. See clause 928.	The Operating Company shall attach a report and graphical output to this schedule as specified in clause 956	The Operating Company shall attach a report and graphical output to this schedule as specified in clause 956
Other properties the Operating Company considers useful and/or necessary: Minimum Binder Content Binder temperature range for spray application Emulsion Properties and Viscosity Break time Breaking Agent type Weather limits – information from binder manufacturer: road or air temperatures, humidity, wind chill adjustment, tolerance of surface dampness and other weather related factors Temperature maximum: Temperature minimum: Other:		

APPENDIX 7/6 – BREAKING UP OR PERFORATION OF EXISTING PAVEMENTS

1 Where perforation of existing pavements is required the Operating Company shall perforate the full depth of the existing carriageway construction with holes of 100 mm minimum diameter on a 500 mm x 500 mm grid.

2 No perforation shall be made within 750 mm of a chamber, cover, box or grating in the pavement surface or of an edge of a pavement.

APPENDIX 7/7 – SLURRY SURFACING INCORPORATING MICROSURFACING

1. Slurry sealing and microsurfacing shall be in accordance with clause 918.

2. Special Restrictions: Guarantee period if not 2 years shall be stated on the Order.

3. Where stated on the Order a coloured surfacing shall be provided.

4. Preparation and masking requirements: Street furniture, road markings, and kerbs shall be masked unless otherwise stated on Order.

5. Minimum macrotexture depth at end of guarantee period shall be in accordance with Table NG 9/1 of MCHW Volume 2.

6. Maximum texture depth after 4 weeks trafficking: 3mm shall be required if stated on Order.

7. Maximum percentage decrease in macrotexture initially measured and at end of the guarantee period shall be 40%.

8. Class of area Defects (% area affected) acceptable shall be in accordance with Table NG 9/4 and NG 9/5 of MCHW Volume 2.

9. Class of linear Defects (metre per 100 metres) acceptable shall be in accordance with Table NG 9/3 of MCHW Volume 2.

10. Class of transverse regularity shall be in accordance with Table NG 9/4 and NG 9/5 of MCHW Volume 2.

11. Class of longitudinal regularity shall be in accordance with Table NG 9/6 and NG 9/7 of MCHW Volume 2.

APPENDIX 7/7 – SLURRY SURFACING INCORPORATING MICROSURFACING (CONTD)

SHEET 1 – Information to be provided the Operating Company in accordance with the other provisions of this Contract.

1 Location.

2 Traffic count.

3 Traffic speed, 85 percentile and Site speed limit.

4 Category of Site.

5 Description of existing surface.

6 Thickness of slurry surfacing.

7 Minimum declared PSV of coarse aggregate.

8 Maximum AAV of coarse aggregate.

9 Definition of colour required.

10 Surface finish required for footways (if not by transverse brushing).

APPENDIX 7/7 – SLURRY SURFACING INCORPORATING MICROSURFACING (CONTD)

SHEET 2 – Information to be provided by the Operating Company

The Operating Company shall provide the following information to the Overseeing Organisation, upon request:

1 A copy of:

(i) British Standard EN ISO 9001 Certificate showing at least the name of the company, the name of the certification body and the reference number and date of the Certificate, and

(ii) the relevant part of the company Quality Assurance document showing the appropriate scope (Slurry Surfacing and Sector Scheme) and limitations of the certification.

The Overseeing Organisation may wish to inspect all or any of the company's QA documentation as part of the vendor assessment system and may wish to satisfy itself on the nature of the QA systems of the Company's material suppliers.

2 Design proposal for slurry surfacing for each location and target binder content with tolerances.

3 Estimated Design life of the slurry surfacing for each location.

4 A copy of the Type Approval Installation Trial Certificate within the *Sector Scheme for Slurry Surfacing* for the proposed system together with its supporting data.

In the event of no Certificates being issued a statement of any previous applications on roads similar in site type to this Contract's Sites containing the same data as listed in NG Sample Appendix Sheet 3.

5 A method statement for each Site or group of similar Sites showing how it is proposed to carry out the work in conformance with the Specification.

6 Proposed source or sources of coarse aggregate together with statements of properties including target grading, declared PSV and AAV.

7 Proposed source or sources of fine aggregate including target grading and other constituents together with statements of properties.

8 Proposed binder together with data sheets and cohesivity data.

9 Proposals for traffic control and aftercare for each Site and reaction times for: carrying out remedial measures, sweeping, and Site visits with the Overseeing Organisation.

10 Contingency plans in the event of any breakdown of plant or failure of the slurry surfacing.

11 An 'As Built Manual' as specified in sub-clause 918.30.

12 If available, the following information shall be provided in order to assist the Overseeing Organisation to assess the technical merits of the design proposal:

(i) Test method for binder content,

(ii) Test for thickness of slurry surfacing,

(iii) Trafficability time, including method of test,

(iv) Wheel tracking test results at 45ºC or 60ºC or other suitable measure of the ability of the proposed system to resist deformation and flow,

(v) Water sensitivity test results from the test used by BBA/HAPAS *Thin Surfacing Guidelines Document* or from wet wheel tracking (whichever is available),

(vi) Permeability test carried out on the system, if it is claimed that the process seals the existing surface together with the method of test,

(vii) Accelerated ageing test results in accordance with the appropriate BBA/HAPAS test,

(viii) Bond test results using the BBA/HAPAS test on either a bituminous or a concrete substrate as appropriate to the Site or bond coat binder BBA/HAPAS Certificate,

(ix) Shaking abrasion test results,

(x) Slurry surfacing mix cohesion, and

(xi) The results of any other tests or other data this Operating Company considers would assist the Overseeing Organisation in assessing the technical merit of the Design proposal.

Binder Data Sheet – Appendix 7/7	Slurry Surfacing Incorporating Microsurfacing		
Manufacturer of Binder:	Product Name:		
Binder type:	Batch No:		
Binder source:			
Test	Binder as supplied to Site	Recovered binder in accordance with clause 955	Aged binder in accordance with clause 955
Penetration at 25°C 0,1 mm (100g and 5 secs)			
Penetration at 5°C 0,1 mm (200g and 60 secs)			
Vialit pendulum cohesion see clause 957 maximum peak value J/cm^2		#	#
Product identification test sub-clause 918.7. Complex shear (stiffness) modulus (G*) and phase angle (δ) data. See clause 956.		#	#
Other properties this Operating Company considers useful			
Weather limits – information from binder manufacturer: road or air temperatures, humidity, wind chill adjustment, etc.	Temperature Max: Temperature Min: Other:		

Where indicated with # the Operating Company shall attach a graphical output to this schedule.
Shaded cells do not require data.

APPENDIX 7/9 – COLD-MILLING (PLANING) OF BITUMINOUS BOUND FLEXIBLE PAVEMENT

1 The location of areas to be cold-milled (planed) together with details of whether profile planing or constant depth planing is required shall be determined by the Operating Company in accordance with this Contract.

2 Areas to be cold-milled shall be swept in accordance with clause 709.11.

APPENDIX 7/12 - ARRESTER BEDS

Route	Location and RMM Inventory Number	Frequency

APPENDIX 7/13 – SAW-CUT AND SEAL BITUMINOUS OVERLAYS ON EXISTING JOINTED CONCRETE PAVEMENTS

1. The location of saw-cut and sealing of bituminous overlays on existing jointed concrete pavements shall be determined by the Operating Company in accordance with this Contract.

2. The tolerance on co-linearity of the crack initiation slot with the underlying joint or saw-cut shall be ± 5 mm for target overlay thickness less than 100 mm, and ± 10 mm for target overlay thickness 100 mm and greater.

APPENDIX 7/14 – PREPARATION OF JOINTED CONCRETE PAVEMENTS PRIOR TO OVERLAYING AND SAW-CUT AND SEAL OF THE BITUMINOUS OVERLAY

1 The location of the preparation of jointed concrete pavements prior to overlaying and saw–cut and sealing of the bituminous overlay shall be determined by the Operating Company in accordance with this Contract.

2. The treated surface shall be bond coated in accordance with Appendix 7/4 prior to overlaying.

APPENDIX 7/18 – SITE SPECIFIC DETAILS AND REQUIREMENTS FOR COLD RECYCLED BITUMEN BOUND MATERIAL

The Site specific details and requirements for cold recycled bitumen bound material shall be determined by the Operating Company in accordance with this Contract.

APPENDIX 7/22 –REPAIRS TO POTHOLES

1 General

1.1 Temporary repairs to small areas of pavement courses including holes for road stud sockets but excluding repairs to potholes on the Forth Road Bridge shall be carried out in accordance with clause 946 paragraphs 4, 6 and 7.

Standing water shall be removed before filling the hole.

2 Temporary Repair Materials

2.1 The Operating Company shall list in the following table proposed temporary repair materials suitable for use on the Unit.

The Operating Company shall select the most appropriate temporary repair material from the completed table.

Table of Materials for Temporary Repairs - Sheet 1

Reference Number	Temporary Repair material

Table of Materials for Temporary Repairs - Sheet 2

Column 1	Column 2	Column 3						
Locations On The Unit Where Temporary Repair Materials May Be Used.	**Climatic Conditions/ Seasonal/Time Conditions Where Temporary Repair Materials May Be Used.**	**Type of Repair**						
		Holes Less Than 0.5m^2 In Area	**Holes Exceeding 0.5m^2 But Not Exceeding 1.0m^2 In Area**	**Holes Greater Than 1.0m^2 In Area**	**Road Stud Sockets**	**Depressions Not Exceeding 0.5m^2 In Area**	**Depressions Exceeding 0.5m^2 But Not Exceeding 1.0m^2 In Area**	**Depressions Exceeding 1.0 m^2 In Area**

Notes for completion of Table of Materials for Temporary Repairs - Sheet 2

1. In column 1 the Operating Company shall state in which location the particular temporary repair material is suitable for use which can be generic for example 'all motorways' or specific for example 'Routes XXX'.

2. In column 2 the Operating Company shall state under what conditions the temporary repair material is suitable for use e.g. summer, winter, temperatures greater than x degrees, wet conditions, etc.

3. In column 3 the Operating Company shall insert the reference number of the temporary repair material.

APPENDIX 11/1: KERBS, FOOTWAYS AND PAVED AREAS

1 Details of Kerbs, Channels, Edgings, Footways, Paved areas shall be as shown on Standard Drawings Series 1100/01 contained in Schedule 9 Part 3.

2. Footways and Paved Areas shall be laid using materials and to thicknesses detailed in the Tables below, and as shown on Standard Drawings Series 1100/05 contained in Schedule 9 Part 3.

3. All materials shall be machine laid where possible. Where hand laid flexible surfacing to footways and cycleways shall comply with level tolerance requirements of British Standard 594987 Table 7.

4. Concrete flags shall comply with British Standard EN 1339 and Table 11/1D below. Surface levels of paved areas shall be to British Standard 7533-4: Tables B1 and B2.

5. Concrete paving blocks shall comply with British Standard EN 1338 and Table 11/1B below. Surface levels of paved areas shall be to British Standard 7533-3: Annex B.

Flexible Construction: Type F1 (New/replacement construction)

Pavement Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	909	6mm Dense Asphalt Concrete Surface Course	125	20	AC 6 dense surf 100/ 150 PSV 55 to BS EN 13108-1: 2006. Crushed rock aggregate excluding limestone.
Binder Course	906	Dense Binder Course Asphalt Concrete	125	40	AC 20 dense bin 100/150 to BS EN 13108-1: 2006. Crushed rock aggregate.
Sub base	803	Type 1	--	100	
Total thickness				160	

Flexible Construction: Type F2 (New/replacement construction)

Pavement Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	909	6mm Dense Asphalt Concrete Surface Course	125	20	AC 6 dense surf 100/ 150 PSV 55 to BS EN 13108-1: 2006. Crushed rock aggregate excluding limestone.
Binder Course	906	Dense Binder Course Asphalt Concrete	125	60	AC 20 dense bin 100/150 to BS EN 13108-1: 2006. Crushed rock aggregate.
Sub base	803	Type 1	--	150	
Total thickness				230	

Flexible Construction: Type F3 (Overlay existing paved area)

Pavement Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	909	6mm Dense Asphalt Concrete Surface Course	125	20	AC 6 dense surf 100/ 150 PSV 55 to BS EN 13108-1: 2006. Crushed rock aggregate excluding limestone.
Binder Course	906	Dense Binder Course Asphalt Concrete	125	40	AC 20 dense bin 100/150 to BS EN 13108-1: 2006. Crushed rock aggregate.
Regulating	907	Regulating course	--	Varies	
Total thickness				Varies	

Flexible Construction: Type F4 (Overlay existing paved area)

Pavement Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	909	6mm Dense Asphalt Concrete Surface Course	125	20	AC 6 dense surf 100/ 150 PSV 55 to BS EN 13108-1: 2006. Crushed rock aggregate excluding limestone.
Regulating	907	Regulating course	--	Varies: max 55mm	
Total thickness				Varies	

Concrete Construction: Type F5 (New/replacement construction)

Pavement Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	1001.2	Concrete	--	75	ST5 Concrete. Crimped surface finish.
Separation Membrane					
Sub base	803	Type 1	--	100	
Total thickness				175	

Concrete Construction: Type F6 (Overlay existing paved area)

Pavement Layer	**Clause**	**Material**	**Binder Grade**	**Thickness (mm)**	**Special Requirements**
Surface course	1001.2	Concrete	--	75	ST5 Concrete. Crimped surface finish.
Existing surface					
Total thickness				75	

Flagged Construction: Type F7 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	63	Plan Dimensions 450x450mm
Joints		Mortar			6mm wide. BS 7533 Part 4 Table 4
Laying Course	--	Mortar	--	25	BS 7533 Part 4 Table 3
Sub base	803	Type 1	--	100	
Total Pavement Thickness				188	

Flagged Construction: Type F8 (Overlay existing paved area)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	63	Plan Dimensions 450x450mm
Joints		Mortar			6mm wide. BS 7533 Part 4 Table 4
Laying Course	--	Mortar	--	25	BS 7533 Part 4 Table 3
Existing surface					
Total Pavement Thickness				88	

Flagged Construction: Type F9 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	--	Concrete Flags	--	70	Plan Dimensions 450x450mm.
Jointing		Sand			BS 7533 Part 4 Table 6
Laying Course	--	Sand	--	25 compacted thickness	BS 7533 Part 4 Table 5 Site Category III
Sub base	803	Type 1	--	150	
Total Pavement Thickness				245	

Flagged Construction: Type F10 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	70	Plan Dimensions 450x450mm.
Joints		Mortar			6mm wide. BS 7533 Part 4 Table 4
Laying Course	--	Mortar	--	25	BS 7533 Part 4 Table 3
Base	1030	Wet Lean Concrete	--	100	C8/10
Total Pavement Thickness				195	

Flagged Construction: Type F11 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	100	Plan Dimensions 450x450mm.
Joints		Mortar			6mm wide. BS 7533 Part 4 Table 4
Laying Course	--	Mortar	--	25	BS 7533 Part 4 Table 3
Sub base	803	Type 1	--	150	
Total Pavement Thickness				275	

Flagged Construction: Type F12 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	100	Plan Dimensions 450x450mm.
Joints		Mortar			6mm wide. BS 7533 Part 4 Table 4
Laying Course	--	Mortar	--	25	BS 7533 Part 4 Table 3
Sub base	803	Type 1	--	150	
Total Pavement Thickness				275	

Flagged Construction: Type F13 (Overlay existing paved area)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	70	Plan Dimensions 450x450mm
Jointing		Sand			BS 7533 Part 4 Table 6
Laying Course	--	Sand	--	25 compacted thickness	BS 7533 Part 4 Table 5 Site Category III
Sub base	803	Type 1	--	varies	
Existing surface					
Total Pavement Thickness				Varies	

Flagged Construction: Type F14 (Overlay existing paved area)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags	--	100	Plan Dimensions 450x450mm
Joints		Mortar			6mm wide. BS 7533 Part 4 Table 4
Laying Course	--	Mortar	--	25	BS 7533 Part 4 Table 3
Sub base	803	Type 1	--	varies	
Existing surface					
Total Pavement Thickness				Varies	

Concrete Paving Block Construction: Type F15 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course		Concrete Paving blocks	--	60	Plan Dimensions 200x100mm
Jointing		Sand			BS 7533 Part 3 Table D4
Laying Course	--	Sand	--	50 compacted thickness	BS 7533 Part 3 Table D2 and D3 Site Category III
Sub base	803	Type 1	--	100	
Total Pavement Thickness				210	

Concrete Paving Block Construction: Type F16 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course		Concrete Paving blocks	--	80	Plan Dimensions 200x100mm
Jointing		Sand			BS 7533 Part 3 Table D4
Laying Course	--	Sand	--	50 compacted thickness	BS 7533 Part 3 Table D2 and D3 Site Category III
Sub base	803	Type 1	--	150	
Total Pavement Thickness				280	

Concrete Paving Block Construction: Type F17 (Overlay existing paved area)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course		Concrete Paving blocks	--	60	Plan Dimensions 200x100mm
Jointing		Sand			BS 7533 Part 3 Table D4
Laying Course	--	Sand	--	30 compacted thickness	BS 7533 Part 3 Table D2 and D3 Site Category III
Existing Surface					
Total Pavement Thickness				90	

Flagged Construction (Tactile): Type F18 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags: Tactile Paving	--	70	Tactile Paving to DD CEN/TS 15209:2008. Pattern and colour to be agreed. Plan Dimensions 450x450mm
Jointing		Sand			BS 7533 Part 4 Table 6
Laying Course	--	Sand	--	25 compacted thickness	BS 7533 Part 4 Table 5 Site Category III
Sub base	803	Type 1	--	150	
Total Pavement Thickness				245	

Flagged Construction (Tactile): Type F19 (Overlay existing paved area)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course	1104	Concrete Flags: Tactile Paving	--	70	Tactile Paving to DD CEN/TS 15209:2008. Pattern and colour to be agreed. Plan Dimensions 450x450mm
Jointing		Sand			BS 7533 Part 4 Table 6
Laying Course	--	Sand	--	25 compacted thickness	BS 7533 Part 4 Table 5 Site Category III
Existing surface					
Total Pavement Thickness				95	

Concrete Ramped Footway Construction: Type F20 (New/replacement construction)

Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	1001.2	Concrete	--	75	C20 Concrete. Crimped surface finish. See drawing 1100/05/055-064 for layout
Sub base	803	Type 1	--	150	
Total thickness				225	

Flexible Ramped Construction: Type F21 (New/replacement construction)

Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	909	6mm Dense Asphalt Concrete Surface Course	125	25	AC 6 dense surf 100/ 150 PSV 55 to BS EN 13108-1: 2006. Crushed rock aggregate excluding limestone. See drawing 1100/05/055-064 for layout
Binder Course	906	Dense Binder Course Asphalt Concrete	125	60	AC 20 dense bin 100/150 to BS EN 13108-1: 2006. Crushed rock aggregate.
Sub base	803	Type 1	--	150	
Total thickness				235	

Concrete Footway Construction: Type F22 (New/replacement construction)

Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	1001.2	Concrete	--	100	C20 Concrete. Crimped surface finish. See drawing 1100/05/055-064 for layout
Sub base	803	Type 1	--	100	
Total thickness				200	

Concrete Footway Construction: Type F23 (Overlay existing paved area)

Layer	Clause	Material	Binder Grade	Thickness (mm)	Special Requirements
Surface course	1001.2	Concrete	--	100	C20 Concrete. Crimped surface finish.
Sub base	803	Type 1	--	Varies	
Existing Surface					
Total thickness				Varies	

Concrete Paving Block Construction: Type F24 (Overlay existing paved area)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course		Concrete Paving blocks	--	80	Plan Dimensions 200x100mm
Jointing		Sand			BS 7533 Part 3 Table D4
Laying Course	--	Sand	--	50 compacted thickness	BS 7533 Part 3 Table D2 and D3 Site Category III
Sub base	803	Type 1	--	Varies: max 100mm	
Existing Surface					
Total Pavement Thickness				Varies	

Concrete Paving Block Construction: Type F25 (New/replacement construction)

Layer	Clause	Material	Grade of Binder	Thickness (mm)	Special Requirements
Surface Course		Concrete Paving blocks	--	80	Plan Dimensions 200x100mm
Jointing		Sand			BS 7533 Part 3 Table D4
Laying Course	--	Sand	--	30 compacted thickness	BS 7533 Part 3 Table D2 and D3 Site Category III
Base	1030	Wet Lean Concrete	--	100	C8/10
Sub base	803	Type 1	--	150	
Existing Surface					
Total Pavement Thickness				360	

Table 11/1A General Requirements for Permitted Construction Materials	
Clause	Requirement
801.7	All materials used within 450mm of the pavement finished surface shall not be frost susceptible
802.4	Material up to 225mm compacted thickness shall be spread in one layer
901.2 and 942.5	In addition to the requirements of clauses 901.2 and 942.5 the coarse aggregate in all base, binder course and surface course materials shall be crushed rock
920.1	All Bituminous surfaces shall be treated with either a tack coat or bond coat prior to overlay. The use of a tack coat or bond coat shall be as stated in Appendix 7/4

Table 11/1B Particular Requirements for Concrete Blocks: British Standard **EN 1338**	
Requirement	Specification
Shape	Rectangular
Dimensions	200 x 100mm in plan. 60mm or 80mm thick as specified
Colour	As instructed
Weathering & Abrasion Resistance	Class 3
Slip/skid resistance	Minimum pendulum value 45
Characteristic tensile splitting strength	>3.6MPa
Minimum Load at Failure	250N/mm

Table 11/1C General Requirements for Block Paving	
No	Requirement
1	Blocks shall be laid in a 45 degree herringbone pattern, unless otherwise instructed. Block paver layout details shall be as shown in the drawings
2	Formation to footways to be treated with an appropriate weed killer in accordance with manufacturer's instructions prior to construction.
3	Infill blocks shall be cut using a shielded water based diamond tipped cutter to remove dust. All cut edges to be lightly chamfered to match adjoining edges. Blocks of less than one third full size should not be used. Splitting of blocks is not permitted.
4	All paving shall be jointed with kiln dried jointing sand brushed into the joints before and between two passes with a rubber soled vibrating plate. Repeat at regular intervals thereafter whenever necessary to ensure that joints remain full.
5	All fully sanded joints in flexible paving shall be sealed with an appropriate PVA joint stabilising fluid or applied in accordance with the manufacturer's instructions.

Table 11/1D Particular Requirements for Concrete Flags: British Standard **EN 1339**	
Requirement	Specification
Shape	Rectangular or square
Dimensions	As specified
Colour	As instructed
Water Absorption	Class 2
Slip/skid resistance	Minimum pendulum value 45
Characteristic bending strength	Class 3

APPENDIX 11/2 – ACCESS STEPS

Details of access steps to feeder pillars, communications, cabinets, traffic counter cabinets, Ice Prediction sites and other monitored apparatus shall be as shown on Standard Drawing Number MCX 0138 (modified) contained in Schedule 9 Part 3.

APPENDIX 12/1 – TRAFFIC SIGNS: GENERAL

1 General

1.1 Sign schedules for Schemes which detail the individual requirements for sign assemblies shall be prepared by the Operating Company in accordance with the other provisions of this Contract. The schedules shall include:

(i) sign face details, dimensions and location,

(ii) mounting height,

(iii) post details, including details for passively safe posts, and

(iv) foundation details.

2. Sign faces

2.1 Sign faces shall be made using Class RA2 material to British Standard EN 12899-1 or microprismatic material to British Standard 8408 2005 as determined by the Operating Company in accordance with this Contract.

2.2 Where determined by the Operating Company in accordance with this Contract, sign faces shall be protected with dew resistant sheeting.

3 Foundations

3.1 Details of foundations for sign posts and signal posts shall be shown on drawings numbers 1200/10/1 and 1200/10/2 in Schedule 9 Part 3.

4 Round or Rectangular Sign Posts

4.1 Base Plates

Each post shall have a base plate and this shall be fixed to the post in order to prevent any rotation of the post.

It shall be of square section with the side dimensions being at least twice the width of the post.

4.2 Base Housings

The minimum diameter of base housings on tubular posts shall be 168 mm.

Rectangular posts requiring an electrical supply shall be fitted with an integral flush fitting door above ground level.

Detachable root boxes are not to be used.

The internal base housing shall:

(i) contain a baseboard manufactured from marine plywood or hardwood with a minimum thickness of 15 mm and minimum dimensions of 100 x 380 mm,

(ii) be mounted securely to the back of the compartment on which the electrical equipment shall be mounted,

(iii) have a minimum distance of 100 mm from the face of the baseboard to the inside of the front of the housing,

(iv) have a brass or stainless steel earthing screw or stud 8 mm diameter complete with two brass washers and a brass nut and locknut in a suitable and easily accessible position,

(v) have a door aperture measuring not less than 110 x 400 mm, and

(vi) be positioned such that the lower edge of the door is not less than 300 mm above ground level, once installed.

4.3 End Caps

All round or rectangular posts shall be supplied complete with plastic end caps. End caps shall be shaped to shed water to the outside of the post and shall be the same colour as the post.

4.4 Protective Finish

The post shall be covered in bitumen in accordance with British Standard EN 40-5 both outside and inside the post up to 150 mm above proposed ground level.

5 Passively Safe Sign Posts

All passively safe sign posts shall be designed and installed accordance with British Standard EN 12767: 2007.

6 Permanent Bollards

Internally illuminated bollards shall be base illuminated.

7 Sign Fix Clips

Sign fix clips shall be made of stainless steel.

8 Ducting

Ducting installed through the foundations of posts into which electrical equipment shall be installed shall be 50 mm diameter uPVC street lighting duct with a wall thickness of 5 mm.

9 Identification Numbers

9.1 Identification numbers shall be as follows:

(i) Each sign shall be identified by a unique system of letters and numbers for maintenance and inspection purposes. The number shall be fixed to the sign by an appropriate adhesive,

(ii) Letters and numbers shall be provided on both sides of sign located in the central reservation. On all other signs the numbers shall face oncoming traffic,

(iii) Letters and numbers shall be black on a yellow background with characters 75 mm high at a minimum height of 1.5 metres and a maximum height of 2.5 metres above ground level, and

(iv) Letters and numbers shall be screen printed onto reflective self adhesive vinyl mounted on 3 mm thick Foamex.

APPENDIX 12/2 – TRAFFIC SIGNS: MARKER POSTS

1 Hazard Marker Posts

1.1 Hazard marker posts shall be capable of being overrun by vehicles in order that they shall deflect and spring back to an upright position without shattering in all weather conditions and with little or no vehicular damage.

1.2 Hazard marker posts shall be fitted with anti-removal tabs below the ground.

1.3 The reflectors shall be of retroreflective sheet material to comply with Diagram 561 of *Traffic Signs Regulations and General Directions 2002*.

1.4 The retroreflective sheeting shall be protected from damage from over-running vehicles by raised edges or other acceptable methods.

1.5 The hazard marker post shall have the main body self-coloured black with a highly visible weather resistant white band to the sizes quoted in paragraph 16.1 in Chapter 4 of the *Traffic Signs Manual*.

1.6 The top of the hazard marker post shall be installed in order that the top of the post is 750 mm-1000 mm above ground level.

2 Verge Hazard Marker Posts

2.1 Verge hazard marker posts shall be as shown on drawing numbers 1200/08/001 and 002 and are defined as follows:

(i) Type VM1 – stake type fixing which shall include a timber pressure impregnated stake and automatic stake locking mechanism,

(ii) Type VM2A – Extended base fixing backfilled with excavated material, and

(iii) Type VM2B – Extended base fixing backfilled with concrete type ST2.

2.2 Verge hazard marker posts shall be constructed of material resistant to damage and vandalism and maintenance free.

The posts shall have two integrally moulded shatterproof reflectors angled to give maximum visibility to traffic travelling from either direction on bends and a high visibility band integrally moulded into its body minimum 155 mm.

2.3 Verge hazard marker post shall be installed in accordance with the manufacturer's instructions.

3 Motorway Distance Marker Posts

3.1 Motorway distance marker posts shall be as specified in the Manual of Contract Documents for Highways Works Volume 3 Highway Construction Details Drawing E Series.

4 Edge of Carriageway Hazard Markers

4.1 Edge of carriageway hazard markers Type ECB1 shall be as shown on drawing number 1200/09/001 contained in Schedule 9 Part 3.

4.2 The edge of carriageway marker shall be installed in accordance with the manufacture's written instructions.

4.3 A 150 mm retroreflective red and white band shall be attached to the marker.

APPENDIX 12/3 – TRAFFIC SIGNS: ROAD MARKINGS AND STUDS

1 Road Markings

1.1 The colour location and material type for permanent or temporary road markings shall be determined by the Operating Company in accordance with this Contract.

1.2 Ribbed road markings shall be formed of hot applied thermoplastic formulated to allow the formation of transverse ribs.

The transverse ribs shall not be less than 8 mm and not greater than 10 mm high and shall be at 500 mm spacing except on slip roads where the spacing shall be reduced to 250 mm.

1.3 The requirement for drainage gaps in raised rib markings shall be determined by the Operating Company in accordance with this Contract.

1.4 All road markings shall provide a skid resistance level of 55.

1.5 Where existing road markings are required to be covered over the cover application shall comply with British Standard EN 60832:1997.

2 Road Studs

2.1 General Requirements

Road studs shall be placed in new sockets with a clearance of at least 300 mm from any existing sockets.

Refurbished road stud shoes may be re-used but fitted with new inserts.

2.2 Road studs with red and green reflectors shall be uni-directional. Road studs with white shall be bi-directional. Road studs with amber reflectors shall be of the corner-cube reflection type.

2.3 Temporary road studs shall be either hot melt adhesive type or self adhesive type.

APPENDIX 12/5 – TRAFFIC SIGNS: TRAFFIC SIGNALS

1 Temporary Traffic Signals

1.1 Temporary traffic signals used to control alternate one-way working shall comply with current versions of *Department of Transport specifications TR2502A* for portable traffic signal control equipment and TR2504A for vehicle detection equipment. The signals shall be located and operated in accordance with Chapter 8 of the *Traffic Signs Manual.*

1.2 The Operating Company shall obtain the prior written consent of the Overseeing Organisation for multiphase temporary traffic signals.

1.3 The Operating Company shall provide to the Overseeing Organisation a drawing to a scale of 1:500 with the position of the signals indicated by a dot and an arrow from the dot indicating the direction of the lights and a key to symbols used shall be shown.

The position of signals shall be accurate to within 2 metres.

APPENDIX 13/2 – TYPICAL LIGHTING COLUMN AND BRACKET DATASHEET 1

Name of manufacturer	Column Reference No	
	Revision No	
	Date	

NAME OF CONTRACT

PART A General

Column nominal height	(m)		
Column material			
Material design strength	(N/mm^2)		
No of door openings			
Door opening size – Height	(mm)		
Width	(mm)		
Cross-section of base compartment	Height (mm)	Width (mm)	Depth (mm)

Door Opening		
	Any	
Manufacturer's drawing ref no		

Corrosion protection (steel columns only) – basic system type sub-clauses (1911.9 and 1911.10)	
Reference Wind Velocity $V_{ref,o}$ as defined in BS EN 40-3-1:2000	m/s

Additional sacrificial steel thickness above that needed in the Design from the bottom of the column to at least 250 mm above the anticipated ground level	(mm)

PART B Foundation Data

Planted base	Planting depth	(metres)

	Standard Soil Type Factor G		
	630	390	230
Diameter of concrete surround (if any)			

	Bolt hole centres	Bolt Hole diameter	Design load/bolt
Flange plate	(MM)	(mm)	(N)

Relevant forces and moments at ground level	
Line of action of max moment relating to door opening	

NOTE For flange plates with slotted holes a diagram shall be included with the data sheet

APPENDIX 13/2 CONTINUED – TYPICAL LIGHTING COLUMN AND BRACKET DATASHEET 2

LUMINAIRE MAXIMUM CHARACTERISTICS

PART C

Acceptable Luminaires

Post Top Column

		Terrain Categories as defined in BS EN 40-3-1:2000				
		I	II	III	IV	
	Luminaire Maximum Weight (kg)	Maximum Windage Area (m²) for terrain categories as defined in BS EN 40-3-1:2000				
Luminaire Connection						
Diameter / Length						

Single Arm Bracket Column	Luminaire lever arm (mm)	
	Due to weight of luminaire	Due to Windage on luminaire

Bracket projection (metre)	Reference Number	Drawing Number	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Maximum Windage Area (m²) for terrain categories as defined in BS EN 40-3-1:2000				
			Grade	Design Strength (N/mm²)		Diameter (mm)	Length (mm)						

Double Arm Bracket Column	Luminaire lever arm (mm)	
	Due to weight of luminaire	Due to Windage on luminaire

Bracket projection (metre)	Reference Number	Drawing Number	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Weight (kg)	Maximum Windage Area (m^2) for terrain categories as defined in BS EN 40-3-1				
			Grade	Design Strength (N/mm^2)		Diameter (mm)	Length (mm)						

PART D CERTIFICATION

It is certified that the information given in this data sheet has been obtained in accordance with Departmental Standard BD 94/07 (DMRB 2.2.1) and the Specifications.

Signed on Behalf of the Operating Company _____ Date _____

Name (in Block Capitals): _____

APPENDIX 13/3 – INSTRUCTIONS FOR COMPLETION OF LIGHTING COLUMN AND BRACKET DATASHEETS

1 When information is not required a dash shall be inserted in the appropriate boxes.

2 Where a data sheet is amended it shall be given a new revision number with a date.

3 The revision number shall be consecutive letters of the alphabet commencing with 'A'.

4 The date of the revision shall agree with the date of the Operating Company Representative's signature.

5 The column may be aluminium, fibre glass or galvanised steel.

6 The material design strength shall be the minimum specified in the Design.

Where more than one material is used values for all materials shall be given.

7 All relevant entries shall be made on the data sheet before the document is certified by the Operating Company.

8 The column nominal height shall be selected from clauses 2 or 3 of BS EN 40-2 as appropriate.

The height shall also be dependent upon local factors, for example overhead power lines, in accordance with the requirements of BS 7671:2008.

9 The number of door openings shall agree with the manufacturer's drawing.

10 The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.

11 The acceptable positions of bracket arms relative to the door position shall be indicated on the diagram.

Where all positions are acceptable the box noted 'ANY' shall be ticked.

12 Where concrete is necessary around the planted base in accordance with clauses 1305.3 and 1305.4 the minimum diameter shall be entered.

13 For flange bases all forces and moments necessary for the Design of the foundations shall be obtained in writing from the manufacturer.

14 The corrosion protection system used on the column when new shall be recorded.

Where additional steel is provided for sacrificial purposes the amount shall also be recorded.

15 The signs and attachments surface area, eccentricity from the centreline of the column to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

16 The luminaire lever arm's weight and maximum windage area quoted shall be based on the most adverse loading on the bracket when it is attached to any of the columns quoted in the compatible column sections.

Note: The luminaire lever arms shall be the horizontal distances from the centre of gravity of the luminaire and if applicable, the centroid of the windage surface area to the end of the bracket joint.

APPENDIX 17/1 – SCHEDULE FOR THE SPECIFICATION OF DESIGNED CONCRETE

SHEET 1 – Structural concrete above ground

Requirement	Schedule		
Designed Concrete Reference	STR1	STR2	
Intended Working Life of Structure	120	120	
Nominal Cover to Reinforcement	#	#	
Applicable Exposure Classes (Excluding DC-class)	#	#	
DC-class (where appropriate)	N/A	N/A	
Compressive Strength Class of Concrete	C32/40	C40/50	
Minimum Cement Content (kg/m^3)	360	380	
Maximum Free Water/Cement Ratio	0.4	0.4	
Required Group or Type and Class of Cement or Combination (where a DC-class has not been specified)	Group 5 IIB-V IIIA	Group 4 IIA-V IIB-S	
Maximum Aggregate Size, mm	20	20	
Chloride Content Class	Cl0,30[b]	Cl0,10[a] Cl0,30[b]	
For Lightweight Concrete, the Density Class or Target Density			
For Heavyweight Concrete, the Target Density			
Consistence Class	#	#	
Special Type or Class of Cement or Combination			
Required Source/Special Type of Aggregate	Freeze/thaw resisting aggregates	Freeze/thaw resisting aggregates	
Maximum Cement Content (kg/m^3) [See NG 1704.7]	550	550	
Required Admixture	#	#	
Air Entrainment Required [YES/NO]	3.5% min	No	
Minimum or Maximum Temperature of Fresh Concrete ˚C	5/30	5/30	
Sampling and Testing Identity testing Type of test	##	##	

Requirement	Schedule		
Testing rate			
Other Requirements UKAS or equivalent third party product conformity certification [YES/NO]	Yes	Yes	

The Operating Company shall determine this detail when selecting from the above table and inform the Overseeing Organisation

Cross-reference shall be made to Appendix 1/5 and 1/6 as appropriate

a Prestressed or heat cured concrete

b Concrete with reinforcement or embedded metal

Note Designed concrete reference STR 1 shall be used for all reinforced concrete above foundation level

Designed concrete reference STR 2 may be used for reinforced concrete above ground level only with the prior approval of the Overseeing Organisation.

Designed concrete reference STR 2 may be used for prestressed or heat cured concrete.

In line with Appendix 17/70, the Operating Company may develop an alternative designed concrete in accordance with British Standard 8500-1 and 2 and this Specification and submit to the Overseeing Organisation for written consent.

SHEET 2 – Structural concrete in foundations

Requirement	Schedule				
Concrete Reference	FOU 1	FOU 2	FOU 3	FOU 4	FOU 5
Intended Working Life of Structure	120	120	120	120	120
Structural Performance Level	High	High	High	High	High
Nominal Cover to Reinforcement	#	#	#	#	#
DC-class (where appropriate)	DC-1	DC-2 DC-2z DC-3[b] DC-3-z	DC-3*[b] DC-3 **[b] DC-4[b] DC4z	DC-3[a] DC-4[a] DC4*[b] DC-4**[b] DC4-m[a]	DC-4m[b] DC-4m*[b] DC-4m**[b]
Compressive Strength Class of Concrete	C32/40	C32/40	C32/40	C32/40	C32/40
Minimum Cement or Combination Content (kg/m^3)	360	380	360	380	360
Maximum Free Water/Cement Ratio	0.4	0.4	0.4	0.4	0.4
Required Group or Type and Class of Cement or Combination	IIB-V+SR IIIA+SR	IIB-V+SR IIIA+SR	IVB-V	IVB-V	IIIB+SR
Maximum Aggregate Size	20 mm	20 mm	20 mm	20 mm	20 mm
Chloride Content Class	Cl 0,30	Cl 0,30	Cl 0,30	Cl 0,30	Cl 0,20
For Lightweight Concrete, the Density Class or Target Density					
For Heavyweight Concrete, the Target Density					
Consistence Class	#	#	#	#	#
Special Type or Class of Cement or Combination	#	#	#	#	#

Requirement	Schedule				
Required Source/Special Type of Aggregate	#	#	#	#	#
Maximum Cement Content (kg/m^3) [See NG 1704.7]	380	380	400	420	420
Required Admixture					
Air Entrainment Required [YES/NO]	No	No	No	No	No
Minimum or Maximum Temperature of Fresh Concrete ˚C	5/30	5/30	5/30	5/30	5/30

Requirement	Schedule				
Sampling and Testing Identity testing Type of test Testing rate	##	##	##	##	##
Other Requirements UKAS or equivalent third party product conformity certification [YES/NO]	Yes	Yes	Yes	Yes	Yes

The Operating Company shall determine this detail when selecting from the above table and inform the Overseeing Organisation.

Cross-reference shall be made to Appendix 1/5 and 1/6 as appropriate.

a Aggregate carbonate range A, DC-3, DC-4 and DC-4m to use only Combination CIIIB+SR

b Aggregate carbonate range B, C only

Note Designed concretes included in this Appendix are for use at the discretion of the Operating Company. In line with Appendix 17/70, the Operating Company may develop an alternative designed concrete in accordance with British Standard 8500-1 and 2 and this Specification and submit to the Overseeing Organisation for written consent.

APPENDIX 17/2 – CONCRETE – IMPREGNATION SCHEDULE

Impregnation Treatment

Structure Reference	Drawing Reference	Area Definition Impregnation Treatment (Note 1)
To be completed by the Operating Company	To be completed by the Operating Company	Piers, columns, crossheads and abutments
		Bearing shelves, ballast walls and deck ends
		Structures in marine environments and columns and soffits over brackish water
		Concrete parapets and parapet plinths
		Deck beams and soffits
		Wing walls
		Retaining walls
		'M' beams

Notes

1 This list shall be a guide for selection by the Operating Company but shall not be construed as exhaustive.

Other area definitions shall be inserted by the Operating Company.

2. Surface treatments shall be applied in accordance with BD 43 of the DMRB.

3. Where an alternative to silane impregnation shall be available the Operating Company may submit proposals for its use to the Overseeing Organisation for prior written consent. Any alternative shall not be used until prior written consent has been obtained.

4. The Overseeing Organisation shall wherever possible not later than four Working Days after receipt of the Operating Company's submission:

(i) accept the submission in writing,

(ii) reject the submission in writing with reasons, and

(iii) request the Operating Company to supply further information.

If action (ii) is taken by the Overseeing Organisation, the period of approval of four Working Days shall recommence on receipt of a redrafted submission. If action (iii) is taken by the Overseeing Organisation, a minimum period of approval of four Working Days shall commence on receipt of the additional information.

APPENDIX 17/3 – CONCRETE – SURFACE FINISHES

1. Patterned Profile Finishes

1.1 Unless otherwise instructed by the Overseeing Organisation where a patterned profile finish is required it shall comprise 40 millimetres deep vertical rebates, 200 millimetres wide at the inner most face of the rebate tapering to 250 millimetres wide at the outermost face of the rebate.

APPENDIX 17/4 – CONCRETE – GENERAL

1 Conformity and Accreditation

1.1 The Operating Company shall provide evidence that the concrete supplier is certified by UKAS and conforms to QSRMC Quality and Product Conformity Regulations British Standard EN ISO 9001:2000.

1.2 The Operating Company shall provide evidence that all material test laboratories to be used are UKAS certified.

1.3 When the mix proportions have been consented to by the Overseeing Organisation, no variations shall be made by the Operating Company in the manufacture, supply, mix proportions or method of mixing of the material without prior written consent.

1.4 In-situ testing shall be carried out to the satisfaction of the Overseeing Organisation and the Operating Company shall submit certified copies of the results to the Overseeing Organisation no later than 1 day after the data was recorded.

1.5 The Operating Company shall obtain laboratory tests results, no later than 3 days after the due test date.

1.6 The mixer and method of mixing the samples shall be the same as that to be used throughout the work.

2 Materials

2.1 The content of equivalent sodium oxide in the mix shall be restricted or non-reactive aggregates shall be used, as defined in the relevant clauses of Series 1700.

2.2 The total chloride ion content of the materials shall not exceed 0.3 per cent of the mass of cement. Any chloride or admixtures containing chlorides shall not be used.

2.3 The aggregates shall be well graded with the maximum size not exceeding that specified in Appendix 17/1, and complying with clause 1702.2 and 1705.

2.4 Elongated aggregates of a fraction greater than the maximum aggregate size shall not be used.

3 Delivery of Materials

3.1 The Operating Company shall obtain with each batch or part of a batch of the material used in relation to the concreting work, Certificates furnished by the formulator or its agent stating:

(i) Formulator's name and address,

(ii) Formulator's agent's name and address where applicable,

(iii) Material identification,

(iv) Batch reference number, size of batch and number of containers in the delivery order,

(v) Date of manufacture, and

(vi) Evidence that the chloride contents are less than specified in clause 2.2.

4 Sampling

4.1 Each batch of material delivered to Site shall be tested at random from one or more containers of the same batch in accordance with British Standard EN 12350-1:2009.

5 Placing and Curing

5.1 The standing time between placements shall not be greater than 30 minutes unless a construction joint is formed in accordance with clause 1710.

5.2 When concrete has been in place for more than 30 minutes, a construction joint shall be formed and no further concrete shall be placed against it for a further 20 hours. In addition to the requirements of clause 1710, the construction joint surface shall be saturated for a minimum of 2 hours immediately before any further concrete is placed against it.

5.3 Where concrete is placed in layers, compaction shall extend below the top layer and into the one underneath by at least 100 mm. External compaction may also be adopted.

5.4 Immediately after placing and for 14 days thereafter, concrete shall be protected against harmful effects of weather including rapid temperature changes, frost and from drying out. The methods of protection used must in all cases be subject to the prior written consent of the Overseeing Organisation. Proprietary curing membranes shall not be used.

APPENDIX 17/5 – CONCRETE – BURIED CONCRETE

The following information shall be completed by the Operating Company for each Structure, or group of Structures, and applies only for buried concrete or partially buried concrete, i.e. with one or more faces in contact with natural or disturbed ground or imported backfill.

Structure Name or Location (A separate appendix should be provided for each Structure or location with varying conditions or Design constraints – identical conditions and constraints may be grouped together in one appendix)	
Aggressive Chemical Environment for Concrete Class for Site (derived from Table A.2 of BS 8500-1)	
Structural Performance Level (High, normal or low) (derived from Table 3 of BS 8500-1)	
Design Chemical Class (derived from the Aggressive Chemical Environment for Concrete class determined by assessment of ground conditions together with the Structural Performance Level and the concrete section thickness and adjusted as necessary by reference to the footnotes to Table A.4 of BS 8500-1 and NG 1704.11(i) for increase in concrete quality when used as an Additional Protective Measure, specification of 'starred' or 'double' starred' DC classes)	
Other Requirements and Design Constraints (eg Limitations on drainage or Additional Protective Measures required)	

APPENDIX 17/70 – SCHEDULE FOR THE SPECIFICATION OF AN ALTERNATIVE DESIGNED CONCRETE

	Schedule		
Reference	RC30(B) Below Ground	RC30(A) Above Ground	
Intended Working Life of Structure (years)	120	120	
Nominal Cover to Reinforcement (mm)	#	#	
Applicable Exposure Classes		#	
DC-class	DC-1[$]		
Compressive Strength Class of Concrete	C25/30	C25/30	
Minimum Cement Content (kg/m^3)	280	280	
Maximum Free Water/Cement Ratio	0.6	0.6	
Required Group or Type and Class of Cement or Combination (where a DC-class has not been specified)	#	Group 4, 5, 6	
Maximum Aggregate Size, (mm)	20	20	
Chloride Content Class	Cl 0,30	Cl 0,30	
For Lightweight Concrete, the Density Class or Target Density			
For Heavyweight Concrete, the Target Density			
Consistence Class	#	#	
Special Type or Class of Cement or Combination			
Required Source/Special Type of Aggregate			
Maximum Cement Content (kg/m^3) [See NG 1704.7]	300	300	
Required Admixture			
Air Entrainment Required [YES/NO]	NO	NO	
Minimum / Maximum Temperature of Fresh Concrete (˚C)	5/30	5/30	
Sampling and Testing	##	##	
Other Requirements	#	#	

#	The Operating Company shall determine this detail when selecting from the above table and inform the Overseeing Organisation.
##	Cross-reference shall be made to Appendix 1/5 and 1/6 as appropriate.
Notes 1	Structural performance level shall be 'High'.
2	See tables A2, A4 and A5 of BS 8500-1 and BRE Special Digest 1.

		Schedule		
3 1	RC30 above ground shall comply with Table A6 of British Standard 8500-			

APPENDIX 18/70 – WELD REPAIRS TO ORTHOTROPIC DECKS

1. Acceptance criteria for existing Defects on steel orthotropic decks shall be established by a civil or structural engineer with experience in welding of existing plated steel structures, or through written consultation with same and shall take account of the age of the deck and materials used during manufacture. Qualifications for relevant welding, coordination and testing personnel shall be as required in British Standard EN ISO 3834-5:2005 for the comprehensive quality requirement level.

2. Where cracks in the deck plate, deck plate stiffeners or welds are identified their location and extent shall be recorded. The extent of cracks shall be clearly marked, logged and photographed.

3. Deck plate and welds shall be inspected visually and weld defects sought further by Magnetic Particle Inspection to British Standard 6072 using an A.C. yoke by a person qualified to at least PCN level 2. The procuring specification shall define the extent and basis of MPI inspection frequency.

4. Ultrasonic inspection d may be used to establish the extent and depth of defects encountered or establish other characteristics such as fusion. The ultrasonic inspection shall be carried out using the methods recommended in British Standard EN 583.

5. Welders shall be qualified for the relevant procedure in the proposed location in accordance with British Standard EN 287: Part 1. Written weld and repair procedures shall be submitted as part of the Contractor's method statement for on-site welding to British Standard EN 1011-1 and British Standard EN 1011-2. Welders must be in possession of the relevant procedure when carrying out the work.

6. Weld procedures shall be subject to shop application trials using, where possible, samples of plate taken from the structure at relevant locations. All laboratory tests required shall be defined in the trial procedure specification.

7. The Operating Company shall prepare procedures for the repair of Defects based on the following, which assumes a deck plate thickness of 12.0-12.7mm:

   (i) An assessment of the likely depth of the defect shall be made. If less than 3mm deep, it shall be removed by shallow dishing in an approved manner and direction with a disc grinder and inspected using MPI. No further repair is necessary. If, however, during this process, it emerges that the defect has depth greater than 3mm, dishing should be stopped,

   (ii) Where the Defect is 3mm or greater in depth, excavate using a disc or burr grinder as appropriate in increments of 2mm depth. No length in excess of 250mm or 25% of the total length of Defect, whichever is the greater, shall be ground out at any one time. Grinding from one side shall be limited to 75% of the plate thickness,

   (iii) Ensure that the excavation has smooth sides and forms a weld preparation,

   (iv) Examine the excavation by MPI to ensure complete removal of the Defect,

   (v) Immediately prior to welding, ensure that the excavation is dry. If drying is required this shall be carried out using a suitable gas torch or other acceptable means. The heat from the torch shall not be concentrated in one spot, but evenly distributed over the length of the excavation and applied for sufficient time to dispel all moisture including that generated by the heating flame itself,

   (vi) Undertake repairs in accordance with an appropriate weld procedure using manual metal arc welding. Electrode and repair procedure selection shall be determined bearing in mind the provenance of the existing plate and any existing weld

composition by an experienced welding specialist qualified to at least PCN level 2. Identification shall be provided to enable each weld to be traced to the welder or operator who made it,

(vii) Visually inspect the repaired area to ensure the minimum acceptance criteria are achieved, and

(viii) Undertake MPI and ultrasonic testing over 100% of the repair area, after a minimum period of 48 hours, has elapsed to ensure the minimum acceptance criteria are achieved.

APPENDIX 19/1 – (SPECIFICATION FOR HIGHWAY WORKS) FORM HA/P1 (NEW WORKS) PAINT SYSTEM SHEET

1. CONTRACT TITLE: STRUCTURE NO: GRID REF:				
2. DATE OF ISSUE OF DOCUMENTS TO TENDERERS				
3. ENVIRONMENT AND ACCESSIBILITY:				
4. REQUIRED DURABILITY OF SYSTEM: NO MAINTENANCE: up to …….. YEARS MINOR MAINTENANCE: from …… YEARS MAJOR MAINTENANCE: after …… YEARS (Ref: NG Cl 1911.14(iii)	5. COLOUR OF FINISH:			
6. PAINT SYSTEM TO BE APPLIED OVER: AREA REF: ……. AREA DESCRIPTION: ……. PROTECTIVE SYSTEM TYPE: (i.e. I, II etc):……..				
7. DETAILS	1st Coat	2nd Coat	3rd Coat	4th Coat
Registered Description Item No. and Colour Date Registered BBA HAPAS Roads and Bridges Certificate Reference Brand Name and Manufacturer's Ref. No. Manufacturer's Data Sheet No. Where Applied How applied Minimum dry film thickness (mdft) (μm) Maximum local dft (See Cl. 1914.7) (μm) Estimated total volume of paint likely to be used. (litres) 'A' type testing required (YES/NO) (See Cl 1912.3) 'B' type testing required (YES/NO) (See Cl 1912.10)				

8. STRIPE COAT DESCRIPTION (Including Item No. and colour) Workshop: Site:	9. PAINT MANUFACTURER'S OFFICIAL STAMP:
10. Mdft (μm) NOTE. The minimum total dry film thickness of the paint system, neglecting primers and sealers under 30 microns, shall be 15% greater (to the nearest 25 microns) than the sum of the mdfts of the individual paint coats.	11. APPROVED BY: DATE

Note: The Operating Company shall complete the paint system sheet HA/P1 for protection of steelwork against corrosion for new work.

A separate form shall be provided for each Structure, including CCTV masts, cantilever masts, street lighting columns and bracket arms as appropriate.

APPENDIX 19/3 – (SPECIFICATION FOR HIGHWAY WORKS) FORM HA/P2 PAINT DATA SHEET

BBA HAPAS Road and Bridges Certificate Reference and Date:

Manufacturer: Item No:

Registered Description: Brand Name and Reference No:

Consistency and Method of Application: Weight per 5 Litres (kg):

Specific gravity: Colour:

For two-pack paints :

Base: Activator: Mixed Components:

Volume Solids %:

For two pack paints volume solids % for mixed paint:

VOC content g/l (mixed):

Manufacturer's Minimum Dry Film Thickness Range

Recommended lower mdft:

Recommended upper mdft:

Full Application Instructions:

Mix ratio:

Flash Point:

		5°C	10°C	20°C	30°C
Drying Times (hours)	Surface Dry				
	Hard Dry				
Overcoating Times (hours)	Minimum				
	Maximum				
Pot Life (hours)					

Cleaning Solvent:

State effects on Drying Times of Temperatures below 20°C:

Manufacturer's Application Restrictions:

e.g. for Temperatures or Humidity:

Manufacturer's General Recommendations:

Note: The Operating Company shall complete the paint system sheet HA/P2 for protection of steelwork against corrosion for new work.

APPENDIX 19/4SE – (SPECIFICATION FOR HIGHWAY WORKS) FORM SEDD/P3

PAINT SAMPLE DESPATCH LIST: SHEET 1

Contract Title:

Structure Name : Structure No:

Client Name:

Supervising Firm: Fax No:

Supervising Firm's Representative Name: Tel No:

Address:

Painting Inspection Firm:

Samples Despatched From: (Note 1) Date Despatched:

Inspector's Name: Tel No:

Inspector's Signature:

SAMPLES: (Numbered A1, A2 etc. or B1, B2 etc.) (Note 2)					
Sample No.	Item No.	Manufacturer's Reference No.	Batch No	Colour BS 4800 reference (Note 3)	Sp.G. (note 4 & 5)

Paint Manufacturer:

(SPECIFICATION FOR HIGHWAY WORKS) FORM SEDD/P3

PAINT SAMPLE DESPATCH LIST: SHEET 2

1 Procedures

1.1 To be followed closely before despatch of paints to Scientifics Ltd or an approved local paint testing firm:

Check the specific gravity of each batch of paint,

Check the matching of finish colours to BS 4800,

Select the required sample, i.e.

(i) 'A' sample – unopened tin, and

(ii) 'B' sample – 500 ml sample from painter's kettle or from nozzle of airless spray gun in the case of single component coatings or if the check is to be done in situ. Otherwise, for two pack coatings, separate samples of the base and the activator must be dispatched to the testing laboratory.

List contract details in Section 1 of Form SEDD/P3,

List details of each set of samples in Section 1 of Form SEDD/P3 including the specific gravity of each sample,

Send Form HA/P1 Paint System Sheet with Form SEDD/P3 to the following:

(i) Scientifics Ltd, 500 London Road, Derby, DE24 8BQ or an approved local paint testing firm, and

(ii) The Director, Buchanan House, 58 Port Dundas Road, Glasgow G4 0HF.

The Operating Company shall despatch samples to (i) above.

The Operating Company shall label samples correctly, clip lids of tins down securely and send the samples promptly.

Samples shall be labelled with this Contract title, structure name, sample number, and additionally in the case of 'B' samples, item number, manufacturer's reference number, batch number and colour.

Results will be notified by the Director, as soon as they become available.

Notes:

1 State whether from workshop or Site (give name and address).

2. Batch samples comprising unopened tins to be marked A1, A2, etc. Control samples in 0.5 litre tins to be marked B1, B2, etc. Samples No. to run consecutively, i.e. A1 and B1 onwards.

3. Colour reference to BS 4800 to be given, as stated on Form HA/P1 (Maintenance) Paint System Sheet, e.g. 18 B 25.

4. For 'A' samples specific gravity (Sp.G.) to be measured by Inspector from separate tins of the same batch. For 'B' samples Sp.G. to be measured by Inspector when taking samples. Samples will be rejected unless Sp.G. is filled in above by Inspector.

5. If Sp.G. differs appreciably from data sheet do not dispatch 'A' or 'B' samples.

6. The Operating Company shall complete the paint system sheet SEDD/P3 for protection of steelwork against corrosion for new work.

APPENDIX 20/1 – WATERPROOFING FOR CONCRETE STRUCTURES

1 Repair and Replacement of Bridge Deck Waterproofing

1.1 Repair and Replacement of Bridge Deck Waterproofing shall be in accordance with clause 2008.

Where details of existing waterproofing systems to bridge decks are unknown the Operating Company shall carry out investigations to determine the system employed. The integrity of the waterproofing membrane and bond to substrate shall be included in the investigation.

2 Bridge decks without waterproofing

2.1 Some existing bridge decks may not have received waterproofing. In such cases the deck shall be prepared to a U4 finish and receive waterproofing in accordance with Series 2000.

3 Typical Existing Waterproofing Systems

3.1 Typical Waterproofing systems that may be found on the Trunk Road network include:

(i) Mastic Asphalt System,

(ii) Proprietary membrane and sheet system, and

(iii) Proprietary sprayed waterproofing system.

4 Design

4.1 Non-destructive integrity tests compatible with the waterproofing system shall be carried out in accordance with clause 2007.

4.2 Where the concrete deck deviates from a U4 finish further preparation shall be carried out to bring the surface finish up to a suitable standard for the application of waterproofing.

4.3 The application of an additional thin screed coating on the existing concrete deck shall only be used for localised repairs.

5 Waterproofing with bituminous paint to buried faces of concrete structures

This shall be applied as follows:

Material	**Method of Application**	**Rate of Application**	**Number of coats**
Bituminous paint	Brush or spray applied	0.55 litres / m^2 (first coat) 0.45 litres/m^2 (second coat)	2

APPENDIX 24/1 – BRICKWORK, BLOCKWORK AND STONEWORK

1 Selection of Mortar Type

1.1 The Operating Company shall select lime or cement mortars on the basis of the points listed below and in conjunction with clause 2470AR.

For repointing of natural stone masonry, lime mortars should generally be used, and particularly for weaker/more porous masonry. Cement mortars will normally only be permitted in natural stone structures where stonework consists of hard, non-porous masonry and subject to harsh environmental exposure conditions or below open water level.

The mortar mix will vary for each Scheme depending on the exposure of the work, the stone in question and the time of year that the work is carried out. Specialist advice shall be sought for the appropriate mortar mix, from the Scottish Lime Centre or equivalent organisations.

2 Cement Mortars

2.1 The mortar designation shall be selected by the Operating Company from Table 24/5 of the Specification (as amended by the Contract Specific Minor Alterations).

Sulphate resisting portland cement shall be used in all mortar designations where located below non tidal open water.

The Operating Company shall determine other locations where it shall be appropriate for sulphate resisting portland cement to be employed.

3 Lime Mortars

3.1 Lime mortar shall be mixed using gauging boxes.

The durability designation shall comply with clause 2476AR and shall be selected by the Operating Company from Table 24/7, 24/8 and 24/9 of this Specification.

The Operating Company shall ensure that personnel responsible for the supervision of the production of mortars and the like shall be suitably experienced in the techniques of preparing and using traditional lime mortars.

Where ready made mortars are purchased the Operating Company shall obtain evidence that the supplier shall be suitably experienced in the techniques of production of traditional lime mortars.

4 Selection of masonry

4.1 Natural building stone in repair work shall be of the same quality colour and type as adjacent sound stone and bedded jointed dressed and tooled to match.

Before building into the Site activities the Operating Company shall compare and match samples of natural building stone with the existing sound stone.

Reconstructed stone shall be of the same quality colour and type as adjacent sound existing reconstructed stone.

Before building into the Site activities the Operating Company shall compare and match samples of reconstructed stone with the existing sound reconstructed stone.

5 Repointing

5.1 Pointing to repair work shall be finished to match the existing pointing of adjacent sound areas of pointing to brickwork, blockwork, reconstructed stonework and stonework.

In new work:

Finished pointing shall generally be:

(i) bucket handle in brickwork, block-work and reconstructed stone,

(ii) flush with the exposed face in natural ashlar stonework and stonework in arch rings and faces, and

(iii) finished 5 mm from the exposed face of squared or un-squared coursed or un-coursed random rubble stonework.

The proposed specification and details of brickwork, stonework, blockwork and reconstructed stonework and other relevant details for new build shall be submitted for the written consent of the Overseeing Organisation.

6 Other

The variation in depth, front to back, of stones for natural stone face-work to cast concrete shall not exceed 25 mm.

The variation in depth, front to back of adjacent stones for natural stonework in composite walls shall not exceed 50 mm.

In coursed work the courses shall generally be horizontal.

For all work, bricks, stone blocks, reconstructed stone and mortar materials shall be stored on pallets and kept dry.

Bonding for brickwork and blockwork in repairs shall match existing and for new work shall be submitted for the written consent of the Overseeing Organisation.

The Operating Company shall comply with British Standard 8000-3 'Code of Practice for Masonry' in terms of standards of workmanship and Site practice.

The type of permitted fill between the crown of the arch and the underside of the pavement as described in clause 2417.25 shall be selected by the Operating Company based on the fill thickness and site specific criteria.

Unreinforced masonry arch bridges shall be waterproofed with a permitted sheet system conforming to clauses 2003 and 2005 of the Specification.

APPENDIX 26/1 – ANCILLARY CONCRETE

SRPC (sulphate-resisting portland cement) shall be used when required.

APPENDIX 30/1 – GENERAL

1 The Operating Company shall give at least two Working Days notice to the Overseeing Organisation of the intention to commence any of the Operations listed in Sub-clause 3001.2 to take place at the locations listed below:

(i) Sites of Special Scientific Interest,

(ii) Special Areas of Conservation including candidate sites,

(iii) Special Protection Areas including candidate sites,

(iv) Ramsar sites,

(v) Sites of Interest for Nature Conservation, and

(vi) Any site of Archaeological interest which may be affected by the Operations.

The Operating Company shall also ensure that the appropriate advisory body (for example Scottish Natural Heritage, Scottish Environmental Protection Agency and Historic Scotland) shall also be advised of the intended Operations prior to the Operations commencing on Site.

2 The Operating Company shall comply with the schedule of environmental commitments given in the Environmental Statement for the Forth Replacement Crossing where they relate to Operations. These are re-stated in Annex 5.8/A of Schedule 5 Part 8.

3 Pesticide record forms as detailed below shall be submitted to the Overseeing Organisation on an annual basis as part of the annual report to be submitted in accordance with Schedule 7 Part 4.

LANDSCAPE WORKS PESTICIDE RECORD

Contract Reference number:

Date of visit …/…/…

(minimum one record per day)

Contract Name: Name of Operating Company:

Operating Company's telephone number:……..

Operations carried out	**Pesticide used**	**Location of operation**
Total weed control		
Selective herbicide		
Weed control in vicinity of any burn, ditch, or open water		
Weed control around planting		
Weed control to cultivated beds		
Other		

Names and qualifications of operatives on Site:

Supervisor ……

Operatives……

Storeman ..……..

Application by …….....

Signed for Operating Company:……

Operating Company's observations on damage or any other incidents:

……

……

……

3 The bird nesting season shall be generally accepted as being from the end of March to the end of July but shall be confirmed by the Operating Company after consultation with Scottish Natural Heritage.

Evidence of this consultation shall be provided by the Operating Company to the Overseeing Organisation prior to any Operations commencing on Site.

4 Inspection Reports are required for the activities carried out under clauses 3007, 3009 and 3010 on the form below.

Inspection Reports shall be submitted at the following intervals:

(i) In the case of activities carried out under clause 3009:

(a) six times per year in the first relevant 52 week period of the period of establishment maintenance,

(b) four times per year in the second relevant 52 week period of the period of establishment maintenance,

(c) three times per year in the third relevant 52 week period of the period of establishment maintenance, and for any remaining years as appropriate,

and

(ii) In the case of activities carried out under clauses 3007 and 3010 at the frequencies stated in Schedule 7 Part 1 for Detailed Inspections.

LANDSCAPE WORKS – INSPECTION REPORT

Contract reference Number:

Date of visit .../.../…

Contract Name:

Name of Operating Company:

Operating Company's telephone number:

Operations carried out	**Location of Operations**

Names of operatives on Site:

……

Operating Company's observations on damage by others additional work required or general condition of the Operations and/or Works:

……

This maintenance visit has been satisfactorily completed.

SIGNED (for Operating Company)……

NAME IN CAPITALS…….... DATE../../..

SIGNED (For Overseeing Organisation)……..

NAME IN CAPITALS:……..

APPENDIX 30/2 – WEED CONTROL

1 The Operating Company shall control all injurious weed species which shall be defined for this Appendix as being those listed in sub-clause 3002.1 with the addition of Oil Seed Rape, Rosebay Willowherb and Rhododendron Ponticum within or associated with the Unit and throughout all Annual Periods at sufficient frequency to restrict their growth and prevent their spread.

The Operating Company's programme of weed control shall ensure there shall be a significant reduction in the occurrences and extent of these species each successive year for until the Service End Date wherever they occur.

In locations where effective weed control shall be possible and practicable by other means allowed within this Contract there shall be a presumption against the use of chemical herbicides.

2 The Operating Company shall apply contact, translocated or residual herbicide for total weed control at the following locations:

(i) All Structures, paved areas, kerbs, hardstandings, filter drains and gravel areas (including gravelled central reserves).

The Operating Company shall apply herbicides at sufficient frequency to eliminate weed growth in these areas until the Service End Date.

3 The Operating Company shall apply non-residual translocated herbicide for the total elimination of vegetation during Site preparation at the following locations:

(i) all areas prior to seeding or planting, and

(ii) all stockpiles of topsoil.

4 The Operating Company shall use a translocated herbicide approved by the Scottish Environmental Protection Agency in or near water for the total control of vegetation in all filter drains and any other areas adjacent to water and requiring weed control.

The application shall be at sufficient frequency to eliminate weed growth throughout the duration of this Contract.

5 The Operating Company shall apply herbicide for the selective control of all weeds listed in paragraph 1 above in all non-hardened verges and central reserves, planted areas and other grassed areas throughout the Site including embankments and cuttings.

The application shall be at sufficient frequency to restrict their growth and prevent their spread.

6 The Operating Company's programme of weed control shall ensure there shall be a significant reduction in the occurrences of these species each successive year until the Service End Date wherever they occur.

7 Where any of the weeds listed in paragraph 1 of this Appendix are controlled using herbicide, the application shall be by spot treatment in accordance with the

manufacturer's written instructions unless otherwise consented to in writing by the Overseeing Organisation.

Spot treatment shall be via controlled droplet application of a type appropriate to the herbicide being used and the location, at the season and frequency appropriate to the species being treated.

8 Handweeding shall be undertaken at appropriate locations.

9 Within wildflower areas or areas of nature conservation value the Operating Company shall eliminate any injurious weeds that cannot be effectively controlled by chemical means without causing damage to other vegetation by hand pulling in accordance with sub-clauses 3002.8 and 3002.10 and at the frequency stated in paragraph 1 of this Appendix.

10 The Operating Company shall hand weed as necessary and at sufficient frequency to eliminate weed growth throughout the duration of this Contract in the following locations:

(i) ornamental shrub beds where the application of herbicide may cause damage,

(ii) hedgerow planting where herbicide application may cause damage,

(iii) around planting stations in existing woodland,

(iv) within plant protectors and tree/shrub shelters,

(v) where necessary throughout or associated with the Unit for the control of Ragwort and Oil Seed Rape, and

(vi) in areas densely populated with desirable broadleaved species or areas of wildflowers where the application of herbicide may cause damage.

11 The Operating Company shall cut weeds listed in paragraph 1 of this Appendix throughout or associated with the Unit that have become unsightly or a nuisance or to prevent such weeds becoming unsightly or a nuisance or to facilitate effective control by herbicide.

12 Any arisings from weed control Operations shall be removed from Site and disposed of to a licensed disposal facility.

Where weed control Operations result in the production of controlled waste products typically from Ragwort and Japanese Knotweed the arisings shall be placed in waterproof bags sealed and removed from the Site to a licensed disposal facility.

The Operating Company shall remove the remnants of any dead or dying weeds at the appropriate time following herbicide application.

APPENDIX 30/3 – CONTROL OF RABBITS AND DEER

1 The Operating Company shall carry out rabbit, hare and deer control in all areas of new planting or seeding undertaken under this Contract for the duration of the period of establishment maintenance.

For all other areas within or associated with the Unit the Operating Company shall undertake rabbit, hare and deer control when instructed by the Overseeing Organisation.

No guns or snares shall be used for the control of rabbit, hare and deer without the written consent of the Overseeing Organisation.

The Operating Company shall be responsible for contacting adjacent landowners regarding their obligation to control infestations on their own land and thereafter to liaise as necessary to control co-ordination and report any further complaints in writing to the Overseeing Organisation.

Areas of brambles and herbage that interfere with the control of rabbit or deer shall be cut.

The arisings shall either be used to form habitat piles or chipped and spread around the Site in locations within the Site where the habitat piles and/or the chippings shall not be likely to become visually intrusive or interfere with access or maintenance.

No clearance of brambles or herbage shall be undertaken during the bird nesting season without the completion of a comprehensive bird survey by appropriately qualified ecologists and the submission of a corresponding report for the written consent of the Overseeing Organisation.

For all areas of new planting or seeding Operations and/or Works the Operating Company shall maintain the planting enclosures free of rabbits, rabbit burrows including exit/entry holes and deer for the duration of the period of establishment maintenance.

For all areas of new planting or seeding Operations and/or Works the Operating Company shall replace all plants damaged by rabbits, hares and/or deer and maintain them for the entire duration of the period of establishment maintenance.

APPENDIX 30/4 – GROUND PREPARATION

1 Prior to treatment with an appropriate herbicide, the Operating Company shall cut all areas to be planted or seeded to a height of between 50 – 75 mm, and remove the arisings from the Unit to a licensed disposal facility.

2. The Operating Company shall apply herbicide to all areas to be planted or seeded with the exception of areas in existing woodland and on rock faces.

3. Prior to spreading topsoil the Operating Company shall rip the sub-soil in all areas to be planted other than on rock faces.

The minimum depth of ripping shall be 450 mm unless otherwise consented to by the Overseeing Organisation.

The spacing between tine furrows used for ripping shall be 500 mm.

The requirements of sub-clauses 3004.8 to 3004.11 shall apply to subsoil to be seeded or topsoil spread.

Stones brought to the surface during final preparation of soils shall be retained on the Unit and used to form habitat piles in locations where the habitat piles are not likely to become visually intrusive or interfere with the Operations.

All inorganic foreign matter shall be removed off the Unit.

APPENDIX 30/5 – GRASS SEEDING, WILDFLOWER SEEDING AND TURFING

1 Wildflower seeding shall be undertaken typically in early Spring or early Autumn and following best horticultural practice appropriate to the species involved.

2. Immediately prior to any sowing of grass and wildflower seed, hydraulic seeding or laying turf, with the exception of rock faces and inaccessible areas, the Operating Company shall reduce the upper 50 mm of soil to a fine tilth by use of a chain harrow, rotovator or other suitable construction plant.

3. Fertilisers and organic soil improvers may be used with the written consent of the Overseeing Organisation to aid initial grass establishment in areas where this may be difficult to achieve.

The use of such additives is not permissible in areas of proposed wildflower seeding.

4 Grass and wildflower/grass seed mixtures shall be selected by the Operating Company and submitted to the Overseeing Organisation for written consent prior to ordering.

The selection shall take account of the following criteria:

(i) Intended work location – the choice of grass and/or wildflower species may vary depending on the relative location of the proposed work,

(ii) Proximity to any areas of nature conservation interests – the Operating Company shall consult with Scottish Natural Heritage if the intended Site for seeding lies in or adjacent to an area of conservation interest,

(iii) Biodiversity interests – including the specification of wildflower species native to Scotland or the UK and of local provenance,

(iv) Deer interests – deer can often be attracted to the road side by the presence of new grass seeding and some areas may be more likely to have regular deer activity near to the road. The Operating Company shall consider a choice of grass and wildflower seed that is less palatable to deer, and

(v) Future maintenance requirements – the choice of seed type shall balance the need for good establishment with reduced long term maintenance, particularly in less accessible areas such as central reserves. For wildflower/grass mixtures the ratio of grass seed to wildflowers shall be 80% to 20% respectively. No single species of wildflower shall be less than 10% of the wildflower component with the exception of Ox Eye Daisy (Leucanthemnum vulgare) that, if specified, shall be limited to 3% of the wildflower component.

All seed shall be delivered to the Unit in bags sealed by the supplier.

A label shall be attached to each bag giving details of species and percentage breakdown.

The same details shall also be enclosed within the bag.

Each bag shall be numbered differently and relate to the label and documents within the bag.

The documents within the bag shall be retained by the Operating Company for inspection by the Overseeing Organisation.

The wild flower seeds shall be of UK native origin selected and procured in accordance with Appendix 1 of 'Cost *Effective Landscape: Learning from Nature' published by the Scottish Office in 1998 and any subsequent editions.*

The Operating Company shall complete and submit to the Overseeing Organisation the appropriate Wildflower Seed Provenance Certificates in the format shown in this Appendix.

5 The grass seed mixture shall be sown at a rate of not less than 20g/m^2 for side slopes of cuttings and embankments and 15g/m^2 elsewhere.

Wildflower/grass mix shall be sown at a rate of not less than 10 g/m^2.

6 Hydraulic seeding shall be undertaken only with the prior written consent of the Overseeing Organisation.

It shall typically be undertaken on areas such as rock and scree slopes but may be utilised elsewhere as appropriate.

Seeding rate of application for grass seed mix and wildflower/grass mix shall be the same as for conventional sowing.

7 The number of establishment cuts for all newly-established/sown grass shall be 4 for high amenity areas and 2 for all other grass areas.

WILDFLOWER SEED PROVENANCE CERTIFICATE

CERTIFICATE A – Seed Harvested from the Nursery

Certificate No:…….

Species	Name of seed supplier	Name and location of the nursery from which the seed was harvested	Locations and dates of seed collection	Name of person(s) and company(s) responsible for collecting the seed	Any other relevant details or comments

We hereby certify that the wildflower seed incorporated into Operations is as identified in the Specification Appendix 30/5, and the details provided with each individual bag of seed delivered to the Site.

Part (i). (in the event of the Operations being sub-contracted by the Operating Company to be completed by the sub-contractor responsible for undertaking the planting Operations).

SUB-CONTRACTOR

Firm:…….

Name:……

Position:……

Signed:……..……

Date: ../../..

Part (ii). (to be completed by the Operating Company, regardless of whether or not the planting Operations have been sub-contracted).

OPERATING COMPANY

Firm:…….

Name:……

Position:……

Signed:……..……

Date: ../../..

WILDFLOWER SEED PROVENANCE CERTIFICATE

CERTIFICATE B – Seed Collected Directly from the Wild

Certificate No:…….

Species	Name of seed supplier	Locations from which the seed was harvested	Dates of seed collection	Name of person(s) and company(s) responsible for collecting the seed	Any other relevant details or comments

We hereby certify that the wildflower seed incorporated in to Operations is as identified in the Specification Appendix 30/5, and the details provided with each individual bag of seed delivered to the Site.

Part (i). (in the event of the Operations being sub-contracted by the Operating Company to be completed by the sub-contractor responsible for undertaking the planting Operations).

SUB-CONTRACTOR

Firm:…….

Name:……

Position:……

Signed:……..……

Date: ../../..

Part (ii). (to be completed by the Operating Company, regardless of whether or not the planting Operations have been sub-contracted).

OPERATING COMPANY

Firm:…….

Name:……

Position:……

Signed:……..……

Date: ../../..

APPENDIX 30/6 – PLANTING

1 All new plant stock to be used within the Unit shall conform to British Standard 3936: Nursery Stock and British Standard 4043: Recommendations for transplanting rootballed trees, with the exception that Holly (Ilex aquifolium) which shall be container grown to a minimum height of 500 mm and then cut back to 200 mm in height before delivery to the Unit.

Plant stock types, planting densities and sizes shall be as Tables 30/2, 30/3 and 30/4.

TABLE 30/2 – Extra Heavy Standard, Heavy Standard, Standard, Rootballed Conifers and Feathered Trees

Type	Girth at 1m Above Ground Level (centimetres (cm))	Clear Stem from Ground Level (metres (m))	Minimum Height from Ground Level (metres (m))	Maximum Height from Ground Level (metres)
Extra heavy standard	14 to 20	1.8	4.25	6.0
Heavy standard	12 to 14	1.8	3.5	4.25
Standard	8 to 10	1.8	2.5	3.0
Large rootballed conifers	–	–	1.5	1.75
Feathered Tree	–	–	1.2	1.8

TABLE 30/3 – Whip transplants, Container Grown and Cell Grown Stock

Type	Minimum Age (years)	Minimum Height Above Ground Level (millimetres)	Minimum Container Size
Cell grown stock: Broadleaves Conifers	1.5	 250 180	175 cc
Whip transplants	3.0	450	–
Container grown evergreens	3.0	200	2 litres or 1.5 litre rigid cell with internal grooves or ridges

TABLE 30/4 – Shrubs, Conifers, Hedge Plants, Climbers and Ground Cover Plants

Type	Minimum Density (plants/per square metre or as shown)	Minimum Age (years)	Column A Acceptable Height (millimetres)	Column B Minimum Height for Small/Slow Growing Plants not Readily Available to Sizes Shown in Column A (millimetres)	Minimum Volume (litres (l))
Hedge plants, bare root beech, hawthorn	6 per linear metre double staggered row	3.0	400-600	–	–
Cell grown		1.5	200-400		
Other species as detailed on the drawings and Specification		Other as above			
Bare-root shrubs	As Ordered	3.0	300 to 600		–
Container grown shrubs and conifers	As Ordered	3.0	450 to 600	300 to 450	2 or 1.5 rigid cell with internal grooves or ridges
Container grown climbers	As Ordered	3.0	600 – 900	400 to 600	2
Ground cover plants	As Ordered	3.0	300 – 450	150 to 200	2
Marginal and aquatic plants	As Ordered	2.0	150 – 300	100 to 150	2

2. Any planting design shall be accompanied by written confirmation from the Operating Company that, in respect of the planting proposed, the United Kingdom native plant species of trees, shrubs climbers and wildflower (seeds and plants) will be sourced from the highest available preference for selecting native seed sources contained

within Appendix 1, Figure 5 of *Cost Effective Landscape: Learning from Nature*, first published by the Scottish Office in 1998.

3. This confirmation shall be provided prior to the commencement of the landscape planting Operations and shall consist of the completed Provenance Certificates in the format shown in this Appendix.

4. Where there is a choice of form of plant, preference shall be given to the most local provenance.

PROVENANCE CERTIFICATE

Certificate Number…….

1 We hereby certify that the provenance of the United Kingdom native plant stock incorporated in the Operations shall be as identified in the Plant Schedule contained in Annex 1 of this Certificate.

2. The words and phrases herein, unless otherwise stated, have the same meaning as attributed to them in *Cost Effective Landscape: Learning from Nature (Scottish Office publication, February 1998).*

PART A. (in the event of the Operations being sub-contracted by the Operating Company to be completed by the sub-contractor responsible for undertaking the planting Operations).

SUB-CONTRACTOR
Firm:……..
Name:……
Position:……
Signed:……..
Date: ../../..

PART B. (to be completed by the Operating Company, regardless of whether or not the planting Operations have been sub-contracted).

OPERATING COMPANY
Name:……
Position:……
Signed:……..
Date: ../../..

PROVENANCE CERTIFICATE

Certificate Number:…….

ANNEX 1 – Plant Schedule

Botanical Name	Quantity	Form/Age	Height (Cm)	Zone Of Provenance And Location	Approximate Date Propagation Material Collected	Nursery(S) Where Plants Have Been Grown

1. The Operating Company shall make special arrangements for the Overseeing Organisation to inspect planting stock at the nursery if requested by the Overseeing Organisation.

2. Tree pits shall be back-filled with Class 5A or Class 5B topsoil.

3. Planting compost may be used for the cultivation of intended planting areas where the soil structure is poor or nutrient deficient and will be detrimental to the successful establishment of the planting.

4. Areas intended for the use of compost shall have the written consent of the Overseeing Organisation prior to the incorporation of the compost.

5. Slow/controlled release fertiliser with a nitrogen: phosphorus: potassium: magnesium ratio of 14:8:13:2 shall be incorporated into backfill of pits for standard trees, heavy standard trees and extra heavy standard trees at the following rates respectively - 20 grams, 40 grams and 100 grams and into the top 75 mm of planting bed soil in ornamental planting areas at the rate of 100 grams per square metre.

6. Scattering fertiliser of any description on the surface of the ground around the plants is not permitted.

7. Root dips shall be applied to all bare root plants and shall be applied to all evergreen species in accordance with the manufacturer's written instructions.

   Root dips shall be applied at the following times:

   (i) immediately after the plants have been dug-up in the nursery,

   (ii) on arrival at Site, and

   (iii) immediately prior to planting if more than 3 days delay after arrival on the Site.

8. Anti-desiccant sprays shall be applied on arrival of the plants at Site and immediately prior to planting if more than 3 days delay after arrival on site.

9. Planting of bare-rooted root-balled and cell grown trees shrubs non-aquatic perennials and wildflower plants shall take place during favourable weather and soil conditions, between the beginning of November and the end of March unless otherwise consented to in writing by the Overseeing Organisation.

10. Bare-rooted or root-balled conifers and all evergreens shall be planted either during November or March.

11. Notch planting shall be into a T-shaped opening of sufficient size for the roots of bare-rooted plants to be fully spread out or to accommodate a cell-grown plant without breaking the root plug.

12. The T-shaped opening shall be through an upturned turf which shall have been dug from the planting location or upturned ground where there shall be no turf.

13. For individual plants, turfs or upturned ground shall be 300 mm square and 200 mm deep, for single row hedges strip of turf or upturned ground shall be 300 mm wide and

200 mm deep and for a double-row hedge, the strip shall be 600 mm wide and 200 mm deep.

14. Surrounding ground shall be firmed back after planting.

15. Planting pits and trenches shall be in accordance with Table 30/1 below. Unwanted sub-soil arising from planting pits and trenches shall be retained on Site, wherever practicable, and deposited in new mounding.

TABLE 30/1 – Planting Pits and Trenches

TYPE	DIMENSION OF EXCAVATION WxWxD mm	DEPTH OF CULTIVATION AT THE BASE OF PITS OR TRENCHES mm
Semi-mature trees	Measurement of root-ball plus 400 in each direction.	200
Extra heavy and heavy standard trees	1800 x 1800 x750	200
Standard trees	1000 x 1000 x 500	200
Feathered trees	600 x 600 x 400	200
Whip trees, shrubs and climbers where pit planting shall be specified	300 x 300 x 350	150
Hedges	* x 600 x 350	150
Cell-grown plants where pit planting shall be specified and container grown plants.	100 greater than W and D of root-plug.	

* length of hedge

16 Where planting is undertaken in land without a topsoil depth of 350 mm or greater trenches excavated in accordance with Table 30/1 shall be backfilled with Class 5A or Class 5B as required to make up the required volume.

17 Where planting is in undisturbed land and where the existing topsoil is 300 mm deep or deeper, the ground shall be cultivated to a minimum depth of 300 mm and all live injurious weed roots and growth and all stones and other such arisings above 75 mm in any one dimension, shall be removed to a licensed disposal facility.

18 Areas where topsoil has been spread to a depth of 300 mm or greater shall be cultivated in accordance with sub-clause 3006.29 prior to planting.

19 Where a hedge is planted in undisturbed land and where the existing topsoil is 300 mm deep or deeper, a 600 mm wide strip along the proposed hedgerows shall be cultivated transplants, feathered trees, whip trees, shrubs, climbers and container-

grown plants shall be back-filled with Class 5A topsoil and lightly firmed prior to planting.

21 Root barriers shall only be required where the clearances required for underground services and drainage infrastructure affects the requirement of the planting.

22 The Operating Company is responsible for determining the location of any underground services in the vicinity of the proposed planting area and shall secure agreement with the relevant Statutory Undertaker(s) before employing root barriers to reduce standard clearances from their services.

23 Semi-mature trees shall be planted as shown on HCD Drawing No. K5.

24 Backfill to tree pits shall comprise any Class 5A or Class 5B topsoil as required.

25 Controlled release fertiliser in accordance with sub-clause 3006.15 shall be thoroughly mixed into the topsoil.

26 All newly planted standard heavy standard extra heavy standard and semi-mature trees shall be fully watered-in to field capacity on the same day as planting.

27 All container grown cell grown and root-balled plants shall be watered to field capacity immediately before planting.

28 A 75 mm diameter perforated flexible, plastic irrigation pipe shall be inserted around the root-balls of extra heavy standards trees at a depth of 150 mm below the ground surface.

29 The pipe shall be of sufficient length to coil horizontally completely around the root system or root-ball and shall be provided with two 'T'-piece connections with aeration caps, which shall be located opposite each other. The leg of the T-piece shall extend vertically from the buried coil to a minimum of 5 mm above ground level in unpaved areas or flush with the paved surface.

30 Individual plant protectors a minimum of 750 mm in height and 80-100 mm diameter shall be used to protect all cell grown stock whip trees, feathered trees of under 4 years in age and holly plants within hedgerows except for hedge plants.

31 Individual plant protectors a minimum of 750 mm in height and 150 mm diameter shall be used to protect all shrubs, climbers, container grown evergreens and container grown conifers.

32 Fagus species shall be protected by plant protectors with base ventilation.

33 Shelters shall be supported by timber stakes attached by releasable ratchet ties.

34 Stakes shall be circular section "pencilled," and a minimum of 35 mm diameter in cross section or 35 x 35 mm square section, sharpened at one end.

35 Stakes shall be of sufficient length to adequately support the plant protector and remain stable in the ground for the full duration required.

36 Previously used tree and shrub shelters in sound condition may be used.

37 Timber mulch shall be composted wood chips or bark free of fungi and diseases, methyl bromide contamination and foreign material.

38 It shall be matured for a minimum of 16 weeks naturally heated by the process of decomposition to temperatures exceeding 50 degrees centigrade for a minimum period of 14 days followed by a period of not less than 1 week of stabilisation.

39 Individual mulch mats shall be square or round and not less than 800 mm x 800 mm (or 800 mm diameter) or greater than 1000 mm x 1000 mm (or 1000 mm diameter), and not less than 7 mm thick and biodegradable.

40 Sheet mulch shall be biodegradable and shall have a minimum thickness of 7 mm.

41 It may be used in areas of amenity planting except for planting areas in rock cutting.

42 Edges of sheet mulch mats shall be secured by burying a strip 100 mm wide around the edge of the mat vertically into the ground.

43 Sheet mulch used for hedges shall be laid in either of the methods specified in sub-clause 3006.62.

44 The number of bulbs to be planted per m2 per species shall be as follows:

Bluebell	150	
Crocus	100	
Tulips	50	
Narcissus (large)	40	
Narcissus (medium)	60	
Narcissus (small)	100	for example Lent lily (Pseudonarcissus)

45 The depth of planting shall be in accordance with good horticultural practice.

46 The Operating Company shall insert marker posts to identify the boundary of each planting or wildflower seeding area which are not otherwise to be protected by fencing or other structures.

47 The Operating Company shall replace all plants which are missing, have died or which in the opinion of the Overseeing Organisation are failing to make satisfactory growth for the duration of the period of establishment maintenance.

48 All replacement extra heavy standard, heavy standard and standard trees and any root-balled conifer stock shall be watered to field capacity following planting.

49 All areas of new planting undertaken by the Operating Company shall be subject to a period of establishment maintenance for a minimum duration of three years.

APPENDIX 30/7 – GRASS, BULBS AND WILDFLOWER MAINTENANCE

1 The Operating Company shall maintain all the grass and wildflower grass areas within the Unit in accordance with the landscape inventory categories.

In the case of any areas not recorded in the landscape inventory, the Operating Company shall agree the categories of these areas with the Overseeing Organisation.

2 No grass cutting shall be carried out within 250 mm of unprotected trees and shrubs. Strimmers shall not be used for cutting grass within unprotected planted areas without the written consent of the Overseeing Organisation.

3 All areas indicated within the landscape inventory as high amenity grass shall be cut to the minimum height detailed in sub-clause 3007.9 and at intervals between cuts not exceeding 14 days during the period between 1st March and 30th September each year.

4 All areas indicated within the landscape inventory as amenity grass shall be subject to medium frequency cutting in accordance with sub-clauses 3007.10.

Unless otherwise stated in the landscape inventory, this regime shall also apply to the following typical areas where they are not already subject to the high frequency regime:

(i) The full boundary width of all Trunk Roads subject to a 30 mph or 40 mph speed restriction including a 100 metres stretch before and after the speed restriction.

(ii) Grassed areas on roundabouts within or associated with urban areas and settlements.

(iii) Adjacent to all lay-bys and bus-stops to a maximum width of 5 metres from the back edge of the lay-by and including 25 metres from the end of the merge and diverge sections, tapering from the maximum 5 metres width behind the lay-by to tie-in with the 1.2 metres swathe cut at the edge of the carriageway, unless subject to an Order issued by the Overseeing Organisation.

5 All areas indicated within the landscape inventory as general grass shall be subject to low frequency cutting in accordance with sub-clause 3007.10

Unless otherwise stated in the landscape inventory the general grass regime above shall also apply to the following typical areas not already subject to the high amenity or amenity regimes:

(a) A 1.2 metre swathe width measured from the back edge of the carriageway,

This width shall be increased (to encompass the whole verge area) where the remaining grass between the 1.2 metre area and any adjacent boundary (for example a wall, fence, remote footpath or area of planting) is less than 2 metres.

(b) Grassed central reservations – cuttings from these areas shall be removed from Site,

(c) Grassed areas within visibility splays,

(d) Any areas where a varying width swathe cut may be desirable, such as large grassed cutting slopes or the inside of bends, and

(e) A 1.0 metre swathe width shall be cut to both sides of any footpaths remote from the carriageway edge but within the Trunk Road boundary.

6 All grassed areas indicated within the landscape inventory not covered by any of the high, medium or low frequency regimes shall be subject to minimal frequency cutting in accordance with clause 3007.10 except that the cut shall be undertaken in the late autumn and shall be to a height not exceeding 150 mm and such areas shall be cut once during the second Annual Period and once per two years thereafter.

7 Visibility splays in front of road signs shall be cut in accordance with the requirements for general grass areas. At no point shall any part of the sign board be obscured by grass or any other vegetation.

The extent of cutting shall be in accordance with sub-clause 3007.20.

8 In the locations stated in the landscape inventory, grassed banks and ditches shall be cut to a height of between 60 and 80mm, at a frequency of once per year. The arisings shall be dispersed evenly over the sward avoiding blockage of drains and ditches.

APPENDIX 30/8 – WATERING

1 The Operating Company shall water all new planting undertaken under this Contract in accordance with clause 3008 at the frequency necessary to ensure satisfactory establishment and healthy growth for the duration of the period of establishment maintenance.

2. Additional watering for trees, shrubs and or grassed areas shall be undertaken by the Operating Company only when subject to an Order from the Overseeing Organisation.

APPENDIX 30/9 – ESTABLISHMENT MAINTENANCE FOR PLANTING

1 All planting and planting areas shall be maintained by the Operating Company for the duration of the period of establishment maintenance in accordance with sub-clauses 3009.2 to 3009.25.

The period of establishment maintenance shall be three years minimum or otherwise as consented to in writing by the Overseeing Organisation.

2 Stakes, tubes, guards and their ties shall be removed from plants when they are no longer required and before the end of the period of establishment maintenance. Stakes, tubes and guards which are in good enough condition may be re-used by the Operating Company.

3 Where new planting has been undertaken, and where no mulch mats have been used the Operating Company shall apply a translocated herbicide to plant circles of all individual trees and shrubs, and clumps of planting where applicable in accordance with clause 3001 and sub-clause 3002.2 whilst protecting the trees and shrubs from the herbicide.

4 The Operation shall include the clearance of vegetation by hand from within the shelters and guards.

This part of the Operation shall be carried out twice (in early Spring and in October) during the first year of the three year period of establishment maintenance and once (in early Spring) during the second year of the period of establishment maintenance.

5 Where mulch has been used in individual plant circles or overall planting beds it shall be inspected by the Operating Company once per year in March for the duration of the period of establishment maintenance.

6 If the mulch depth shall be less than an even 75 mm, new mulch to sub-clause 3006.55 shall be laid to restore the 75 mm depth.

7 Mulch mats and sheet mulch shall be inspected three times per year and re-secured or replaced in accordance with sub-clause 3009.13.

8 All new beds of ornamental planting shall be inspected monthly during the growing season with the required maintenance Operations undertaken in accordance with sub-clause 3009.16.

9 The soil in ornamental planting beds where the beds are not mulched shall be cultivated in accordance with sub-clause 3009.19.

10 The base of all new hedge planting and an area of 300 mm width on each side shall be kept weed free for the first two years of the period of establishing maintenance in accordance with sub-clause 3009.20. During the same period the hedge shall be pruned once each year, between 1 September and 31 January, to encourage the formation of a vigorous, compact and uniform hedge. The current year's growth of prominent new shoots shall be reduced in length by 1/3.

11 All new planting of individual trees as defined in sub-clause 3009.24, shall be maintained for the three year period of establishment maintenance in accordance with sub-clause 3009.25.

APPENDIX 30/10 – MAINTENANCE OF ESTABLISHED TREES AND SHRUBS

1 Trees and shrubs shall receive weed control treatment by the Operating Company in accordance with clause 3002 at the frequencies stated in clause 3010.

2. Grass and weed growth within ornamental shrub beds shall be removed by hand or by chemical means.

3. Healthy arisings from pruning, cutting or felling of woody plants shall be treated in accordance with sub-clause 3010.4 paragraphs (ii), (iv), (vi), (vii) and (viii).

4. Treatment in accordance with sub-clause 3010.4 paragraph (ii) shall take place only where there shall be sufficient area within the Unit to spread the chippings out of sight from the road and to a maximum depth of 25 mm.

5. This treatment is not permitted where it is likely that the chippings will affect the growth of desired grass and/or plant species.

6. Chippings shall not be spread on sloping ground where they may inhibit vegetation growth which would otherwise help stabilise the slope.

7. Where arisings are treated in accordance with sub-clause 3010.4 paragraph (viii) the locations selected within the Site area shall not be visible from the road.

8. If it is not possible to deposit the arisings in the general locality of the Operations, the arisings shall be removed to a licensed disposal facility.

9. Species grown for coloured stems shall be cut in accordance with sub-clause 3010.8 paragraph (i). The cutting frequency shall be every two years.

10. Overgrown shrubs within all ornamental shrub areas shall treated in accordance with sub-clause 3010.8 paragraph (vii).

11 Tree size shall be categorised using the following method:

(i) Key factors relating to tree size/habit:

(a) Height of tree – measured in metres from ground level to the apex of the crown,

(b) Mean crown spread – calculated by adding the measurements in metres of the spread of the tree's crown along the north-south and east-west axes and dividing by two,

(c) The measurements referred to in paragraphs (a) and (b) of this sub-clause shall be taken to the nearest whole metre,

(d) Branch density factor shall be taken as follows: 1.00 for normal branch density 1.25 for heavy branch density, and

(e) Individual tree species shall be classified as having normal or heavy branch density in accordance with the following table:

Branch Density Classification of Individual Tree Species	
Normal Branch Density	Heavy Branch Density
Acer species	Carpinus betulus and cultivars
Aesculus species	Crataegus species
Alnus species	Chamaecyparis species
Betula species	Malus species
Castanea species	Populus alba 'Fastigiata'
Fagus species	Populus nigra 'Italica'
Fraxinus species	Prunus 'Amanagowa'
Juglans species	Prunus cerasifera 'Nigra'
Pinus species	Prunus padus and cultivars
Platanus species	Quercus ilex
Populus alba	Quercus robur 'Fastigiata'
Populus nigra	Sorbus species
Populus tremula	Tilia species
Populus balsamifera	Taxus baccata
Prunus avium and cultivars	
Prunus 'Kanzan'	
Pyrus species	
Quercus robur	
Quercus cerris	
Quercus rubra	
Robinia pseudoacacia	
Salix species	
Larix species	

Tree Size Factor = Height x Mean Crown Spread x Branch Density Factor.

Trees shall be categorised in accordance with the table below:

Tree Size Category	Tree Size Factor
A	3 to 34
B	35-70
C	71-125
D	126-200

Tree Size Category	Tree Size Factor
E	201-340
F	341-450
G	451-650

(ii) To be classed as a tree, vegetation must have a stem diameter of more than 100 mm.

12. Stumps shall be cut as close to the ground as possible or where the tree is growing in a hedge or fence line the stump shall be left level with the top of the hedge or fence.

13. Thinning and coppicing shall be carried out in areas of establishing and maturing woodland where identified as being required through the Operating Company's inspections and when ordered.

14. Scrub control shall be undertaken where identified as being required through the Operating Company's inspections and when subject to an Order. Tree and shrub species to be controlled as scrub shall have a stem diameter of less than 75 mm and a height of between 0.75 – 2.5 metres. The specified species shall be cut down to 50 mm above ground level and the plants allowed to re-grow. A translocated herbicide shall be applied during the period of active growth in accordance with clause 3001 Scrub control is required on rock ledges and scree where appropriate.

APPENDIX 30/11 – MANAGEMENT OF WATERBODIES

1 The Operating Company shall maintain all water bodies within the Unit in accordance with clause 3011.

2 The Operating Company shall inspect all water bodies and associated inlets and outlets within and associated with the Unit in accordance with the requirements of Schedule 7 Part 1.

3 The Operating Company shall eliminate injurious weeds as listed in clause 3002 growing within or immediately adjacent to water bodies.

4 Where silt is affecting the intended operation of a water body or is likely to have the potential to affect the intended operation of a water body the silt shall be removed in accordance with sub-clause 3011.8.

5 The Operating Company shall consult with the Scottish Environmental Protection Agency and any other relevant body prior to undertaking any Operations affecting a water body and shall apply for all necessary licences including as a minimum all licences required under the *Controlled Activities Regulations*.

6 All reed beds and marginal plants planted as part of the Operations shall be maintained by the Operating Company for the duration of the period of establishment maintenance with any failed or defective plants replaced in accordance with sub-clauses 3006.6 to 3006.90 inclusive.

All existing reed beds and marginal vegetation shall be inspected twice annually in accordance with sub-clause 3011.9.

7 In addition the Operating Company shall comply with the Schedule of Commitments given in the Environmental Statement for the Forth Replacement Crossing where they relate to operations. These are re-stated in Annex 5.8/A of Schedule 5 Part 8.

APPENDIX 30/12 – SPECIAL ECOLOGICAL MEASURES

1 With effect from Commencement of Service Date 1, in February and October each year until the Service End Date the Operating Company shall inspect all fencing, tunnels, underpasses, wildlife reflectors and all other provisions for wildlife contained within the Unit or as listed in the inventory of wildlife mitigation measures in accordance with sub-clause 3012.5.

2. The Operating Company shall consult and comply with Scottish Natural Heritage in respect of any Operations likely to affect any protected species or area.

3. The Operating Company shall obtain all necessary wildlife licences required for the effective maintenance and management of the Unit including any new Operations to be undertaken through this Contract.

4. In addition the Operating Company shall comply with the Schedule of Commitments given in the Environmental statement for the Forth Replacement Crossing where they relate to Operations. These are re-stated in Annex 5.8/A of Schedule 5 Part 8.

APPENDIX 32/1 - INCIDENT RESPONSE

1 INCIDENT RESPONSE TIME

1.1.1 The response time for attendance at an Incident shall be defined as the time taken from receipt of notification of the Incident by the Operating Company to commencement of appropriate action at the site of the Incident.

1.1.2 The Trunk Road Incident Support Service response times shall always be as short as practicable but in any event shall aspire to the target times stated in Table 1.1 of this Appendix.

TABLE 1.1 - RESPONSE TIMES FOR TRUNK ROAD INCIDENT SUPPORT SERVICES

Road Type	Operational Hours	Target initial response time	Target secondary response time
Designated Strategic Trunk Road Routes	06.30 to 18.30	20mins	20mins

1.1.3 The Incident Support Unit response times shall always be as short as practicable but in any event shall not exceed the maximum times states in Table 1.2 of this Appendix.

TABLE 1.2 - RESPONSE TIMES FOR INCIDENT SUPPORT UNITS

Road Type	Operational Hours	Maximum initial response time	Maximum secondary response time	Maximum Back-Up response time
Motorways and Dual Carriageways	07.00 to 19.00	1 hour	1 hours	24 hours
	19.00 to 07.00	1½ hours	2 hours	24 hours
Other Trunk Roads	07.00 to 19.00	1 hours	1 hours	24 hours
	19.00 to 07.00	1½ hours	2 hours	24 hours

1.1.4 The vehicle recovery service response times shall always be as short as practicable but in any event shall not exceed the maximum times stated in Table 1.3 of this Appendix for vehicle recovery on the Principal Crossings.

TABLE 1.3 - RESPONSE TIMES FOR VEHICLE RECOVERY SERVICE

Road Type	Vehicle Type	Operational Hours	Maximum Initial response time
Dual Carriageway- Forth Road Bridge	Light recovery vehicles, motorcycle recovery facilities and Impact Protection Vehicles	24 hours	15mins
Dual Carriageway- Forth Road Bridge	Heavy recovery vehicles	24 hours	45mins
Motorway – Queensferry Crossing	Light recovery vehicles, motorcycle recovery facilities and Impact Protection Vehicles	24 hours	15mins

2 INCIDENT SUPPORT VEHICLES

2.1 Vehicle Types

2.1.1 The primary vehicles that are used by the Operating Company for all initial Incident Response Operations by the Trunk Road Incident Support Service and Incident Support Units shall be as described in Table 2.1 of this Appendix for Type 1 vehicles.

2.1.2 Type 2 vehicles described in Table 2.1 may be specified by the Overseeing Organisation for specific routes or response operations.

2.1.3 The general vehicle liveries shall be as given in Appendix 1/75.

2.1.4 The TRISS vehicles shall, in addition, have:

- Class 1 red microprismatic diagonal markings alternating with yellow reflective diamond grade stripes on the rear of the vehicle,
- 600mm long 300mm wide alternating yellow and black rectangular 'Battenburg' pattern in retro-reflective material on the sides of the vehicle, and
- 'TRUNK ROADS INCIDENT SUPPORT' in black capital letters on the sides and rear of the vehicle with the mirror image on the front of vehicle.

TABLE 2.1 VEHICLE TYPES FOR TRUNK ROAD INCIDENT SUPPORT SERVICE AND INCIDENT SUPPORT UNITS

Vehicle Type	Description	Minimum Equipment Requirements for each vehicle
Type 1	2 wheel drive high roof van powered by a Euro 5 compliant engine with a minimum power of 129PS with automatic transmission and ABS. Gross vehicle weight 3500kg, capable of carrying the equipment detailed in Table 3.1 and performing the duties set out in this Contract. Unglazed rear and nearside loading door, shelving and full height steel bulkhead. Dual passenger seat with three point inertia seat belts. Driver and passengers' air bags. Air conditioning.	1 No. mobile CCTV Camera system of a type compliant with the specification contained within Appendix 1/77. Mobile VMS of a type compliant with the specification contained within Appendix 1/78. Appropriate type of built-in hands-free kit. Fire extinguisher and first aid kit. Global positioning tracking system (The Operating Company shall supply map based software to monitor vehicle locations, and record dates and times and movements of vehicles. The Operating Company will supply the relevant Network Operations provider with a live feed to this data).

Vehicle Type	Description	Minimum Equipment Requirements for each vehicle
	Drop pin and 50mm ball towing equipment. Access steps and grab handles. Audible reversing alert. Handwash station	Two light bars with corner lights, 8 rear lights and eight front lights and twin grill mounted yellow strobes connected into the vehicle electrics to remain functional when the vehicle ignition is off with an internal warning light fitted to indicate when the light bar is operational.
Type 2	4 wheel drive double cab pick-up powered by a Euro 5 compliant engine with a minimum power of 100PS, capable of carrying the equipment detailed in Table 3.1 and performing the duties set out in this Contract. Passenger seat with three point inertia seat belt. Driver and passenger's air bags. Air conditioning. Drop pin and 50mm ball towing equipment. Audible reversing alert.	Appropriate type of built-in hands-free kit. Fire extinguisher, first aid kit and a load restraint. Global positioning tracking system (The Operating Company shall supply map based software to monitor vehicle locations, and record dates and times and movements of vehicles. The Operating Company will supply the relevant Network Operations provider with a live feed to this data). A light bar with twin yellow strobes connected into the vehicle electrics to remain functional when the vehicle ignition is off with an internal warning light fitted to indicate when the light bar is operational.

3 INCIDENT RESPONSE RESOURCES

3.1 General

3.1.1 The Operating Company shall provide the Incident Response Resources specified in Table 3.1 of this Appendix.

TABLE 3.1 EQUIPMENT TO BE CARRIED IN TRUNK ROAD INCIDENT SUPPORT SERVICE AND INCIDENT SUPPORT UNIT VEHICLES

Equipment	Minimum Quantity	
	Vehicle Type 1	Vehicle Type 2
Electronic language translator	1 no.	1 no.
Tow rope	1 no.	1 no.
2 Stroke oil	2 x 1 litre bottles	2 x 1 litre bottles
Rigger Gloves	5 pairs	5 pairs
Lube oil spray	1 no. 400 ml tin	1 no. 400 ml tin
Hard hat	2 no.	2 no.
Diesel Fuel	5 litres in container	5 litres in container
Petrol	5 litres in container	5 litres in container
Fence Nails & Staples	Sufficient	Sufficient
Face Dust Masks	12 no.	12 no.
Paper Towels	Sufficient	Sufficient
De-icer	2 x 500ml	2 x 500ml
Animal Carcass Bags	10 no.	3 no.
Handwipes	Sufficient	Sufficient
Absorbent Granules	6 no. x 2kg bags	2 no. x 2kg bags
Powered debris blower	1 no.	1 no.
Digital Camera	1 no.	1 no.
Reflective waterproof jackets for use by stranded motorists	2 no.	2 no.
Reflective long sleeved vests for use by stranded motorists	-	-
Drain Rods	1 set	1 set
Claw hammer	1 no.	1 no.
Pointing Trowel	1 no.	1 no.
Manhole Lifting Keys	1 set	1 set
Handsaw	1 no.	1 no.
Wire Brush	1 no.	1 no.
Floating Trowel	1 no.	1 no.
Power Saw	1 no.	-
Stone Cutting Discs	6 no.	-
Metal Cutting Discs	6 no.	-
Shovels	2 no.	2 no.
Stiff Brush	1 no.	1 no.
Soft Brush	1 no.	1 no.
Spirit Level	1 no.	1 no.
Chainsaw with PPE	1 no.	-
Punner	1 no.	1 no.
Pickaxe	1 no.	1 no.
Bow Saw	1 no.	1 no.
Foam Ear Plugs	5 sets	5 sets

Equipment	Minimum Quantity	
	Vehicle Type 1	Vehicle Type 2
Safety Goggles	2 pairs	2 pairs
Paper Coveralls	4 pairs	4 pairs
Large torch	2 no.	2 no.
Spare batteries for torches	24 no.	24 no.
14lb Sledge hammer	1 no.	1 no.
Stilson wrench	1 no.	1 no.
Galvanised fence wire	1 roll	1 roll
Temporary fence with support	1 roll	-
Sequential road studs with charger and case	2 no. x set of 6	2 no. x set of 6
750 mm traffic cones	30 no.	10 no.
Cone lights	16 no.	6 no.
Spare batteries for cone light	16 no.	6 no.
Men at Work Signs	2 no.	2 no.
Road Narrows Signs	2 no.	2 no.
610 Arrows Signs	2 no.	2 no.
Road Closed Signs	4 no.	2 no.
Flooding Signs	4 no.	2 no.
Diverted Traffic Signs	5 no.	5 no.
Traffic Lights Inoperable Signs	4 no.	4 no.
Pedestrian Demand Unit Covers	8 no.	8 no.

APPENDIX 33/1 – STRUCTURAL INVESTIGATIONS TEST REQUIREMENTS

1 The following types of test may be required:

1.1 Site surveys/tests

(i) half cell potential survey,

(iv) cover survey,

(v) delamination /soundness survey,

(vi) exposing reinforcement,

(vii) depth of carbonation,

(viii) resistivity measurement,

(ix) initial surface absorption,

(x) ultrasonic pulse velocity survey, and

(xi) borescope or endoscope survey.

1.2 Chemical tests

(i) acid soluble chloride content,

(xii) water soluble chloride content,

(xiii) cement content/sulphate content/mix proportion,

(xiv) water/cement ratio,

(xv) alkali content, and

(xvi) alkali silica reaction samples.

1.3 Physical tests

(i) visual examination of cores,

(xvii) density and compressive strength,

(xviii) permeability,

(xix) aggregate grading,

(xx) petrographic examination,

(xxi) micro cracking assessment, and

(xxii) electron microscope examination.

2 Details of Site Tests

2.1 Potential Measurements

Potential measurements shall be carried out and recorded in the following manner:

(i) Half cell measurements shall be taken at 500 mm x 500 mm grid centres in areas proposed by the Operating Company and consented to in writing by the Overseeing Organisation,

(ii) The equipment shall be saturated copper sulphate half cell placed on the concrete surface and connected via a high-impedance voltmeter to the reinforcement,

(iii) The tests shall be carried out in accordance with the American Society for Testing and Materials C876-09. Two readings shall be taken at each node of the grid and the mean value used. Where the readings differ by more than 20 mV a third reading shall be taken and the mean of the two closest readings used,

(iv) Ambient conditions and concrete surface temperature shall be recorded together with details of the type of half cell and its most recent calibration check,

(v) Excavation to expose reinforcement for electrical connections shall be made good in accordance with the requirements of Series 1700,

(vi) Where appropriate permanent connections shall be made to the reinforcement to facilitate future monitoring of changes in potential,

(vii) The results shall be presented as a grid of values marked on projected plans or elevations of the areas measured at a scale of 1:50,

(viii) Potential contours shall also be plotted with colour coding at a scale of 1:50 with a contour interval of 50 mV, and

(ix) Colour block diagrams are not an acceptable alternative to colour contours.

2.2 Cover Survey

2.2.1 Cover surveys shall be carried out using an instrument complying with the requirements of and in the manner described in British Standard 1881- 204.

The lowest cover detected in each grid rectangle shall be recorded.

2.3 Delamination/Soundness Survey

Delamination/soundness surveys shall be carried out and recorded in the following manner:

(i) A visual survey shall be carried out and concrete defects such as spalling, cracking, crazing, honeycombing, surface deterioration and staining together with previous patching or remedial work shall be recorded,

(ii) Parts of the concrete which are suspected of being delaminated shall be tested by sounding with a light hammer,

(iii) The affected area shall be recorded and the results presented in the report, and

(iv) Photographic Records of typical defects shall be taken for the report.

2.4 **Exposing Bars**

Reinforcing bars shall be exposed in areas proposed by the Operating Company and consented to in writing by the Overseeing Organisation when the results of the potential tests are available:

(i) the cut-out shall not be greater than 100 mm diameter,

(ii) the cover to the bars and the condition of the reinforcement shall be recorded,

(iii) a photograph shall be taken of each bar and calliper measurements taken to establish the residual cross sectional area, and

(iv) the removal of concrete shall be carried out carefully so that no damage is caused to the reinforcement and over break shall be minimised.

2.5 **Carbonation Tests**

Tests for depth of carbonation using a phenolphthalein indicator as detailed in *Building Research Establishment Information paper IP/6/81 'Carbonation of concrete made with dense natural aggregates'* shall be carried out on core samples drill holes and where concrete is broken out either to examine the bars or connect the potential measuring apparatus to the reinforcement.

2.6 **Resistivity Survey**

Resistivity measurements shall be taken at locations and orientations where the half cell potential test has indicated that corrosion of reinforcing steel is most likely.

The test procedure shall be similar to that used for measuring soil resistivity using four electrodes temporarily attached to the concrete across which measurements of voltage and current shall be taken.

Details of the proposed testing equipment and method shall be proposed by the Operating Company and consented to in writing by the Overseeing Organisation prior to commencing the tests.

2.7 **Initial Surface Absorption**

Initial surface absorption test shall be carried out in accordance with British Standard 1881 Part 5.

2.8 **Ultrasonic Pulse Velocity Survey**

Ultrasonic pulse velocity surveys shall be carried out using equipment and procedures complying with British Standard EN 12504-4.

The purpose of this testing is the detection of defects and estimation of the depth of surface cracks using semi-direct or indirect transmission at grid centres not exceeding 150 mm.

The testing shall be carried out by suitably qualified personnel with previous experience in the interpretation of the survey results.

A water-soluble non-staining couplant shall be used and subsequently removed by power washing.

2.9 **Borescope Survey**

Experienced operatives shall be available to carry out borescope investigations.

The borescope shall also be fitted with a measuring graticule and a camera attachment and photographs shall be taken of typical defects.

2.10 **Endoscope Survey**

Experienced operatives shall be made available to carry out endoscope surveys.

The endoscope shall be fitted with a camera attachment and photographs shall be taken of typical defects.

3 **Chemical Tests**

3.1 Chloride content acid and water soluble tests shall be carried out in the following manner:

(i) Dust samples shall be removed from reinforced concrete members using a 20 to 25 mm diameter drill bit and the dust collected by a method described in *TRRL Technical Report 'Guide to Testing and Monitoring the durability of Concrete Structures' (by the Concrete Bridge Development Group – 2002)*,

(ii) Dust samples from the chloride drillings shall be taken at different depths into the concrete and shall be collected and stored in different containers for each depth range clearly labelled with the location depth range date and name of operator,

The depth ranges shall be 0 to 30mm, 30 to 60mm, 60 to 90mm and 90 to 120 mm.

Sufficient dust shall be collected at each depth range to enable both acid soluble and water soluble analysis to be carried out.

(iii) Chloride content shall be determined in accordance with British Standard 1881-124,

Samples from each depth range from each set of drillings shall be analysed for the "total" chloride content using the acid extraction method.

One sample from the 90 to 120mm depth range for each set of drillings shall be analysed for the "free" chloride content using the water extraction method.

Where the sample from the 90 to 120mm depth range are insufficient or unsuitable the "free" chloride analysis may be carried out on a sample obtained from one of the other depth ranges from the same set,

and,

(iv) Results shall be given in terms of chloride ion by % cement content.

The average cement and sulphate content shall be measured from the analysis of 10% of the drilling samples.

The location of the drillings shall be determined from the potential measurement plots.

The exact position shall be determined to avoid reinforcing steel by locating the steel with a cover meter.

3.2 Cement content, sulphate content, mix proportions, water/cement ratio and alkali content testing shall be determined in accordance with British Standard 1881-124 on samples obtained from cores.

3.2.1 Alkali silica reaction samples shall be carried out in the following manner:

(i) Cores shall be drilled at locations proposed by the Operating Company and consented to in writing by the Overseeing Organisation,

The cores shall be 75mm diameter drilled to a depth of 400mm.

Intact cores at least 300mm long shall be required.

(ii) Samples taken from the cores shall be tested for susceptibility of the coarse and fine aggregates to alkali silica reaction,

(iii) The equivalent sodium oxide content shall also be determined for each core. Petrographic examination shall also be carried out as described in this Appendix, and

(iv) If alkali silica reaction is suspected the Operating Company may propose for the written consent of the Overseeing Organisation that the cores be subject to accelerated expansion tests in accordance with the *Concrete Society Technical Report 'Minimising the risk of damage to concrete' (CS TR 30),* measurements to be continued up to 1 year with interim reports at 3 monthly intervals.

4 **Physical Tests**

4.1 Examination of cores density and compressive strength tests shall be carried out in accordance with British Standard EN 12504-1.

Visual examinations shall be carried out on all core samples before preparing the samples for testing.

Density and compressive strength tests shall be carried out on 100mm diameter cores.

4.2 Permeability shall be determined by means of the capillary absorption test in accordance with British Standard 1881-5 on samples from cores.

4.3 Aggregate Grading shall be determined in accordance with British Standard 1881-124 on samples obtained from cores.

4.4 Petrographic Examination shall be carried out in the following manner:

(i) Petrographic Examination shall be carried out in accordance with American Society for Testing and Materials C856-04 'Standard Practice for Petrographic Examination of Hardened Concrete' on sections obtained from 75mm diameter cores,

(ii) The sections shall be obtained from the cores taken for expansion tests for alkali-silica reaction, and

(iii) Constituent materials shall be identified and a description of the specimen given together with a photograph typically at a magnification of 50 times.

4.5 Microcracking Assessment shall be carried out in the following manner:

(i) Selected core samples shall be cleaned of any extraneous debris and air dried in the laboratory, and

(ii) They shall then be sprayed with a fluorescent penetrant solution (a dispersion of fluorescent particles in an organic liquid).

5 When the excess solution has drained from the surface the core samples shall be viewed under ultra-violet light.

4.6 Electron Microscope Examination shall be carried out in the following manner:

(i) Where examination of a sample for microcracking alkali silica reaction susceptibility petrographic analysis or any other purpose indicates that some form of deleterious reaction may be present in the concrete the Overseeing Organisation may instruct examination by electron microscope.

6 Appropriate pieces of the sample which may take the form of thin sections, finely ground sections, off-cuts or freshly broken surfaces shall be explored with the electron microscope to confirm the presence of the constituents or products of deleterious reactions and to identify them wherever possible.

7 A written report shall be submitted with electron micrographs (typically at a magnification of 3500 to 5000 times) and results of analysis of the matrix with the microprobe.

5 Report Requirements

5.1 All reports shall be submitted for the consent off the Overseeing Organisation.

5.2 Interim reports shall comply with the following:

(i) An interim report shall be submitted for each part of a Structure to be investigated within one week of completion of site testing showing the results of all surveys and tests carried out on site. Copies of field measurements with suitable explanatory notes are adequate.

8 Chloride content analysis shall be presented within fourteen days of sampling.

9 Three copies of each interim report are required.

5.3 Final reports shall comply with the following:

(i) Irrespective of size which shall dictate the number of volumes, the final report shall be submitted in two sections.

10 Section 1 of the final report shall be submitted within three weeks of completion of Site work and shall contain the following information where applicable:

(a) A description of the testing programme and tests carried out a presentation of the results in the form outlined below and a summary of the results,

(b) The results shall be presented as follows plotted to a scale of 1:50 unless otherwise instructed, and

half cell potential/ cover	(i)	tabular
	(ii)	colour coded contour plans/elevations to indicate chloride content distribution of results with a contour interval of 50 mV
delamination/ soundness	(i)	plan/elevation marked with suspect areas
	(ii)	colour print of major Defects
petrographic	(i)	colour prints of each section
	(ii)	detailed description of section with particular reference to alkali silica reaction
ultrasonic pulse	(i)	typical graphs/computer output to demonstrate velocity and interpretation of results
	(ii)	plans/elevations/cross sections to show Defects detected
electron microscope	(i)	electron micrographs

	(ii)	detailed description of section together with results of microprobe analysis
borescope	(i)	developed elevations of internal surface of holes examined
	(ii)	enlarged colour prints of typical Defects
endoscope	(i)	plans/elevations/cross sections to show location of fibroscope and direction of view of photographs
	(ii)	enlarged colour prints of typical Defects and other photographs

(c) All results shall be presented in tabular form and histograms shall be produced where appropriate.

(v) Section 2 of the final report shall contain a written discussion and interpretation of the results of the survey and testing with recommendations in writing to the Overseeing Organisation for remedial work.

(vi) A draft copy of the report shall be submitted for the written consent of the Overseeing Organisation before production of the final report.

6 Addendum Reports

6.1 The results of the alkali silica reaction expansion test shall be reported on a 3 monthly basis.

6.2 An Addendum Report shall be produced to cover all the expansion test results.

APPENDIX 50/1 – (SPECIFICATION FOR HIGHWAY WORKS) FORM HA/P1 (MAINTENANCE) PAINT SYSTEM SHEET

<table>
<tr><td colspan="10">1. CONTRACT TITLE:
STRUCTURE NO:
GRID REF:</td></tr>
<tr><td colspan="10">2. DATE OF ISSUE OF DOCUMENTS TO TENDERERS:</td></tr>
<tr><td colspan="10">3. ENVIRONMENT AND ACCESSIBILITY:</td></tr>
<tr><td colspan="10">4. EXISTING PROTECTIVE SYSTEM(S):
Metal coatings:
Paint coatings:
Average total thickness (microns):</td></tr>
<tr><td colspan="5">5. REQUIRED DURABILITY OF SYSTEM:
NO MAINTENANCE: ……YEARS
MINOR MAINTENANCE: ……YEARS
MAJOR MAINTENANCE:…….YEARS
(Ref: NG.5008.5 sub-para (iii))</td><td colspan="5">6. COLOUR OF FINISH:</td></tr>
<tr><td colspan="3">7. BILLED AREA</td><td colspan="5"></td><td colspan="2" rowspan="6">8. PROTECTIVE SYSTEM TYPE: (eg. I (M), II (M), III (M), etc):</td></tr>
<tr><td colspan="3">REF: AREA DESCRIPTION:</td><td colspan="5">SURFACE PREPARATION METHOD</td></tr>
<tr><td colspan="3"></td><td colspan="5"></td></tr>
<tr><td colspan="3"></td><td colspan="5"></td></tr>
<tr><td colspan="3"></td><td colspan="5"></td></tr>
<tr><td colspan="3"></td><td colspan="5"></td></tr>
<tr><td rowspan="3">9. PAINT COAT SUMMARY

COAT & ITEM NO.</td><td colspan="9">CONDITION OF SURFACES OF EXISTING SYSTEM AFTER SURFACE PREPARATION</td></tr>
<tr><td colspan="2">Condition:

Area Ref.</td><td colspan="2">Condition:

Area Ref.</td><td colspan="2">Condition:

Area Ref.</td><td colspan="2">Condition:

Area Ref.</td></tr>
<tr><td>mdft</td><td>B or AS</td><td>mdft</td><td>B or AS</td><td>mdft</td><td>B or AS</td><td>mdft</td><td>B or AS</td></tr>
<tr><td>1st Coat: Item ....</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>2nd Coat: Item ....</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>3rd Coat: Item ....</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>4th Coat: Item ....</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>MINIMUM TOTAL DFT TO BE OBTAINED</td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
</table>

10. DETAILS				
	1st Coat	2nd Coat	3rd Coat	4th Coat
Registered Description				
Item No. and Colour				
BBA HAPAS Roads and Bridges Certificate Reference				
Date Registered				
Brand Name and Manufacturer's ref. No.				
Manufacturer's Data Sheet No.				
Minimum dry film thickness (mdft) (µm)				
Maximum local dft (See sub–clause 5012.6) (µm)				
Estimated total volume of paint likely to be used. (litres)				
'A' type testing required (YES/NO) (See sub–clause 5009.3)				
'B' type testing required (YES/NO) (See sub–clause 5009.11)				
11. STRIPE COAT(S) DESCRIPTION (Including Item No. and colour)				
12. PATCH COAT(S) DESCRIPTION (Including Item No. and colour)				
13. ADDITIONAL INFORMATION (By Paint Manufacturer)				
14. PAINT MANUFACTURER'S OFFICIAL STAMP:				
15. Mdft (µm) NOTE. The minimum total dry film thickness (mdft) of the paint system, neglecting primers and sealers under 30 microns, shall be 15% greater (to the nearest 25 microns) than the sum of the mdfts of the individual paint coats. For example, if the sum of the mdfts is 270, 15% (ie 40) is added, which gives a total of 310 microns. The nearest 25 microns is 300, as opposed to 325, so the total is 300 microns.			16. APPROVED BY: DATE	

Note:

1 The Operating Company shall complete the paint system sheet HA/P1 for maintenance painting of steelwork.

A separate form should be provided for each Structure, including CCTV masts, cantilever masts, street lighting columns and bracket arms if appropriate.

A separate form shall also be provided for each element of the Forth Road Bridge or Queensferry Crossing including:-

- Suspended span
- Approach viaduct steelwork
- Towers
- Main cables
- Hangers
- Ballustrades, handrails and footplates

2. The compiler shall refer to the notes under the example Appendix 50/1 in the *Notes for Guidance on the Specification of Highway Works* and *National Alterations of the Overseeing Organisation of Scotland*.

APPENDIX 50/3 – (SPECIFICATION FOR HIGHWAY WORKS) FORM HA/P2 PAINT DATA SHEET

BBA HAPAS Road & Bridges Certificate Reference and Date:

Manufacturer :

Item No. :

Registered Description :

Brand Name and Reference No. :

Consistency and Method of Application :

Weight per 5 Litres (kg) :

Specific gravity: Colour :

For two-pack paints :

Base: Activator: Mixed components:

Volume Solids % :

For two-pack paints volume solids % for mixed paint:

VOC content g/l (mixed) :

Manufacturer's Minimum Dry Film Thickness Range

Recommended lower mdft :

Recommended upper mdft :

Full Application Instructions :

Mix ratio :

Flash Point :

Temperature		5°C	10°C	20°C	30°C
Drying Times (hours)	Surface Dry				
	Hard Dry				
Overcoating Times (hours)	Minimum				
	Maximum				
Pot Life (hours)					

Cleaning Solvent/thinner :

State effects on Drying Times of Temperatures below 20°C :

Manufacturer's Application Restrictions,

e.g. for Temperatures or Humidity :

Manufacturer's General Recommendations :

Note:

The Operating Company shall complete the paint system sheet HA/P2 for maintenance painting of steelwork.

APPENDIX 50/4SE – (SPECIFICATION FOR HIGHWAY WORKS) FORM SEDD/P3 PAINT SAMPLE DESPATCH LIST

SHEET 1

Contract Title :

Structure Name : Structure No:

Client Name : (Overseeing Organisation or other company)

Supervising Firm :

Supervising Firm's Representative Name: Tel No:

Address : Fax No:

Painting Inspection Firm :

Samples Despatched From: (Note 1) Date Despatched:

Inspector's Name : Tel No:

Inspector's Signature :

SAMPLES: (Numbered A1, A2 etc. or B1, B2 etc.) (Note 2)					
Sample No.	Item No.	Manufacturer's Reference No.	Batch No	Colour BS 4800 reference (Note 3)	Sp.G. (Notes 4 & 5)

Paint Manufacturer :

SHEET 2

PROCEDURES

To be followed closely before despatch of paints to Scientifics Ltd or an approved local paint testing firm:

1 Check the specific gravity of each batch of paint.

2. Check the matching of finish colours to BS 4800.

3. Select the required sample, i.e.:

   (i) 'A' sample – unopened tin, and

   (ii) 'B' sample – 500 ml sample from painter's kettle or from nozzle of airless spray gun in the case of single component coatings or if the check is to be done in situ otherwise for two pack coatings separate samples of the base and the activator must be dispatched to the testing laboratory.

4. List contract details and details of each set of samples, including the specific gravity of each sample in Sheet 1 SEDD/P3.

5. Send Form HA/P1 Paint System Sheet with Form SEDD/P3 to the following:

   (i) Scientifics Ltd, 500 London Road, Derby, DE24 8BQ or an approved local paint testing firm, and

   (ii) The Director, Buchanan House, 58 Port Dundas Road, Glasgow,G4 0HF.

6. The Operating Company shall despatch samples to 5 (i) above.

   The Operating Company shall label samples correctly, clip lids of tins down securely and send the samples promptly.

   Samples shall be labelled with this Contract title, structure name, sample number, and additionally in the case of 'B' samples, item number, manufacturer's reference number, batch number and colour.

   Results will be notified by the Director, as soon as they become available.

Notes:

1 State whether from workshop or Site (give name and address).

2. Batch samples comprising unopened tins to be marked A1, A2, etc. Control samples in 0.5 litre tins to be marked B1, B2, etc. Samples No. to run consecutively, i.e. A1 and B1 onwards.

3. Colour reference to BS 4800 to be given, as stated on Form HA/P1 (Maintenance) Paint System Sheet, e.g. 18 B 25.

4. For 'A' samples specific gravity (Sp.G.) to be measured by the inspector from separate tins of the same batch. For 'B' samples Sp.G. to be measured by Inspector when taking samples. Samples will be rejected unless Sp.G. is filled in above by Inspector.

5. If Sp.G. differs appreciably from data sheet do not dispatch 'A' or 'B' samples.

6. The Operating Company shall complete the paint system sheet SEDD/P3 for maintenance painting of steelwork.

APPENDIX 50/5 – GENERAL REQUIREMENTS

1 It is the Operating Company's responsibility to ensure that all work is carried out within the provision of the *Health and Safety at Work Act 1974*, or any further Act, with particular reference to the removal of lead based paint by grit blasting. All work shall as a minimum be in compliance with *The Control of Lead at Work Regulations 1998*; the *HSE Approved Code of Practice (COP2)*, published in 1998; and the *COSHH Regulations* (1999). The Operating Company shall also consult and comply with the requirements of Scottish Environment Protection Agency, Marine Scotland, the local authorities' Environmental Health Officer, the Health and Safety Executive and other Operational Partners.

2 Unless otherwise consented to by the Overseeing Organisation, the Operating Company shall provide full containment to prevent any dust, debris, water spray or any other materials falling on and/or affecting watercourses, vehicles, persons or any other public or private property or carriageway in use either on or adjacent to the Site during all maintenance painting Operations.

3 Unless otherwise consented to by the Overseeing Organisation, re-painting of the hangers on the Forth Road Bridge shall be undertaken using Gulf Metalcoat A30 or equivalent. Gulf Metalcoat A30 or equivalent shall be supplied, stored and used in accordance with the manufacturers written instructions including all measures necessary for the control of substances which are potentially harmful to health. The Operating Company shall complete Form HA/P1 (Maintenance) Paint System Sheet parts 1 to 9 as set out in Appendix 50/1 which shall confirm the method of surface preparation.

4 The Gulf Metalcoat A30 shall be applied using gloves to apply the paint to the hangers.

APPENDIX 62/1 – REQUIREMENTS FOR PROFESSIONAL SERVICES

Requirements for Professional Services Staff

For roles requiring professional qualifications, a non-UK professional qualification awarded by an appropriate engineering institution which, in the opinion of the UK Engineering Council is Chartered Engineer equivalent, may be acceptable to the Overseeing Organisation. For non-engineering professional qualifications, evidence of UK equivalence shall be provided.

A non-UK academic qualification in an appropriate discipline, which is acknowledged by UK academic institutions to be of equivalent standing, may also be acceptable to the Scottish Ministers. Where non-UK qualifications are proposed, evidence of UK equivalence must be provided. Where a degree in an appropriate discipline is specified, either Masters, Honours or Ordinary level is acceptable.

1 **Scheme Manager**

1.1 **Role**

The role of a Scheme Manager shall be the overall management and direction of the Operating Company's staff with overall responsibility to the Scottish Ministers for their activities and deliverables.

1.2 **Qualifications**

The Scheme Manager shall be a Chartered Engineer awarded by an appropriate UK engineering institution including the Institution of Civil Engineers, the Institution of Structural Engineers, the Institute of Highway Engineers and the Chartered Institution of Highways and Transportation. A non-UK professional qualification awarded by an appropriate engineering institution which in the opinion of the UK Engineering Council is CEng equivalent may also be acceptable to the Scottish Ministers. It is unlikely that anyone with less than 15 years' experience relevant to the position and performance of the role will meet the requirements for this post.

1.3 **Key Tasks**

The key tasks of a Scheme Manager shall be to:

(i) manage the relationship between the Operating Company's staff and the Overseeing Organisation, and to ensure that the Scottish Ministers' Requirements are satisfied,

(ii) ensure that the Operating Company's Key Staff fulfil their responsibilities with the required degree of skill care and diligence and to ensure that the necessary Operating Company's Key Staff and resources are properly deployed to meet the Scottish Ministers' Requirements,

(iii) ensure that the Operating Company's staff seek continuous improvement in their processes and effectiveness,

(iv) manage this Contract in accordance with the Management System including the Quality Plan,

(v) certification of Design,

(vi) seek and utilise the Overseeing Organisation's feedback on their assessment of performance of the Operating Company's staff,

(vii) ensure that liaison is maintained between the respective senior management of the Scottish Ministers, the Operating Company and any sub-consultants,

(viii) monitor and report to the Overseeing Organisation on the performance of the Operations against the time, budget and quality, targets of this Contract and Orders, and

(ix) ensure that Operating Company's staff are conversant with and understand the relevant Operations required under the provisions of this Contract.

1.4 **Specific Tasks Knowledge and Experience Required**

The specific tasks, knowledge and experience of a Scheme Manager are:

(i) to present Scheme proposals at value for money workshops and presentations to senior management of Transport Scotland,

(ii) Trunk Road promotion and the relevant Legislation in particular the *Roads (Scotland) Act 1984*,

(iii) Scottish Government procedures for the preparation and publication of the relevant statutory road and compulsory purchase orders,

(iv) Public Local Inquiry procedures (the Scheme Manager shall have direct experience in appearing as a witness on behalf of the Promoter at Public Local Inquiries),

(v) Design and specification of major bridge and road Schemes using the DMRB and associated documents and, if subject to an Order, the Scottish Government's Alternative Tendering Initiative,

(vi) preparation of contract documents for Schemes using the approved forms of procurement referred to in this Contract,

(vii) monitoring and control of programming and financial aspects of Schemes,

(viii) implementation of the relevant environmental Legislation and its requirements for Trunk Road Schemes,

(ix) to assist the Operating Company Representative in presenting Scheme proposals at value for money workshops and presentations to senior management of Transport Scotland. The Scheme Manager will also be required to take the lead in explaining proposals to the general public and other interested/affected parties at public exhibitions and during the course of public consultations during Scheme preparation, and

(x) possession of a high standard of presentational and communication skills.

2 Senior Project Engineer

2.1 Role

The role of a Senior Project Engineer shall be the day to day management and direction of the Operating Company's staff with responsibility to the Scheme Manager for their activities and deliverables.

2.2 Qualifications

A Senior Project Engineer shall be a Chartered Engineer awarded by an appropriate UK engineering institution including the Institution of Civil Engineers, the Institution of Structural Engineers, the Institute of Highway Engineers and the Chartered Institution of Highways and Transportation or a corporate member of an appropriate engineering institution/organisation acceptable to the Scottish Ministers. It is unlikely that anyone with less than 10 years' experience relevant to the position and performance of the role will meet the requirements for this post. Experience alone will not be acceptable for this role.

2.3 Key Tasks

The key tasks of a Senior Project Engineer are to:

(i) assist the Scheme Manager in the performance of the Scheme Manager's duties under this Contract,

(ii) liaise with the Overseeing Organisation and implement the requirements of this Contract as set out in this Contract and as amended from time to time by the Scottish Ministers,

(iii) manage the Operating Company's staff in order that the requirements of this Contract are achieved on time, within budget and to the quality required by the Management System including the Quality Plan,

(iv) certification of Design,

(v) ensure that the implications of all current Legislation are incorporated in the deliverables under this Contract,

(vi) ensure that all Operations are carried out to the relevant standards as specified in this Contract, and

(vii) supervise the procurement of such Operations which require to be sourced externally.

2.4 Specific Tasks Knowledge and Experience Required

The specific tasks knowledge and experience required of a Senior Project Engineer are:

(i) preparation of Road Orders, Schemes and Compulsory Purchase Orders and associated documents and negotiation with affected parties and objectors,

(ii) the procedural and legislative background to the promotion of road and compulsory purchase orders and the procedural aspects and requirements of Public Local Inquiries and in particular the effects that this shall have on Scheme programming or preparation of Operations,

(iii) consulting individuals and organisations affected by Trunk Road Schemes,

(iv) the Design and Specification of Trunk Roads including the preparation of contract documents for Schemes,

(v) traffic modelling (including microscopic modelling),

(vi) environmental and economic assessment,

(vii) computer aided Structures and roads Design,

(viii) practical working knowledge and experience of the DMRB and associated documents and the Manual of Contract Documents for Highway Works,

(ix) preparation of documentation for ground investigation including the preparation of orders, briefs, Statements of Intent, reports, and topographical survey contracts,

(x) procurement of ground, topographic and other investigation contracts, including tender procedures, tender assessment and reporting,

(xi) translating Design requirements into employer's requirements into contracts,

(xii) preparation of contract documents,

(xiii) assisting the Director with tender procedures, assessment and reporting for Works Contracts,

(xiv) knowledge of current advertising procedures of the Official Journal of the European Union (OJEU),

(xv) experience of financial control and programme management of Trunk Road Schemes, and

(xvi) knowledge of the relevant environmental Legislation and the impact that its requirements shall have on the activities or programming of Schemes.

3 Principal Crossings Principal Structural Engineer

3.1 Role

The Principal Crossings Principal Structural Engineer shall be responsible to the Scheme Manager for the production of all Design, procedural or other Operations required to secure the preparation or promotion of Schemes relating to the Queensferry Crossing or Forth Road Bridge.

3.2 Qualifications

A Principal Crossings Principal Structural Engineer shall:

(i) be a Chartered Civil or Structural Engineer with substantial experience of cable supported bridges, procedural or other work for major Structures of the size and complexity of the Queensferry Crossing and Forth Road Bridge. It is unlikely that anyone with less than 15 years' experience in the design and specification of cable supported structures to the DMRB will meet the requirements for this post. Experience alone will not be acceptable for this role,

(ii) have extensive experience in the production of outline preliminary and detailed designs for cable supported bridges and of the assessment of contractor's design proposals including construction methods, and

(iii) have experience in the drafting of contract documents for both "employer's Design" and "Design and build" contracts for cable supported bridges.

3.3 Key Tasks

The key tasks of a Principal Crossings Principal Structural Engineer are to:

(i) assist the Scheme Manager in the performance of the Scheme Manager's duties under this Contract,

(ii) liaise with the Overseeing Organisation and implement the requirements of this Contract as set out in this Contract and as amended from time to time by the Scottish Ministers,

(iii) manage the Operating Company's staff in order that the requirements of this Contract are achieved on time, within budget and to the quality required by the Management System including the Quality Plan,

(iv) Certification of Design,

(v) ensure that the implications of all current Legislation are incorporated in the deliverables under this Contract,

(vi) ensure that all Operations are carried out to the relevant standards as specified in this Contract, and

(vii) supervise the procurement of such Operations which require to be sourced externally.

3.4 Specific Tasks Knowledge and Experience Required

The specific tasks knowledge and experience required of a Principal Crossings Principal Structural Engineer shall be to:

(i) to provide expert analysis, advice, support and recommendations on any structural matters associated with the Queensferry Crossing or Forth Road Bridge as and when required,

(ii) consulting individuals and organisations affected by Schemes,

(iii) the Design and specification of Structures related Design including the preparation of contract documents for employer's Design and Design and build Schemes,

(iv) the Design and specification of Operations and Works Contracts,

(v) practical working knowledge of the DMRB and associated documents and the Specification for Highway Works,

(vi) translating Design requirements into employer's requirements,

(vii) preparation of contract documents, carrying out of the Overseeing Organisation's tender procedures (including use of the documentation as referred to in Schedule 6 Part 1 of this Contract and if subject to an Order the use of the Alternative Tendering Initiative) assessment and reporting for both "Employer's Design" and "Design and build" form of contract,

(viii) assisting the Overseeing Organisation with tender procedures, assessment and reporting for Works Contracts,

(ix) knowledge of current advertising procedures of the Official Journal of the European Union (OJEU),

(x) experience of financial control and programme management of Trunk Road Schemes, and

(xi) knowledge of the relevant environmental Legislation and the impact which its requirements shall have on the activities and programming of Schemes.

4 Principal Crossings Structural Engineer

4.1 Role

A Principal Crossings Structural Engineer shall be responsible to the Principal Crossings Principal Structural Engineer for the production of all Design, procedural or other Operations required to secure the preparation or promotion of Schemes relating to the Queensferry Crossing or Forth Road Bridge.

4.2 Qualifications

A Principal Crossings Structural Engineer shall:

(i) be a Chartered Civil or Structural Engineer with extensive experience of cable supported bridges, procedural or other work for major structures of the size and complexity of the Queensferry Crossing and Forth Road Bridge. It is unlikely that anyone with less than 10 years' experience in the design and specification of cable supported structures to the DMRB will meet the requirements for this post. Experience alone will not be acceptable for this role,

(ii) have extensive experience in the production of outline preliminary and detailed designs for cable supported bridges and of the assessment of contractor's design proposals including construction methods, and

(iii) have experience in the drafting of contract documents for both employer's Design and Design and build contracts for cable supported bridges.

4.3 **Key Tasks**

The key tasks of a Principal Crossings Structural Engineer shall be to:

(i) assist the Principal Crossings Principal Structural Engineer in the performance of the Principal Crossings Principal Structural Engineer's duties under this Contract,

(ii) manage the Operating Company's staff in order that the requirements of this Contract are achieved on time, within budget and to the quality required by the Management System including the Quality Plan,

(iii) provide expert analysis, advice, support and recommendations on any structural matters associated with the Queensferry Crossing or Forth Road Bridge as and when required

(iv) Design and specification of Structures related Design including the preparation of contract documents for "employer's Design" and "Design and build" Schemes,

(v) Design and specification of Operations and Works Contracts,

(vi) have practical working knowledge of the DMRB and associated documents and the Specification for Highway Works,

(vii) translate Design requirements into employer's requirements,

(viii) preparation of contract documents, carrying out of Overseeing Organisations' tender procedures (including use of the documentation as referred to in Schedule 6 Part 1 of this Contract and if subject to an Order the use of the Alternative Tendering Initiative) assessment and reporting for both "employer's Design" and "Design and build" form of contract,

(ix) have knowledge of advertising procedures of the Official Journal of the European Union (OJEU),

(x) have experience of financial control and programme management of Trunk Road Schemes, and

(xi) have knowledge of the relevant environmental Legislation and the impact which its requirements shall have on the activities and programming of Schemes.

5 Structural Engineer

5.1 Role

A Structural Engineer shall be responsible to the Senior Project Engineer or the Principal Crossing Principal Structural Engineer for the production of all design, procedural or other Operations required to secure the preparation or promotion of Schemes.

5.2 Qualifications

A Structural Engineer shall:

(i) be a Chartered Civil or Structural Engineer It is unlikely that anyone with less than 7 years' experience (with at least 4 of these since becoming chartered) in the design and specification of road structures to the DMRB will meet the requirements for this post. Experience alone will not be acceptable for this role,

(ii) have extensive experience in the production of outline preliminary and detailed designs and of the assessment of contractor's design proposals, and

(iii) have experience in the drafting of the structural elements of contract documents for both employer's design and design and build contracts.

5.3 Key Tasks

The key tasks of a Structural Engineer shall be to:

(i) the Design and specification of Structures related Design including the preparation of contract documents for employer's Design and Design and build Schemes,

(ii) the Design and specification of Operations and Works Contracts,

(iii) practical working knowledge of the DMRB and associated documents and the Specification for Highway Works,

iv) translating Design requirements into employer's requirements,

(v) preparation of contract documents, carrying out of the Overseeing Organisations' tender procedures (including use of the documentation as referred to in Schedule 6 Part 1 of this Contract and if subject to an Order the use of the Alternative Tendering Initiative) assessment and reporting for both Employer's Design and Design and build form of contract,

(vi) knowledge of advertising procedures of the Official Journal of the European Union (OJEU),

(vii) experience of financial control and programme management of Trunk Road Schemes, and

(viii) knowledge of the relevant environmental Legislation and the impact which its requirements shall have on the activities and programming of Schemes.

6. Roads Engineer

6.1 Role

A Roads Engineer shall:

(i) be responsible to the Senior Project Engineer or the Principal Crossing Principal Structural Engineer for the production of all design, procedural or other Operations required to secure the preparation or promotion of Schemes,

(ii) prepare or promote Schemes,

(iii) produce road Designs, incorporating environmental mitigation measures, where appropriate,

(iv) prepare statutory orders,

(v) procure external surveys and services, and

(vi) ensure the Design obligations with respect to this Contract are delivered by the Operating Company.

6.2 Qualifications

A Roads Engineer shall:

(i) be a corporate member of the Institution of Civil Engineers, the Institution of Structural Engineers, the Institute of Highway Engineers or the Chartered Institution of Highways and Transportation or other engineering institution/ organisation acceptable to the Scottish Ministers. It is unlikely that anyone with less than 7 years' experience of roads Design and specification to the DMRB and the Manual of Contract Documents for Highway Works will meet the requirements for this post,

(ii) have experience in traffic modelling and all aspects of computer aided roads design,

(iii) have experience in the preparation and publication of draft road and compulsory purchase orders,

(iv) have knowledge and experience of the Overseeing Organisations' procedures, and

(v) have experience in preparing contract documents for road Schemes including employer's requirements for employer's Design and Design and build contracts for major road Schemes.

6.3 Key Tasks

The key tasks of a Roads Engineer are to:

(i) assist the Senior Project Engineer in the performance of the Senior Project Engineer's duties under this Contract,

(ii) liaise with the Overseeing Organisation as required,

(iii) supervise junior staff engaged in Design or preparation activities,

(iv) provide expert advice support and recommendations on any matters associated with all Design, Operations or maintenance relating to the Unit from time to time as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision or performance of this Contract,

(v) ensure that all Operations are undertaken in accordance with current standards as specified in this Contract,

(vi) ensure compliance with the Overseeing Organisations' procedures, and

(vii) procure services that require to be sourced externally.

6.4 Specific Tasks Knowledge and Experience Required

The specific tasks knowledge and experience required of a Roads Engineer shall be:

(i) to assist in the preparation of draft orders and negotiation with affected parties and objectors,

(ii) to assist in the procedural and legislative background to the promotion of road and compulsory purchase orders and the procedural aspects and requirements of Public Local Inquiries, in particular the effects that this shall have on Scheme programming and preparation of Operations,

(iii) to assist in consulting individuals and organisations affected by Trunk Road Schemes,

(iv) the Design and Specification of Trunk Roads including the preparation of contract documents for employer's Design and Design and build Schemes,

(v) the Design and specification of Operations and Works Contracts,

(vi) the Design and specification of accident investigation and prevention schemes including the preparation of Route Accident Reduction Plans,

(vii) traffic modelling (including microscopic modelling), environmental and economic assessment, and computer aided roads Design,

(viii) practical working knowledge of the DMRB and associated documents and the Specification for Highway Works,

(ix) preparation of documentation for ground investigation (including the preparation of orders, briefs, Statements of Intent and report) and topographical survey contracts,

(x) procurement of ground, topographic and other investigation contracts including tender procedures, tender assessment and reporting,

(xi) translating Design requirements into employer's requirements,

(xii) preparation of contract documents, carrying out of the Overseeing Organisations' tender procedures (including use of the documentation as referred to in Schedule 6 Part 1 of this Contract and if subject to an Order the use of the Alternative Tendering Initiative) assessment and reporting for both employer's Design and Design and build form of contract,

(xiii) knowledge of advertising procedures of the Official Journal of the European Union (OJEU),

(xiv) experience of financial control and programme management of Trunk Road Schemes, and

(xv) knowledge of the relevant environmental Legislation and the impact which its requirements shall have on the activities and programming of Schemes.

7. Graduate Engineer

7.1 Role

The role of a Graduate Engineer shall be to assist and support the Operating Company engineer(s) in the delivery of their tasks.

7.2 Qualifications

A Graduate Engineer shall possess a degree or post-graduate degree in Civil or Structural Engineering or other discipline appropriate to the individual role and acceptable to the Overseeing Organisation, with experience relevant to the provision and performance of this Contract will meet the requirements for this post.

7.3 Key Tasks

The key tasks of a Graduate Engineer shall be to:

(i) liaise with the Operating Company's staff to ensure issues arising from Operations are fully understood or implemented in accordance with the requirements of this Contract,

(ii) develop and carry out Designs and document preparation in accordance with this Contract,

(iii) develop and manage technical studies and investigations,

(iv) assist in preparing deliverables from the Operating Company including:

(a) reports,

(b) Design,

(c) tender documents including:

(i) drawings,

(ii) calculations,

(iii) specifications,

(iv) bills of quantities, and

(v) hold points,

(d) surveys, and

(e) to manage information distribution to and from the Operating Company.

8. Senior Technician

8.1 Role

The role of a Senior Technician shall be to support the Operating Company's technical team.

8.2 Qualifications

A Senior Technician shall be an Incorporated Engineer or possess an academic qualification in an appropriate discipline recognised by the UK Engineering Council as an exemplifying qualification for Incorporated Engineer and acceptable to the Overseeing Organisation. It is unlikely that anyone with less than 5 years' experience relevant to the position and performance of the role will meet the requirements for this post.

8.3 Key Tasks

The key tasks of a Senior Technician shall be:

(i) to liaise with colleagues on technical issues,

(ii) to liaise with colleagues to ensure issues arising from Operations are fully understood or implemented in accordance with the requirements of this Contract,

(iii) to develop Designs and document preparation in accordance with this Contract,

(iv) to assist in preparing deliverables from the Operating Company including:

(a) reports,

(b) Design,

(c) tender documents including:

(i) drawings,

(ii) calculations,

(iii) specifications,

(iv) bills of quantities,

(v) hold points, and

(vi) schedules,

(d) surveys, and

(e) managing information distribution to and from the Operating Company.

9. **Technician**

9.1 **Role**

The role of a Technician shall be to support the Operating Company's technical team.

9.2 **Qualifications**

A Technician shall be an Engineering Technician or possess a post secondary academic qualification in an appropriate discipline acceptable to the Overseeing Organisation. It is unlikely that anyone with less than 2 years' experience relevant to the position and performance of the role will meet the requirements for this post.

9.3 **Key Tasks**

The key tasks of a Technician shall be:

(i) to liaise with colleagues on technical issues,

(ii) to liaise with colleagues to ensure issues arising from Operations are fully understood or implemented in accordance with the requirements of this Contract,

(iii) to develop Designs and document preparation in accordance with this Contract,

(iv) to assist in preparing deliverables from the Operating Company including:

(a) reports,

(b) Design,

(c) tender documents including:

(i) drawings,

(ii) calculations,

(iii) specifications,

(iv) bills of quantities,

(v) hold points, and

(vi) schedules,

(d) surveys, and

(e) managing information distribution to and from the Operating Company.

10. Junior Technician

10.1 Role

The role of a Junior Technician shall be to support the Operating Company's technical team.

10.2 Qualifications

A Junior Technician shall be an Engineering Technician or Student Engineer, including summer student and undergraduate course student placement, with experience relevant to the position and performance of the role.

10.3 Key Tasks

The key tasks of a Junior Technician shall be:

(i) to liaise with colleagues on technical issues,

(ii) to liaise with colleagues to ensure issues arising from Operations are fully understood or implemented in accordance with the requirements of this Contract,

(iii) to develop Designs and document preparation in accordance with this Contract, and

(iv) to assist in preparing deliverables from the Operating Company including:

(a) reports,

(b) Designs,

(c) tender documents including:

(i) drawings,

(ii) calculations,

(iii) specifications,

(iv) bills of quantities,

(v) hold points, and

(vi) schedules,

(d) surveys, and

(e) managing information distribution to and from the Operating Company.

11. Principal Specialist

11.1 Role

The role of a Principal Specialist shall be to provide expert advice, support and recommendations on any matters associated with major cable supported bridges including cables, anchorages, structural steelwork, surfacing, Structural Health Monitoring and mechanical and electrical systems together with traffic measurement, geotechnical surveys, topographical surveys, environmental obligations and Legislation or landscaping obligations and Legislation in terms of analysis and verification related to this Contract.

11.2 Qualifications

A Principal Specialist shall be a Chartered Engineer or hold a recognised professional qualification or high level corporate membership of a professional organisation appropriate to the specialist role. A Principal Specialist shall hold one or more qualifications from the following non-exhaustive list including Member of the Institution of Civil Engineers, Member of the Institution of Structural Engineers, Member of the Institution of Mechanical Engineers, Member of the Institution of Electrical Engineers, Fellow of the Institute of Environmental Management & Assessment, Fellow of the Institution of Water and Environmental Management, Chartered Environmentalist, Chartered Geologist, Fellow of the Landscape Institute, Chartered Member of the Landscape Institute or professional qualifications from other institutions of equal standing relevant to surveyors, architects, builders, foresters and ecologists as appropriate to the specialist role and acceptable to the Overseeing Organisation. It is unlikely that anyone with less than 15 years' experience relevant to the position and performance of the role will meet the requirements for this post.

11.3 Key Tasks

(a) Key tasks for a Principal Cable Supported Bridge Specialist shall be to:

(i) provide expert advice on the Design, construction, inspection and maintenance of elements of cable supported bridges including cables, anchorages, structural steelwork, aerodynamics, foundations and surfacing,

(ii) liaise with the Scheme Manager or Main Crossings Principal Structural Engineer on issues arising relating to cable supported bridges,

(iii) liaise with the Operating Company's staff to ensure issues arising from cable supported bridges are fully understood or implemented in accordance with the requirements of this Contract, and

(iv) certification of Design.

(b) Key tasks for a Principal Structural Health Monitoring Specialist shall be to:

(i) provide expert advice on the operation and maintenance of Structural Health Monitoring Systems including the operation, maintenance and replacement of components and the storage and retrieval of data,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to the Structural Health Monitoring System, and

(iii) liaise with the Operating Company's staff to ensure issues arising from the Structural Health Monitoring System are fully understood or implemented in accordance with the requirements of this Contract.

(c) Key tasks for a Principal Mechanical and Electrical Systems Specialist shall be to:

(i) provide expert advice on the operation and maintenance of mechanical and electrical systems related to major cable supported structures including the operation and maintenance of de-humidification, SCADA, CCTV and security systems,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to mechanical and electrical systems,

(iii) liaise with the Operating Company's staff to ensure issues arising from the mechanical and electrical systems are fully understood or implemented in accordance with the requirements of this Contract.

(iv) Certification of Design

(d) Key tasks for a Principal Traffic Measurement and Economics Specialist shall be to:

(i) undertake sufficient checks on the traffic measurement data,

(ii) liaise with the Scheme Manager on issues arising from traffic measurement and analysis,

(iii) liaise with the Operating Company's staff to ensure issues arising from traffic measurement and analysis are fully understood or implemented in accordance with the requirements of this Contract, and

(iv) certification of Design.

(e) Key tasks for a Principal Geotechnical Specialist shall be to:

(i) undertake sufficient checks on the geotechnical surveys and analysis,

(ii) develop and manage geotechnical studies and ground investigations,

(iii) prepare geotechnical deliverables,

(iv) liaise with the Scheme Manager on issues arising from geotechnical measurement, analysis and reporting,

(v) liaise with the Operating Company's staff to ensure issues arising from:

(a) geotechnical surveys,

(b) measurement,

(c) analysis, and

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract, and

(vi) certification of Design,

(f) Key tasks for a Principal Topographical Specialist shall be to:

(i) undertake sufficient checks on the topographical surveys and analysis,

(ii) develop and manage topographical studies and investigations,

(iii) prepare topographical deliverables,

(iv) liaise with the Scheme Manager on issues arising from topographical measurement, analysis and reporting,

(v) liaise with the Operating Company's staff to ensure issues arising from:

(a) topographical surveys,

(b) measurement,

(c) analysis, and

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(g) Key tasks for a Principal Environmental Specialist shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of the Unit that have environmental impact implications from time to time as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision and performance of this contract,

(ii) develop and manage environmental studies,

(iii) undertake sufficient checks on the environmental studies,

(iv) prepare environmental study deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) environmental studies,

(b) measurement,

(c) analysis, and

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) environmental studies,

(b) measurement,

(c) analysis, and

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract, and

(vii) certification of Design,

(h) Key tasks for a Principal Landscaping Specialist (Landscape Architect) shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of landscaping on the Unit that have environmental impact implications from time to time as or when required by the Operating Company Representative or the Overseeing Organisation or as required in the provision and performance of this contract,

(ii) develop and manage the:

(a) Landscape Action Plan,

(b) landscaping studies, and

(c) reporting,

(iii) undertake sufficient checks on the:

(a) Landscape Action Plan,

(b) landscaping studies, and

(c) reporting,

(iv) Prepare the:

(a) Landscape Action Plan,

(b) landscaping studies, and

(c) reporting deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) landscaping studies,

(b) measurement,

(c) analysis, or

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) landscaping studies,

(b) measurement,

(c) analysis, or

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract, and

(vii) certification of Design.

12. Senior Specialist

12.1 Role

The role of a Senior Specialist shall be to provide expert advice support and recommendations on any matters associated with major cable supported bridges including cables, anchorages, structural steelwork, surfacing, foundations, aerodynamics, Structural Health Monitoring and mechanical and electrical systems

together with traffic measurement, geotechnical surveys, topographical surveys, environmental obligations and Legislation or landscaping obligations and Legislation in terms of analysis and verification related to this Contract.

12.2 **Qualifications**

A Senior Specialist shall be a Chartered Engineer or hold a recognised professional qualification or corporate membership of a professional organisation appropriate to the specialist role. A Senior Specialist shall hold one or more qualifications from the following non-exhaustive list including Member of the Institution of Civil Engineers, Member of the Institution of Structural Engineers, Member of the Institution of Mechanical Engineers, Member of the Institution of Electrical Engineers, Member of the Institute of Environmental Management & Assessment, Member of the Institution of Water and Environmental Management, Chartered Environmentalist, Chartered Geologist, Chartered Member of the Landscape Institute or professional qualifications from other institutions of equal standing relevant to surveyors, architects, builders, foresters and ecologists as appropriate to the specialist role and acceptable to the Scottish Ministers. It is unlikely that anyone with less than 10 years' experience relevant to the position and performance of the role will meet the requirements for this post.

12.3 **Key Tasks**

(a) Key tasks for a Senior Cable Supported Bridge Specialist shall be to:

(i) provide expert advice on the Design, construction, inspection and maintenance of elements of cable supported bridges including cables, anchorages, structural steelwork, aerodynamics, foundations and surfacing,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to cable supported bridges,

(iii) liaise with the Operating Company's staff to ensure issues arising from cable supported bridges are fully understood or implemented in accordance with the requirements of this Contract.

(b) Key tasks for a Senior Structural Health Monitoring Specialist shall be to:

(i) provide expert advice on the operation and maintenance of Structural Health Monitoring Systems including the operation, maintenance and replacement of components and the storage and retrieval of data,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to the Structural Health Monitoring System,

(iii) liaise with the Operating Company's staff to ensure issues arising from the Structural Health Monitoring System are fully understood or implemented in accordance with the requirements of this Contract.

(c) Key tasks for a Senior Mechanical and Electrical Systems Specialist shall be to:

(i) provide expert advice on the operation and maintenance of mechanical and electrical systems related to major cable supported structures including the operation and maintenance of de-humidification, SCADA, CCTV and security systems,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to mechanical and electrical systems,

(iii) liaise with the Operating Company's staff to ensure issues arising from the mechanical and electrical systems are fully understood or implemented in accordance with the requirements of this Contract.

(d) Key tasks for a Senior Traffic Measurement and Economics Specialist shall be to:

(i) undertake sufficient checks on the traffic measurement data,

(ii) liaise with the Scheme Manager on issues arising from traffic measurement and analysis, and

(iii) liaise with the Operating Company's staff to ensure issues arising from traffic measurement and analysis are fully understood or implemented in accordance with the requirements of this Contract.

(e) Key tasks for a Senior Geotechnical Specialist shall be to:

(i) undertake sufficient checks on the geotechnical surveys and analysis,

(ii) develop and manage geotechnical studies and ground investigations,

(iii) Liaise with the Scheme Manager on issues arising from:

(i) geotechnical measurement,

(ii) analysis, and

(iii) reporting,

(iv) liaise with the Operating Company's staff to ensure issues arising from:

(i) geotechnical measurement,

(ii) analysis, and

(iii) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(f) Key tasks for a Senior Topographical Specialist shall be to:

(i) undertake sufficient checks on the topographical surveys analysis,

(ii) develop and manage topographical studies,

(iii) prepare topographical survey deliverables,

(iv) liaise with the Scheme Manager on issues arising from:

(i) topographical surveys,

(ii) measurement,

(iii) analysis, and

(iv) reporting,

(v) liaise with the Operating Company's staff to ensure issues arising from:

(i) topographical surveys,

(ii) measurement,

(iii) analysis, and

(iv) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(g) Key tasks for a Senior Environmental Specialist shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of the Unit that have environmental impact implications from time to time as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision and performance of this Contract,

(ii) develop and manage environmental studies,

(iii) undertake sufficient checks on the environmental studies,

(iv) prepare environmental study deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(i) environmental studies,

(ii) measurement,

(iii) analysis, or

(iv) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(i) environmental studies,

(ii) measurement,

(iii) analysis, or

(iv) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(h) Key tasks for a Senior Landscaping Specialist (Landscape Architect) shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of landscaping on the Unit that have environmental impact implications from time to time as or when required by the Operating Company Representative or the Overseeing Organisation or as required in the provision and performance of this Contract,

(ii) develop and manage landscaping studies and reporting,

(iii) undertake sufficient checks on the landscaping studies and reporting,

(iv) prepare landscaping study or reporting deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(i) landscaping studies,

(ii) measurement,

(iii) analysis, or

(iv) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(i) landscaping studies,

(ii) measurement,

(iii) analysis, or

(iv) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

13 Specialist

13.1 Role

The role of a Specialist shall be to provide expert advice support and recommendations on any matters associated with major cable supported bridges including cables, anchorages, structural steelwork, surfacing, foundations, aerodynamics, Structural Health Monitoring and mechanical and electrical systems together with traffic measurement, geotechnical surveys, topographical surveys, environmental obligations and Legislation or landscaping obligations and legislation in terms of analysis and verification related to this Contract.

13.2 Qualifications

A Specialist shall be a Chartered Engineer or hold a recognised professional qualification or corporate membership of a professional organisation appropriate to the specialist role. A Specialist shall hold one or more qualifications from the following non-exhaustive list including Member of the Institution of Civil Engineers, Member of the Institution of Structural Engineers, Member of the Institution of Mechanical Engineers, Member of the Institution of Electrical Engineers, Member of the Institute of Environmental Management & Assessment, Member of the Institution of Water and Environmental Management, Chartered Environmentalist, Chartered Geologist, Member of the Landscape Institute, Chartered Membership of the Landscape Institute or professional qualifications from other institutions of equal standing relevant to surveyors, architects, builders, foresters and ecologists as appropriate to the specialist role and acceptable to the Scottish Ministers. It is unlikely that anyone with less than five years' experience relevant to the position and performance of the role will meet the requirements for this post.

13.3 Key Tasks

(a) Key tasks for a Cable Supported Bridge Specialist shall be to:

(i) provide expert advice on the Design, construction, inspection and maintenance of elements of cable supported bridges including cables, anchorages, structural steelwork, aerodynamics, foundations and surfacing,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to cable supported bridges,

(iii) liaise with the Operating Company's staff to ensure issues arising from cable supported bridges are fully understood or implemented in accordance with the requirements of this Contract.

(b) Key tasks for a Structural Health Monitoring Specialist shall be to:

(i) provide expert advice on the operation and maintenance of Structural Health Monitoring Systems including the operation, maintenance and replacement of components and the storage and retrieval of data,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to the Structural Health Monitoring System,

(iii) liaise with the Operating Company's staff to ensure issues arising from the Structural Health Monitoring System are fully understood or implemented in accordance with the requirements of this Contract.

(c) Key tasks for a Mechanical and Electrical Systems Specialist shall be to:

(i) provide expert advice on the operation and maintenance of mechanical and electrical systems related to major cable supported structures including the operation and maintenance of de-humidification, SCADA, CCTV and security systems,

(ii) liaise with the Scheme Manager or Principal Crossings Principal Structural Engineer on issues arising relating to mechanical and electrical systems,

(iii) liaise with the Operating Company's staff to ensure issues arising from the mechanical and electrical systems are fully understood or implemented in accordance with the requirements of this Contract.

(d) Key tasks for a Traffic Measurement and Economics Specialist shall be to:

(i) undertake sufficient checks on the traffic measurement data,

(ii) liaise with the Scheme Manager on issues arising from traffic measurement and analysis, and

(iii) liaise with the Operating Company's staff to ensure issues arising from traffic measurement and analysis are fully understood or implemented in accordance with the requirements of this Contract.

(e) Key tasks for a Geotechnical Specialist shall be to:

(i) undertake sufficient checks on the geotechnical surveys and analysis,

(ii) develop and manage geotechnical studies and ground investigations,

(iii) prepare geotechnical deliverables,

(iv) liaise with the Scheme Manager on issues arising from:

(a) geotechnical measurement,

(b) analysis, and

(c) reporting,

(v) liaise with the Operating Company's staff to ensure issues arising from:

(a) geotechnical measurement,

(b) analysis, and

(c) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(f) Key tasks for a Topographical Specialist shall be to:

(i) undertake sufficient checks on the topographical surveys analysis,

(ii) develop and manage topographical studies,

(iii) prepare topographical survey deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) topographical surveys,

(b) measurement,

(c) analysis, and

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) topographical surveys,

(b) measurement,

(c) analysis, and

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(g) Key tasks for an Environmental Specialist shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of the Unit that have environmental impact implications from time to time as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision and performance of this Contract,

(ii) develop and manage environmental studies,

(iii) undertake sufficient checks on the environmental studies,

(iv) prepare environmental study deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) environmental studies,

(b) measurement,

(c) analysis, or

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) environmental studies,

(b) measurement,

(c) analysis, or

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(h) Key tasks for a Landscaping Specialist (Landscape Architect) shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of landscaping on the Unit that have environmental impact implications from time to time as or when required by the Operating Company Representative or the Overseeing Organisation or as required in the provision and performance of this Contract,

(ii) develop and manage landscaping studies and reporting,

(iii) undertake sufficient checks on the landscaping studies and reporting,

(iv) Prepare landscaping study or reporting deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) landscaping studies,

(b) measurement,

(c) analysis, or

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) landscaping studies,

(b) measurement,

(c) analysis, or

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

14 Junior Specialist

14.1 Role

The role of a Junior Specialist shall be to provide expert advice support and recommendations on any matters associated with traffic measurement, geotechnical surveys, topographical surveys, environmental obligations and Legislation or landscaping obligations and Legislation in terms of analysis and verification related to this Contract.

14.2 Qualifications

A Junior Specialist shall be a Graduate in the appropriate discipline or hold a recognised professional qualification or be a member of a professional organisation appropriate to the specialist role and acceptable to the Scottish Ministers. It is unlikely that anyone with less than one years' experience relevant to the position and performance of the role will meet the requirements for this post.

14.3 Key Tasks

(a) Key tasks for a Junior Traffic Measurement and Economics Specialist shall be to:

(i) undertake sufficient checks on the traffic measurement data,

(ii) liaise with the Scheme Manager on issues arising from traffic measurement and analysis, and

(iii) liaise with the Operating Company's staff to ensure issues arising from traffic measurement and analysis are fully understood or implemented in accordance with the requirements of this Contract.

(b) Key tasks for a Junior Geotechnical Specialist shall be to:

(i) undertake sufficient checks on the geotechnical surveys and analysis,

(ii) develop and manage geotechnical studies and ground investigations,

(iii) prepare geotechnical deliverables,

(iv) liaise with the Scheme Manager on issues arising from:

(a) geotechnical measurement,

(b) analysis, and

(c) reporting,

(v) liaise with the Operating Company's staff to ensure issues arising from:

(a) geotechnical measurement,

(b) analysis, and

(c) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(c) Key tasks for a Junior Topographical Specialist shall be to:

(i) undertake sufficient checks on the topographical surveys analysis,

(ii) develop and manage topographical studies,

(iii) prepare topographical survey deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) topographical surveys,

(b) measurement,

(c) analysis, and

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) topographical surveys,

(b) measurement,

(c) analysis, and

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(d) Key tasks for a Junior Environmental Specialist shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of the Unit that have environmental impact implications from time to time as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision and performance of this Contract,

(ii) develop and manage environmental studies,

(iii) undertake sufficient checks on the environmental studies,

(iv) prepare environmental study deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) environmental studies,

(b) measurement,

(c) analysis, or

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) environmental studies,

(b) measurement,

(c) analysis, or

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

(e) Key tasks for a Junior Landscaping Specialist shall be to:

(i) provide expert advice, support and recommendations on any matters associated with the Design operation or maintenance of landscaping on the Unit that have environmental impact implications from time to time as or when required by the Operating Company Representative or the Overseeing Organisation or as required in the provision and performance of this Contract,

(ii) develop and manage landscaping studies and reporting,

(iii) undertake sufficient checks on the landscaping studies and reporting,

(iv) prepare landscaping study or reporting deliverables,

(v) liaise with the Scheme Manager on issues arising from:

(a) landscaping studies,

(b) measurement,

(c) analysis, or

(d) reporting,

(vi) liaise with the Operating Company's staff to ensure issues arising from:

(a) landscaping studies,

(b) measurement,

(c) analysis, or

(d) reporting,

are fully understood or implemented in accordance with the requirements of this Contract.

15 Lighting/Electrical Engineer

15.1 Role

The role of a Lighting/Electrical Engineer shall be to ensure that road lighting, including traffic signs, traffic signals, traffic management systems, temporary mobile equipment requiring electrical energy and any other electrical equipment and apparatus installed within the Unit (and to such extent electrical circuits that may extend beyond the Unit), are continuously managed and maintained to a high standard.

15.2 Qualifications

A Lighting/Electrical Engineer shall be a corporate member of the Institution of Lighting Engineers or Institution of Engineering and Technology. It is unlikely that anyone with less than seven years' experience in the design, maintenance and operation of lighting systems and other electrical equipment and apparatus relevant to the provision and performance of this Contract will meet the requirements for this post. In addition the Lighting/Electrical Engineer shall have a thorough understanding of health and safety requirements for the relevant subject areas, including Design, and possess at least a basic knowledge of quality assurance. A Lighting/Electrical Engineer shall have such skills to be able to manage the operation of IRIS and associated electrical energy inventory.

15.3 **Key Tasks**

Key tasks of a Lighting/Electrical Engineer shall be to:

(i) manage the installation, operation and maintenance of electrical apparatus and associated structural supports, network cabling and wiring for lighting, traffic signs, traffic signals, traffic management systems, traffic safety systems, weather stations, temporary mobile equipment requiring electrical energy and any other electrical equipment and apparatus installed within the Unit (and to such extent electrical circuits extend beyond the Unit),

(ii) ensure the competence of the personnel to whom the work is issued in accordance with the appropriate Code of Practice,

(iii) manage the maintenance of all electrical and all associated structural supports data on IRIS and manage the maintenance of the electrical energy inventory and delivery of required reporting and ensure all necessary Records are provided and maintained,

(iv) develop and manage such risk assessment regimes as detailed in document referenced within TD23/99 of the DMRB and appropriate Code of Practice,

(v) develop and maintain a good working relationship with lighting/electrical engineers of adjoining units, Traffic Scotland and local authorities and other third parties who may have shared lighting operational needs or who share use of electrical installations,

(vi) provide expert advice support and recommendations on any matters associated with the Design, installation, maintenance and repair of electrical systems in terms of:

(a) relevant health and safety requirements,

(b) diagnosis and correction of faults,

(c) technical and functional information,

(d) assurance that electrical systems are appropriate for the working conditions,

(e) installations and connections for/to electrical systems and components,

(f) inspecting and testing,

(g) execution of emergency work, and

(h) energy saving management.