

NETWORK MANAGEMENT CONTRACT

SCHEDULE 5 – SPECIFICATION AND DRAWINGS

This is Schedule 5 Specifications & Drawings referred to in the foregoing Agreement between Scottish Ministers and BEAR Scotland Limited dated 28 April 2022 relative to the Scottish Trunk Road Management Contract for the North West Unit.

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Preamble To The Specification

1. The Specification for Operations shall be the *Specification for Highway Works*, published by The Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, as modified and extended by the following:
 - (i) Appendix 0/1: Contract-specific Additional, Substitute and Cancelled clauses, Tables and Figures,
 - (ii) Appendix 0/2: Contract-specific minor alterations to existing clauses, Tables and Figures,
 - (iii) the Numbered Appendices listed in Appendix 0/3, and
 - (iv) Appendix 0/5: Special national alterations of the Overseeing Organisation of Scotland, Wales or Northern Ireland.

Appendix 0/4 contains a list of the drawings.

2. The relevant publication date of each page of the *Specification for Highway Works* is given in the Schedule of Pages and Relevant Publication Dates.
3. An Additional clause as indicated by a suffix 'A' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland. An Additional clause as indicated by a suffix 'AR' in Appendix 0/1 is a Contract-specific alteration.
4. A Substitute clause as indicated by a suffix 'S' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland. A Substitute clause as indicated by a suffix 'SR' in Appendix 0/1 is a Contract-specific alteration.
5. A Cancelled clause as indicated by a suffix 'C' in Appendix 0/5 is an alteration originating from the Overseeing Organisation of Scotland, Wales or Northern Ireland. A Cancelled clause indicated by a suffix 'CR' in Appendix 0/1 is a Contract-specific alteration.
6. Insofar as any of the Numbered Appendices may conflict or be inconsistent with any provision of the *Specification for Highway Works* the Numbered Appendices shall always prevail. Additionally, Numbered Appendices 0/1 and 0/2 shall take precedence over Numbered Appendix 0/5.
7. Any reference in this Specification to a clause number or Appendix shall be deemed to refer to the corresponding Substitute clause number or Appendix listed in Appendix 0/1, 0/2 or 0/5.
8. Where a clause is altered any original Table/Figure referred to in the clause shall apply unless the Table/Figure is also altered. Where a Table/Figure is altered any reference in a clause to the original Table/Figure shall apply to the altered Table/Figure.
9. Where a clause in the Specification relates to work goods or materials which are not required for the Operations it shall be deemed not to apply.

10. Any Appendix referred to in the Specification which is not used shall be deemed not to apply.
11. Where a clause in the Specification is prefixed by an # this indicates that this particular clause has a substitute National Alteration for one or more of the Overseeing Departments of Scotland, Wales or Northern Ireland. Substitute or additional National clauses shall be used within countries to which they specifically apply and they are deemed to replace corresponding clauses in the main text of the Specification as appropriate. The substitute National clauses are located at the end of the relevant Series together with the additional National clauses of the Overseeing Organisations.
12. Subject to the provisions of paragraph 13 below and other Parts of the Scottish Ministers' Requirements, the roles and functions of the Overseeing Organisation shall be undertaken by the Director or, if waived by the Director, the Operating Company.
13. Where the Specification provides for the Overseeing Organisation to require a test, waive the requirement for a test or alter testing frequency, the Operating Company shall exercise such decisions in accordance with the Scottish Ministers' Requirements stated in this Contract.
14. In this Specification any reference to the Contractor shall be deemed to be a reference to the Operating Company unless otherwise stated.
15. British Standards and British Standard Codes of Practice incorporated in this Contract by a reference which does not include a date shall be the respective editions current on the date 42 days prior to the date on which the Final Tender Submission shall be submitted.

Specification For Highway Works

Schedule of Pages and Relevant Publication Dates

Series/Appendix	Page Number	Publication Date
000	1 to 3	May 2014
000	6 to 7F	February 2016
000	4 to 5	April 2022
100	2, W1F, N2 to N11F	May 2014
100	N1	December 2014
100	1, 3 to 30F	April 2022
200	1 to 3F	February 2016
300	1	May 2001
300	4	November 2002
300	2 to 3, 5 to 6F	May 2008
400	1 to 23F	March 2020
500	1 to 2, 4 to 39F, N1 to N2F	February 2020
500	3	March 2020
600	1 to 68, 70 to 77F, S1 to S4F, W1 to W4F, N1 to N5F	February 2016
600	69	February 2017
700	1 to 5, 8 to 36F, N1 to N4	February 2016
700	6 to 7, N5 to N6F	October 2022
800	1 to 42F	November 2021
900	1 to 83F, S1 to S3F, W1 to W2F, N1F	July 2021
1000	1 to 33	January 2020
	1 to 2, 34 to 58F	November 2021
1100	1 to 16	February 2021
1200	5	May 2001
1200	2, 3, W1F	August 2003
1200	1, 14 to 16F	May 2004
1200	4, 9 to 11, 13	May 2005
1200	12	November 2006
1200	6 to 7, N1 to N4F	November 2007
1200	8	May 2008
1300	N2F	November 2003

Series/Appendix	Page Number	Publication Date
1300	3 to 4	November 2004
1300	1, 5 to 10, 12F	November 2005
1300	2, 11, N1	May 2006
1400	2, N1F	May 2001
1400	1, 3 to 9F	May 2006
1500	1 to 31F	February 2017
1600	1, 4 to 5, 9, 15, 17 to 18, 24 to 26, 29 to 31, 35, 38, 49F	March 1998
1600	2, 6 to 8, 10 to 14, 16, 19, 27 to 28, 32 to 34, 36 to 37, 39 to 42, 44 to 48	November 2003
1600	3, 20 to 23, 43	November 2005
1700	2, 4, 6 to 7, 19, 24 to 27, 30 to 34	December 2014
1700	1, 3, 5, 8 to 18, 20 to 23, 28 to 29, 35 to 39F	March 2020
1800	1 to 39F	April 2021
1900	1 to 35F, S1 to S2F	August 2014
2000	1, 3 to 4F	May 2001
2000	2	November 2004
2100	1 to 2F	February 2016
2300	1	March 1998
2300	2 to 3F	May 2001
2400	1, 4, 7F	May 2005
2400	2	May 2006
2400	3, 5, 6	May 2008
2500	1	May 2001
2500	2, 8, 11F	November 2003
2500	10	November 2004
2500	6 to 7, 9	May 2005
2500	5	May 2006
2500	3 to 4	November 2006
2600	2 to 4	November 2003
2600	5	November 2004
2600	6	May 2005
2600	7	November 2006
2600	1, 8F	March 2020
3000	1, 4 to 7, 10, 12 to 17, 19, 22 to 27F	May 2001

Series/Appendix	Page Number	Publication Date
3000	20	November 2004
3000	2, 3	May 2006
3000	8, 9, 11, 18, 21	May 2008
5000	1, 4 to 19F, S1F	May 2005
5000	2, 3	November 2008
5700	1 to 30F	February 2020
Appendix A	1 to 4F	May 2014
Appendix B	1 to 3F	May 2014
Appendix C	1 to 2F	May 2014
Appendix D	1F	May 2014
Appendix D (NI)	N1F	May 2014
Appendix E	1F	May 2014
Appendix F	1 to 60F	October 2022
Appendix G	Not used	
Appendix H	1	May 2004
Appendix H	2	November 2005
Appendix H	3	November 2006
Appendix H	4 to 9F	November 2008

Appendix 0/1 – Contract-Specific Additional, Substitute and Cancelled Clauses Tables and Figures included in this Contract

List of Additional Clauses, Tables and Figures

Clause No	Title	Page No
070AR	Equality Act	
071AR	Creation, Maintenance and Submission of Documents and other Media	
170AR	Licences Servitudes Wayleaves and Rights of Access	
171AR	Not used	N/A
172AR	Not used	N/A
173AR	Not used	N/A
174AR	Not used	N/A
175AR	Operating Company Vehicles	
176AR	Incident Support Unit and Trunk Road Incident Support Service Operatives' Uniforms	
177AR	Trunk Road Incident Support Service Vehicle Mobile CCTV System	
178AR	Vehicle Mounted Variable Message Signs	
179AR	Dashcams	
370AR	Repairs to and Renewal of Existing Fencing	
371AR	Snow Fences	
372AR	Deer, Otter, Badger, Combined and Stock Fence Specifications	
470AR	Repairs to Safety Barriers	
471AR	Repairs to Existing Pedestrian Guardrail	
472AR	Re-Tensioning of Safety Barriers	
473AR	Painting of Pedestrian Guardrails and Handrails	
570AR	Rodding Eyes	
571AR	Renewal of Filter Drain Material	
572AR	Closed Circuit Television Surveys	
573AR	High Pressure Water Jetting	
970AR	Not used	N/A
971AR	Not used	N/A
972AR	Grip Testing	
973AR	Grip Tester	
974AR	TS2010 Stone Mastic Asphalt (SMA) Surface Course	

Clause No	Title	Page No
975AR	Overband Sealing	
976AR	Electronic Data Monitoring during Pavement Maintenance Schemes	
1170AR	Red Chipping Paved Areas	
1171AR	Relaying of Existing Footways	
1172AR	Artificial Stone Paving or Natural Stone Paving and Precast Concrete Paving Flags and Blocks	
1173AR	Laying of Artificial Stone Paving Natural Stone Paving and Precast Concrete Paving Flags and Blocks	
1174AR	Timber Edging to Footways and Paved Areas	
1175AR	Siding Out	
1270AR	Passively Safe Sign Posts	
1271AR	Snow Poles	
1272AR	Requirements for the illumination of illuminated Traffic Signs	
1273AR	Not used	N/A
1370AR	Lamp Disposal	
1371AR	Not used	N/A
1470AR	Temporary Overhead Feed to Lighting Units	
1471AR	Lighting Central Management System	
1472AR	Weather Stations	
1473AR	Electric Vehicle Charging Installations	
1474AR	Not used	N/A
1770AR	Not used	N/A
1771AR	Requirements for Concrete Repairs	
1772AR	Not Used	N/A
1773AR	Not Used	N/A
1774AR	Not Used	N/A
1775AR	Foamed Concrete Fill to Structures and Backfilling to Drainage Trenches	
1870AR	Repairs to Existing Steelwork and Welds	
2070AR	Replacement of Bridge Deck Waterproofing on Concrete Decks	
2071AR	Replacement of Bridge Deck Waterproofing on Steel Decks	
2072AR	Repairs to Existing Waterproofing on Concrete Decks	
2370AR	Bridge Expansion Joints Used on Bridge Decks	

Clause No	Title	Page No
2371AR	Replacement of Bridge Deck Expansion Joints and Gap Sealants	N/A
2372AR	Asphaltic Plug Joints	
2470AR	Repointing of Brickwork Blockwork and Stonework	
2471AR	Replacement of Precast Concrete Copings	
2472AR	Rebedding Existing Precast Concrete or Stone Masonry Copings	
2473AR	Replacement Tiling	
2474AR	Rebuilding of Defective Masonry	
2475AR	Lime Putty	
2476AR	Hydraulic Lime Mortars	
2570AR	Inspection Chambers	
2670AR	Anti-Graffiti Coatings	
2671AR	Graffiti Removal	
2801AR	Winter Service Plant	
2802AR	Not used	
2803AR	Winter Service Vehicle Data Logging and Transmitting Equipment	
2804AR	Winter Service Vehicle Data Receiving, Storing, Archiving and Web Based Systems	
2805AR	Winter Service Vehicle Communications Equipment	
3070AR	Shrub Maintenance Operations	
3071AR	Woodland Maintenance Operations	
3072AR	Hedge Maintenance Operations	
3073AR	Hedgerow Maintenance Operations	
3074AR	Scrub Maintenance Operations	
3075AR	Individual Tree Maintenance Operations	
3301AR	Rotary Coring in Carriageways	
3302AR	Rotary Coring in Structures	
3303AR	Structural Investigations	
3304AR	Inspection Patches within Surfacing on Bridge Structures	
3305AR	Trial Pits in Paved Areas	
3306AR	Falling Weight Deflectometer Tests	
3307AR	Dynamic Cone Penetrometer Tests	
3308AR	Structural Investigation Tests	

Clause No	Title	Page No
6101AR	Not Used	N/A
6102AR	Maintenance of Gullies, Catchpits, Soakaways, Manholes and Oil Separators	
6103AR	Maintenance of Drainage Grips	
6104AR	Not Used	N/A
6105AR	Maintenance of Filter Material	
6106AR	Maintenance of Drainage Structures	
6107AR	Maintenance of Ancillary Drainage Items	
6108AR	Litter and Refuse, Objects and Cleaning	
6109AR	Dead Animals	
6110AR	Maintenance of Structures - General	
6111AR	Maintenance of Expansion Joints	
6112AR	Maintenance of Bridge Drainage Systems	
6113AR	Maintenance of Parapets and Pedestrian Protection on Structures	
6114AR	Maintenance of Bearings and Bearing Shelves	
6115AR	Maintenance of Structures Over or Conveying Watercourses	
6116AR	Maintenance of Sign or Signal Gantries High Mast Lighting Masts	
6117AR	Maintenance of Non-Structural Items	
6118AR	Maintenance of Underpasses and Culverts used by Pedestrians and Cyclists and Retaining Walls	
6119AR	Maintenance of Road Traffic Signs, Bollards and Marker Posts	
6120AR	Maintenance of Lit Sign Units	
6121AR	Maintenance of Traffic Signals	
6122AR	Maintenance of Roadside Electrical Assets, Lighting and Power Supplies	
6123AR	Not used	N/A
6124AR	Maintenance of High Mast Lighting	
6125AR	Incident Response	
6126AR	Not used	N/A
6127AR	Removal of Graffiti, Posters and Encrusted Deposits	
6128AR	Not used	N/A
6129AR	Not used	N/A

Clause No	Title	Page No
6130AR	Not used	N/A
6131AR	Maintenance of Channels, kerb block drains, drainage kerbs and piped grips	
6201AR	Requirements for Professional Services Staff	
Appendix F AR	Additional Publications	N/A

List of Substitute Clauses, Tables and Figures

Clause No	Title	Page No
110SR	Information Boards	
1401SR	General	
1402SR	Site Records	
1403SR	Location of Lighting Units and Feeder Pillars	
1407SR	Luminaires	
1409SR	Photo electric Control Units (PECU's)	
1412SR	Ballasts	
1416SR	Cut outs, Fuse Holders, Fuses and Miniature Circuit Breakers (MCB's)	
1417SR	Base Compartment Fixing Arrangements	
1418SR	Feeder Pillars	
1419SR	Wiring	
1420SR	Earthing	
1421SR	Underground, Overhead and Ducted Cable	
1422SR	Cable Joints	
1423SR	Armoured Cable Terminations	
1424SR	Inspection and Testing to be Carried Out by the Contractor	
1801SR	Structural Steelwork General	
1802SR	Amendments to BS EN 1090-2:2018	
1803SR	Amendments to Steel Bridge Group Model Project Specification	
2007SR	Integrity Testing of Bridge Deck Waterproofing	
2101SR	Bridge Bearings General	
3007SR	Grass, Bulbs and Wildflower Maintenance	
3010SR	Maintenance of Established Trees and Shrubs	
TABLE 50/2SR	Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems	

List of Cancelled Clauses, Tables and Figures

Clause No	Title	Page No
	None	N/A

Additional Clauses and Tables

Clause No.	Title and Written Text	
Series 000 - Introduction		
070AR	Equality Act	
	1	The Operating Company shall follow the guidance given in the <i>Roads for All: Good Practice Guide for Roads</i> in all Operations.
	2	Where the guidance given in the <i>Roads for All: Good Practice Guide for Roads</i> conflicts with the <i>Specification for Highway Works</i> , the "good practice guide" shall take precedence.
	3	Compliance with the <i>Roads for All: Good Practice Guide for Roads</i> shall not absolve the Operating Company from any liability under the <i>Equality Act 2010</i> .
071AR	Creation, Maintenance and Submission of Documents and Other Media	
	1	A document, Record or submission required to be created, maintained, submitted or otherwise provided or procured by the Operating Company shall be in the native electronic format in which it was created and may be supported by the same information in pdf. A pdf version of a document, Record or submission shall be created directly from the original native electronic format, with a presumption against scanned documents. All documents, Records or submissions provided or procured by the Operating Company, regardless of format, shall clearly show the date of issue.
	2	Scanned documents shall only be permitted for cover letters with signature, handwritten Records, notices required by this Contract or where the original document has been provided in hard copy only to the Operating Company by an organisation outwith the Operating Company's control. The Operating Company shall provide and electronic transcript of any scanned document that it provides to the Director when requested by the Director and within a period requested by the Director. The Operating Company is deemed to have allowed for this when compiling its Final Tender Submission.
	3	All electronic files created or supplied by the Operating Company shall be compatible with software used by the Overseeing Organisation. The Operating Company shall liaise with the Overseeing Organisation on a regular basis to ensure such compatibility.

Clause No.	Title and Written Text
4	Except where provided otherwise within the Contract, electronic files shall adhere to a naming convention to be agreed with the Director, but in any case shall commence with the format YYMMDD which shall correspond to the date of logging or submission or if not logged or submitted, the date of creation; and shall contain clear indication as to the content of the file, the Unit to which it refers and, where relevant the route number
5	All electronic files shall be formatted such that they can be easily interpreted when printed at A4 or A3.
6	All photographs and video recordings taken for the purposes of this Contract shall be taken using a global positioning system enabled device and shall display time, date and global positioning system co-ordinates on all images. Photographs not displaying these requirements shall not be accepted as a true record. Photographs shall have a minimum resolution of 1MB.
Series 100 - Preliminaries	
170AR	Licences Servitudes Wayleaves and Rights of Access
1	The Operating Company shall gain access to boundary fences and adjacent areas from the Unit.
2	If, in the opinion of the Operating Company, access from the Unit is impractical then the Operating Company shall notify the Overseeing Organisation of any licences, servitudes, wayleaves or rights of access that are needed to enable the work to be undertaken.
3	The Operating Company shall not, under any circumstances, gain access across private land without the written permission of the Overseeing Organisation.
171AR	Not used
172AR	Not used
173AR	Not used
174AR	Not used
175AR	Operating Company Vehicles
	<p>The Operating Company fleet vehicles used on the Trunk Road network shall comply with the livery requirements given in Schedule 5 Specification and Drawings, Appendix 1/75 Operating Company's Vehicle Liveries</p> <p>As required by Schedule 1 Conditions of Contract, Clause 2 Operating Company Main Responsibilities, 2.6 General Obligations, 2.6.3. During each Winter Service Period, all vehicles actively involved in maintenance and management Operations shall be fitted with winter tyres on all wheels. Winter tyres are tyres marketed as such which are designed for enhanced traction and grip at low temperatures.</p>
176AR	Incident Support Unit and Trunk Road Incident Support Service Operatives' Uniforms

Clause No.	Title and Written Text
	Each of the Operating Company's Incident Support Unit and Trunk Road Incident Support Service operatives shall wear the appropriate Incident Support Unit and Trunk Road Incident Support Service operatives' uniform when engaged in Incident Support Unit and Trunk Road Incident Support Service Operations on the Unit. The uniform requirements are given in Schedule 5 Specification and Drawings, Appendix 1/76 Incident Support Unit and Trunk Road Incident Support Service Operatives' Uniforms.
177AR	Trunk Road Incident Support Service Vehicle Mobile CCTV System
1	Two of the Operating Company's Trunk Road Incident Support Service vehicles shall be equipped in accordance with the requirements given in Schedule 5 Specification and Drawings, Appendix 1/77 Specification for TRISS Vehicle Mobile CCTV System.
178AR	Vehicle Mounted Variable Message Signs
1	Each of the Operating Company's Trunk Road Incident Support Service vehicles shall be equipped with vehicle mounted variable message signs, which shall comply with the requirements of Schedule 5 Specification and Drawings, Appendix 1/78 Specification for Mounted Variable Message Signs.
179AR	Dashcams
1	The Operating Company's Trunk Road Incident Support Service vehicles which are not equipped with a CCTV system shall be equipped with forward and rear facing cameras, which shall comply with the requirements of Schedule 5 Specification and Drawings, Appendix 1/79 Specification for DASHCAMs
2	The Operating Company's Incident Support Units shall be equipped with dashcams, which shall comply with the requirements of Schedule 5 Specification and Drawings, Appendix 1/79 Specification for DASHCAMs.
3	The Operating Company's Winter Patrol vehicles shall be equipped with dashcams, which shall comply with the requirements of Schedule 5 Specification and Drawings, Appendix 1/79 Specification for DASHCAMs.
Series 300 - Fencing	
370AR	Repairs to and Renewal of Existing Fencing
1	Repairs to and renewal of existing fences shall comply with the relevant clauses in this Series.
2	Repairs to and renewals of existing fences shall match the existing materials, dimensions and objectives as far as is practicable.
371AR	Snow Fences
1	Snow fences shall be in accordance with the recommendations set out in <i>Transport and Road Research Laboratory Report LR 362 Snow Fences by L E Hogbin dated January 1970</i> and shall comply with the quality management schemes detailed in the Specification for Highway Works Appendix A Quality Management Systems.
372AR	Deer, Otter, Badger, Combined and Stock Fence Specifications

Clause No.	Title and Written Text
1	<p>Deer Fencing</p> <p>Unless otherwise agreed with the Overseeing Organisation fences as deer mitigation and/or to protect planting areas from deer shall be in accordance with <i>British Standard 1722-2:2006 Fences. Specification for strained and wire mesh netting fences. Woven wire fences.</i> and the following specification:</p> <ul style="list-style-type: none"> (i) 1.80 metres high timber post and 4 wire deer fence with rectangular wire mesh. <ul style="list-style-type: none"> (a) Top rectangular wire mesh to be type C/6/90/30. (b) Bottom rectangular wire mesh to be type C/8/80/15. If agreed with the Overseeing Organisation there may be a requirement for the bottom mesh to be high tensile steel (HT8/80/15) (c) Timber posts and struts are to be for a 1.8 metres high fence. Timber straining posts are to be 2.90 metres length, 178 millimetres minimum diameter. All timbers to be round peeled softwood (not spruce) and preserved in accordance with clause 311. (d) Intermediate posts are to be set or driven into the ground to a depth of 0.6 metres. Straining posts shall be set into the ground to a depth of 1.0 metre. (e) Struts are to be anchored in the ground in rammed backfill with a 450 x 102 x 51 millimetres timber thrust plate attached to the end of the strut. (f) 4 line wires complying with the requirements <i>British Standard 1722-2:2006 Fences. Specification for strained wire and wire mesh netting Fences. Woven wire fences.</i> shall be provided set 50, 850, 1750, 1800 millimetres above ground level. The wire mesh shall be attached to the line wires to the details of <i>British Standard 1722-2:2006 Fences. Specification for strained wire and wire mesh netting Fences. Woven wire fences.</i> (g) Intermediate posts are to be provided at intervals not exceeding 2.75 metres. (h) Existing ground must be trimmed to maintain the 50 millimetres distance between the ground and the bottom of the fence. (i) Where the project assessment determines that there is potential for required deer fencing to impact on avian species, such as grouse, capercaillie and various raptors, the design will incorporate suitable measures to make the fencing more visible to the birds and thereby reduce the likelihood of

Clause No.	Title and Written Text
	<p>collisions occurring. The design will need to be agreed with the Director.</p> <p>(j) Where droppers are required these shall be in accordance with <i>Highway Construction Detail Drawing Number H5 - Motorway and Accommodation Works High Tensile Strained Wire Deer Fences 180</i>, unless otherwise agreed with the Overseeing Organisation.</p> <p>(ii) The above specification will be the default for deer fencing but where agreed with the Overseeing Organisation for relevant situations deer fencing may be in accordance with <i>Highway Construction Detail Drawing Number H5 - Motorway and Accommodation Works High Tensile Strained Wire Deer Fences 180</i>.</p>
2	<p>Otter Fencing</p> <p>Fences shall be in accordance with the following specification:</p> <p>Post and mesh fence in accordance with <i>British Standard 1722-2:2006 Fences. Specification for strained wire and wire mesh netting Fences. Woven wire fences with a rectangular steel wire mesh having maximum openings of 50 x 50 millimetres and wires of not less than 3 millimetres diameter in accordance with BS EN 10223-12012 Steel Wire and Wire Products For Fencing & Netting Zinc and Zinc Alloy Coated Steel Barbed Wire to BS EN ISO 1461:2009 Hot dip galvanized coatings on fabricated iron and steel articles. Specifications and test methods.</i> 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 300 millimetres and turned at right angles from the bottom of the buried section away from the road for a further 300 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. No cranked top, mesh or wire overhang shall be included unless specifically requested by the Overseeing Organisation. 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.</p>
3	<p>Badger Fencing</p> <p>Badger fencing shall be to the same specification as the otter fencing except that the mesh opening size shall be reduced to 50 x 25 millimetres.</p>

Clause No.	Title and Written Text
4	<p>Combined Purpose Wildlife Fencing</p> <p>Where it is likely or anticipated that mitigation for or protection against more than one species will be required (e.g. deer, badger, otter etc.) the species requirements shall be combined into one fence as far as practicable.</p> <p>Where there is a requirement for a badger fence to be combined with a fence for another species the fence shall have the smaller rectangular steel mesh specified for the badger fencing.</p> <p>Where possible, the combined purpose wildlife fencing shall be further combined with other fencing or boundary requirements in the location, such as the road boundary fence/wall or noise mitigation barrier etc.</p> <p>Where the adjacent land supports domestic stock of some variety the Contractor shall liaise with the landowner with the aim of agreeing to combine all fencing requirements for both parties into one fence. This is likely to require agreement on the future maintenance requirements on the understanding that the landowner retains responsibility for the stock.</p>
5	<p>Bat Bridges</p> <p>Where a bat bridge is required it shall be in accordance with the following specification:</p> <p>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.</p>
6	<p>Stock-Proof Fencing</p> <p>Any required repairs to stock-proof fencing shall be undertaken to match the existing/former specification.</p> <p>Where new stock-proof fencing is required as accommodation works or as part of the Scheme the Contractor shall liaise with the relevant landowner to discuss the requirements.</p>

Clause No.	Title and Written Text
	<p>Notwithstanding the above required liaison, the general specification for stock-proof fencing shall be as follows:</p> <p>Overall height of fence – 1150 mm.</p> <p>TIMBER – all timber to be round peeled softwood (not spruce) and preserved in accordance with clause 311.</p> <p>Straining posts: 2.30 m x 200 mm top diameter. Straining posts to be spaced at a minimum of 50 m apart but also at all corners and any changes of direction.</p> <p>Supporting struts: 2.0 m x 100 mm top diameter. Struts to be set against the pull of the fence and are to be nailed to notches in posts and buried at a depth of 90 mm minimum.</p> <p>Intermediate posts: 1.70 m x 65 mm top diameter (longer stakes may be needed in soft or uneven ground conditions). Intermediate posts to be no greater than 3 m apart.</p> <p>NETTING – C/8/80/15 mesh – 80 cm height. Netting to be fastened to Line Wires by means of lashing rods. If agreed with the Overseeing Organisation there may be a requirement for the bottom mesh to be high tensile steel (HT8/80/15).</p> <p>LINE WIRES – TOP: 2 x 4.0 mm (8 swg) plain wire, mild galvanised wires and 1 x 2.6 mm (12 swg) high tensile, barbed wire, mild steel galvanised 4 point barbed. Each top wire set 100 mm apart with barbed wire at top.</p> <p>BOTTOM: 1 x 4.0 mm (8 swg) plain wire, mild galvanised wire, set in the centre of the 50 mm gap between ground level and bottom of mesh. If this gaps exceeds 100 mm, infill mesh will be required.</p> <p>Line wires and netting to be stapled to posts using barbed staples (to be securely fixed but not driven fully 'home').</p>
Series 400 – Road Restraint System (Vehicle and Pedestrian)	
470AR	Repairs to Safety Barriers
1	Repairs to safety barrier systems shall comply with the requirements of <i>British Standard 7669-3:1994 - Vehicle restraint systems. Guide to the installation, inspection and repair of safety fences</i> and <i>BS EN 1317-1:2010 Road restraint systems. Terminology and general criteria for test methods</i> generally.
2	Repairs of safety barrier systems shall be carried out in accordance <i>with CD377 Requirements for Road Restraint Systems</i> and the manufacturers' latest drawings and instructions.
3	Where damage is appropriately localised, all accident damage repairs shall be carried out using the same type of safety barrier system as currently

Clause No.	Title and Written Text
	<p>exists at the location <i>CD377 Requirement for Road Restraint Systems</i>, Chapter 1. Scope, relates, and specifically in this instance, paragraphs 1.2 to 1.8 (Implementation and application). In addition, please ensure reference is made to CD377, Chapter 10. Legacy systems.</p> <p>The type of post used shall depend on the results from examination of post foundations and, where necessary, loading tests being carried out by the Operating Company in accordance with <i>Annex B of BS EN 1317-1:2010 Road restraint systems. Terminology and general criteria for test methods</i>.</p>
471AR	Repairs to Existing Pedestrian Guardrail
1	Repairs to existing pedestrian guardrail will generally be undertaken following accident damage or long-term deterioration, and will generally comprise the taking-down of parts or sections of the existing guardrail and the erection in their place of new parts or sections.
2	When existing posts and concrete footings are removed and new posts and concrete footings are installed in the same location, any remaining voids shall be filled with concrete and the surrounding surface reinstated to match the existing. Concrete shall be mix ST1.
3	Existing bolts, nuts and washers shall not be reused.
4	Repairs to pedestrian guardrails shall be carried out using panels and posts which match the original installation as closely as possible.
5	Repaired and renewed pedestrian guardrail shall comply with <i>Specification for Highway Works, Series 400 - Road Restraint Systems (Vehicle and Pedestrian) - Clause 411, Pedestrian Parapets and Pedestrian Guardrails</i> .
6	The Operating Company shall remove damaged sections of guardrail and close the resulting opening using suitable temporary guardrail, following which the Operating Company shall make permanent repairs using panels to match existing.
7	Permanent repairs shall be carried out in accordance with the requirements of Schedule 2 Scope, Section 2 Defects, Hazard Notices & Observations Resulting from Inspections, 2.2 Rectification of Defects and, in any case, no later than 28 days after the removal of the damaged sections.
472AR	Re-Tensioning Of Safety Barriers
	Tensioned Corrugated Beam Safety Barrier
1	Tensioned Corrugated Beam Safety Barrier shall be re-tensioned in accordance with <i>British Standard 7669-3:1994 Vehicle restraint systems. Guide to the installation, inspection and repair of safety fences, Section 2</i> .
2	Tension checking, or tensioning itself, is facilitated by carrying out this work when the ambient temperature on the Site indicates that a neutral condition (i.e. no tension, and no perceptible slack) should be present in the beams. This simplifies the checking/tensioning process both in terms of time and ease of carrying out the work, in that it minimises abortive de-tensioning and subsequent re-tensioning activities.
3	Regarding absolute values, tensioning shall be undertaken only when the ambient temperature is between -5°C and 25°C and tensioning between any

Clause No.	Title and Written Text
	two limits shall not proceed until each limit is anchored sufficiently securely to resist the load effects due to re-application of tension.
4	Tensioning assemblies should be located not more than 70.5 metres apart and each installation should incorporate at least one adjuster assembly. If the inspection prior to re-tensioning indicates that additional tensioning assemblies are required, these shall be supplied and fitted by the Operating Company as part of the re-tensioning operation.
5	On completion of any tensioning, the centre of each screw securing beams to posts shall not be closer than 25 mm \pm 2 mm to the end of the slotted hole in the beam.
	Wire Rope Safety Barrier
6	Wire Rope Safety Barrier shall be re-tensioned in accordance with <i>British Standard 7669-3:1994 - Vehicle restraint systems. Guide to the installation, inspection and repair of safety fences, Section 2.5.</i>
7	Tensioning between any two limits shall not proceed until each limit is anchored sufficiently securely to resist the load effects due to tensioning.
8	Tensioning shall be undertaken only when the ambient temperature is between 30°C and -10°C.
9	The ambient temperature shall be recorded by the Operating Company.
	Tensioned Rectangular Hollow Section Beam Safety Barrier
10	Assembly and tensioning shall be carried out in accordance with <i>British Standard 7669-3:1994 - Vehicle restraint systems. Guide to the installation, inspection and repair of safety fences, Section 2.4.</i>
11	Tensioning between any two limits shall not proceed until each limit is anchored sufficiently securely to resist the load effects due to tensioning.
12	Tensioning shall be undertaken only when the ambient temperature is between 10°C and 20°C.
13	Tensioning assemblies shall be located not more than 70.5 m apart and each installation shall incorporate at least one tensioning assembly. If the inspection prior to re-tensioning indicates that additional tensioning assemblies are required, these shall be supplied and fitted by the Operating Company as part of the re-tensioning operation.
473AR	Painting of Pedestrian Guardrails and Handrails
1	Painting of Pedestrian Guardrails and Handrails shall be carried out in accordance with <i>Manual of Contract Documents for Highway Works , Volume 1 - Specification for Highway Works Series 5000 – Maintenance Painting of Steelwork, including clause 5007SE Paint and Similar Protective Coatings.</i>
2	All primed surfaces shall be painted with one coat of undercoating of the colour appropriate to the colour of finishing coat.
3	Two finishing coats shall be applied.

Clause No.	Title and Written Text
Series 500 – Drainage and Service Ducts	
570AR	Rodding Eyes
1	Rodding eyes shall be either a Type 1 single or Type 2 double arrangement.
2	Rodding eyes shall not be used for pipe diameters in excess of 225mm.
3	The connecting pipe shall be laid at an angle of 45° to the horizontal.
4	The connecting pipes shall be surrounded with 150mm concrete mix ST2 for the full depth of the connection and extending 150mm beyond the connection with the main drain.
5	Covers and frames shall comply with the loading category of BS EN 124-1:2015 Gully tops and manhole tops for vehicular and pedestrian areas. Definitions, classification, general principles of design, performance requirements and test methods as stated in Schedule 5 Specification and Drawings, Appendix 5/1 Drainage Requirements with a clear opening of 150mm or 225mm.
6	Covers and frames shall be bedded and haunched with mortar to clause 2404 mix designation (ii) and set flush with the surface.
7	Bedding mortar shall be a maximum of 25mm thick and placed directly on the concrete surround.
571AR	Renewal of Filter Drain Material
1	Filter drain material shall be renewed by replacing the filter media with Type B material in accordance with Table 5/5 of clause 505.
2	The depth of the existing material to be removed from within the trench shall be the depth to invert level of the pipe or the depth to the level of the underside of siltation if this is higher than invert level of the pipe. This depth shall be determined in advance of excavation and replacement Operations by the excavation of trial pits.
3	The width of the existing material within the trench to be removed shall be that of the existing drain filter material at the invert level of the pipe or at the level of the underside of siltation if this is higher than invert level of the pipe. This width shall be determined in advance of excavation and replacement Operations by the excavation of trial pits.
4	The trench shall be back-filled up to ground level or where the filter material is to be covered with red chippings to the underside of the red chippings with Type B material in accordance with Table 5/5 of clause 505.
5	If required, any geotextile membrane present shall be replaced with new material equivalent to that removed.
6	Where the filter drain is to be completely renewed, it shall be constructed in accordance with <i>Highway Construction Detail Drawing Number F2 – Filter Drains – Trench Bedding Details - with Type B material.</i>
7	Where the existing filter drain material is recycled it shall be tested in accordance with clause 710.

Clause No.	Title and Written Text
572AR	Closed Circuit Television Surveys
	Definition
1	For the purposes of this clause, "drain" shall be deemed to include sewers, drains, filter drains, ducts, piped grips, combined drainage and kerb systems and linear drainage channel systems.
	Extent of Survey and Method to be Used
2	Wherever instructed to do so or where subject to an Order, the drains shall be inspected by closed circuit television, all in accordance with <i>Manual of Contract Document for Highways Works, CS551 – Drainage Surveys</i> , so that all cracks, blemishes, encrustations, open joints, silt, debris, collapsed sections, roots, vermin and alignment can be observed.
3	Television cameras shall be drawn by cables and winches self-propelled tractor driven or fixed to rods.
4	Where the survey of a drain length is stopped by a blockage in the drain, the drain shall be surveyed in the opposite direction on the other side of the blockage.
	Records
5	The Operating Company shall provide a record on Digital Versatile Disc (DVD) of all drain lengths showing a continuous record of data displayed automatically on the monitor screen containing the following information: <ul style="list-style-type: none"> (i) automatic update of the camera's metreage position in the drain line, (ii) date of survey, (iii) direction of survey, (iv) pipe dimensions, and (v) length/location reference.
6	The DVD recordings shall become the property of the Overseeing Organisation and shall be stored against the relevant Inventory item within APMS.
	Photographs
7	<ul style="list-style-type: none"> (i) Colour photographs shall be taken of Defects and samples of average condition. (ii) Photographs shall be taken at intervals not exceeding 5 metres. (iii) Electronic copies of photographs shall be provided. (iv) The photographs shall be identified in relation to the metreage of the place taken and shall show clear definition and accurately reflect what is shown on the monitor. (v) The speed of the camera in the drain shall be limited to: 0.10 m/s for drains of diameter less than 200mm, 0.15 m/s for diameters exceeding 200mm but not exceeding 300mm, and 0.20 m/s for those exceeding 300mm.

Clause No.	Title and Written Text
	Reports
8	<p>(i) All reports shall be presented to the Overseeing Organisation in accordance with the format laid down in the <i>Manual of Sewer Condition Classification – 5th Edition</i>, published by the Water Research Council.</p> <p>(ii) Each chamber shall be recorded on a separate sheet except for buried chambers which may be included within a length.</p> <p>(iii) Photographs shall be mounted and shall follow the relevant page of the report.</p> <p>(iv) All dimensions shall be in metric units.</p> <p>(v) The report shall include the depth measured from cover level to invert for every drain in each chamber.</p> <p>(vi) One copy of the report shall be provided within 14 days of completion of each survey or if required by the Overseeing Organisation each section of the survey.</p>
	Inventory
9	All relevant detail captured on DVD or through Reports should be used to update Inventory records.
573AR	High Pressure Water Jetting
	High pressure water jetting shall be carried out using water by a jetting pump with a variable output up to 220l/minute at a minimum of 14N/mm ² . Minimum water storage capacity shall be 4.5 cubic metre. A minimum length of 180 metres of 25 millimetre diameter jetting hose shall be provided.
Series 900 – Road Pavements – Bituminous Bound Materials	
970AR	Not used
971AR	Not used
972AR	Grip Testing
	General Requirements
1	<p>The surface course skid resistance shall be measured using the Grip Tester braked –wheel fixed-slip device or equivalent devices possessing appropriate validation.</p> <p>All surface course materials laid in accordance with clause 974AR shall have Skid Resistance carried out with a Grip Tester in accordance with the requirements for testing using the Grip Tester given in <i>Transport Scotland Interim Amendment No 49/18 - The use of GripTester on the Scottish trunk road network - Operating Procedure</i>.</p> <p>The results shall be forwarded to the Overseeing Organisation within seven days of the Grip Test being completed for monitoring purposes.</p>

Clause No.	Title and Written Text
	Survey Procedure
2	The Griptesting survey procedure will be according to the <i>Transport Scotland Interim Amendment No 49/18 - The use of GripTester on the Scottish trunk road network - Operating Procedure</i> .
	Reporting
3	Griptest results shall be reported as per the requirements of the <i>Transport Scotland Interim Amendment No 49/18 - The use of GripTester on the Scottish trunk road network - Operating Procedure</i> .
	Longer-Term Skid Resistance
12	After two years trafficking and within the SCRIM testing season, skid resistance will be measured by Transport Scotland (via SCRIM) in accordance with <i>Design Manual for Roads and Bridges, CS228 Skidding Resistance</i> .
973AR	Grip Tester
	General
1	The Director will provide the Grip Tester and, except where otherwise specified, the Operating Company shall maintain and operate it.
2	The Grip Tester will be handed over to the Operating Company by Commencement of Service Date. At the start of the contract the Operating Company shall organise a complete overhaul of the Griptester by the supplier and this will be paid for by the Scottish Ministers.
3	The Operating Company shall store the Grip Tester undercover in a secure location.
	Maintenance
4	The Operating Company shall arrange twice annual maintenance, calibration and certification of the Grip Tester in accordance with the Grip Tester MK2 D-type Maintenance Manual Issue 4 March 2008 MAR 982 L. Thomas, except where otherwise specified.
5	Maintenance referred to in clauses 2.3 (Annual Maintenance) and 2.4 (Calibration) of <i>Grip Tester MK2 D-type Maintenance Manual Issue 4 March 2008 MAR 982 L. Thomas</i> are the responsibility of the supplier and will be paid for by the Overseeing Organisation as well as an annual health check of the automatic watering system also to be carried out by the supplier. The Operating Company shall arrange for this maintenance and delivery and return of the Grip Tester to the supplier.
6	In addition to the requirements of <i>Grip Tester MK2 D-type Maintenance Manual Issue 4 March 2008 MAR 982 L. Thomas</i> the Operating Company shall ensure that the Grip Tester is regularly maintained in a clean and presentable condition ensuring required functionality at all times.

Clause No.	Title and Written Text
7	The Operating Company shall be responsible for any loss or damage to the Grip Tester and for effecting such additional insurance as may be necessary to cover the risk of such loss or damage from any cause.
	Vehicle
8	The Operating Company shall supply an appropriate vehicle which may be dedicated or multi purpose. The vehicle will be fitted out by the Grip Tester supplier at the expense of Overseeing Organisation during Mobilisation Period not later than 30 days prior to Commencement of Service Date. The Operating Company shall arrange for this fitting out and delivery and return of the vehicle to and from the supplier.
	Staff
9	A minimum of two operatives is required to operate the apparatus, a driver and a Grip Tester operator. The Grip Tester operator shall be appropriately experienced and qualified.
10	Initial training by the supplier of the operatives, and Skid Resistance Manager in terms of operation, maintenance and software use will be arranged at the start of the Mobilisation Period and at the expense of Transport Scotland. Any additional training shall be provided at the expense of the Operating Company.
	Operations
11	An annual certification process shall be undertaken for each Grip Tester to be used on the Unit. The procedure shall be carried out in accordance with <i>American Society for Testing and Materials Standard Test Method E1844 Standard Specification for A Size 10 x 4-5 Smooth-Tread Friction Test Tire test procedures</i> where network machines are verified against a reference machine. The testing procedure must produce a check that machines are within a $\pm 0.02GN$ tolerance of each other. An additional certification check shall be carried out monthly to ensure that machines continue to read within specification.
12	The calibration check is not necessarily required where use relates to the rapid deployment of the Grip Tester to spillage Sites. In these instances a simple relative measurement can be obtained to reveal the differential at the spill Site by taking measurements either side of the spillage area.
	Apparatus
13	The Operating Company shall provide one laptop along with the appropriate software to operate the apparatus in accordance with the <i>Roadbase Grip Tester Survey Software for Roads User Manual</i> .
14	The supplier will provide three user manuals: <i>Grip Tester MK2 D-type Maintenance Manual Issue 4 March 2008 MAR 982 L. Thomas</i> , <i>Roadbase Grip Tester Survey Software for Roads User Manual</i> , and the <i>Grip Tester Automatic Watering System Operations Manual Issue 2 June 2005 (MAR918)</i> .

Clause No.	Title and Written Text
974AR	TS2010 Stone Mastic Asphalt (SMA) Surface Course
	General
1	The TS2010 stone mastic asphalt (SMA) shall conform to <i>BS EN 13108-5:2016 - Bituminous mixtures. Material specifications Part 5 Stone Mastic Asphalt</i> where applicable and with <i>TSIA35-18 TS2010 Surface Course Specification and Guidance</i> as per 942TS . Where the requirements of <i>TSIA35-18 TS2010 Surface Course Specification and Guidance</i> differ from other clauses, standards and specifications, the requirements of <i>TSIA35-18 TS2010 Surface Course Specification and Guidance</i> shall take precedence.
2	Conformity shall be established in accordance with <i>BS EN 13108-20:2016 Bituminous mixtures. Material specifications. Type Testing</i> and <i>BS EN 13108-21:2016 Bituminous mixtures. Material specifications. Factory Production Control</i> .
3	The requirements of clauses 901 and 903 apply.
4	The Contractor shall guarantee the installed material for a period of 5 years from the date of opening to traffic. For the period of the guarantee the TS2010 surface course shall meet the performance requirements stated in this Clause and contract specific Appendix 7/1. The guarantee shall exclude defects arising from accidental damage or damage caused by settlement, subsidence or failure of the underlying carriageway on which the surfacing material has been laid. Replacement of the surfacing or other remedial measures agreed with the Overseeing Organisation shall be executed if the surfacing is in a "Acceptable" "Suspect", "Poor" or "Bad" condition as defined in Appendix A of TRL Report TRL674 – "Durability of thin surfacing systems, Part 4, Final report after nine years monitoring, TRL report 674"
975AR	Overband Sealing
1	<p>The Operating Company shall use systems holding Highway Authorities Product Approval or equivalent product approval Scheme certification and the system shall be applied in accordance with the Scheme approval.</p> <p>The minimum skid resistance value of the overband material shall be 60 measured by the skid resistance pendulum method.</p> <p>All material removed from the cracks and joints shall be removed to a licensed waste disposal site.</p> <p>All loose material shall be removed off the Unit to a licensed waste disposal site or recycling centre.</p>
	1.1.1
976AR	Electronic Data Monitoring during Pavement Maintenance Schemes
1	<p>Scope</p> <p>This specification sets out the requirements for the use of electronic data capture during resurfacing works for quality control and as-built records purposes.</p>

Clause No.	Title and Written Text
	<p>These requirements are intended to be used throughout all stages of the construction process; asphalt transportation, paving operation, compaction and processing of data for individual schemes of value >£250,000.</p> <p>All tasks are the contractor's responsibility, unless designated otherwise.</p> <p>All tests shall comply with the requirements of the DMRB, SHW or this document. Any other methodology will not be accepted.</p> <p>The contractor is responsible for ensuring all reported chainage and GPS locations are accurately positioned and correlated with each other and are an accurate representation of the construction site layout.</p>
2	<p>Equipment Requirements</p> <p>The contractor shall prepare and submit a written Quality Control Plan (QCP) for the project.</p> <p>The contractor shall ensure that the equipment holds built-in provisions to facilitate the calibration and verification of the test results.</p> <p>The Contractor shall supply proof of calibration of the equipment. The equipment shall be calibrated at intervals not exceeding 12 months in conjunction with a calibration protocol and / or the manufactures recommendations. Evidence of recent conformity and / or consistency check may be requested during the period of the contract.</p> <p>The Contractor must provide all plant, equipment, staff, licenses, administration and software (including firmware and software updates) with appropriate licenses to complete the works and ensure that all their apparatus is in good working order throughout the period of the contract.</p> <p>A qualified representative for on-site technical assistance should be provided during the project to maintain equipment within specifications and requirements.</p>
3	<p>Asphalt Transportation</p> <p>Live tracking of asphalt delivery vehicles shall be available to the paving crew via a secure web portal.</p> <p>The tracking information shall include, as a minimum, an identification number for the delivery vehicles, record of the plant supplying the material, full designation of asphalt mix, departure time from the plant, expected arrival time on site and weight of load.</p> <p>Locations details of where the asphalt is deposited shall also be recorded using both the linear chainage system and GPS Lat/Long (WGS84) . A</p>

Clause No.	Title and Written Text
	<p>electronic report detailing all the above information shall be available following the construction.</p>
4	<p>Paver Digital Technology</p> <p>Paver technology shall capture a full electronic laying record including; ambient weather conditions at the time of laying and as a minimum the following for each load: supplying plant, material, load temperature, start/end location, road layer (base, binder or surface), thickness and date/time laid. Any stoppages shall be easily identifiable by generation of a graph of paver stop time versus chainage.</p> <p>Each load of bituminous material shall be checked for temperature compliance at the point of discharge into the paver.</p> <p>A record of the discharge location shall be taken using both GPS Lat/Long (WGS84) and the linear chainage system.</p> <p>GPS tracking of the paver shall be available to an accuracy to within 1m, and with the ability to identify any stoppages.</p> <p>Continuous temperature scans of the full width of the material being laid immediately after the rear screed of the paver shall also be recorded. Surfacing operatives shall take care not to obstruct the temperature scan.</p> <p>A minimum 95% availability of data capture for schemes over 1200m² and 200m in length shall be achieved.</p> <p>Data must be provided to the Overseeing Organisation as a geospatial colour coded shape file incorporating captured metadata. This report shall generate details of % area of cold spots below the specified minimum laying temperature.</p>
5	<p>Roller Digital Technology</p> <p>The contractor shall supply sufficient numbers of rollers, and other associated equipment, necessary to complete the compaction requirements for the specific materials.</p> <p>Roller technology must capture first pass temperature and pass count data for the full lane area for the compacted mat.</p> <p>The system must be capable of producing a single combined compaction record where multiple rollers are used in tandem.</p> <p>The system shall include an in-cab display to aid roller drivers with effective compaction. This should include details of any cold areas identified by the continuous temperature scans being carried out on the paver.</p>

Clause No.	Title and Written Text
	<p>GPS accuracy is required to within 20cm.</p> <p>A minimum 95% availability of data capture for schemes over 1200m² and 200m in length.</p> <p>Data must be provided to the Overseeing Organisation as a geospatial colour coded shape file incorporating captured metadata. This will include:</p> <p>A) Data on % coverage of material below the specified minimum rolling temperature at first pass of the roller and</p> <p>B) Data on % coverage with each number of roller passes.</p>
6	<p>Processing of Data</p> <p>Data must be provided to the Overseeing Organisation as a compiled laying record in a format that allows the copy and transfer the data with ease such as CSV, Excel spread sheet or unlocked PDF.</p> <p>The reported data must be compatible with the Asset Performance Management System (APMS)</p>
Series 1100 – Kerbs, Footways and Paved Areas	
1170AR	Red Chipping Paved Areas
1	Red chipping paved areas shall be 14mm nominal size natural red igneous stone in a single layer 80mm thick.
1171AR	Relaying of Existing Footways
1	Relaying of existing footways shall be carried out with materials compatible with the adjacent areas.
1172AR	Artificial Stone Paving or Natural Stone Paving and Precast Concrete Paving Flags and Blocks
1	Before work commences in any individual existing artificial stone paving, York stone paving or precast concrete flag or block paved footway, the Operating Company shall record the dimensions and number of flags or blocks to be replaced and take photographic Records.
2	The Operating Company shall carefully lift the flags or blocks and set aside.
3	Flags or blocks not permanently re-laid on the same day as they are lifted shall be stacked in neat piles to a height not exceeding one metre.
1173AR	Laying of Artificial Stone Paving, Natural Stone Paving and Precast Concrete Paving Flags and Blocks
1	Paving of artificial stone paving, York stone paving or precast concrete paving flags shall be reconstructed to match existing as closely as possible

Clause No.	Title and Written Text
	and shall be in accordance with <i>British Standard 7533-1:2001 Pavements constructed with clay, natural stone or concrete pavers. Guide for the structural design of heavy duty pavements constructed of clay pavers or precast concrete paving blocks.</i>
1174AR	Timber Edging to Footways and Paved Areas
1	Timber shall be as described in clause 304 and sized to match existing or 75mm x 32mm whichever is the lesser.
2	Fixing shall be by 50mm x 50mm x 300mm pointed pegs at 600mm centres.
3	Timber edgings and pegs shall be pressure impregnated with preservative in accordance with clause 311.
4	Timber edging to footways and paved areas will only be permitted where agreed with the Overseeing Organisation.
1175AR	Siding Out
1	Siding out shall be carried out at the edges of carriageways, footways and paved areas but may be extended to more general areas for the breaking up and removal of excessive or hardened dirt or weeds or any other undesirable material on the carriageway, footway or paved surface.
2	Footways shall be sided out up to and including any existing footway edging or to a specified width of line.
3	Where the sided out edges do not exceed a height of 75mm above the existing footway surface they may be trimmed with a vertical face.
4	Where they exceed a height of 75mm above the existing paved surface they shall be trimmed to an approximately 45 degree battered face.
Series 1200 – Traffic Signs	
1270AR	Passively Safe Sign Posts
1	Passively safe sign posts shall be in accordance with <i>British Standard EN 12767:2007 Passive safety of support structures for road equipment. Requirements, classification and test methods</i> erected in accordance with the manufacturer's instructions.
1271AR	Snow Poles
1	Snow poles shall be 50mm external diameter aluminium poles 20 gauge 2.5m long with ends capped and 150mm reflective strips at the top of the pole and 500mm above ground level.
2	On single carriageways the reflective strips are to be red facing the oncoming adjacent traffic with white on reverse side.
3	In central reserves on dual carriageways the reflective strips are to be orange on both faces.
4	Pole foundations shall be 400mm x 400mm x 300mm deep in-situ concrete grade ST2 to clause 2602 finished flush with ground level.
5	Tops of poles shall be 2.2 metres above the adjacent ground level.

Clause No.	Title and Written Text
6	Poles shall be located 1.2 metres from the carriageway edge.
7	Poles shall be located at 50 metre intervals on each verge at staggered intervals along opposing verges.
1272AR	Requirements for the illumination of illuminated Traffic Signs
	Refer to <i>LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices.</i>
1273AR	Not used
Series 1300 – Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts	
1370AR	Lamp Disposal
	Refer to <i>LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices.</i>
1371AR	Not used
Series 1400 – Electrical Work for Road Lighting and Traffic Signs	
1470AR	Temporary Overhead Feed to Lighting Units
1	No temporary overhead cable shall be installed until the lighting columns involved have been assessed as being suitable for the additional mechanical loading placed on them.
2	<p>Cables used for any temporary overhead feed to lighting units or luminaries shall consist of sheathed or armoured cables supported by a steel catenary wire and shall be installed in accordance with the requirements of <i>British Standard 7671:2018 Requirements for Electrical Installations. IET Wiring Regulations.</i></p> <p>The minimum height above ground of the span shall, according to the location, be as follows:</p> <ul style="list-style-type: none"> (i) 10 metres for motorways, and (ii) 5.8 metres for all other roads and road crossings.
1471AR	Lighting Central Management System
	Refer to <i>LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices.</i>
1472AR	Weather Stations
	Refer to <i>LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices.</i>
1473AR	Electric Vehicle Charging Installations
	Refer to <i>LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices.</i>
1474AR	Not used
Series 1700 – Structural Concrete	

Clause No.	Title and Written Text
1770AR	Not used
1771AR	Requirements for Concrete Repairs
1	Concrete repairs shall be undertaken in accordance with the Manual of Contract Documents for Highway Works Volume 1 – Specification for Highway Works Series 5700 Concrete Repairs and this Appendix 0/1.
2	Concrete repairs shall be carried out using either, normal-flow concrete proprietary repair mortar, high-flow repair concrete proprietary sprayed concrete or a proprietary repair system proposed by the Operating Company and consented to in writing by the Overseeing Organisation. The Operating Company shall complete the following appendices, as described in Volume 2 of the Notes for Guidance on the Specification for Highway Works, as appropriate and submit them to the Overseeing Organisation for approval. Appendix 57/1: Repair Product - Requirements Appendix 57/2: Requirements for Reinforcement Appendix 57/3: Execution of Concrete Repairs
3	Where concrete repairs are required to the top surface of bridge decks the repair material shall be compatible with the waterproofing system.
4	Crack repairs carried out by a resin injection system shall be proposed by the Operating Company and subject to written consent by the Overseeing Organisation. The Operating Company shall complete Appendix 57/5, as described in Volume 2 of the Notes for Guidance on the Specification for Highway Works, as appropriate and submit it to the Overseeing Organisation for approval.
5	Proprietary repair mortars shall not be used for individual repairs of volumes greater than 0.03m ³ and greater than 30mm deep
6	As repair work proceeds, the Operating Company shall keep Records including digital date stamped photographs.
1772AR	Not Used
1773AR	Not Used
1774AR	Not Used
1775AR	Foamed Concrete Fill to Structures and Backfilling to Drainage Trenches
1	Foamed concrete fill to arches or bridge decks shall be of density 1400 – 1600 kg/m ³ . Minimum cement content shall be 350 kg/m ³ . The maximum free-water/cement ratio shall be 0.4. The minimum cube compressive strength shall be 8 N/mm ² .

Clause No.	Title and Written Text
2	Foamed concrete fill to drainage trenches shall comply with sub-clause 1 of this clause.
Series 1800 – Structural Steelwork	
1870AR	Repairs to Existing Steelwork and Welds
1	The Operating Company shall develop repair procedures for the repair of all Defects in steel plates and welds. The repair procedures shall be compatible with the grade and properties of the steel plate or sections. Repair procedures shall be submitted to the Overseeing Organisation for consent.
Series 2000 – Waterproofing for Concrete Structures	
2070AR	Replacement of Bridge Deck Waterproofing on Concrete Decks
	Removal of Existing Waterproofing – Concrete Decks
1	The existing surfacing shall be removed by cold-milling (planing) in accordance with clause 709 except in the case of small areas which may be removed using other suitable methods.
2	The existing bridge deck waterproofing or protective layer comprising the last 30mm above the concrete substrate shall be carefully removed by other means to avoid damage to the concrete. Method statements for the removal of existing waterproofing shall be submitted by the Operating Company for the written consent of the Overseeing Organisation before the proposed techniques shall be used.
3	The final removal of the remaining waterproofing or primer to expose the concrete substrate shall be by recoverable abrasive blast cleaning systems. 'Open' blast cleaning shall not be permitted except on vertical surfaces or intricate details.
	Inspection and Testing – Concrete Decks
4	Prior to application of the new waterproofing, the deck concrete shall be examined by the Operating Company to determine the following: (i) if any testing is required (in accordance with the requirements of Schedule 5 Specification and Drawings, Appendix 33/1 Structural Investigations Test Requirements, (ii) if additional deck preparation is required, and (iii) if structural concrete repairs are required (in accordance with the requirements of Series 1700).

Clause No.	Title and Written Text
	Additional Preparation of Bridge Deck – Concrete Decks
5	<p>Additional preparation of bridge decks prior to the application of the new waterproofing shall be the following:</p> <ul style="list-style-type: none"> (i) removal of surface Defects such as screed marks and footprints, (ii) removal of formwork and falsework anchors from the original construction which have inadequate cover, (iii) sealing of cracks greater than 0.25mm, and (iv) repairs to or forming of fillets and chases to facilitate waterproofing.
6	Any work required in addition to the items listed above, such as removal of chloride contaminated concrete or delaminated concrete and concrete repairs considered necessary by the Operating Company, shall be deemed to be structural concrete repairs and shall be undertaken in accordance with Series 1700.
	Replacement of Bridge Deck Waterproofing – Concrete Decks
7	The replacement waterproofing system shall be in accordance with clauses 2008 and shall comply with the requirements of clauses 2002, 2003, 2005 & 2007 and any additional requirements described in Schedule 5 Specification and Drawings, Appendix 20/1 Waterproofing for Concrete Structures.
8	The provisions of <i>Transport Scotland Interim Amendment No. 24 - Guidance on Implementing Results of Research on Bridge Deck Waterproofing</i> - shall be followed.
9	<p>In planning re-waterproofing Schemes the Operating Company shall undertake sufficient investigation and testing to determine the likely extent of concrete repairs required to a bridge deck. The programming of the works prior to commencement should take due consideration of the likely extent of repairs and the period required for such repairs to be sufficiently cured to allow the application of the new waterproofing system.</p> <p>The use of proprietary repair mortars for deck repairs prior to waterproofing shall only be allowed with the express consent of Overseeing Organisation.</p>
2071AR	Replacement of Bridge Deck Waterproofing on Steel Decks
	Removal of Existing Waterproofing
1	<p>The existing surfacing, waterproofing and any primer shall be prepared to 'clean steel' by blast cleaning or 'bright steel' by abrading on accordance with clause 5004.</p> <p>Where zinc metal coating is present the deck shall be prepared to 'sound metal coating' by blast cleaning or 'bright metal coating' by abrading in accordance with clause 5004. In areas where the deck plate or the welds are to be tested the zinc coating shall be removed to 'clean steel' or 'bright steel as noted above.</p>

Clause No.	Title and Written Text
	The method of removing the existing waterproofing shall avoid damage to the steel deck plate and where necessary procedure trials shall be undertaken demonstrate that the removal method will avoid damage.
	Inspection and Testing – Steel Decks
2	Prior to application of the new waterproofing, the deck plate and welds shall be visually examined by the Operating Company and the Operating Company shall carry out non destructive testing of the deck plate and welds using magnetic particle inspection techniques using the methods recommended in <i>British Standard EN ISO 9934 -1:2016 Non-destructive testing. Magnetic particle testing. General principles.</i>
3	Where Defects are identified the Operating Company shall prepare a Welding Plan in accordance with clause 1807 and forward to Overseeing Organisation for approval
4	The steel surface profile required shall be determined by the requirements of the proposed waterproofing system.
	Replacement of Bridge Deck Waterproofing – Steel Decks
5	A zinc rich blast primer shall then be applied to the steel deck. The blast primer shall be either selected from Table 50/1 of <i>Manual of Contract Documents for Highway Works Volume 1 – Specification for Highway Works Series 5000 Maintenance Painting of Steelwork</i> or a proprietary zinc rich blast primer developed for use with the proposed waterproofing system. In either case the Operating Company shall ensure that the primer is compatible with waterproofing system and shall prevent any corrosion of the deck plate prior to waterproofing. Adhesion testing shall be undertaken in accordance with the requirements of clause 2007SR.
6	The replacement waterproofing system shall be in accordance with clauses 2008 and shall comply with the requirements of clauses 2002, 2003, 2005 & 2007SR and any additional requirements described in Schedule 5 Specification and Drawings, Appendix 20/1 Waterproofing for Concrete Structures.
7	The waterproofing system shall be applied in accordance with the manufacturer’s instructions with such primers, bond coats and the like as may be required.
8	On footbridges with steel decks it will be permissible to apply a combined waterproofing and anti-slip coating designed specifically for pedestrian use. Such systems shall be HAPAS approved or based on a HAPAS approved bridge waterproofing system. The proposed system shall be subject to the approval of Overseeing Organisation.
9	The waterproofing membrane shall be tested in accordance with clause 2007SR and made good as required prior to application subsequent

Clause No.	Title and Written Text
	coats or binder layer.
10	Prior to surfacing a separate hot melt tack coat as recommended by the waterproofing manufacturer to be compatible with the surfacing shall be applied.
11	All components of the waterproofing system shall be suitable for the levels of environmental exposure that will be encountered in permanently exposed locations.
12	The Operating Company shall have special regard for the limitations of the waterproofing system in terms of its application at low temperatures and ensuring inter-coat adhesion is not compromised by delay between applications of different components of the system. The Operating Company shall strictly follow the requirements of the manufacturer in all aspects of the application of the waterproofing system.
13	All components of the system shall be provided by one supplier who shall operate a Quality System registered to <i>British Standard EN ISO 9001:2015 Quality management systems. Requirements.</i>
14	Only persons trained and authorised by the supplier of the waterproofing system may install the waterproofing system.
2072AR	Repairs to Existing Waterproofing on Concrete Decks
1	<p>Repairs shall be carried out to the existing waterproofing only where the existing system has a current British Board of Accreditation -Roads and Bridges Agrément certificate showing compliance with the requirements of <i>Design Manual for Roads and Bridges, CD358 - Waterproofing and Surfacing of Concrete Bridge Decks</i> or for other spray applied waterproofing with the written consent of the Overseeing Organisation.</p> <p>Repairs shall be carried out using systems compliant with <i>Design Manual for Roads and Bridges, CD358 - Waterproofing and Surfacing of Concrete Bridge Decks</i> and compatible with the system to be repaired.</p> <p>The waterproofing shall be applied in accordance with the method statement included with the Agrément certificate for the particular system.</p> <p>All waterproofing repairs shall be carried out in accordance with clause 2070AR.</p> <p>Where the existing waterproofing is a spray applied system for repair areas of less than 2m² at any one location a hand-applied system equivalent to and compatible with the existing may be used subject to the written consent of the Overseeing Organisation.</p> <p>The repair areas within the carriageway width shall have a protective layer incorporated into the waterproofing system in accordance with sub-clause 2003.2.</p>
Series 2300 – Bridge Expansion Joints and Sealing of Gaps	

Clause No.	Title and Written Text																
2370AR	Bridge Expansion Joints Used on Bridge Decks																
1	<p>The following types of bridge expansion joints are known to occur on the Trunk Road network.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Type</th> <th style="text-align: center;">Description</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Buried joint under continuous surfacing</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Asphaltic plug joint</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Nosing joint with poured sealant</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Nosing with preformed compression seal</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Reinforced Elastomeric</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Elastomeric in metal runners</td> </tr> <tr> <td style="text-align: center;">7</td> <td>Maurer D80</td> </tr> </tbody> </table> <p>This list is not exhaustive and reference shall be made to <i>Design Manual for Roads and Bridges, CD357 – Bridge Expansion Joints</i>.</p>	Type	Description	1	Buried joint under continuous surfacing	2	Asphaltic plug joint	3	Nosing joint with poured sealant	4	Nosing with preformed compression seal	5	Reinforced Elastomeric	6	Elastomeric in metal runners	7	Maurer D80
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	A description of deck joint types and deck joint manufacturers' details shall be as provided in APMS for individual Structures where these are known.																
2371AR	Replacement of Bridge Deck Expansion Joints and Gap Sealants																
1	Replacement repair and alterations to expansion joints shall comply with the requirements of clauses 2301 to 2304 and <i>CD357 – Bridge Expansion Joints</i> .																
2	<p>Joints shall be installed in accordance with the manufacturer's written instructions.</p> <p>Work may comprise replacement of a complete joint or maintenance of a joint where complete or partial replacement is not considered necessary.</p>																
3	<p>Existing joints (including transition strips) shall be carefully broken out or unbolted and removed.</p> <p>The adjacent carriageway hardshoulder, hardened verges and central reservations shall be saw cut to provide neat vertical edges.</p> <p>The location of any existing services or ducts shall be determined prior to breaking out or saw cutting and measures shall be taken to protect them.</p> <p>The installation of joints should also make provision for the presence of services and ducts. Where necessary protective measures should be implemented to protect services from heat, to ensure sleeves are debonded from the enclosed duct and that the movement capacity of services and ducts is not compromised by the installation of the joint.</p>																
4	<p>Existing flashings and sealants shall be removed.</p> <p>Where appropriate, existing intact waterbars may be retained.</p> <p>Existing galvanised plates in buried joints shall be set aside for possible re-use.</p>																

Clause No.	Title and Written Text
5	<p>The existing surfacing and additional protective layer adjacent to the expansion joint shall be removed to expose the waterproofing membrane.</p> <p>The waterproofing shall be carefully cut back to expose the concrete surface which shall be prepared to receive the expansion joint system.</p>
6	<p>Continuity of the waterproofing membrane shall be provided by bond or lap between the waterproof membrane and the expansion joint.</p>
7	<p>Existing holding down bolts and fixings shall be protected, if required, for installation of the proposed replacement joint.</p> <p>If such bolts and fixings, including embedded fixings, are not required they shall be removed or ground flush with the surface of the deck concrete.</p>
8	<p>The concrete substrate shall be examined by the Operating Company for Defects.</p> <p>Where required, testing shall be carried out and concrete repairs undertaken in accordance with Manual of Contract Documents for Highway Works Volume 1 – Specification for Highway Works Series 1700 Structural Concrete and this Appendix 0/1.</p>
9	<p>If the joint is not completely replaced, material and components shall form the same system as the existing joint, where possible.</p>
10	<p>Where gap sealant shall be replaced, the existing sealant and deteriorated joint filler shall be raked out to leave clean surfaces.</p> <p>Where possible, new joint filler to replace that removed shall be installed prior to re-sealing the gap.</p> <p>Where it is not possible to replace joint filler the joint shall still be sealed.</p>
11	<p>All joints shall have a valid approval/registration in accordance with the <i>Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works, Appendix E Type Approval/Registration/Listing</i>.</p>
2372AR	Asphaltic Plug Joints
	Installation
1	<p>All batches of materials delivered to the Site shall have a Certificate of compliance stating:</p> <ul style="list-style-type: none"> (i) The binder compound and its properties including Penetration Value Softening Point (Ring and Ball) and Flow Resistance, (ii) The specific type and density of aggregate/stone used in the asphaltic plug matrix, and (iii) The quantities and weights of binder and aggregate used at each joint location.
Series 2400 – Brickwork, Blockwork and Stonework	
2470AR	Repointing of Brickwork Blockwork and Stonework

Clause No.	Title and Written Text
1	<p>Masonry joints in brickwork and blockwork to be repointed shall be ground out to a depth of 25mm to give adequate key. For natural stone masonry and historic structures, power tools shall not be used.</p> <p>All unsound mortar at a greater depth than 25mm shall be removed until sound mortar is encountered.</p> <p>Apparatus used for grinding out shall be fitted with a depth gauge to allow control of rake out depth.</p>
2	<p>All detritus shall be removed by low pressure water jetting.</p> <p>Repointing shall be carried out by trowel or purpose made repointing keys or by using injection techniques.</p>
3	<p>Cement mortar designation shall be selected based on clause 2404 and 2417 and Table 24/5.</p> <p>Lime mortar designation shall be selected based on clause 2476AR Table 24/7, Table 24/8 and Table 24/9.</p> <p>Water for mortars shall be clean and free from impurities.</p>
4	<p>The specification of mortars used in the repair of masonry construction shall be prepared with reference to the existing mortar in the remaining construction and appropriate adjustment shall be made to take account of existing conditions and availability of materials.</p>
5	<p>For historic brick Structures and all stone masonry Structures, the mortar specification shall be prepared by the Operating Company in conjunction with specialist advice based on mortar analysis and evaluation carried out on the mortar samples from the existing construction.</p>
6	<p>Lime mortar is extensively used in the construction of masonry road Structures. Mortars used for repairs and repointing shall match the appearance and characteristics of existing materials as closely as possible.</p>
7	<p>The choice of lime mortar to be used shall be influenced by the nature of stone, the nature of any surviving lime based materials and the environmental conditions or exposure of the Site.</p>
8	<p>Samples of mortar pointing at locations shall be provided for reference and comparison for the duration of the work.</p> <p>Mortar for pointing shall match the standards and details of the samples.</p>
9	<p>Adequate protection of repair work and pointing from sun, wind, rain and frost shall be provided until cured.</p>
10	<p>For historic Structures, power tools shall not be used to remove mortars. Damage to stonework shall be avoided.</p>
11	<p>If any significant voids are present the Operating Company shall where necessary wedge and pin up loose stones.</p>
12	<p>In deep cavities, work shall be carried out in layers of not more than 35mm allowing the material to dry before placing the next layer. A period of 24 hours shall elapse between each layer.</p>

Clause No.	Title and Written Text
13	Deep voids shall be filled to within 35mm or twice the width of the joint back from the finished wall face to allow sufficient depth for pointing.
2471AR	Replacement of Precast Concrete Copings
1	Broken precast concrete copings shall be removed together with the old mortar bed and any loose and friable mortar in the joints below the coping.
2	New precast concrete copings shall be laid on a mortar designation (i) (refer to clause 2404) bed to a line and level to match existing copings.
2472AR	Rebedding Existing Precast Concrete or Stone Masonry Copings
1	Precast concrete or stone masonry copings shall be removed and stored for re-use.
2	The existing mortar bed shall be completely removed together with any loose and friable mortar joints below the coping.
3	Copings shall be relaid on mortar designation (i) (refer to clause 2404) or where wall construction contains lime mortar to clause 2476AR. Rebedding of existing precast concrete or stone masonry copings shall match existing line and level.
2473AR	Replacement Tiling
1	All damaged and defective tiles, adhesive, mortar, loose concrete and grout shall be broken out.
2	Replacement tiles shall be in accordance with <i>British Standard 5385-1:2018 Wall and floor tiling. Design and installation of ceramic, natural stone and mosaic wall tiling in normal internal conditions. Code of practice for wall and floor tiling.</i>
3	Any areas of the underlying concrete surface which have been damaged shall be made good as detailed in Series 1700 Structural Concrete.
4	Repair materials shall be compatible with the tile adhesive to be used.
5	The edges of retained existing tiles shall be clean and free of any grout.
6	Unless otherwise determined by the Operating Company in accordance with other provisions of this Contract, replacement tiles shall be glazed ceramic of a colour size and pattern to match existing tiles.
7	Tiles shall be installed to a line and level to match existing tiling with the joints grouted to match the existing grout colour and pattern.
8	New tiling shall be cleaned of excess grout when the grout to the joints has hardened.
9	Where a mural or other new tile pattern is to replace an existing, the Operating Company shall produce Drawings for approval by the Overseeing Organisation prior to construction.
2474AR	Rebuilding of Defective Masonry
1	Bricks, concrete blocks and stones designated for reuse in the repairs or reconstruction of existing masonry including bridge parapets shall be taken down and set aside for reuse or removed for storage.

Clause No.	Title and Written Text
2	Where parapets have been damaged, the Operating Company shall retrieve displaced bricks, blocks and stones from their position after displacement. This may include recovery from watercourses and rail tracks.
3	The Operating Company shall consult the appropriate bodies to obtain agreement on access and method of working for retrieval and rebuilding.
4	For Structures which are scheduled ancient monuments approvals shall be obtained from Historic Environment Scotland.
5	For Structures which are historic listed approvals shall be obtained from the appropriate local authority.
6	The Operating Company shall set up lines of communication and processes to enable timescales for rebuilding to be achieved.
7	<p>The Operating Company shall include in its procedure for approval by Historic Environment Scotland the following steps to ensure early consent:</p> <ul style="list-style-type: none"> (i) Inform Historic Environment Scotland Ancient Monument Division of damage to a scheduled ancient monument structure and apply for scheduled monument consent for repair work with cost estimates using new stone and sketch drawings of proposed repairs. Record photos of damaged areas shall be submitted to Historic Environment Scotland Ancient Monument Division at this time. (ii) Carry out assessment of retrieval of stones from river beds and the like and notify Historic Environment Scotland of outcome. (iii) Send stone samples to British Geological Survey for best matching replacement stones. Copy report to Historic Environment Scotland. (iv) Meet Historic Environment Scotland on Site with draft proposals for repair. (v) Agree final repair Scheme and submit all information to Historic Environment Scotland for final comment. (vi) Historic Environment Scotland issue Scheduled Monument Consent.
9	The Operating Company shall include in its procedures for the liaison and approval by local authorities any proposals for repairs and any repair work or alterations required due to damage to historic listed Structures other than scheduled ancient monuments which shall be covered by sub-clause 4 of this clause.
10	All mortar from the faces of the bricks, concrete blocks or stone shall be removed before incorporating them into the reconstructed work.
11	Recovered bricks, blocks and stones from watercourses and other situations where the surfaces have been discoloured or contaminated shall be cleaned and allowed to dry before incorporating into the reconstructed work.
12	Where new replacement parapet stones are required for listed / ancient monument Structures, they shall be of matching stone based on British Geological Survey's analysis of stone samples from the relevant Structure.

Clause No.	Title and Written Text
13	New materials to be incorporated into existing brick, concrete block or stone masonry construction shall match the remaining construction with regard to appearance and physical characteristics.
2475AR	Lime Putty
1	Lime putty shall be traditional non-hydraulic slaked lime putty to comply with <i>British Standard EN 459-1:2015 Building lime. Definitions, specifications and conformity criteria</i> , with a density of not less than 1.35kg/ltr.
2	Water for mortars shall be clean and free from impurities which would adversely affect the mortar.
2476AR	Hydraulic Lime Mortars
1	Hydraulic lime for preparation of lime mortars to be used for building, rebuilding, grouting, mechanical pointing and hand pointing shall be Natural Hydraulic Lime NHL5 (eminently hydraulic) or Natural Hydraulic Lime NHL3.5 (moderately hydraulic) or Natural Hydraulic Lime NHL2 (feebly hydraulic) and shall conform to <i>British Standard EN 459-1:2015 Building lime. Definitions, specifications and conformity criteria</i> . Non-hydraulic lime shall conform to <i>British Standard EN 459-1:2015 Building lime. Definitions, specifications and conformity criteria</i> .
2	Proportions of hydraulic lime to sand shall be based on Table 24/7 according to the required mortar Durability Designation as defined in <i>British Standard EN 1996-2:2006 Eurocode. Design of masonry structures. Design considerations, selection of materials and execution of masonry</i> and as specified in Schedule 5 Specification and Drawings, Appendix 24/1 Brickwork, Blockwork and Stonework.

Clause No.	Title and Written Text																																																																																																																																															
	<p style="text-align: center;">TABLE 24/7 Typical Hydraulic Lime Mortar Proportions by Volume</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2" style="text-align: center;">Constituents</th> <th colspan="11" style="text-align: center;">Mix Reference/Durability Designation</th> </tr> <tr> <th style="text-align: center;">M1 10</th> <th style="text-align: center;">M2 9</th> <th style="text-align: center;">M3 8</th> <th style="text-align: center;">M4 7</th> <th style="text-align: center;">M5 6</th> <th style="text-align: center;">M6 5</th> <th style="text-align: center;">M7 4</th> <th style="text-align: center;">M8 3</th> <th style="text-align: center;">M9 2</th> <th style="text-align: center;">G1* 5-6</th> <th style="text-align: center;">G2* 2-4</th> </tr> </thead> <tbody> <tr> <td>NHL5 Eminently Hydraulic</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> </tr> <tr> <td>NHL3.5 Moderately Hydraulic</td> <td></td> <td></td> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>NHL2 Feebly Hydraulic</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td></td> <td></td> </tr> <tr> <td>Lime Putty</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> </tr> <tr> <td>Brick Powder (Reactive)/ Pozzolanic additive</td> <td></td> <td style="text-align: center;">½</td> <td></td> <td style="text-align: center;">½</td> <td></td> <td style="text-align: center;">½</td> <td style="text-align: center;">½</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Well Graded Sharp Sand</td> <td style="text-align: center;">1½</td> <td style="text-align: center;">1½</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1½</td> <td style="text-align: center;">2</td> <td style="text-align: center;">2½</td> <td style="text-align: center;">1½</td> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> <td style="text-align: center;">10</td> <td style="text-align: center;">9</td> </tr> <tr> <td>Soft Sand</td> <td style="text-align: center;">½</td> <td style="text-align: center;">½</td> <td style="text-align: center;">½</td> <td style="text-align: center;">½</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td style="text-align: center;">½</td> <td></td> <td style="text-align: center;">½</td> <td></td> <td></td> </tr> <tr> <td>Porous Limestone or Brick Aggregate</td> <td></td> <td style="text-align: center;">½**</td> <td style="text-align: center;">½</td> <td style="text-align: center;">½**</td> <td></td> <td style="text-align: center;">½**</td> <td style="text-align: center;">½**</td> <td style="text-align: center;">1</td> <td style="text-align: center;">1½</td> <td></td> <td></td> </tr> <tr> <td>Lime Mortar Mix Proportions by Volume</td> <td style="text-align: center;">1:2</td> <td style="text-align: center;">1:2 ½</td> <td style="text-align: center;">1:3</td> <td style="text-align: center;">1:2 ½</td> <td style="text-align: center;">1:3</td> <td style="text-align: center;">1:4</td> <td style="text-align: center;">1:2 ½</td> <td style="text-align: center;">1:3</td> <td style="text-align: center;">1:4</td> <td style="text-align: center;">3:1 :10</td> <td style="text-align: center;">2:1 :9</td> </tr> <tr> <td colspan="12"> <p>*Gauged mixes G1 and G2 comprise Natural Hydraulic Lime NHL5: Lime Putty: Sand</p> <p>** Porous Limestone aggregate may be substituted for equivalent amount of soft sand to achieve the specified lime mix proportions.</p> </td> </tr> </tbody> </table>	Constituents	Mix Reference/Durability Designation											M1 10	M2 9	M3 8	M4 7	M5 6	M6 5	M7 4	M8 3	M9 2	G1* 5-6	G2* 2-4	NHL5 Eminently Hydraulic	1	1	1							3	2	NHL3.5 Moderately Hydraulic				1	1	1						NHL2 Feebly Hydraulic							1	1	1			Lime Putty										1	1	Brick Powder (Reactive)/ Pozzolanic additive		½		½		½	½					Well Graded Sharp Sand	1½	1½	2	1½	2	2½	1½	2	2	10	9	Soft Sand	½	½	½	½	1	1	½		½			Porous Limestone or Brick Aggregate		½**	½	½**		½**	½**	1	1½			Lime Mortar Mix Proportions by Volume	1:2	1:2 ½	1:3	1:2 ½	1:3	1:4	1:2 ½	1:3	1:4	3:1 :10	2:1 :9	<p>*Gauged mixes G1 and G2 comprise Natural Hydraulic Lime NHL5: Lime Putty: Sand</p> <p>** Porous Limestone aggregate may be substituted for equivalent amount of soft sand to achieve the specified lime mix proportions.</p>											
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4	<p>Mortar shall be mixed thoroughly by hand or mechanically until its colour and consistency are uniform.</p> <p>The constituent materials shall be accurately measured.</p> <p>Mortar shall be made in small quantities only as and when required for the Operations.</p>																																																																																																																																															

Clause No.	Title and Written Text
	Mortar which has begun to set or has been mixed for a period of more than 2 hours shall be discarded.
	<p>Hydraulic lime shall be delivered to Site in sealed paper bags stored in dry conditions and used within 24 weeks of manufacture.</p> <p>Brick powder in fine particle (<100 microns) reacts with free lime to form a pozzolan which improves frost resistance. Care is needed as if used at too high a proportion it can increase porosity and reduce flexibility.</p> <p>Introducing porous limestone or brick to the lime mortar mix will assist carbonation and frost resistance. Grading shall be similar to that for sharp sand. Pre-soaking prior to mixing will also help act as a retarder.</p>
	Hydraulic Lime: Sand Mortars
5	Hydraulic lime mortars may be provided as pre-mixed dry lime/sand mixes - either bagged or silo mixes or they may be site-mixed from bagged hydraulic lime and sand.
6	<p>Hydraulic lime mortars shall be used for the construction of masonry arch bridges which require a degree of flexibility to function structurally as arches.</p> <p>Hydraulic lime mortars shall be used for repair of masonry arch bridges that were constructed using hydraulic lime mortars.</p>
7	All hydraulic lime mortars shall be mixed in accordance with the supplier's written instructions.
8	Hydraulic lime mortar shall be in accordance with the durability classification required (refer to Table 24/8).

Clause No.	Title and Written Text																			
	<p>TABLE 24/8 Durability Class Requirements for Straight Hydraulic Lime Mortars</p> <p>Mortar Durability Designation (with approximate compressive strengths) for General use building mortar & General use mechanical or hand pointing mortar</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Masonry Type</th> <th style="width: 25%;">Parapet & copings Masonry facing roadsides subject to spray & de-icing salts</th> <th style="width: 25%;">Other parapets, abutments & spandrel walls Above flood level</th> <th style="width: 25%;">Soffit to arch barrel Above flood level</th> </tr> </thead> <tbody> <tr> <td>Dense impermeable masonry. Squared or random. Brick, Basalt, Granite etc. (No Suction)</td> <td style="text-align: center;">9 – 10 2.2 N/mm²</td> <td style="text-align: center;">7 – 8 1.8 N/mm²</td> <td style="text-align: center;">5 – 6 1.5 N/mm²</td> </tr> <tr> <td>Medium permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone, Sandstone, Limestone and mixed quality field stone masonry. (Moderate Suction)</td> <td style="text-align: center;">7 – 8 1.8 N/mm²</td> <td style="text-align: center;">5 – 6 1.5 N/mm²</td> <td style="text-align: center;">3 – 4 1.34 N/mm²</td> </tr> <tr> <td>High permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone, Sandstone, Limestone and poor quality mixed field stone masonry. (High Suction)</td> <td style="text-align: center;">5 – 6 1.5 N/mm²</td> <td style="text-align: center;">3 – 4 1.34 N/mm²</td> <td style="text-align: center;">2 – 4 1.34 N/mm²</td> </tr> </tbody> </table>				Masonry Type	Parapet & copings Masonry facing roadsides subject to spray & de-icing salts	Other parapets, abutments & spandrel walls Above flood level	Soffit to arch barrel Above flood level	Dense impermeable masonry. Squared or random. Brick, Basalt, Granite etc. (No Suction)	9 – 10 2.2 N/mm ²	7 – 8 1.8 N/mm ²	5 – 6 1.5 N/mm ²	Medium permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone, Sandstone, Limestone and mixed quality field stone masonry. (Moderate Suction)	7 – 8 1.8 N/mm ²	5 – 6 1.5 N/mm ²	3 – 4 1.34 N/mm ²	High permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone, Sandstone, Limestone and poor quality mixed field stone masonry. (High Suction)	5 – 6 1.5 N/mm ²	3 – 4 1.34 N/mm ²	2 – 4 1.34 N/mm ²
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Clause No.	Title and Written Text
10	<p>Lime mortars suitable for use below flood level, depending on time required, are mortar designation 9–10 which shall be suitable for immersion within 24 hours or mortar designation 7–8 if a coffer dam shall be provided to allow 72 hours for setting.</p>
11	<p>Site-mixed hydraulic lime mortars are sufficiently workable for laying and building stone masonry units but shall be generally not initially workable for laying bricks in a modern context without being banked up for several hours and reworked.</p> <p>Site-mixed hydraulic lime mortars shall be generally not suitable for pumping without the use of air entraining additives.</p> <p>Where required for site-mixed mortars, an air entrainer can be used to increase workability and minimise water requirement.</p> <p>Air entrainers shall be used in accordance with the manufacturer's written instructions.</p> <p>Pre-mixed dry bagged or silo mixes generally have a higher entrained air content than site-mixed mortars and shall be suitable for building, pumping and pointing without the need for additional air entrainers.</p> <p>The use of air entraining additives provides mortars of the same Durability Class which shall generally have superior performance characteristics in respect of earlier resistance to freeze/thaw action, faster rate of carbonation, better vapour permeability, and lower capillarity, due to their higher air content and reduced water demand.</p>
	Gauged Hydraulic Lime: Sand Mortars
12	<p>Gauged hydraulic lime mortars shall only be used where this is necessary to match existing mortars in repointing work.</p> <p>There shall be no requirement for significant structural strength in re-pointing work.</p> <p>Gauged Hydraulic lime mortar shall be in accordance with the durability classification required (Refer to Table 24/9).</p>

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	<p>TABLE 24/9 Durability Class Requirements for Gauged Hydraulic Lime Mortars</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">Mortar Durability Designation (with approximate compressive strengths) for Non-general use hand pointing mortar</th> </tr> <tr> <th style="width: 25%;">Masonry Type</th> <th style="width: 25%;">Parapet & copings Masonry facing roadsides subject to spray & de-icing salts</th> <th style="width: 25%;">Other parapets, abutments & spandrel walls Above flood level</th> <th style="width: 25%;">Soffit to arch barrel Above flood level</th> </tr> </thead> <tbody> <tr> <td>Dense impermeable masonry. Squared or random. Brick, Basalt and Granite (No Suction)</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">N/A</td> <td style="text-align: center;">5 – 6 1.5 N/mm²</td> </tr> <tr> <td>Medium permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone Sandstone, Limestone and mixed quality field stone masonry. (Moderate Suction)</td> <td style="text-align: center;">N/A 1.8 N/mm²</td> <td style="text-align: center;">5 – 6 1.5 N/mm²</td> <td style="text-align: center;">2 – 4</td> </tr> <tr> <td>High permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone Sandstone, Limestone and poor quality mixed field stone masonry. (High Suction)</td> <td style="text-align: center;">5 – 6 1.5 N/mm²</td> <td style="text-align: center;">3– 4 1.34 N/mm²</td> <td style="text-align: center;">1.34 N/mm²</td> </tr> </tbody> </table> <p>When work is planned to continue beyond the autumn raise the durability class by at least 1 where the background masonry permits. Where the background masonry does not permit, plan to commence in the early spring and be complete before the end of summer.</p>	Mortar Durability Designation (with approximate compressive strengths) for Non-general use hand pointing mortar				Masonry Type	Parapet & copings Masonry facing roadsides subject to spray & de-icing salts	Other parapets, abutments & spandrel walls Above flood level	Soffit to arch barrel Above flood level	Dense impermeable masonry. Squared or random. Brick, Basalt and Granite (No Suction)	N/A	N/A	5 – 6 1.5 N/mm ²	Medium permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone Sandstone, Limestone and mixed quality field stone masonry. (Moderate Suction)	N/A 1.8 N/mm ²	5 – 6 1.5 N/mm ²	2 – 4	High permeability masonry. Squared or random. Brick, Blockwork, Reconstructed stone Sandstone, Limestone and poor quality mixed field stone masonry. (High Suction)	5 – 6 1.5 N/mm ²	3– 4 1.34 N/mm ²	1.34 N/mm ²
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Clause No.	Title and Written Text
13	Gauged hydraulic lime mortars exhibit slower rates of carbonation and higher capillarity than straight hydraulic lime mortars and shall not be used in close proximity to wet areas or in areas subject to road spray.
14	Air entrainers shall not be added to gauged hydraulic lime mortars.
Series 2500 – Special Structures	
2570AR	Inspection Chambers
1	Inspection chambers shall be provided at all changes in direction, pipe junctions and at intervals of not more than 50 metres.
Series 2600 - Miscellaneous	
2670AR	Anti-Graffiti Coatings
1	Anti-graffiti coatings shall be of the sacrificial type and shall be capable of being cleaned at least twice before re-coating is necessary.
2	The coating system shall be applied in accordance with the manufacturer's written instructions.
3	The application of the coating system shall not change the appearance of the substrate.
4	<p>Prior to application the surface shall be cleaned of all loose material, oil, grease, dirt and existing graffiti.</p> <p>The surface shall be lightly abraded after cleaning and drying.</p> <p>All loose and flaking paintwork shall be feathered back to a sound edge.</p> <p>A suitable sealer/primer shall be applied to bare areas and areas of graffiti which resist cleaning and may present a problem by showing through the coating system unless sealed.</p>
5	<p>The cleaning of the coating/removal of graffiti shall not have any detrimental effect on the substrate.</p> <p>Grit-blasting water jetting or chemical cleaning agents likely to have long term effects on the substrate shall not be used.</p>
2671AR	Graffiti Removal
	<p>Graffiti posters and encrusted deposits shall be removed by hand high pressure water jetting chemical washing light grit blasting or over-painting of painted surfaces provided the substrate is not damaged.</p> <p>Encrusted deposits may be removed by a light grit blast in accordance with clause 1773AR Surface Preparation provided the substrate is not damaged.</p> <p>The Operating Company shall ensure that all electrical equipment and any other fixtures and fittings are fully protected during graffiti removal.</p> <p>Over-painting shall be in a colour and material to match the existing where necessary and shall be subject to consent in writing by the Overseeing Organisation.</p>

Clause No.	Title and Written Text
Series 2800 Winter Service	
2801AR	Winter Service Plant
1	<p>Winter Service Plant used for spreading de-icing materials shall:</p> <ul style="list-style-type: none"> (i) be a vehicle with a Euro 6 compliant engine, capable of performing the duties set out in this Contract. (ii) be of proven design and comply with the requirements of <i>British Standard 1622:1989 Spreaders for the Winter Maintenance of Roads</i>, (iii) be capable of symmetrical and asymmetrical spreading in accordance with the Class A1 requirements of <i>British Standard 1622:1989 Spreaders for the Winter Maintenance of Roads</i>, (iv) be capable of being fitted with a plough blade which shall be set at zero height when performing Operations to remove snow. The plough blade will be of a suitable design to allow for such use while preventing damage to the road surface, other equipment on the road surface and the plough blade.
	<p>The Operating Company shall obtain the Directors approval for the Vehicle's conspicuity markings and equipment design. This includes:</p> <ul style="list-style-type: none"> • the placement of beacons and additional lighting • the proposed colours for the Chassis, Cab, Spreader, access systems and Snow Plough • providing samples of the paint colours that will used the Transport Scotland livery on the Vehicle and Snow Plough • proposed markings in accordance with the requirements below.
	<p>Four high performance, low energy, high visibility rotating beacons (two front, two rear) shall be mounted to achieve maximum conspicuity to road users whilst minimising impact on driver vision in all weather conditions. Beacons shall not be mounted in a position where the visibility of any other vehicle signs (namely "spreading") or other reflective markings may be washed out during operation.</p> <p>Where required beacons shall be protected to prevent damage from any Operations undertaken</p> <p>Beacons shall be automatically activated during spreading and ploughing Operations with manual override option available for when beacons are required to be switched on whilst the vehicles is not spreading/ploughing</p> <p>The beacons must comply with the requirements of the <i>Road Vehicle Lighting Regulations 1989</i> and the <i>United Nations Economic Commission for Europe (UNECE) Regulation 65 Uniform provisions concerning the approval of special warning lamps for power-driven</i></p>

Clause No.	Title and Written Text
	<i>vehicles and their trailers</i>
	<p>The colour for the cab, spreader body and brine tanks shall be orange (RAL 2011). The design shall aim to maximise the extent of the colour to increase vehicle's contrast against the background winter environment.</p> <p>All systems of access including cab access steps, handrails, covers, ladders, platforms and walkways shall be painted in the colour orange (RAL 2011). Any of the main areas where feet (such as cab or platform step treads) or hands are expected to make physical contact as part of undertaking Operations identified in 4.1 shall be painted in a contrasting highly visible yellow.</p>
	Vehicle livery and reflective marking shall be in accordance with the " <i>UNECE 104: Uniform provisions concerning the approval of retro-reflecting markings for vehicles of category m, n and o</i> " regulation.(UNECE 104)
	<p>Material Requirements</p> <p>Markings shall be manufactured from retro reflective material with full cube corner optics, complying with the requirements of <i>UNECE 104</i> and <i>Chapter 8 of the Traffic Signs Manual</i> (https://www.gov.uk/government/publications/traffic-signs-manual).</p> <p>Markings shall either:</p> <ul style="list-style-type: none"> Be applied directly to the vehicle bodywork that is clean and free from detritus; or Be mounted on boards fixed to the bodywork using tamper-proof fixings. <p>Markings shall, as far as practicable, be manufactured so as to consist of one complete piece.</p>
	<p>Rear Markings</p> <p>The vehicle shall be fitted with rear marking in accordance with <i>United Nations Economic Commission for Europe Regulation 70 - Uniform provisions concerning the approval of rear marking plates for heavy and long vehicles (UNECE 70) requirements using type 6, 7, 8 or 9 type markers</i>.</p> <p>Other rear markings shall be in accordance with Chapter 8 requirements In addition to the Chapter 8 requirements A "SPREADING" warning sign in accordance with <i>British Standard 1622:1989 Spreaders for the Winter Maintenance of Roads</i> surrounded with 25mm retro reflective tape shall be displayed on the rear of the vehicle.</p>
	<p>Side Markings</p> <p>All side markings shall comprise 50mm high + 10mm/0mm of yellow reflective material.</p>

Clause No.	Title and Written Text
	<p>All side markings shall be fitted so that the lower edge is horizontal.</p> <p>Each side of the Vehicle shall be marked as follows:</p> <ul style="list-style-type: none"> • One 50mm strip extending the length of the top of the hopper • One 50mm strip extending the length of the bottom of the hopper, or where this is not practical, in a series of lengths so as to identify the overall length of the hopper • One 50mm strip along the length of lower side-impact bars • One 50mm strip along the length of the cab at a height as near as practicable to item (ii) above. <p>Side markings shall be a minimum height above ground of 350mm and a maximum of 2100mm, except where otherwise stated.</p> <p>Markings over each side of the vehicle shall be sufficient to identify a minimum of 80% of the length. In addition a 100mm high x 200mm length day-glo strip shall be fitted on each corner of the spreader to aid loading.</p>
	<p>Transport Scotland Livery and Fleet referencing</p> <p>All Vehicles shall be marked as detailed in Schedule 5 Specification and Drawings, Appendix 1/75 Operating Company's Vehicle Liveries.</p>
2802AR	Not used
2803AR	Winter Service Vehicle Data Logging and Transmitting Equipment
1	<p>The in-vehicle data logger shall be capable of system and data back-up so that the system can be recovered in 12 hours. The data shall be transferred from the vehicle to the data store in near real time (as per <i>British Standard EN 15430-1:2015 Winter and road service area maintenance equipment. Data acquisition and transmission - Part 1: In-vehicle data acquisition</i> or within 30 seconds of collection). In the event of communications failure, the in-vehicle data logger shall be capable of storing one week's worth of data on a robust onboard storage device.</p>
2	<p>The equipment shall comply with <i>British Standard EN 15430-1:2015 Winter and road service area maintenance equipment. Data acquisition and transmission - Part 1: In-vehicle data acquisition.</i></p>
3	<p>The system shall provide accurate recorded data of the following parameters:</p> <ul style="list-style-type: none"> (i) location of vehicle, (ii) spreading or not spreading, (iii) rate of spreading,

Clause No.	Title and Written Text
	<ul style="list-style-type: none"> (iv) spreading pattern, width and lane position, (v) ploughing or not ploughing, (vi) road surface temperature, (vii) air temperature, (viii) record of weight out of and weight in to the depot, and total used of each of salt/liquid (ix) beacons on or off (including confirmation that they are actually working if on), (x) pre-wet on or off, (xi) flow rates for liquid treatment, (xii) in –line refractometer brine concentration strength (xiii) plough orientation, (xiv) driver identification, (xv) fuel usage, (xvi) distance travelled, (distance spreading and distance not spreading) (xvii) vehicle speed, (xviii) time of leaving depot, (xiv) actual treatment start time (xviii) actual treatment completion time (xiv) time of returning to the depot, (xx) treatment type, (xxi) travelling off Route, with driver alert, and (xxii) time. <p>Data shall be referenced to the Ordnance Survey grid.</p>
4	All Records shall contain a date and time stamp, vehicle identification and the geographical position of the vehicle at the time of record creation and meet the requirements of <i>British Standard EN 15430-1:2015 Winter and road service area maintenance equipment. Data acquisition and transmission - Part 1: In-vehicle data acquisition.</i>
5	The data output shall be in accordance with <i>British Standard EN 15430-1:2015 Winter and road service area maintenance equipment. Data acquisition and transmission - Part 1: In-vehicle data acquisition (DPC:05/30142514DC)</i> , to allow data logging information to be easily acquired for transmission.
6	The accuracy of all data shall be validated by the Operating Company. Calibration of the time and date stamp and Geographical Positioning System location shall be confirmed prior to commissioning and at a frequency not exceeding 12 months thereafter.

Clause No.	Title and Written Text
7	The method of calibration and accuracy of the time and date stamp shall be in accordance with <i>British Standard EN 15430-1:2015 Winter and road service area maintenance equipment. Data acquisition and transmission-Part 1: In-vehicle data acquisition.</i>
2804AR	Winter Service Vehicle Data Receiving, Storing, Archiving and Web Based Systems
1	Data transmitted from the vehicles shall be stored by the Operating Company on a secure server and be accessible to the same level of reporting and data as the systems administrator level by the Director and the Performance Audit Group by means of a web interface, from a commercially available computer and from Apple and Android Smartphones and tablets via an approved App.
2	The web interface shall provide access to reports on any of the measured parameters detailed in clause 2803AR. These reports shall be capable of being parameterised to be configured for national, regional and local use by means of routinely configurable system reports
3	Reports for the following shall be available: <ul style="list-style-type: none"> (i) material usage (vehicle weight in and out), (ii) fuel usage, (iii) vehicle mileage, (iv) Route identification and adherence to Route, (v) treatment times, (vi) reports on any/all control functions (plough and spinner/chute settings), (vii) beacons on or off, (viii) driver identification, and (ix) vehicle identification.
4	The system shall be capable of displaying treatment routes on a map background showing the Trunk Road network in Scotland. The scale of the map shall be user selectable between Unit and national views.
5	The Operating Company shall provide that the system provider shall enable that The Director will have full API access to the system to integrate with Transport Scotland and Traffic systems as required including any RWIS system and Push to Talk over Cellular Radio System nominated by The Director.
6	The system shall be capable of displaying due treatment, treated and untreated routes and vehicle position and status in a graphical colour coded format.
7	The system shall be capable of operating on dial-up type connection when required.

Clause No.	Title and Written Text
8	The system shall be capable of alerting the driver if the pre-determined route is not adhered to.
9	The system shall be capable of generating a remote alert if the vehicle does not follow the prescribed route. The system alert shall be available via user selectable short message service and email.
10	The system shall display time of last data transmission in order that the viewer can determine if the vehicle is stationary or if there is a break in data transmission.
11	The Operating Company shall demonstrate how the transmission system will be capable of full operation in poor signal areas or during times of system network overload.
12	The system shall display configurable fields including 1) Vehicle registration 2) Vehicle type and size 3) Trunk Road Gritter Tracker name
13	The Operating Company shall provide that all of the requirements of the Trunk Road Gritter Tracker System provider shall have full unrestricted access to required API interfaces and shall supply such services via its System supplier
14	The Operating Company shall provide that all of the requirements of the Traffic Scotland Operator shall have full unrestricted access to required API interfaces and shall supply such services via its System supplier and to enable full unlimited display at the NNCC
2805AR	Winter Service Vehicle Communications Equipment
1	The Operating Company shall supply a Push To Talk over Cellular Radio system in each vehicle and item of plant within its approved Winter Service Plan
2	The Operating Company will supply 5 number licences and devices for full access by The Director
3	The Operating Company will supply 5 number licences and devices for full access by The Traffic Scotland Operator including one unit for Access by the Operating Company Mart Representative as required.
4	The system shall be capable of operating talk groups to as requested by The Director or The Traffic Scotland Operator
5	The Operating Company shall ensure that all communications during operational Winter Service are capable of being undertaken using the system by drivers and operators whilst the vehicle is in motion.
Series 3000 – Landscape and Ecology	
3070AR	Shrub Maintenance Operations

	<p>Shrubs within the Trunk Road network are defined as follows:</p> <p>Ornamental shrubs – planted as a visual element of the road corridor and usually associated with settlements and/or urban/feature roundabouts, and;</p> <p>Informal shrubs – generally native major and minor shrub species (excluding gorse and broom) informally planted or naturally developing along the road corridor up to a height of approximately 3.5m.</p> <p>Shrubs are maintained for the reasons stated in clause 3010.1. Where vegetation is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>Otherwise the following levels and frequencies of maintenance will apply:</p> <p>The level and frequency of maintenance for shrubs is adjusted according to the level of maintenance proscribed for the adjacent grassed areas i.e. high maintenance shrub treatment is undertaken in areas of high amenity grass (high frequency grass cutting), medium maintenance shrub treatment is undertaken in areas of amenity grass (medium frequency grass cutting) and low maintenance shrub treatment is undertaken in areas of general grass and rough grass (low frequency grass cutting), as follows:</p> <p>(a) High Maintenance Treatment:</p> <ul style="list-style-type: none"> (i) Weeding: Monthly during growing season, (ii) Pruning/cutting back/ removal/ disposal of arisings: Once per year, (iii) Checking/topping-up mulch: Once per year if relevant, and, (iv) Gapping-up: When subject to an Order. <p>(b) Medium Maintenance Treatment:</p> <ul style="list-style-type: none"> (i) Weeding: Three times during growing season, (ii) Pruning/cutting back/ removal/disposal of arisings. Once per year, (iii) Checking/topping up mulch. Once per year, if relevant, (iv) Gapping up. When the subject of an Order. <p>(c) Low Maintenance Treatment:</p> <ul style="list-style-type: none"> (i) Weeding. Once during growing season, (ii) Pruning/cutting back/removal/disposal of arisings. Once every two years, (iii) Gapping Up. When the subject of an Order.
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Clause No.	Title and Written Text
3071AR	<p>Woodland Maintenance Operations</p> <p>Woodland which is sub divided into three definitions:</p> <p>(a) New woodland (5 years old and under) -</p> <p style="padding-left: 40px;">a newly planted area of predominantly tree and woodland shrub species with the potential of developing into a mature wooded area. This category includes any new planting undertaken through this Contract which will already be subject to establishment maintenance for three years.</p> <p>(b) Establishing Woodland (6 to 14 years old inclusive)</p> <p style="padding-left: 40px;">a developing area of tree species with or without woodland shrubs and with the potential of developing into a mature wooded area, and,</p> <p>(c) Maturing Woodland (15 years old and over) -</p> <p style="padding-left: 40px;">an established area of tree cover, whether single or mixed species/ varieties and with or without a woodland shrub layer.</p> <p>Maintenance requirements and frequency are as follows:</p> <p>New Woodland:</p> <p>When woodland is planted under this Contract it shall be maintained for three years post completion in accordance with clauses 3006, 3007 and 3009 and items (a) through to (f) below. This will not require an Order and maintenance shall be included in the planting Scheme costs.</p> <p>For any New Woodland outwith the three year maintenance provision the following items apply:</p> <p style="padding-left: 40px;">(a) Weeding or strimming. Twice during growing season,</p> <p style="padding-left: 40px;">(b) Checking and adjusting any stakes/shelters, ties. Annually.</p> <p>The following items would be subject to an Order:</p> <p style="padding-left: 40px;">(c) Pruning/cutting back/removal/disposal of arisings,</p> <p style="padding-left: 40px;">(d) Removing any stakes/shelters/ties,</p> <p style="padding-left: 40px;">(e) Re-firming plants,</p> <p style="padding-left: 40px;">(f) Replacement planting.</p> <p>Establishing Woodland:</p> <p>Woodland is maintained for the reasons stated in clause 3010.1. Where woodland vegetation is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any</p>

Clause No.	Title and Written Text
	<p>part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>If there are no operational issues the following items will be undertaken when required and subject to an Order:</p> <ul style="list-style-type: none"> (a) Weeding or strimming, (b) Pruning/cutting back/removal/disposal of arisings, (c) Thinning/coppicing, and (d) Clearing/felling. <p>Maturing Woodland:</p> <p>Woodland is maintained for the reasons stated in clause 3010.1. Where woodland vegetation is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>If there are no operational issues the following items will be undertaken when required and subject to an Order:</p> <ul style="list-style-type: none"> (a) Pruning/cutting back/removal/disposal of arisings, (b) Thinning/coppicing, and (c) Clearing/felling.
3072AR	<p>Hedge Maintenance Operations</p> <p>Hedges are defined as distinct linear planting strips within the road corridor intended to be formally shaped and maintained. Hedges generally form a boundary line or mark a transition between areas/treatments. They may also be used a means of demarcating a planting area or as an element in a landscape design.</p> <p>Hedges are maintained for the reasons stated in clause 3010.1. Where a hedge is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>If there are no operational issues maintenance requirements and frequencies are as follows:</p>

Clause No.	Title and Written Text
	<ul style="list-style-type: none"> (a) Trimming, shaping and pruning: Once every two years with arisings removed from Site. The frequency shall be increased to annual treatment for formal hedges in ornamental areas; (b) Laying: When subject to an Order; (c) Gapping up: When subject to an Order; (d) Checking/topping-up mulch: Annually, if relevant, and; (e) Weeding: Hedges in cultivated or formal beds shall be weeded annually.
3073AR	<p>Hedgerow Maintenance Operations</p> <p>Hedgerows are defined as informal or rough linear planting strips of single or a mixture of wild shrubs and occasional trees, typically rural in character and bordering the road or loosely marking the boundary between the Unit and adjacent land.</p> <p>Hedgerows are maintained for the reasons stated in clause 3010.1. Where a hedgerow is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>If there are no operational issues maintenance requirements and frequencies are as follows:</p> <ul style="list-style-type: none"> (a) Cutting back: a minimum of once every three years. However, where a hedgerow is encroaching the edge of carriageway and/or impacting the safe operation of the road, including obscuring any road sign, cutting shall be undertaken as often as necessary to resolve the issue(s). (b) Shaping: When subject to an Order, (c) Gapping up: When subject to an Order.
3074AR	<p>Scrub Maintenance Operations</p> <p>Scrub is defined as an area of self-seeded vegetation of native and/or non-native tree and shrub species, up to a height of approx. 2.5m. Scrub areas may be typified by scattered vegetation or more dense, closed canopy cover.</p> <p>Scrub is maintained for the reasons stated in clause 3010.1. Where an area of scrub is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but</p>

Clause No.	Title and Written Text
	<p>is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>If there are no operational issues the following maintenance Operations will be undertaken when subject to an Order:</p> <ul style="list-style-type: none"> (a) Cutting back. (b) Clearing. (c) Thinning. <p>All arisings from scrub treatment Operations shall be dealt with in accordance with clause 3010.4.</p>
3075AR	<p>Individual Tree Maintenance Operations</p> <p>Individual trees are defined as lone trees, or trees with no/limited interlocking canopy with the nearest neighbours, or sporadic trees where there is a loose arrangement of established trees, or avenues of trees.</p> <p>Trees are maintained for the reasons stated in clause 3010.1. Where such a tree is impacting the safe operation of the road, footway or cycle track it shall be cut back, as appropriate, with arisings removed. This includes, but is not limited to, any vegetation affecting driver/road user forward visibility or sightlines; vegetation encroaching the edge of carriageway and likely to impact traffic; vegetation obscuring or affecting any part of any road sign; vegetation affecting access to or operation of any road infrastructure such as barriers, masts, IT equipment etc.</p> <p>If there are no operational issues the following maintenance Operations will be undertaken:</p> <ul style="list-style-type: none"> (a) Checking and adjusting any stakes/shelters/ties. Annually. (b) Pruning/cutting back. When subject to an Order (c) Removing any stakes/shelters/ties. When subject to an Order, (d) Re-firming trees. Once per year, and (e) Replacement planting. When subject to an Order.
Series 3300 Site Investigation	
3301AR	<p>Rotary Coring in Carriageways</p>
1	Rotary coring in carriageways shall be carried out in accordance with this clause.
	Cores shall be 100mm or 150mm nominal diameter and taken in the positions and to the depths proposed by the Operating Company and consented to in writing by the Overseeing Organisation.

Clause No.	Title and Written Text
2	Cores shall be cut in accordance with <i>British Standard EN 12697-27:2017 Bituminous mixtures. Test methods. Sampling</i> using a coring machine that complies with <i>British Standard 4019:1993 Rotary Core Drilling Equipment: Specification for System A. Metric Units.</i>
3	The walls and base of all holes from which core samples have been cut shall be thoroughly dried and painted with hot bituminous binder immediately prior to reinstatement.
4	The holes shall be filled to within 50 to 75mm inclusive from the road surface with wet lean concrete and topped off with well compacted bituminous repair material. . Alternatively they may be filled with an alternative approved reinstatement asphalt material in well compacted layers not exceeding 50mm. On completion the filled whole shall be at the same level as the adjacent surface.
5	The cores shall be handled carefully to prevent damage, photographed and wrapped in polythene to prevent moisture loss. They shall be indelibly marked to indicate the location and date of coring.
6	Cores shall be packaged to avoid damage, clearly labelled and delivered to the Operating Company's store with a core log and sample certificate as per <i>British Standard EN 12697-27:2017 Bituminous mixtures. Test methods. Sampling.</i> At the Operating Company's store, cores shall be handled carefully and stored on purpose built racks or shelves.
7	Cores shall be stored for periods determined by the Operating Company to enable the necessary recording, testing and data to be obtained or inspected by the Overseeing Organisation.
8	The Operating Company shall establish if the Overseeing Organisation wishes to inspect the cores prior to disposal.
9	Core sampling Operations testing, referencing, information obtained from data analysis and interpretation shall be recorded by the Operating Company and a copy of data and reports supplied to the Overseeing Organisation.
10	Any tests required to be carried out on cores shall be subject to an Order.
11	The Operating Company shall submit evidence, in writing to the Overseeing Organisation for his written consent, that the persons including any sub-contractor proposed to carry out coring testing and reporting Operations have the expertise and resources to carry out any such work.
12	All coring testing and reporting Operations shall be carried out by a specialist testing firm or laboratory holding accreditation granted in respect of such coring and testing by the United Kingdom Accreditation Service (UKAS) or by the European Co-operation for Accreditation of Laboratories (EAL).
3302AR	Rotary Coring in Structures
1	Rotary coring in Structures shall be carried out in accordance <i>British Standard EN 12697-27:2017 Bituminous mixtures. Test methods. Sampling</i> with this clause.

Clause No.	Title and Written Text
	Cores shall be 50mm, 75mm, 100mm or 150mm nominal diameter and taken in the positions and to the depths proposed by the Operating Company and consented to in writing by the Overseeing Organisation.
2	The cores shall be cut in accordance with British Standard 598 using a coring machine which complies with <i>British Standard 4019:1993 Rotary Core Drilling Equipment: Specification for System A. Metric Units</i> . Cores shall generally be cut through structural concrete with measures taken to avoid encountering reinforcement.
3	The holes from which core samples have been cut shall be reinstated using repair mortar in accordance with clause 1773AR.
4	The cores shall be handled carefully to prevent damage, photographed and wrapped in polythene to prevent moisture loss. They shall be indelibly marked to indicate the location and date of coring.
5	Cores shall be packaged to avoid damage, clearly labelled and delivered to the Operating Company's store with a core log and sample certificate as per <i>British Standard EN 12697-27:2017 Bituminous mixtures. Test methods. Sampling</i> .
6	At the Operating Company's [store] cores shall be handled carefully and stored on purpose built racks or shelves.
7	Cores shall be stored for periods determined by the Operating Company to enable the necessary recording testing and data to be obtained or inspection by the Overseeing Organisation.
8	The Operating Company shall establish if the Overseeing Organisation wishes to inspect the cores prior to disposal.
9	Any extended storage periods requested by the Overseeing Organisation shall be subject to an Order.
10	Core sampling Operations, testing, referencing, information obtained from data analysis and interpretation shall be recorded by the Operating Company.
11	Any tests required to be carried out on cores shall be subject to an Order.
12	The Operating Company shall submit evidence, in writing to the Overseeing Organisation for his written consent, that the persons including sub-contractors proposed to carry out coring testing and reporting Operations have the expertise and resources to carry out the work.
13	All coring testing and reporting Operations shall be carried out by a specialist testing firm or laboratory holding accreditation granted in respect of such coring and testing by the United Kingdom Accreditation Service (UKAS) or by the European Co-operation for Accreditation of Laboratories (EAL).
3303AR	Structural Investigations
1	Separate reports upon the findings and testing together with photographic evidence shall be supplied for each Structure as detailed in Schedule 5

Clause No.	Title and Written Text
	Specification and Drawings, Appendix 33/1 Structural Investigations Test Requirements.
2	The Operating Company shall determine in accordance with the other requirements of this Contract, the need for the reports to contain a section giving an expert interpretation of the results of the investigation, and if so the reports shall contain such a section.
3	The number of copies for each report shall be as stated in Schedule 5 Specification and Drawings, Appendix 33/1 Structural Investigations Test Requirements.
4	All sampling and testing Operations shall be carried out by a specialist testing firm or laboratory holding appropriate accreditation granted in respect of such sampling and testing.
3304AR	Inspection Patches within Surfacing on Bridge Structures
1	The general requirements for excavation and reinstatement of inspection patches within surfacing on bridges shall be as referred to in the appropriate clauses of Series 600, 700, 900, 1100 and 2000 and Schedule 5 Specification and Drawings, Appendix 20/1 Waterproofing for Concrete Structures .
2	Details of patch size and location within footways and carriageways shall be determined by the Operating Company.
3	Such inspection patches shall be excavated through any flexible surfacing asphaltic sand carpet and waterproofing system which may be present.
4	Following excavation, all residual deposits of surfacing and waterproofing shall be disposed of and the deck cleaned.
5	Excavation patches shall remain open for testing and inspection and shall only be reinstated, including waterproofing if present, after having received the written consent of the Overseeing Organisation.
3305AR	Trial Pits in Paved Areas
1	The Operating Company shall excavate trial pits to permit inspection or sampling of unbound or bound materials.
2	The size and location of the trial pits shall be determined by the Operating Company.
3	Trial pits shall be excavated and reinstated in accordance with clause 706 except that trial pits shall remain open for testing and inspection by the Overseeing Organisation.
3306AR	Falling Weight Deflectometer Tests
1	The Operating Company shall undertake falling weight deflectometer tests to assess the structural condition of bituminous and cementitious road pavements.
2	The location, length to be tested and number of tests to be carried out shall be determined by the Operating Company.

Clause No.	Title and Written Text
3	The testing and reporting shall be carried out in accordance with the guidance given in <i>Design Manual for Roads and Bridges, CS 229 - Data for Pavement Assessment</i> .
3307AR	Dynamic Cone Penetrometer Tests
1	The Operating Company shall undertake dynamic cone penetrometer tests to assess the structural condition of bituminous and cementitious road pavements.
2	The testing shall be carried out in accordance with the manufacturer's written instructions.
3	The calculations and reporting shall be carried out in accordance with the guidance given in <i>Transport and Road Research Laboratory Overseas Road Note 8 – A Users Manual for a Program to Analyse Dynamic Cone Penetrometer Data</i> .
3308AR	Structural Investigations Tests
1	Structural investigations tests shall be as described in Schedule 5 Specification and Drawings, Appendix 33/1 Structural Investigations Test Requirements.
Series 6100 Core Operations	
6101AR	Not Used
6102AR	Maintenance of Gullies, Catchpits, Interceptors, Soakaways, Manholes and Oil Separators
1	Cleaning of gullies, catchpits, interceptors, soakaways, manholes and oil separators shall be carried out in accordance with clauses 520 and clause 521 and the following:
2	Detritus and debris on the road surface around the entrance to gullies, catchpits shall be removed to ensure that surface water can flow unimpeded into each gully.
3	The outlet pipe shall be jetted at least annually with clean water to ensure that it is flowing freely. The location of any restrictions in flow and obstruction that cannot be removed shall be recorded. Polluted water shall not be used to jet, surcharge or refill gullies.
4	Before putting a gully grating or cover back on after cleaning, a spot of paint shall be sprayed onto the underside. The colour of the paint shall differ for each cycle of cleaning.
5	Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum: <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle

Clause No.	Title and Written Text
	<ul style="list-style-type: none"> • Co-ordinate of Operation • Date/time stamp of operation • Condition of asset before cleaning • Any remaining Defects/issues • Any appropriate notes <p>the Scheme Identifier, where applicable, Operations Instructions road and number of gullies and chambers emptied and any Defects found in respect to blockages or damages to the drainage system or components together with the location of those Defects shall be recorded against the relevant asset.</p>
6103AR	Maintenance of Drainage Grips
1	<p>Drainage grips shall be maintained by cutting and cleaning such that free flow of water shall not be impeded and water does not stand on the carriageway adjacent to the grip. Grips should be a minimum of 150mm wide, with edges angled at a maximum of 45 degrees to the horizontal to minimise edges falling back into the grip. The grip shall incorporate a larger entrance area to maximise the inflow of water and wherever possible should be offset to the perpendicular and in the direction of flow. All debris and arising shall be removed and disposed offsite.</p>
2	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before cleaning • Any remaining Defects/issues • Any appropriate notes <p>Any Defects found in respect to blockages or damages to the drainage system or components together with the location of those Defects shall be recorded against the relevant asset.</p>
6104AR	Not Used
6105AR	Maintenance of Filter Material
1	<p>All weed growth in filter material shall be treated in accordance with clause 3002.</p>
2	<p>Any build-up of detritus upon the filter material or between the edge of the carriageway and the filter drain shall be removed and disposed offsite</p>

Clause No.	Title and Written Text
3	Filter material shall be loosened by harrowing to a depth of 200mm over the full width of the drain including contiguous filter material so as to minimise retention of water within this depth.
4	. The location of any obstruction that cannot be removed shall be recorded.
5	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before cleaning • Any remaining Defects/issues • Any areas that could not be harrowed, their extents and reasons. • Any appropriate notes <p>Any Defects found in respect to blockages or damages to the filter material or components together with the location of those Defects shall be recorded against the relevant asset.</p>
6106AR	Maintenance of Drainage Structures
1	Drainage structures shall be maintained by cleaning in accordance with clauses 520 and clause 521.
2	Each end of the drainage structure including any ancillary drainage items shall be kept free of vegetation and other obstructions including any material disturbed during cleaning. The drainage structure shall be kept free from debris. Erosion of the banks and bed of a watercourse both within and at the end of a drainage structure shall be repaired and any scour protection re-instated as required.
3	Where the invert of any drainage structure at intake and outfall points is below the invert of an adjacent watercourse, the watercourse invert shall be excavated to the invert level of the drainage structure to facilitate flow from the drainage structure.
4.	Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Overseeing Organisation and uploaded

Clause No.	Title and Written Text
	<p>into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found in respect to blockages or damages to the drainage system or components together with the location of those Defects shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6107AR	Maintenance of Ancillary Drainage Items
1	<p>Sluices, tidal flaps, penstocks, valves, pumps and other specialist equipment shall be maintained by checking that all mechanisms are functioning as required and lubricating any moving parts in accordance with any manufacturers' instructions.</p>
2	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Any remaining Defects/issues • Any areas that could not be maintained, their extents and reasons. • Any appropriate notes <p>Any Defects found in respect to blockages or damages to the drainage item or components together with the location of those Defects shall be recorded against the relevant asset.</p>
6108AR	Litter and Refuse, Objects and Cleaning
1	<p>Subject to the other provisions of this Contract, the Operating Company shall ensure that all roads and other land within the Unit are maintained to</p>

Clause No.	Title and Written Text
	the standards of a Category 6 Zone as set out in the <i>Code of Practice on Litter and Refuse (Scotland) 2018</i> .
2	Road cleaning and clearance of channels shall be to such a standard that, on completion of the Operation, there is an unimpeded passage for storm water into the drainage system. Vehicles engaged in sweeping shall only travel in the same direction of flow as the adjacent road traffic. Any growth of grass or other vegetation which may obstruct the flow of water in the channel shall be controlled in accordance with clause 3002.
3	The term "grassed areas" as referred to in the <i>Code of Practice on Litter and Refuse (Scotland) 2018</i> shall be deemed to cover all areas within the Trunk Road boundary which are not hard surfaced.
4	Central reservations may be grassed areas or hard surfaced areas.
5	Objects shall be removed in timescales appropriate to the prevailing circumstances and disposed of in accordance with the Scottish Ministers' Requirements.
6	The network will be cleaned, when required, in timescales appropriate to the prevailing circumstances.
7	Cleaning shall include as a minimum hand or mechanical sweeping of all hard areas, removal of objects, water supply, removal of sweepings and disposal of material and objects in accordance with the Scottish Ministers' Requirements.
6109AR	Dead Animals
1	All dead animals shall be removed from the Trunk Road network within the Unit. Dead animals which constitute a hazard or environmental risk will be removed immediately. All other dead animals will be removed within 24 hours of notification or discovery.
2	All domestic animals shall be examined for any identifying features including scanning for microchips. The Police shall be notified of any identifying features including tags, tattoos and or microchip data found together with a brief description of the animal. The Operating Company shall attempt to contact the owner of the dead animal and shall keep the carcass of any domestic animal for a period of two weeks in conditions to prevent further deterioration in case the owner wishes to claim back the carcass. After this period, the Operating Company shall dispose of the carcass in accordance with the requirements of the local authority
3	If a wild animal is tagged or marked by conservationists the OC should attempt to notify the Police or the organisation responsible for the tag.
4	There shall be no requirement to keep the carcass of any non-domestic animal, which shall be disposed of in accordance with the requirements of the local authority.
6110AR	Maintenance of Structures – General

Clause No.	Title and Written Text
1	<p>Vegetation, including moss, on or adjacent to a Structure shall be removed using methods which do not damage the structure.</p> <p>Injurious weeds such as Japanese Knotweed and Giant Hogweed shall be removed in accordance with clause 3002 and reported to the Overseeing Organisation.</p>
2	Debris from any part of a Structure shall be removed using methods which do not damage the Structure.
3	Bird droppings shall be removed using methods which do not damage the structure.
5	Bolts shall be checked and tightened to the appropriate torque.
5	Missing bolts shall be replaced and tightened to the appropriate torque.
6	Local damage to protective systems shall be made good.
7	Cleaning shall not be carried out when the ambient temperature is 2°C or less and falling or when the Operations are likely to result in the formation of ice.
8	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6111AR	Maintenance of Expansion Joints
1	Debris and vegetation shall be cleaned out from the expansion joint.
2	Bolts securing the expansion joint, cover plates and nosing joints shall be checked and tightened to the appropriate torque.
3	Missing bolts shall be replaced and tightened to the appropriate torque.

Clause No.	Title and Written Text
4	Securing compounds shall be checked and repaired as necessary.
5	Neoprene or elastomeric material shall be checked for splitting or detachment from the supporting frame by a visual inspection and the use of appropriate hand tools.
6	Cover plates and nosing joints shall be checked by visual inspection and the use of appropriate tools.
7	Debris and sediment from associated drainage below the joint shall be cleared.
8	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6112AR	Maintenance of Bridge Drainage Systems
1	Cleaning of bridge drainage systems shall be carried out in accordance with clauses 520, 6102AR, 6103AR and 6106AR.
2	Drainage holes in structural components, obstructions, outlet pipes, diffusers, outlet manholes, weep pipes, silt and debris deposits shall be cleaned using appropriate hand tools drainage rods and mechanical means including jetting.
3	Flap valves shall be checked for operation by hand or using appropriate lifting devices.
4	Hinges and fixings shall be greased using a corrosion inhibiting lubricant that will not flow below 70°C.
5	Vegetation, weeds, debris and rubbish blocking pipes shall be removed.

Clause No.	Title and Written Text
6	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6113AR	Maintenance of Parapets and Pedestrian Protection on Structures
1	Hollow section drain holes shall be cleaned.
2	Bolts shall be checked and tightened to the appropriate torque.
3	Missing bolt assemblies shall be replaced and tightened to the appropriate torque.
4	Local damage to protective systems shall be made good.
5	Parapet expansion joints shall be checked for freedom.
6	Connections with adjoining vehicle restraint barriers shall be checked.
7	Approach and departure lengths (30m and 7.5m) of vehicle restraint barriers associated with bridge parapets shall be checked
8	Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset

Clause No.	Title and Written Text
	<p>Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6114AR	Maintenance of Bearings and Bearing Shelves
1	Maintenance shall be in accordance with the manufacturers' requirements or in accordance with best practice.
2	Local damage to protective systems shall be made good.
3	Bearings shall be checked for freedom of movement and any signs of misalignment, binding, distortion or excessive freedom shall be reported to the Overseeing Organisation.
4	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>

Clause No.	Title and Written Text
6115AR	Maintenance of Structures Over or Conveying Watercourses
1	Structures over or conveying watercourses shall be maintained, including clearing of vegetation, debris and encrustations, greasing and lubrication where appropriate.
2	Maintenance shall be in accordance with manufacturers' requirements or information in the maintenance manual or as-built records.
3	Where silting exceeds 0.3m average bed deposition for structures over 0.75m span, removal of bed deposition material should be undertaken to invert level over a maximum length of 50m (length of structure plus distance upstream and downstream not to exceed 50m) which can be undertaken under a 'simple' CAR license
4	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6116AR	Maintenance of Sign or Signal Gantries and High Mast Lighting Masts
1	Holding down assemblies and fixings, including to cladding, shall be checked and tightened to the designed method or correct torque.
2	Missing bolts in the holding down assemblies and fixings shall be replaced and tightened to the designed method or correct torque.
3	Holding down assemblies shall be cleaned and re-greased in accordance with the manufacturer's written specifications or in accordance with best practice.
4	Cladding shall be cleaned using detergents that will not discolour/degrade cladding finishes.

Clause No.	Title and Written Text
5	<p>Seals to box type gantries shall be visually inspected for leaks using torches and tools suitable for use in confined spaces.</p> <p>Any box type gantries that are not wind and waterproof shall be reported to the Overseeing Organisation.</p>
6	High mast winch and head frame assemblies shall be inspected and maintained in accordance with the manufacturers requirements.
7	Removal of debris from any part of a Structure shall be undertaken without damage to the Structure and any protective systems.
8	Local damage to protective systems shall be made good.
9	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6117AR	Maintenance of Non-structural items
1	Moveable parts shall be cleaned and greased and in accordance with the manufacturers' requirements or in accordance with best practice
2	Holding down assemblies and fixings, including to cladding, shall be checked and tightened to the designed method or correct torque.
3	Missing bolts in the holding down assemblies and fixings shall be replaced and tightened to the designed method or correct torque.
4	Holding down assemblies shall be cleaned and re-greased and in accordance with the manufacturer's written specifications or in accordance with best practice.
5	Local damage to protective systems shall be made good.
6	Vegetation shall be removed in accordance with clause 6110AR.

Clause No.		Title and Written Text
	7	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6118AR		Maintenance of Underpasses and Culverts used by Pedestrians and Cyclists and Retaining Walls
	1	All surfaces, painted finishes and protective systems within culverts and underpasses including ceilings, soffits and handrails shall be cleaned without any detrimental effect to the surface finishes or protective systems.
	2	Cleaning of polycarbonate mirrors shall be undertaken by hand using the appropriate methods as specified in writing by the manufacturer, where available.
	3	Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset

Clause No.	Title and Written Text
	<p>Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Condition of asset before operation • Any remaining Defects/issues • Any appropriate notes • Photographic evidence of before and after of all structures maintenance work shall be recorded. <p>Any Defects found or damages to the structure or components together with the location of those Defects or damages shall be recorded against the relevant asset. The Operating Company shall report any hazards immediately to the Overseeing Organisation.</p>
6119AR	Maintenance of Road Traffic Signs, Bollards and Marker Posts
1	Road traffic signs, bollards and marker posts shall be maintained by cleaning using methods which do not damage them.
2	Hazard posts and marker posts that are not vertical or damaged shall be straightened and re-erected vertically and the ground around the base of the post re-compacted.
3	Cleaning shall not be carried out when the ambient temperature is 2°C or less or when the Operations are likely to result in the formation of ice on the footway or carriageway.
4	Ladders shall not be leant against sign faces during inspection or maintenance Operations
6120AR	Maintenance of Lit Sign Units
1	Lit Sign Units shall be maintained by:
	<ul style="list-style-type: none"> (i) cleaning of all photo electric control units, luminaire external and internal surfaces and any other components affecting the optical performance of the luminaire using methods that do not damage them, (ii) degreasing, lubricating and checking the operation of all toggles, wing nuts, hinges, door locks and lifting gear, (iii) aligning bracket luminaire and luminaire optical equipment in respect of the sign face and to minimise glare to traffic,

Clause No.	Title and Written Text
	<ul style="list-style-type: none"> (iv) checking and tightening screws and locking devices in accordance with the manufacturer's instructions, (v) identifying and recording damage, corrosion or misalignment of posts, (vi) identifying and recording electrical components showing signs of overheating, fracture, condensation or tracking, (vii) inspecting lamps removed for cleaning purposes, and if no longer serviceable replacing the lamp with a new lamp of an equivalent specification. If serviceable, the lamp shall be refitted, (viii) replacing lamps, (ix) marking new lamps with the date of installation and recording this date, (x) identifying and recording faults on any electrical unit, (xi) visually checking fixings and recording any Defects, (xii) identifying and recording damage, corrosion or other Defects of conduits, (xiii) checking all electrical connections and recording any Defects, (xiv) checking all earthing connections and recording any Defects, and (xv) clearing debris from around sign post bases for 1 metre radius. (xvi) photographic evidence of all structures maintenance work shall be recorded.
2	The supply shall be isolated at the cut-out for the removal and fitting of lamps.
3	Any faulty lamp shall be disposed of in accordance with clause 1370AR.
6121AR	Maintenance of Traffic Signals
1	<p>Traffic signals shall be maintained by:</p> <ul style="list-style-type: none"> (i) cleaning lenses internal and external surfaces and any other components affecting the optical performance of the lenses in accordance with manufacturer's recommendations, (ii) checking and tightening all grub screws and locking devices in accordance with the manufacturer's instructions, (iii) identifying and recording damage, corrosion or misalignment of posts, (iv) identifying and recording electrical components showing signs of overheating fracture condensation or tracking, (v) inspecting lamps removed for cleaning purposes, and if no longer serviceable replacing the lamp with a new lamp of an equivalent specification. If serviceable, the lamp shall be refitted, (vi) identifying and recording faults on any electrical unit,

Clause No.	Title and Written Text
	<p>(viii) visually checking fixings and recording any Defects,</p> <p>(ix) identifying and recording damage, corrosion or other Defects of conduits,</p> <p>(x) checking all electrical connections and recording any Defects,</p> <p>(xi) checking of all earthing connections and recording any Defects, and</p> <p>(xii) clearing debris from around post bases for 1 metre radius.</p> <p>(xiii) photographic evidence of all structures maintenance work shall be recorded.</p>
2	The supply shall be isolated at the cut-out for the removal and fitting of lamps.
3	Any faulty lamp shall be disposed of in accordance with clause 1370AR.
6122AR	Maintenance of Roadside Electrical Assets, Lighting and Power Supplies
1	Specific requirements for equipment identified in the risk assessment shall be in place prior to electrical maintenance work commencing.
2	The Operating Company shall obtain the prior agreement of the appropriate third party before carrying out work which will result in loss of service of third party roadside electrical assets.
3	Replacement components shall be either the same as that being replaced or an equivalent.
4	The Operating Company shall store all faulty columns and lanterns removed from the Unit for four weeks to allow inspection by the Overseeing Organisation.
5	The Operating Company shall carry out maintenance Operations of luminaires, columns and brackets, underground cable systems, feeder pillars and associated switchgear, control systems, and any other roadside electrical assets and lighting.
6	When replacing luminaires, columns, brackets and other electrical apparatus as maintenance Operations, the Operating Company shall comply with the aesthetic requirements of clause 1302 and shall ensure that any replaced items match the existing in physical appearance, lighting levels and operational capability.
7	<p>Unless otherwise agreed with the Director, all replacement lamp control gear shall comply with the following specifications:</p> <p>(i) be of electronic type,</p> <p>(ii) be Digital Addressed Lighting Interface (DALI) compatible, enabled and accredited,</p> <p>(iii) be capable of being controlled via a lighting central management system,</p> <p>(iv) be capable of implementing set dimming/trimming control regimes autonomously, and</p>

Clause No.	Title and Written Text
	(v) be ELEXON approved.
8	The Operating Company shall inform the Traffic Scotland Operations and Infrastructure Services Contractor prior to isolating or energising power supplies to any equipment that Traffic Scotland operates.
9	All work carried out by the Operating Company, with the exception of inspections and testing on electrical apparatus shall be recorded by: <ul style="list-style-type: none"> (i) a work report, (ii) a call out report, or (iii) another method approved by the Overseeing Organisation. (iv) photographic evidence of all structures maintenance work shall be recorded.
10	The Operating Company, when submitting call out reports and work reports, shall use the format of the model forms below. These reports shall be forwarded to the Overseeing Organisation in accordance with the reporting requirements of Schedule 3 Contract Management
11	The Operating Company shall comply with <i>Transport Scotland</i> guidance document <i>LDS8020 Statements of Intent - Proposed Works Roadside Electrical Assets and Lighting Guidance Notes</i> when submitting Bids for Works relating to electrical apparatus.
12	The Operating Company shall comply with the recommendations made in <i>Transport Scotland</i> guidance document <i>LDS8018 Sustainability Roadside Electrical Assets and Lighting Guidance Notes</i> .
13	The Operating Company shall ensure that new items of energy consuming equipment supplied for use on the Unit are provided with an appropriate charge code (ELEXON code) for incorporation into the electrical apparatus Inventory in accordance with <i>Transport Scotland</i> guidance document <i>LDS8012 Unmetered and Metered Supplies Road Electrical Assets Guidance Notes</i> .
14	The Operating Company shall comply with <i>Transport Scotland</i> ' guidance document <i>LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices</i> .
15	The Operating Company shall comply with <i>Transport Scotland</i> guidance document <i>LDS8007 Reference Documents Listing - recommended Roadside Electrical Assets and Lighting Guidance Notes</i> .
16	The Operating Company shall comply with <i>Transport Scotland</i> guidance document <i>LDS8021 Festive Decorations on Scottish Trunk Road Network Guidance Notes</i> .
17	The Operating Company shall comply with <i>Transport Scotland</i> guidance document <i>LDS8024 Weather Stations (Road Sensors) on Scotland's Trunk Road Network Guidance Notes</i> .

Clause No.	Title and Written Text
18	The Operating Company shall, where applicable make use of the Transport Scotland guidance document <i>LDS8025 Typical Drawings Roadside Electrical Assets and Lighting Guidance Notes</i> .
19	Where modules relating to Transport Scotland's lighting central management system, for the control of roadside electrical assets, lighting and power supplies, are fitted, such items will become part of the maintained equipment. Typically these modules will consist of sealed, readily replaceable subassemblies mounted directly on the asset being controlled, such as a luminaire and similar enclosed roadside equipment. The Operating Company shall replace such modules when necessary as part of their inspection and maintenance of the roadside electrical assets.

Call Out Report Form	
DATE	WEATHER CONDITIONS
TIME CALLED OUT	CALLED OUT BY
TRUNK ROAD/MOTORWAY	LOCATION
DESCRIPTION OF WORK	
To include: equipment damaged	
nature of emergency	
registration of any vehicle involved	
colour and type of vehicle involved	
name and number of Police Officer at scene	
photographs glued to reverse side of report	
details of any liaison with electricity company	
police station reference.	
MATERIALS USED	
To include stores issue number.	
TIME ON SITE	
TIME OF LEAVING SITE	
ADDITIONAL TEAM TYPES AND DURATION	
DESCRIPTION OF PLANT USED AND DURATION	
NAME OF APPROVED ELECTRICIAN	
SIGNATURE OF APPROVED ELECTRICIAN	
NAME OF SUPERVISOR	
SIGNATURE OF SUPERVISOR	

Works Report Form	
ORDER NUMBER	DATE OF ISSUE
TODAY'S DATE	
WEATHER CONDITIONS	
LOCATION	TIME OF ARRIVAL ON SITE
DESCRIPTION OF WORK	
To include accurate details of all Site Operations undertaken in order of the Site Operations carried out:	
<ul style="list-style-type: none"> results of tests or protective measures taken by the operatives any difficulties and further action required details of clause 1402 times of isolation and energising of power supplies details of any liaison with electricity companies. 	
MATERIALS USED	
TIME OF LEAVING SITE	
TYPE OF CLOSURE USED	
DURATION OF CLOSURE	
OUTSTANDING WORK	
DESCRIPTION OF TEAM TYPES USED AND DURATION	
NAME OF SUPERVISOR	
SIGNATURE OF SUPERVISOR	

Clause No.		Title and Written Text
6123AR		Not used
6124AR		Maintenance of High Mast Lighting
	1	Maintenance of high mast lighting units shall be in accordance with clause 6122AR and Technical Report No.7 <i>High Masts for Lighting and CCTV</i> .
6125AR		Incident Response
	1	The response time for attendance of the Operating Company's primary, secondary and back-up Incident Response Resources at the scene of an Incident shall be as stated in Schedule 5 Specification and Drawings, Appendix 32/1 Incident Response. During the hours specified in Schedule 5 Specification and Drawings, Appendix 32/1 Incident Response, the Operating Company may use the resources identified to respond to requests for assistance on other Operations in connection with this Contract. However they must be able to attend at the Site of any Incident on any part of the Unit within the response time stated in Schedule 5 Specification and Drawings, Appendix 32/1 Incident Response.
		Resources for Incident Operations
	2	Details of the types of Incident Support Resources that the Operating Company may utilise to respond to Incidents are as specified in Schedule 5 Specification and Drawings, Appendix 32/1 Incident Response.
6126AR		Not Used
6127AR		Removal of Graffiti, Posters and Encrusted Deposits
	1	Graffiti, posters and encrusted deposits shall be removed by suitable methods which do not damage the substrate.
6128AR		Not Used
6129AR		Not Used
6130AR		Not Used
6131AR		Maintenance of Channels, Kerb Block Drains, Drainage Kerbs and Piped Grips
	1	All Channels, kerb block drains, drainage kerbs and piped grips shall be carried out in accordance with clauses 520 and clause 521 and the following:
	2	All silt, detritus, debris and obstructions shall be removed from pipes, internal channels, external channels, entrances and surroundings surfaces such that the free flow of water is not impeded, that the water does not stand on the carriageway or channel and water can flow into all openings. All material shall be removed and disposed offsite.
	3	Slot drains, channels with grated coverings, kerb block drains and drainage kerbs shall also be jetted to clean the slot, grating, and openings. The internal channels and pipes shall also be cleaned by

Clause No.	Title and Written Text
	jetting or by drawing through a mandrel with a diameter 20mm less than the nominal diameter of the pipe or nominal minimum area of the "waterway area" of the block.
4	Catchpits, gullies, silt traps etc. associated with Channels, kerb block drains, drainage kerbs and piped grips shall be cleaned at the same time in accordance with clause 6102AR, 520 and 521.
5	If necessary, a root cutter attachment shall be used with the high-pressure water jetter.
6	<p>Details of the Operations shall be recorded in a Data Capture Device or alternative system approved by the Director and uploaded into the Asset Performance Management System within 3 days. Details of the Operations record shall include as a minimum:</p> <ul style="list-style-type: none"> • Asset ID • Operative/gang/vehicle • Co-ordinate of operation • Date/time stamp of operation • Any remaining Defects/issues • Any areas that could not be maintained, their extents and reasons. • Any appropriate notes <p>Any Defects found in respect to blockages or damages to the drainage item or components together with the location of those Defects shall be recorded against the relevant asset.</p>
Series 6200 Professional Services Staff	
6201AR	Requirements for Professional Services Staff
1	The requirements of role, qualifications, experience, areas of knowledge and key and specific tasks for staff engaged in undertaking Professional Services shall be as stated in Schedule 5 Specification and Drawings, Appendix 62/1 Requirements for Professional Services.

Appendix F AR

Appendix F is extended by the addition of the publications listed below

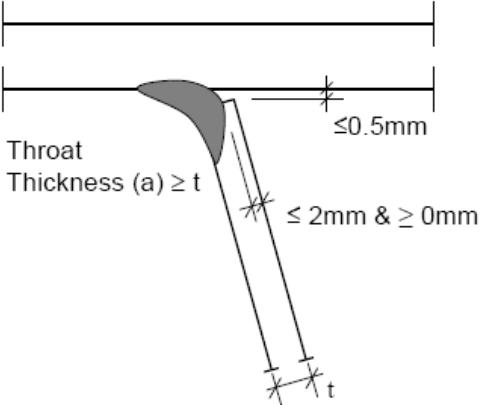
British Standard (BSs)	Specification SHW Clause/Table

Substitute Clauses, Tables and Figures

Clause No.	Title and Written Text
Preliminaries	
110SR	Information Boards
1	<p>The information boards required are:</p> <p>(i) Network Customer Information Signs</p> <p>The Operating Company shall supply and erect network customer information plated signs as detailed in Schedule 3 Contract Management, Section 6 Communications. The Operating Company shall remove the sign face not later than the Service End Date.</p> <p>The network customer information signs shall be erected no later than seven days after Commencement of Service Date.</p> <p>The Operating Company shall maintain the signs in a clean condition.</p> <p>Signs shall be constructed and assembled in accordance with clause 1207,</p> <p>(ii) Works Contract Information Signs</p> <p>Scheme information boards shall comply with the <i>Traffic Signs Regulations and General Directions 2016</i> sign reference 7007.1 and shall be constructed and assembled in accordance with clause 1207, and</p> <p>(iii) Operations Information Signs</p> <p>Temporary scheme contact signs, as defined in the <i>Traffic Signs Regulations and General Directions 2016</i> , sign reference 7008, shall be erected at all Sites within the Unit while Operations, including traffic management, are being carried out.</p> <p>In the permitted variants of sign reference 7008, the word "Undertaker's" shall be replaced with the words "Operating Company's".</p> <p>In the description of the sign reference 7008, the word "employer" shall be replaced with the words "Operating Company".</p> <p>The signs shall be erected in a prominent position at either end of the Site so that they may be read easily by users of the Trunk Road.</p> <p>The sign shall display the name and telephone number of the organisation responsible for carrying out such Operations.</p>
2	<p>The Operating Company shall keep clean and maintain any network customer information signs and operations information signs and shall dismantle and remove the operations information signed on completion of the Operations.</p>

	3	The Operating Company may erect for its own purpose sign boards at the entrance to each of the compounds which it uses in connection with the maintenance of the Unit. The size of these boards shall be no greater than the boards required for network customer contact signs and shall be subject to the approval of the appropriate planning authority.
	4	Operating Company advertising boards other than the customer information signs set out in Schedule 3 Contract Management, Section 6 Communications will not be allowed on or adjacent to the Unit except at the entrance to compounds.
1401SR		General
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1402SR		Site Records
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1403SR		Location of Lighting Units and Feeder Pillars
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1407SR		Luminaires
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1409SR		Photo-electric Control Units (PECUs)
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1412SR		Ballasts
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1416SR		Cut-outs, Fuse Holders, Fuses and Miniature Circuit Breakers (MCBs)
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1417SR		Base Compartment Fixing Arrangements
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1418SR		Feeder Pillars
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1419SR		Wiring

		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1420SR		Earthing
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1421SR		Underground, Overhead and Ducted Cable
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1422SR		Cable Joints
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1423SR		Armoured Cable Terminations
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1424SR		Inspection and Testing to be Carried Out by the Contractor
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1801SR		Structural Steelwork General
	1	<ol style="list-style-type: none"> 1. All steelwork shall be in accordance with <i>British Standard EN 1090-2:2018</i> and the <i>Steel Bridge Group Model Project Specification (SCI Publication P382:2009)</i>, all as amended by clauses 1802SR and 1803SR. 2. For orthotropic steel decks, the requirements within <i>British Standard EN 1993-2:2006 Eurocode 3. Design of steel structures</i>. Steel bridges Annex C clause C.3 shall apply.
1802SR		Amendments to British Standard EN 1090-2:2018 Execution of steel structures and aluminium structures. Technical requirements for steel structures
	1	<ol style="list-style-type: none"> 1. Delete section 5.6.10. Hot rivets are not permitted. 2. Delete sections 10.1 and 10.2 and Annex F. Surface treatment to be in accordance with <i>SHW Series 1900</i>.
1803SR		Amendments to Steel Bridge Group Model Project Specification
	1	<ol style="list-style-type: none"> 1. Insert in Section 4.101 "<i>British Standard EN 1090-2:2018 Execution of steel structures and aluminium structures. Technical requirements for steel structures.</i> Company to add further standards to Schedule 5 Specification and Drawings, Appendix 18/1 Requirements for Structural Steelwork "

		<p>2. Replace clause 4.201 with</p> <p>"A Quality Plan for the execution of the works, in accordance with National Highway Sector Schemes for Quality Management in Highway Works Scheme 20 Particular requirements for the application of ISO 9001:2015 For the Execution of Steelwork in Transportation Infrastructure Assets (<i>NHSS 20</i>), shall be provided and maintained."</p> <p>3. Delete clause 6.602. Hot rivets are not permitted.</p> <p>4. Insert in section 7.402</p> <p>"Pre-production welding tests shall be carried out on complex weld configurations and highly fatigue sensitive details. These shall include but are not restricted to the trough to deck weld and the trough to transverse comb weld."</p> <p>5. Replace clause 7.505 with</p> <p>"Permanent backing material may only be used where the Designer has taken it into account including the joint classification for the backing material in the fatigue design and indicated it on the drawings for construction."</p> <p>6. Replace clause 8.203 with</p> <p>"The Structure shall not be designed to utilise the shear resistance of the unthreaded shank of bolts."</p> <p>7. Delete clause 8.701 and 8.702. Hot rivets are not permitted on this project.</p> <p>8. Delete clauses 10.1, 10.2, 10.5, 10.6, 10.8 and 10.9. Surface treatment to be in accordance with <i>SHW Series 1900</i>.</p> <p>9. Replace 11.302 with,</p> <p>"In addition to the requirements in D.2, the following functional tolerances apply:</p> <p>i) Trough to deck plate weld:</p>  <p>The diagram shows a cross-section of a trough-to-deck plate weld. It features a horizontal top plate and a vertical plate extending downwards from its center. The weld is located at the top of the vertical plate. Dimension lines indicate the following tolerances: the throat thickness 'a' is greater than or equal to the plate thickness 't'; the distance from the top edge of the horizontal plate to the start of the weld is less than or equal to 0.5mm; the distance from the top edge of the horizontal plate to the end of the weld is between 0mm and 2mm; and the thickness of the vertical plate is 't'.</p>
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		<p>10. Delete clause 12.706.</p> <p>11. Delete Annex F. Corrosion protection to be in accordance with <i>SHW Series 1900</i>.</p> <p>12. The Operating Company shall complete the following clauses by providing details in Schedule 5 Specification and Drawings, Appendix 18/1 Requirements for Structural Steelwork:</p> <p style="padding-left: 40px;">5.101, 5.307, 5.606, 6.501, 5.901, 6.604, 6.606, 6.1001, 7.501, 7.506, 7.508, 7.510, 7.602, 7.603, 8.204, 8.901, 8.902, 9.301, 9.302, 9.303, 9.304, 9.401, 12.201, 12.401, 12.504, 12.704, 12.707</p>
2007SR		Delete Integrity Testing of Concrete Bridge Deck Waterproofing and replace with Integrity Testing of Bridge Deck Waterproofing
	1	Waterproof systems to bridge decks shall be tested where required in Schedule 5 Specification and Drawings, Appendix 20/1 Waterproofing for Concrete Structures in accordance with the requirements therein to verify the integrity of the waterproofing.
2101SR		Bridge Bearings – General
		<p>Unless otherwise described in Schedule 5 Specification and Drawings, Appendix 21/1 Bridge Bearing Schedule, bearings shall be supplied and installed in compliance with <i>British Standard EN 1337 Structural bearings</i> consisting of the following parts:</p> <ul style="list-style-type: none"> (a) Part 1 - General design rules (b) Part 2 - Sliding elements (c) Part 3 - Elastomeric bearings (d) Part 4 - Roller bearings (e) Part 5 - Pot bearings (f) Part 6 - Rocker bearings (g) Part 7 - Spherical and cylindrical PTFE bearings (h) Part 8 – Guided and restrained bearings (i) Part 9 - Protection (j) Part 10 - Inspection and maintenance (k) Part 11 - Transport, storage and installation <p>excluding subsections relating to corrosion protection which is covered under the Specification for Highway Works Series 1900 Protection of Steelwork Against Corrosion.</p>
3007 SR		Grass, Bulbs and Wildflower Maintenance
	1	The Operating Company shall maintain all the grass and wildflower grass areas within the Unit in accordance with clause 3007 and in the categories recorded in the landscape Inventory. For the purposes of this Contract grass shall mean the sward including any type of vegetative growth therein. In the case of any areas of grass or wildflowers within the

		<p>existing unit not recorded in the landscape Inventory, the Operating Company shall report these to the Overseeing Organisation for confirmation of the relevant categorisation and shall the maintain areas them accordingly.</p> <p>Prior to any cutting operation all stones or other harmful material from whatever source which may damage grass cutting plant or create a possible hazard to persons or property shall be removed off Site.</p> <p>Not more than 48 hours prior to grass cutting the area to be cut shall be cleansed of litter to Grade A standard as stated in the <i>Code of Practice on Litter and Refuse (Scotland) 2018</i> and any litter susceptible to shredding shall be removed. Where the Operating Company are responsible for litter clearance they shall remove the litter. Where the Local Authority are responsible for litter clearance the Operating Company shall co-ordinate works and provide assistance to allow the Local Authority access to the area not more than 48 hours prior to the grass cutting operation to clear the litter. Any movable obstructions such as seats and litterbins shall be removed to facilitate cutting and replaced prior to leaving the Site.</p> <p>The use of weed killer or other chemical substances shall not be used in order to restrict the growth of grass.</p> <p>Where the areas contain injurious weeds as listed in sub-clause 3002.1, the first cut of any year shall be undertaken prior to the weeds flowering and additional selective cuts shall be undertaken within these areas as required in Schedule 5 Specification and Drawings, Appendix 30/7 Grass, Bulbs and Wildflower Maintenance or instructed by the Overseeing Organisation.</p>
	5	<p>The grass cutting operation shall include cutting around all obstacles such as trees, posts, IT equipment and signs etc. where the sward shall be cut to the same height as specified for the surrounding grassed/wildflower areas. Strimmers may be used where appropriate but shall not be used for cutting grass within 250 mm of unprotected trees and shrubs without the written consent of the Overseeing Organisation.</p>
	6	<p>Mowing Operations shall avoid spillage of debris such as stones onto carriageways or footways. Grass clippings and arisings shall be removed from Site except where they can be finely cut and evenly and thinly distributed over the sward without clumping and/or detrimentally affecting the underlying sward.</p> <p>Where the arisings are likely to be too substantial to remain on Site this may be permitted, with the approval of the Overseeing Organisation, if a further cut of the arisings themselves is undertaken to reduce the size and impact.</p> <p>Without exception, all clippings and arisings must be removed from Site in the following circumstances:</p>

		<ul style="list-style-type: none"> (i) for the first cut of the year in areas of high amenity, amenity or general grass, (ii) for grassed central reservations, (iii) when cutting is carried out in high winds, or when high winds are forecast, which could lead to arisings being blown around, (iv) clippings and arisings lying on roads, footpaths, car parks and other hard surfaces, and, (v) arisings that could lead to the blockage of ditches or drains.
	13	<p>All areas indicated within the landscape Inventory as amenity grass shall be subject to medium frequency cutting in accordance with the following:</p> <ul style="list-style-type: none"> (i) First Cut after Winter/Spring. The areas shall be cut when the grass reaches a height of 75 - 150 mm to a height between 50 - 70 mm and the cuttings removed off Site. (ii) Subsequent Cuts. The areas shall be cut to a height between 50 - 60 mm at least 6 times per year during the growing season and the cuttings evenly dispersed. <p>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:</p> <ul style="list-style-type: none"> (iii) 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. (iv) Grassed areas on roundabouts within or associated with urban areas and settlements. (v) 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.
	17	<p>All areas indicated within the landscape Inventory as general grass shall be subject to low frequency cutting and the following shall apply:</p> <ul style="list-style-type: none"> (i) Grass shall be cut to maintain a height of between 80 mm and 300 mm, and (ii) Grass shall be cut to prevent an obstruction of a sight line or the visibility of a sign or other item.

		<p>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:</p> <ul style="list-style-type: none"> (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 (or those covered by a soft vegetative ground cover) – 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 the outer edge of any footpath/footway/pavement adjacent to the carriageway where there is a grassed edge, and to both sides of such paths that may be remote from the carriageway edge but within the Trunk Road boundary.
3010SR		Maintenance of Established Trees and Shrubs
	1	<p>All areas of established planting/vegetation, as shown within the landscape Inventory, shall to be maintained each year until the end of the full Contract Period. Trunk Road vegetation, relative to this part, shall typically include: trees, woodland, shrubs, scrub, hedges & hedgerows, aquatic & marginal vegetation etc. clause 3010 shall apply to all such vegetation not already subject to Establishment Maintenance in accordance with clause 3009.</p> <p>Maintenance of established planting/vegetation shall typically, but not exclusively, be carried out for the following reasons:</p> <ul style="list-style-type: none"> a) Safety of the network and all users b) Driver/road user forward visibility c) To keep all road signs clear and unobscured d) General amenity e) Good horticultural practice f) Biodiversity/Nature conservation

		<p>g) Control of weeds and non-native invasive species</p> <p>h) To facilitate the management of Operations</p>
	4	<p>Healthy arisings from pruning, cutting or felling of woody plants shall be treated strictly in accordance with the following:</p> <p>(i) Arisings may be removed from Site without chipping if this is deemed appropriate.</p> <p>(ii) Arisings may be chipped using an appropriate woodchipper but must be collected and removed from Site.</p> <p>(iii) Arisings may be chipped using an appropriate woodchipper and may be spread on Site but only following consultation with the Overseeing Organisation and with written approval from the Director. If chipped arisings are permitted to be spread on site this must be in locations 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. The Operating Company shall ensure that any such treatment of arisings shall not detrimentally impact on the Operation of the trunk road network or affect any neighbouring land interests. No remnants of the chipping Operations shall remain in sight of the road. <u>This sub clause always applies with regard to chipped arisings except in the case of such arisings treated in accordance with sub-clause (vii) below.</u></p> <p>(iv) Where chippings are to be retained on the Site the chipper shall produce chippings in the size range 0-75 mm. Larger sized chips are not permitted to be retained on Site.</p> <p>(v) Chipped arisings may not be spread on Site if this is likely to detrimentally affect the growth or establishment of any area of desirable grass or wildflower/herbaceous groundcover.</p> <p>(vi) Chipped arisings may not be spread on sloping ground where there is a likelihood this may inhibit vegetation growth/establishment which would otherwise help stabilise the ground.</p> <p>(vii) Chipped arisings may be used as a weed-suppressant or mulch only with written approval of and in locations agreed with the Overseeing Organisation. Where chippings are intended to act as a weed-suppressant</p>

		<p>mulch, they shall be spread over the agreed locations to a depth of 75 mm.</p> <p>(viii) Chippings which are excess to the requirements specified in sub-clauses (iii) and (vii) shall be removed off Site.</p> <p>(ix) Arisings of greater than 100 mm diameter may be cut to suitable and manageable lengths and securely stacked and placed on Site for nature conservation purposes (habitat piles). The extent and general locations of such material shall be agreed with the Overseeing Organisation and shall be away from the carriageway towards the boundary of the Unit, and screened from the road. Any excess material not able to be treated in this manner shall be removed from Site and treated in accordance with this clause 3010.4.</p>
	36	<p>The Contractor shall comply with the current Arboriculture and Forestry Advisory Group (AFAG) recommendations in relation to all aspects of the arboricultural works.</p>

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems

I (M) – High Build Epoxy (2 pack)/ Polyurethane (2 pack) finish				
Substrate Type	1 Steel	2 Aluminium metal spray, zinc metal spray	3 Existing paint coats	4 Existing paint coats
Surfaces prepared to	Clean, bright Sa2 or St3 quality steel	Bright or sound metal coating	Sound finishing coat or last undercoat	Other sound paint coats
1st Coat				
Item No.	Item 115	Item 115	Nil	Nil
Minimum dry film thickness (µm)	100	100	–	–
2nd Coat				
Item No.	Item 116	Item 116 or 112	Nil	Item 116 or 112
Minimum dry film thickness (µm)	–	–	–	100
3rd Coat				
Item No.	Item 168	Item 168	Item 168	Item 168
Minimum dry film thickness (µm)	50	50	50	50
Minimum total dft of the paint system to be obtained (µm)	300µm	300µm	50µm	175µm
STRIPE COATS	Item 112, 80 µm mdft. Brush or airless spray. One stripe coat in area prepared to clean steel or sound metal coating. Applied over 1 st coat.			
PATCH COATS	Nil			

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (Continued)

NOTES:

1. When a light tint gloss finish is required an extra coat of Item 168 shall be applied. Item 169 Polyurethane Finish, may be used in lieu of Item 168 to provide a semi-gloss finish, alternatively Item 164 (Moisture Cure Polyurethane finish) can provide a semi-gloss finish and is tolerant of surface moisture (but not running water) and low temperatures during application and curing.
2. Types I (M) and II (M) can be combined to allow paint maintenance to proceed when temperature falls and relative humidity increases and for night work.

HEALTH & SAFETY

Polyurethane (two pack) and Moisture Cured Polyurethane paints contain isocyanate and can be injurious to health if not used correctly.

An assessment of the risks and controls for their safe use shall be carried out before use.

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

II (M) – MC/Polyurethanes				
Substrate Type	1 Steel	2 Aluminium metal spray, zinc metal spray	3 Existing paint coats	4 Existing paint coats
Surfaces prepared to	Clean or bright steel	Bright or sound metal coating	Sound finishing coat or last undercoat	Other sound paint coats
1st Coat				
Item No.	Item 160	Item 160	–	–
Minimum dry film thickness (µm)	40	40	–	–
2nd Coat				
Item No.	Item 162	Item 162	–	Item 162
Minimum dry film thickness (µm)	–	–	–	70
3rd Coat				
Item No.	Item 162	Item 162	–	Item 162
Minimum dry film thickness (µm)	70	70	–	70
4th Coat				
Item No.	Item 164/169	Item 164/169	Item 164/169	Item 164/169
Minimum dry film thickness (µm)	40/50	40/50	40/50	40/50
Minimum total dft of the paint system to be obtained (µm)	275/325µm	275/325µm	50/100µm	225/275µm
STRIPE COATS	Item 162, 50 µm mdft. Brush or airless spray. Two stripe coats, the first applied over 1st coat, the second coat applied over the 2nd coat.			
PATCH COATS	Nil			

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

NOTES:

1. Item 168, Polyurethane (two pack) gloss finish may be used in lieu of Item 164 MC Polyurethane semi-gloss finish (two pack Polyurethane gloss finishes shall be less tolerant of moisture and low temperatures during application and curing than MC Polyurethanes and shall therefore only be specified when conditions preclude the formation of moisture on surfaces and when the ambient temperature is likely to be above 5°C during application and the curing period).
2. Types I (M) and II (M) can be combined to allow paint maintenance to proceed when temperature falls and relative humidity increases and for night work.

HEALTH & SAFETY

Polyurethane (two pack) and Moisture Cured Polyurethane paints contain isocyanate and can be injurious to health if not used correctly.

An assessment of the risks and controls for their safe use shall be carried out before use.

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

	III (M) – Extended Cure Epoxy/Polyurethanes	III (M) (alternative) – Extended Cure Epoxy/Polyurethanes
Substrate Type	1 Hot dip galvanizing	2 Hot dip galvanizing
Surfaces prepared to	Bright or sound metal coating	Bright or sound metal coating
1st Coat Item No. Minimum dry film thickness (µm)	Item 155 or other adhesion promoter –	Item 121 100
2nd Coat Item No. Minimum dry film thickness (µm)	Item 121 100	Item 164,168 or 169 50
3rd Coat Item No. Minimum dry film thickness (µm)	Item 164,168 or 169 40/50/50	– –
Minimum total dft of the paint system to be obtained (µm)	175/250µm	175µm
STRIPE COATS	Item 121, 80 µm mdft. Brush or airless spray. One stripe coat in area prepared to clean steel or sound metal coating Applied over 1st coat	
PATCH COATS	Nil	

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

NOTES:

1. Some Item 121 formulations have been developed for direct application to hot dipped galvanised surfaces with excellent adhesion without the need for an adhesion promoter (to be checked with and guaranteed by paint manufacturer).
2. When a light tint gloss is required an extra coat of Item 168 shall be applied. Item 164, Moisture Cured Polyurethane Finish, may be used in lieu of Item 168 to provide a semi-gloss finish tolerant of surface moisture (but not running water) and low temperatures during application and curing.

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

HEALTH & SAFETY

Polyurethane (two pack) and Moisture Cured Polyurethane paints contain isocyanate and can be injurious to health if not used correctly. An assessment of the risks and controls for their safe use shall be carried out before use.

IV (M) – MC/Epoxy/Polyurethane	
Substrate Type	1 Steel
Surfaces prepared to	Clean, bright or Sa2 or St3 quality steel
1st Coat Item No. Minimum dry film thickness (µm)	Item 160 50
2nd Coat Item No. Minimum dry film thickness (µm)	Item 116 or 112 –
3rd Coat Item No. Minimum dry film thickness (µm)	Item 164 or 168 50
Minimum total dft of the paint system to be obtained (microns)	250µm
STRIPE COATS	Item 112, 80µm mdft. Brush or airless spray. One stripe coat in area prepared to clean steel or sound metal coating Applied over 1st coat
PATCH COATS	Nil

NOTES:

- When a light tint gloss finish shall be required an extra coat of Item 168 shall be applied. Item 164, Moisture Cured Polyurethane Finish may be used in lieu of Item 168 to provide a semi-gloss finish tolerant of surface moisture (but not running water) and low temperatures during application and curing.

HEALTH & SAFETY

Polyurethane (two pack) and Moisture Cured Polyurethane paints contain isocyanate and can be injurious to health if not used correctly.

An assessment of the risks and controls for their safe use shall be carried out before use.

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

Grease paint system for maintenance of an Oleo-resinous system on a zinc metal sprayed coating where there has been extensive breakdown of the paint system over areas where corrosion of the zinc metal coating has started.

Also may be used, subject to the written approval of the Overseeing Organisation as a temporary measure over steel strengthening (additional stiffeners, welding or other measures) on the insides of boxes and to external bridge bearings where loose surface paint has been removed.

V (M) – Grease Paint			
Substrate Type	1 Steel	2 Aluminium metal spray, zinc metal spray or hot dip galvanizing	3 Existing paint coats
Surfaces prepared to	Clean, bright or Sa2 or St3 quality steel	Bright or sound metal coating	Sound finishing coat or last undercoat or other sound paint coats
1st Coat: Grease Paint Penetrating Primer Item No. Minimum dry film thickness (µm)	Item 200 Nominal	Item 200 Nominal	Item 200 Nil
2nd Coat: Grease Paint Undercoat, yellow Item No. Minimum dry film thickness (µm)	Item 201 150	Item 201 150	Item 201 Nil
3rd Coat: Grease Paint Finish, black Item No. Minimum dry film thickness (µm)	Item 201 150	Item 201 150	Item 201 150
Minimum total dft of the paint system to be obtained (µm)	330µm	350µm	160µm
STRIPE COATS	Item 201, 150µm mdft. Brush. One stripe coat in all areas over 2 nd coat		
PATCH COATS	Item 201. Brush, over 2 nd coat		

TABLE 50/2SR: Requirements for Bridges, Parapets, Bearings, CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms and other Highway Structures: Protective Systems (continued)

NOTE:

The total dft of existing coats plus new coats, including patch coats, shall not be less than 400 μm .

Number of patch coats to suit.

Appendix 0/2 - Contract-Specific Minor Alterations to Existing Clauses, Tables and Figures included in this Contract

List of Contract Specific Minor Alterations to Existing Clauses, Tables and Figures

Clause No	Title	Page No
104	Standards, Quality Management and Acceptance	
120	Recovery Vehicles and Operations for Breakdowns	
201	Clearing	
204	Hazardous Materials	
507	Chambers	
521	Water Jetting and Suction	
606	Watercourses	
610	Fill to Structures	
611	Fill Above Structural Concrete Foundations	
618	Topsoiling, Grass Seeding and Turfing	
930	EME2 Base and Binder Course Asphalt Concrete	
942	Thin Surface Course Systems	
1101	Precast Concrete Kerbs Channels Edgings and Quadrants	
1102	In Situ Asphalt Kerbs	
1103	Freestanding In Situ Concrete Kerbs Channels and Edge Details	
1104	Footways and Paved Areas (Precast Concrete Flags and Natural Stone Slabs)	
1106	Footpaths and Paved Areas (In Situ Concrete)	
1107	Footways and Paved Areas (Concrete Block Paving)	
1108	Footways and Paved Areas (Clay Pavers)	
1110	Access Steps	
1202	General Requirements for Permanent Traffic Signs	
1204	Posts for Permanent Traffic Signs	
1209	Covering of Permanent Traffic Signs	
1210	Permanent Bollards	
1213	Road Studs	
1218	Detector Loops	
1301	General	

Clause No	Title	Page No
1302	Design of Lighting Columns, Brackets, CCTV Masts, Cantilever Masts, Foundations, Anchorages and Attachment Systems	
1303	Data Sheets	
1304	Identification and Location Markings	
1308	Handling, Transport and Erection	
1714	Structural Concrete	
1904	Workmanship Standards for the Surface Preparation of Steel by Blast Cleaning, Abrading, Grinding and Cleaning	
1906	Procedures for Treatment at Joints	
1907	Procedures for Treatment at Areas of Mechanical Damage or Other Surface Defects	
1908	Procedures for Treatment of Local Failure in Protective Coatings	
1909	Metal Coatings	
1910	Testing of Thermally Sprayed Aluminium Metal Coatings	
1911	Paint and Similar Protective Coatings	
1914	Application of Paint	
1915	Procedure Trials	
1917	Surfaces in Contact with Concrete	
1921	Additional Requirements for the Protection of CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms	
2404	Mortar	
2412	Brickwork and Blockwork	
2417	Unreinforced Masonry Arch Bridges	
3001	General	
3003	Control of Rabbits and Deers	
3007	Grass, Bulbs and Wildflower Maintenance	
3011	Management of Waterbodies	

Appendix 0/2 – Contract Specific Minor Alterations to Existing Clauses, Tables and Figures included in this Contract

Minor Alterations to Existing Clauses, Tables and Figures

Clause No.	Alterations to be made
Series 100 - Preliminaries	
104	Standards Quality Management and Acceptance
4	In sub-clause 4, line 2 After " <i>British Standard EN ISO 9001</i> " insert and <i>British Standard EN ISO 14001:2015 Environmental Management Systems. Requirements with guidance or use</i> ".
7	In sub-clause 7, line 3 After British Standard EN ISO 9001 insert " <i>British Standard EN ISO 14001:2015 Environmental Management Systems. Requirements with guidance of use</i> ".
120	Recovery Vehicles and Operations for Breakdowns
9	Insert in sub-clause 9, after "A copy of each certificate shall be provided to the Overseeing Organisation not less than 14 days before the commencement of the recovery Operations", the following: "and a copy of each certificate shall be kept by the Operating Company".
17	Insert in sub-clause 17 new paragraph as follows: "The Operating Company shall assist, when required by the Overseeing Organisation or the Police, in the removal of loads or parts thereof deposited within the Site".
18	Delete sub-clause 18, and insert the following: "The recovery service shall be provided in accordance with Schedule 5 Specification and Drawings, Appendix 32/1 Incident Response,"
19	Insert in sub-clause 19 new paragraph as follows: "When moving broken down or damaged vehicles, the Operating Company shall take all reasonable measures to prevent further damage to the vehicles."
23	Insert in sub-clause 23 new paragraph as follows: "Drivers shall be informed that they must make their own arrangements for further assistance."
26	In sub-clause 26 delete: "The Contractor shall submit weekly to the Overseeing Organisation:" and replace with: "The Operating Company shall maintain at the Central Office:"

Clause No.	Alterations to be made
32	<p>Insert in sub-clause 32:</p> <p>After "Vehicle and Operator Services Agency (VOSA) approved testing station,...", the following:</p> <p>"or the Freight Transport Association, conducted not less than 14 days nor more than 28 days before the vehicles are required,"</p> <p>Delete "annually on the due anniversary of the inspection" and replace with:</p> <p>"at intervals not exceeding six months, ..."</p> <p>Add a new paragraph as follows:</p> <p>"A copy of each inspection report shall be kept in:</p> <p>(i) the Operating Company Central Office,</p> <p>(ii) the recovery vehicle."</p>
36	<p>Insert in sub-clause 36:</p> <p>After "The vehicle and all retroreflective markings shall be maintained in a good and clean condition." The following</p> <p>"Where the recovery vehicle forms part of the Operating Companies fleet the livery shall be in accordance with Schedule 5 Specification and Drawings, Appendix 1/75 Operating Company Vehicle Liveries."</p>
37	<p>In sub-clause 37:</p> <p>After "FREE RECOVERY TO END OF ROADWORKS" add "or" "FREE RECOVERY TO END OF BRIDGE" whichever is appropriate.</p>
51	<p>Insert in sub-clause 51, after "The Contractor shall ...", the following:</p> <p>"provide suitable mess and other welfare arrangements for the recovery operatives which shall:</p> <p>(i) be in the form of temporary accommodation,</p> <p>(ii) be located at the recovery vehicle station, and</p> <p>shall ..."</p>
Series 200 – Site Clearance	
201	Clearing
3	<p>Delete sub-clause 3 and replace with:</p> <p>"Disused chambers located under the road pavement, verge or central reserve shall be demolished to a depth of 0.5 metres below formation, properly cleaned out, and filled or capped to meet the requirements of the relevant roads authority. To permit free drainage holes of 76 millimetre diameter (minimum) shall be made at 500 millimetre centres over the whole areas or over 10 per cent of the whole area (whichever is more onerous), of slabs basements etc., which are not removed and which are liable to hold water."</p>

Clause No.	Alterations to be made
6	In sub-clause 6, after paragraph 2, add new paragraph as follows: "In the case of items such as stone, copes, granite setts, kerbs and concrete paving, stacking and protection shall be achieved by securing, transporting and storage on appropriate pallets."
7	Delete sub-clause 7 and replace with: "7. Topsoil excavated for any purpose shall be reserved and protected for re-use. Multiple handling of topsoil shall be kept to a minimum. After completion of the work the topsoil shall be spread over the disturbed ground, any surplus being disposed of as described in clause 602".
204	Hazardous Materials
1	In sub-clause 1, after "...in Site clearance", insert "or any other work on the Unit including Incident Response".
Series 500 – Drainage and Service Ducts	
507	Chambers
48	Add the following new sub-clauses 48-52: The frame shall be haunched with mortar to within 40mm of its top. The remaining 40mm shall be painted with joint bitumen.
49	The remainder of the void around the frame shall be filled with either bitumen macadam or rolled asphalt surfacing material to match the surrounding surface. The surface course shall be laid in a uniform layer of the specified thickness and shall include any surface treatment necessary to match the surrounding surface. Such treatment shall comply with the relevant clauses in this Specification.
50	Covers and frames shall be broken-out, adjusted, reinstated and able to be trafficked in the course of one day.
51	In certain circumstances, for example if the Site is to be overlaid, the Operating Company may adjust covers and frames to levels above the adjacent surface. The covers and frames shall be surrounded by a temporary ramp in bituminous material to a gradient not steeper than 1:10. The Operating Company shall provide warning signs in accordance with clause 117.
52	Draw pit chambers for electrical supply cables shall be as referred to in Schedule 5 Specification and Drawings, Appendix 5/2 Service Duct Requirements.

Clause No.		Alterations to be made
521		Low Pressure High Volume Jetting of Drainage Systems
	9	In sub-clause 9, after (vi), insert (vii): "(vii) the suction facility shall be provided by a liquid ring exhauster and shall have an air flow of at least 70 cu m per minute and 380mm Hg vacuum through a 200mm diameter boom mounted pipe with a debris tank capacity of at least 5.5 m ³ ."
Series 600 - Earthworks		
606		Watercourses
	1	In sub-clause 1, after "ditches," insert "drainage grips".
	2	In sub-clause 2 after "unacceptable material", include "with the exception of gravels, water worn pebbles and boulders from areas of redundant watercourses which may be excavated and set aside for reuse."
	5	Add new sub-clause 5: "The cutting of new drainage grips shall be to the profiles required to deal with the discharge of surface water from the carriageway. All arisings from the cutting of new drainage grips shall be removed to a licensed disposal facility unless it is appropriate to spread and level the arisings on the verge such that it does not interfere with the maintenance of grassed areas. The grass shall be trimmed for a distance of 1 metre on either side of the grip."
610		Fill to Structures
	1	In sub-clause 1(iv): delete "unless otherwise required in Schedule 5 Specification and Drawings, Appendix 6/6 Fill to Structures and Fill Above Structural Foundations".
	2	In sub-clause 2 line 1 delete: " 6P, 7A or 7B".
		In sub-clause 2 lines 2 and 3 delete: ", in the locations described in Schedule 5 Specification and Drawings, Appendix 6/6 Fill to Structures and Fill Above Structural Foundations ".
	3	In sub-clause 3 lines 1 and 2 delete: "6P, 7A and 7B".
	6	In sub-clause 6 lines 1: delete: "6P and 7B"
611		Fill Above Structural Concrete Foundations

Clause No.	Alterations to be made
1	In sub-clause 1 (i): delete "6P, 7A or 7B". In sub-clause 1 (ii) delete whole sub-clause.
618	Topsoiling
2	Delete sub-clause 2 and insert "Class 5B imported topsoil shall only be used when permitted in writing by the Employer and shall be tested for major nutrient requirements in accordance with Schedule 5 Specification and Drawings, Appendix 1/5 Testing to be carried out by the Operating Company."
Series 900 – Road Pavements General	
930	EME2 Base and Binder Course Asphalt Concrete
6	Add to end of sub-clause 6: "EME2 shall be laid with uniform compaction over the whole Lane width by a paver fitted with a high density, pre-compaction screed."
8	Delete existing sub-clause 8 and replace with: "Compaction shall be substantially completed before the temperature falls below 125 °C. Limited rolling without vibration may be carried out below this temperature to improve the finish. If EME2 starts to shove or tear during compaction, compaction must be stopped. Compaction can recommence if material temperature drops and no material movement is observed."
20	Add to end of sub-clause 20: "Two copies of the final in situ core air void results shall be passed to the Overseeing Organisation within 7 Days."
942	Thin Surface Course Systems
3	Delete existing 942.3 and replace with The Contractor shall guarantee the installed material for a period of 5 years from the date of opening to traffic. For the period of the guarantee the thin surface course shall meet the performance requirements stated in this Clause and contract specific Appendix 7/1. The guarantee shall exclude defects arising from accidental damage or damage caused by settlement, subsidence or failure of the underlying carriageway on which the surfacing material has been laid. Replacement of the surfacing or other remedial measures agreed with the Overseeing Organisation shall be executed if the surfacing is in a "Acceptable" "Suspect", "Poor" or "Bad" condition as defined in Appendix A of TRL Report TRL674 – "Durability of thin surfacing systems, Part 4, Final report after nine years monitoring, TRL report 674"

Clause No.	Alterations to be made
Series 1100 - Kerbs Footways and Paved Areas	
1101	Precast Concrete Kerbs Channels Edgings and Quadrants
20	In sub-clause 20: amend to read "At expansion joints in bridge decks the kerb joints shall be agreed with the Overseeing Organisation "
1102	In Situ Asphalt Kerbs
6	Delete sub-clause 6.
10	Amend sub-clause 10 to read ""At expansion joints in bridge decks, the kerb joints shall be agreed with the Overseeing Organisation."
1103	In Situ Concrete Kerbs Channels and Edge Details
2	In sub-clause 2, line 2: delete all text after "dragging"
14	Delete sub-clause 14 ."
1106	Footpaths and Paved Areas (In Situ Concrete)
9	Add new sub-clause 9: "Synthetic fibres shall be added to the concrete at the concrete mixing plant at a rate of 0.9kg per cubic metre of concrete as and when specified by the Overseeing Organisation."
1107	Footways and Paved Areas (Concrete Block Paving)
9	Add new sub-clause 9: "When replacing an existing area of block paving the type and colour of the blocks and the pattern used shall match existing."
1108	Footways and Paved Areas (Clay Pavers)
9	Add new sub-clause 9: "When replacing an existing area of paving the type and colour of the blocks and the pattern used shall match existing."

Clause No.		Alterations to be made
1110		Access Steps
	2	In sub-clause 2, line 2: Add " The steps shall be installed in accordance with drawings NDX1070-01ga and NDX1070-02ga".
1118		Polymetric Kerbs, Islands and Lane Separators
	1	Add to end of sub-clause 1: These products will only be permitted for use with prior approval of the Overseeing Organisation.
Series 1200 – Traffic Signs		
1202		General Requirements for Permanent Traffic Signs
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1204		Posts for Permanent Traffic Signs
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1209		Covering of Permanent Traffic Signs
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1210		Permanent Bollards
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1213		Road Studs
	9	Add new sub-clause 9: "New or replacement thermoplastic road studs shall be installed as CHART node points as and when directed by the Overseeing Organisation. Existing metal CHART node points shall be removed with minimum damage to the carriageway which shall be reinstated using filled bitumen or bituminous instant repair material."
1218		Detector Loops
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
Series 1300 – Road Lighting Columns and Brackets, CCTV Masts and Cantilever Masts		
1301		General
		Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1302		Design of Lighting Columns, Brackets, CCTV Masts, Cantilever Masts, Foundations, Anchorages and Attachment Systems

Clause No.	Alterations to be made
	Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1303	Data Sheets
	Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1304	Identification and Location Markings
	Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
1308	Handling, Transport and Erection
	Refer to LDS8016 Specifications Scottish MCHW Series 1200 1300 & 1400 and Sample Appendices
Series 1700 - Structural Concrete	
1714	Reinforcement - Fixing
1	Add the following additional paragraph to sub-clause 1: "Concrete spacers or distance tubes shall conform to <i>British Standard 7973</i> Spacers and chairs for steel reinforcement and their specification and be manufactured in accordance with <i>British Standard EN ISO 9001:2015 Quality management systems. Requirements</i> . Plastic spacers shall not be used."

Clause No.	Alterations to be made
Series 1900 – Protection of Steelwork Against Corrosion	
1904	Workmanship Standards for the Surface Preparation of Steel by Blast Cleaning, Abrading, Grinding and Cleaning
3	Delete the following line from sub-clause 3 “If thermally sprayed aluminium metal coating is to be applied the surfaces shall then be blast cleaned.”
1906	Procedures for Treatment at Joints
7	Delete existing sub-clause 7 and replace with: "Not used.
8	Delete existing sub-clause 8 and replace with: "Not used.
11	Replace existing sub-clause 11 with: “At workshop joints in all steelwork other than in hot dip galvanized steelwork the blast primer alone shall be applied initially to parent and joint material. Immediately before assembly of a joint which is to be painted the first undercoat shall be applied to the contact surfaces and the joint made while the paint is wet.”
12	Replace existing sub-clause 12 with: Hot dip galvanizing shall be removed a minimum of 5 mm back from the edges of weld areas. Paint coats shall be stepped back at 30 mm intervals commencing at least 150 mm from the joint, starting with the 2nd coat of paint.
20	Delete existing sub-clause 20 and replace with: "Not used.
21	Delete existing sub-clause 21 and replace with: "Not used.
26	Delete existing sub-clause 26 and replace with: "Not used.”
1907	Procedures for Treatment at Areas of Mechanical Damage or Other Surface Defects

Clause No.	Alterations to be made
1	<p>Replace existing sub-clause 1 with:</p> <p>Score marks, other surface defects and indentations in the surface of a steel substrate shall be treated by abrading or grinding to bright steel to produce a surface without sharp edges or abrupt change in contour. Damage to unprepared surfaces shall be treated before blast cleaning. A blast cleaning profile may need to be restored on areas to be painted only. Other surface Defects in the steel substrate, including fissures caused by the removal of 'hackles' or inclusions described in sub-clause 1904.3, shall be similarly treated.</p>
4	<p>Delete existing sub-clause 4 and replace with:</p> <p>"Not Used"</p>
5	<p>Replace existing sub-clause 5 with:</p> <p>In the workshop, any damaged sealer or paint coats shall be restored.</p>
6	<p>Delete existing sub-clause 6 and replace with:</p> <p>On Site, with the exception of the small areas, relative to the size of the component, permitted under sub-clause 7 of this clause, any damaged paint coats shall be restored.</p>
7	<p>Delete existing sub-clause 7 and replace with:</p> <p>On Site, small areas of isolated damage in a paint system need not be restored; after surface preparation in compliance with sub-clause 1 of this clause, paint coats shall then be restored over the repaired area.</p>
10	<p>Delete existing sub-clause 10 and replace with:</p> <p>In all cases where paint coats only are to be restored, or hot dip galvanizing is to be replaced by paint, the edges of paint coatings adjacent to the affected area shall be bevelled back into sound paint. This work shall be carried out before any final blast cleaning described in sub-clause 4 of this clause.</p>
1908	Procedures for Treatment of Local Failure in Protective Coatings
1	<p>Delete existing sub-clause 1 and replace with:</p> <p>In the workshop, failed paint coatings shall be restored. Abrading down to sound paint only is permissible.</p>

Clause No.	Alterations to be made
2	Delete existing sub-clause 2 and replace with: On Site, failed paint coatings shall be restored except that: (i) abrading down to sound paint or to bright steel; or (ii) blast cleaning to Sa2½ quality are permissible methods of surface preparation when restoring paint systems over a steel substrate.
5	Delete existing sub-clause 5 and replace with: Sub-clauses 1907.3, 10 and 11 shall be complied with.
1909	Metal Coatings
2	Delete existing sub-clause 2 and replace with: “Not Used”
1910	Testing of Thermally Sprayed Aluminium Metal Coatings
	Delete existing clause 1910 and replace with: “Not Used”
1911	Paint and Similar Protective Coatings
3	Delete existing sub-clause 3 and replace with: “Not Used”
	In Table 19/1 Item 159 shall not be used.
	Notes relating to Table 19/2B “Area D, Type II” shall not be used.

Delete existing Table 19/3B and replace with the table below:

TABLE 19/3B: (08/14) Requirements for Steel in Bridge Bearings (and Metal Coated Fasteners) Protective System Type V

Applied over		Metal Coating	1st Coat	2nd Coat	3rd Coat	4th Coat	Minimum total dry film thickness of the paint system (microns)
Area A and D	Item No		110	111	112	167, 168, 169 or 185	275 (325 if Item 185 finish is specified)
	Min dry film thickness per coat (µm)		12-20 m ² /litre	75	125	50 or 100*	
Area B	Item No		112				150
	Min dry film thickness per coat (µm)		150				
Area C	Item No		110				
	Min dry film thickness per coat (µm)		12-20 m ² /litre				
Area F	Item No	Hot dip galvanize	Adhesion promoter (see Notes)	110	112 or 121	167, 168, 169 or 185	275 (325 if Item 185 finish is specified)
	Min dry film thickness per coat (µm)			25	125	50 or 100*	

		<p>(08/14) Notes (08/14)</p> <p>Finish Coats</p> <p>(i) *Items 167, 168 or 169 finish coats min. dft 50µm. Item 185 finish coat min. dft 100 µm</p> <p>(08/14) Area A and D</p> <p>(i) 4th coat for bearings for steel bridge beams, brush applied on site; colour to match finish on main steelwork.</p> <p>(ii) Aluminium metal spray plus Items 110 or 159 are required on interfaces of machined surfaces of spreader plates and of bearing.</p> <p>(08/14) Areas A, B, C and D</p> <p>(i) Items 110, 111 and 112 shall be applied at the bearing manufacturer's works. Item 167, 168, 169 or 185 shall be applied on site.</p> <p>(ii) Items 110 shall not be over-applied and shall not be included in the overall thickness of the protective paint system.</p> <p>(08/14) Area F</p> <p>(i) Adhesion promoter: Item 155 shall be applied on site, either before or after erection, to surfaces to be painted. Item 155 coming into contact with adjacent paint coats shall be removed immediately. Alternatively after installation, surfaces to be painted shall be cleaned with a solvent wipe to remove all traces of oil and grease and be abraded with (coarse grade) abrasive paper to sufficiently roughen the exposed surface in order to provide a suitable 'adhesion key' and be painted with a coat of either Item 110, Item 157 or Item 160 as an adhesion promoter. The remaining site coats shall be applied to exposed surfaces after erection.</p>	
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Clause No.	Alterations to be made
	<p>(08/14) Stripe coats for bearings only</p> <p>(i) Area F: Stripe coats are not required for bearing site fasteners.</p> <p>(ii) Area A and D: A single stripe coat in Item 112 paint shall be applied over Item 111 at the bearing manufacturer's works. A second stripe coat in Item 112 shall be applied on site. Item 112 coats shall be in contrasting shades, eg medium grey, natural grey.</p> <p>(08/14) Site Coats</p> <p>(i) Site coats shall be applied by the Contractor.</p> <p>(08/14) Paint suppliers</p> <p>(i) The requirements of Clause 1920 shall be noted.</p> <p>(08/14) Appendix 19/1</p> <p>(i) When completing Appendix 19/1, the appropriate finish paints shall be selected from the protective system. The letter references, A, B, C etc shall be varied as appropriate, and the application instructions arranged to suit.</p>

Clause No.		Alterations to be made
1911	8	Protection system A1, A2a and A2b shall not be used. Delete reference to A1, A2a and A2b in Table 19/4A, Table 19/4B and Table 19/4C
1914		Application of Paint
	19	Delete existing sub-clause 19 and replace with: "Not used"
	20	Delete existing sub-clause 20 and replace with: Workshop prepared steel surfaces shall not be exposed outside
	26	Delete existing sub-clause 26 and replace with: Prepared steel surfaces and also paint coats and hot dip galvanizing which have been prepared after surface damage or deterioration shall be overcoated with the sealer primer or first undercoat as appropriate before the surfaces have been affected by moisture and in any case within 4 hours.
	27	Delete existing sub-clause 27 and replace with: On Site, steel surfaces shall be primed within 4 hours and shall have the following coat applied within 72 hours. The next coat shall be applied within a further 72 hours. Finish coats shall be applied within 7 days of application of the preceding undercoat.
1915		Procedure Trials
	2	Delete existing sub-clause 2 and replace with: The Contractor shall provide for the workshop trials, samples of steel from 2 m ² to 10 m ² representing the main steelwork, hot dip galvanized when necessary. The Contractor shall demonstrate his ability to carry out surface preparation by blast cleaning and by using power assisted tools, and the paints he has selected. The Contractor shall provide sufficient paint for the trials in containers of the size to be used for the works.
	3	Delete existing sub-clause 3 and replace with: Painting of the main steelwork shall not be started in the workshop or on site until procedure trials have been completed satisfactorily.
1917		Surfaces in Contact with Concrete

Clause No.	Alterations to be made						
1	Delete existing sub-clause 1 and replace with: Unless otherwise described in Schedule 5 Specification and Drawings, Appendix 19/5 General Requirements or in Series 1800, 1810.7 if applicable, all workshop paint coats shall be returned 50 mm into the concrete/steelwork contact area.						
2	Delete existing sub-clause 2 and replace with: "Not used"						
1921	Additional Requirements for the Protection of CCTV Masts, Cantilever Masts, Steel Lighting Columns and Bracket Arms						
4	Delete existing sub-clause 4 and replace with: For CCTV Masts, cantilever masts and steel lighting columns and bracket arms, only one stripe coat in undercoat paint is required. For protective system Type G2, the stripe coat shall be applied before the last undercoat of the total protective system, in the workshop or on Site as appropriate. All stripe coats shall be applied by brush.						
5	Delete existing sub-clause 5 and replace with: "Not used"						
Series 2400 - Brickwork, Blockwork and Stonework							
2404	Mortar						
3	In sub-clause 3, add cement designation (iv) to Table 24/1 as follows: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Mortar Designation</th> <th style="text-align: center;">Cement: Lime: Stone dust</th> <th style="text-align: center;">Masonry Cement: Stone dust</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">(iv)</td> <td style="text-align: center;">1:1.5 to 6</td> <td style="text-align: center;">1:4½</td> </tr> </tbody> </table>	Mortar Designation	Cement: Lime: Stone dust	Masonry Cement: Stone dust	(iv)	1:1.5 to 6	1:4½
Mortar Designation	Cement: Lime: Stone dust	Masonry Cement: Stone dust					
(iv)	1:1.5 to 6	1:4½					
7	Insert the following additional sub-clause 7: "Where joints less than 2 mm wide in natural stone ashlar stonework shall be required a cement mortar designation (iv) containing natural stone dust of the same colour as the adjacent masonry shall be used. However, for sandstones and similar weaker masonry, a suitable lime mortar mix shall be selected based on clause 2476AR and Schedule 5 Specification and Drawings, Appendix 24/1 Brickwork, Blockwork and Stonework."						
2412	Brickwork and Blockwork						
5	Delete existing sub-clause 5 and replace with: "Not used."						

Clause No.		Alterations to be made					
2417		Unreinforced Masonry Arch Bridges					
		In sub-clause 8 delete the Table and replace with the following table:					
		Location / Element		Masonry Unit Type			
				Class A Eng Brickwork	Class B Eng Brickwork	Common Brickwork/ blockwork/ stonework with joints more than 2mm wide	Natural stone ashlar stonework with joints less than 2mm wide
		Below a level of 150mm above finished ground level		(i)	(ii)	(ii)	(iv)
		Above a level of 150mm above finished ground level	Abutments, spandrel/ wing walls, piers and parapets	(i)	(ii)	(iii)	(iv)
			Arch rings	(ii)	(ii) or (iii)	(iii)	(iv)
Series 3000 – Landscape and Ecology							
3001		General					
	1	Add the following to the end of sub-clause 1. National Highway Sector Scheme 18: The Natural Environment and Landscape including Ecology shall apply to this contract.					
	16	Insert the following as new sub-clause 16 : Biosecurity The Operating Company shall ensure full understanding and application, where appropriate, of the guidance provided by the UK Government for the adoption of biosecurity measures in order to prevent the introduction and spread of tree pests and diseases in the course of delivering the Contract requirements. This is of particular importance when the Operating Company is planning or engaged in works in or adjacent to protected areas and/or in association with known or potential areas of infection. This guidance is available on the Gov UK website: https://www.gov.uk/guidance/prevent-the-introduction-and-spread-of-tree-pests-and-diseases					
3003		Control of Rabbits and Deer					

Clause No.	Alterations to be made
15	<p>Insert the following as new sub-clause 15 :</p> <p>Deer Management and Deer Management Plans (DMP)</p> <p>The Operating Company shall develop and implement a suitable strategy for understanding and recording the presence and impact of wild deer within the Unit. This information shall be used to inform and develop a Deer Management Plan in accordance with the requirements of Schedule 2 - Scope, Appendix 3 Road Attachments 3.6 Deer Management Plan. This plan shall be reviewed and updated annually.</p>
3007	Grass, Bulbs and Wildflower Maintenance
19	<p>Delete existing sub-clause 19 and replace with:</p> <p>"Not used."</p>
3011	Management of Waterbodies
	Reedbeds and Marginal Plants
11	<p>Insert the following as new sub-clause 11:</p> <p>Liaison with SEPA</p> <p>The Operating Company shall consult with the Scottish Environmental Protection Agency (SEPA) and any other relevant body (such as the Fisheries Board) 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 The Water Environment (<i>Controlled Activities</i>)(Scotland) Regulations 2011(as amended).</p>

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 <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
		0/1	<u>INTRODUCTION</u> Contract-Specific Additional Substitute and Cancelled Clauses and Tables included in this Contract
		0/2	Contract-specific Minor Alterations to Existing Clauses and Tables included in this Contract
		0/3	List of Numbered Appendices Referred to in the Specification and included in this Contract
		0/4	List of Drawings included in this Contract
		0/5	Special National Alterations of the Overseeing Department of Scotland
NOT USED		1/1	<u>PRELIMINARIES</u> 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
		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
		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

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
NOT USED		1/14	Payment Applications
NOT USED		1/15	Accommodation Works
		1/16	Privately and Publicly Owned Services or Supplies
		1/17	Traffic Safety and Management
NOT USED		1/18	Temporary Diversions for Traffic
NOT USED		1/19	Routeing of Vehicles
		1/20	Recovery Vehicles for Breakdown
		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		1/27	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Roadworks (TASCAR) – Particular Requirements
			<u>SITE CLEARANCE</u>
NOT USED		2/1	List of Buildings etc to be Demolished or Partially Demolished
NOT USED		2/2	Filling of Trenches and Pipes
		2/3	Retention of Material Arising from Site Clearance
NOT USED		2/4	Explosives and Blasting
NOT USED		2/5	Hazardous Materials
NOT USED		2/6	<u>Existing Trees, Bushed and Shrubs</u>
			<u>FENCING</u>
		3/1	Fences Gates and Stiles
			<u>ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)</u>
		4/1	Road Restraint Systems (Vehicle and Pedestrian)
		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
			<u>DRAINAGE AND SERVICE DUCTS</u>
		5/1	Drainage Requirements
		5/2	Service Duct Requirements
		5/3	Surface Water Channels and Drainage Channel Blocks
		5/4	Fin Drains and Narrow Filter Drains

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
NOT USED		5/5 5/6 5/7	Combined Drainage and Kerb Systems Linear Drainage Channel Systems Thermoplastics Structural Wall Pipes and Fittings
			<u>EARTHWORKS</u>
		6/1	Requirements for Acceptability and Testing etc of Earthworks Materials
		6/2	Requirements for Dealing with Class U1B and Class U2 Unacceptable Materials
		6/3	Requirements for Excavation Deposition Compaction (Other than Dynamic Compaction)
NOT USED		6/4	Requirements for Class 3 Material
		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
		6/8	Topsoiling
NOT USED		6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
		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
		6/14	Limiting Values for Pollution of Controlled Waters
		6/15	Limiting Values for Harm to Human Health and the Environment
			<u>ROAD PAVEMENTS – GENERAL</u>
		7/1TS	Flexible Pavement Options (Schedules 1, 2, 3, 4 and 5)
		7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
		7/3	Surface Dressing – Performance Specification (Sheets 1, 2 and 3)
		7/4	Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
NOT USED		7/5	In Situ Recycling: The Remix and Repave Process
		7/6	Breaking Up or Perforation of Existing Pavement
		7/7	Slurry Surfacing Incorporating Microsurfacing (Sheets 1, 2 and Binder Data Sheet)
NOT USED		7/8	Not Used
		7/9	Cold-Milling (Planing) of Bituminous Bound Flexible Pavement
NOT USED		7/10	Worksheet Pro Forma for Results of Testing for Constituent Materials in Recycled Aggregate and Recycled Concrete Aggregate
NOT USED		7/11	Overband and Inlaid Crack Sealing Systems
		7/12	Arrester Beds
		7/13	Saw-Cut and Seal Bituminous Overlays on Existing Jointed Concrete Pavements
		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
		7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
NOT USED		7/19	Site Specific Details and Requirements for Recycled Cement Bound Material
NOT USED		7/20	Site Specific Details and Requirements for Inducing Cracks
NOT USED		7/21	Surface Dressing – Recipe Specification (Sheets 1, 2, and Binder Data Sheet)
		7/22	Repairs to Potholes
			<u>ROAD PAVEMENTS – CONCRETE AND CEMENT BOUND MATERIALS</u>
NOT USED		10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface
			<u>KERBS FOOTWAYS AND PAVED AREAS</u>
		11/1	Kerbs Footways and Paved Areas
		11/2	Access Steps

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
			<u>TRAFFIC SIGNS</u>
		12/1	Traffic Signs: General
		12/2	Traffic Signs: Marker Posts
		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
			<u>ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS</u>
NOT USED		13/1	Information to be Provided when Specifying Lighting Columns and Brackets
		13/2	(Specification for Highway Works) Typical Lighting Column and Bracket Data Sheets 1 and 2
		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
			<u>ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS</u>
NOT USED		14/1	Site Records
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
			<u>MOTORWAY COMMUNICATIONS</u>
NOT USED		15/1	Motorway Communications
NOT USED		15/2	Cable Duct Requirements
			<u>PILING AND EMBEDDED RETAINING WALLS</u>

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
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
			<u>STRUCTURAL CONCRETE</u>
		17/1	Schedule for the Specification of Designed Concrete
		17/2	Concrete – Impregnation Schedule
		17/3	Concrete – Surface Finishes
		17/4	Concrete – General
		17/5	Buried Concrete
NOT USED		17/6	Grouting and Duct Systems for Post-tensioned Tendons
NOT USED		17/7	Product Standards for Precast Products
			<u>STRUCTURAL STEELWORK</u>
	*	18/1	Requirements for Structural Steelwork
			<u>PROTECTION OF STEELWORK AGAINST CORROSION</u>
		19/1	(Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet
NOT USED		19/2	Requirements for Other Work
		19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
		19/4SE	(Specification for Highway Works) Form SEDD/P3 Paint Sample Despatch List: Sheets 1 and 2
		19/5	General Requirements <u>WATERPROOFING FOR CONCRETE STRUCTURES</u>
NOT USED		20/1	Waterproofing for Concrete Structures <u>BRIDGE BEARINGS</u>
NOT USED		21/1	Bridge Bearing Schedule <u>BRIDGE EXPANSION JOINTS AND SEALING OF GAPS</u>
NOT USED		23/1	Bridge Deck Expansion Joints Schedule
NOT USED		23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints) <u>BRICKWORK</u>
NOT USED		24/1	Brickwork, Blockwork and Stonework <u>SPECIAL STRUCTURES</u>
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 <u>MISCELLANEOUS</u>
NOT USED		26/1	Ancillary Concrete
NOT USED		26/2	Bedding Mortar
NOT USED		26/3	Cored Thermoplastic Node Markers <u>LANDSCAPE AND ECOLOGY</u>
	*	30/1	General, sheets 1, 2 and 3
		30/2	Weed Control
		30/3	Control of Rabbits and Deer
		30/4	Ground Preparation
		30/5	Grass Seeding, Wildflower Seeding and Turfing
	*	30/6	Planting
		30/7	Grass, Bulbs and Wildflower Maintenance
		30/8	Watering
		30/9	Establishment Maintenance for Planting
		30/10	Maintenance of Established Trees and Shrubs

List 'A': List of Numbered Appendices Referred to in the <i>Specification for Highway Works</i>			
Page No	To Be Completed By The Operating Company*	Appendix No	Title
NOT USED		30/11	Management of Waterbodies
		30/12	Special Ecological Measures
		50/1	<u>MAINTENANCE PAINTING OF STEELWORK</u> (Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet
		50/2	Requirements for Other Work
		50/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
		50/4SE	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
		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
		<u>PRELIMINARIES</u>
	1/75	Operating Company Vehicle Liveries
	1/76	Incident Support Unit and Trunk Road Incident Support Service Operatives' Uniforms
	1/77	Specification for TRISS Vehicle Mobile CCTV System
	1/78	Specification for Vehicle Mounted Variable Message Signs
	1/79	Specification for DASHCAMs
		<u>STRUCTURAL CONCRETE</u>
	17/70	Schedule for the Specification of an Alternative Designed Concrete.
		<u>STRUCTURAL STEELWORK</u>
	18/70	Weld Repairs to Orthotropic Decks
		<u>INCIDENT RESPONSE OPERATIONS</u>
	32/1	Incident Response
		<u>SITE INVESTIGATION</u>
	33/1	Structural Investigations Test Requirements
		<u>PROFESSIONAL SERVICES</u>
	62/1	Requirements for Professional Services

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 *MCHW Volume 2 - Notes for Guidance on the Specification for Highway Works Series NG 100 Preliminaries - Table NG 1/1: Typical Testings Details* 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.

Appendix 1/16 - Privately and Publicly Owned Services or Supplies

1

Subject to the other provisions of this Contract, in addition to all types of Undertakers' equipment and services, Trunk Roads may contain 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.

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.

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 update the Asset Performance Management System (APMS) with apparatus installed following the grant of permission in writing pursuant to *Section 109* of the *New Roads and Street Works Act 1991*, 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 record and update APMS with any such apparatus and relevant associated information that it becomes aware of in the course of its inspections or any other 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(2009) Road Works and Temporary Situations Part 2 Operations, Section O5 General Vehicle Issues.*

Vehicles shall have a sign board reading 'Motorway Maintenance' or 'Road Maintenance' (to Diagram 7404 of Schedule 13 Part 6 of *The Traffic Signs Regulations and General Directions 2016*) 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 2016* Schedule 13 Part II on a yellow non-reflecterised background in accordance with British Standard 381C SET:1996 (R2002) Specification for colours for identification, coding and special purposes, 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 (2009) Road Works and Temporary Situations* Part 2 Operations Section O5.3 Roof-mounted beacons.

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 Operating Company's Management System shall be in accordance with the relevant National Highway Sector Schemes for Quality Management in Highway Works Scheme 12 as referred to in Specification for Highway Works, Appendix A Quality Management Systems.

- 1.6 In addition to the requirements of Schedule 2 Scope, Section 1 Purposes & Objectives of Contract 1.3 Statutory Functions Delegated to the Operating Company, 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.
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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 Traffic Signs Manual Chapter 8 - Traffic Safety Measures and Signs for Road Works and Temporary Situations Parts 1 - 3 (Chapter 8).

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 Design Manual for Roads and Bridges (DMRB), and
- (iii) codes of practice in the case of work carried out pursuant to the *New Roads and Street Works Act 1991*.

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 to meet the standard of Grade A as stated in the *Code of Practice on Litter and Refuse (Scotland) 2018* 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 The Operating Company shall participate in Safety Advisory Groups as required to assist in the planning and organising of galas and events which are proposed on, or will impact on, the Trunk Road Network.

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 (2016)* 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 of temporary mandatory speed restrictions and temporary mandatory 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 of the Operating Company becoming aware of such damage or disturbance on motorways and dual carriageways and within 2 hours of the Operating Company becoming aware of such damage or disturbance on single carriageways.
- 2.13 The Operating Company shall erect “When queuing use both lanes” and “Merge in turn” signs prior to Lane merge points. Such signs shall be of the type, and erected at the locations and spacing, stated in D6.23 of Chapter 1 of the *Traffic Signs Manual*.

3 TEMPORARY TRAFFIC REGULATION ORDERS

- 3.1 Where the Operations or work by others, or an event on or affecting the operation of the trunk road require the promotion of Temporary Traffic Regulation Orders (TTROs)
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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 they shall form part of the traffic management arrangements.

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

3.2 A TTRO will be promoted by the Scottish Ministers to enable one carriageway including the hard shoulder of motorways or dual carriageways to be closed for any operation, works or event.

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 such 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 press notice and a plan of the roads affected.

The TTRO1 form 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 Traffic Safety and Management.
- 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 Traffic Safety and Management 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 Traffic Safety and Management.
- 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 *Traffic Signs Manual Chapter 8 (2009) Road Works and Temporary Situations Part 1 Design Paragraph D3.5 Length of works* 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 2 Scope, Section 7 Network Operations – Disruption Risk Management.

- 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 2 Scope, Section 7 Network Operations – Disruption Risk Management. 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 2 Scope, Section 7 Network Operations – Disruption Risk Management. 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, the police and the Overseeing Organisation. 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)
A9	Inveralmond to Blair Atholl	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A9	Inveralmond to Clashmore, North of Dornoch Bridge (Single Carriageways)	Friday 1230 - 1900	0600 - 1900 1 July to 31 August
A9	Inveralmond to Clashmore	Friday 1230 - 1900 (Convoy)	
A9	Inshes to Munlochry junction (including slip roads)	Monday-Saturday 0700 - 1900	0600 - 1900 1 July to 31 August
A9	Munlochry to Tomich (northbound)	Monday-Friday 1600 - 1900	0600 - 1900 1 July to 31 August
A9	Tomich to Munlochry (southbound)	Monday-Friday 0700 - 0930	0600 - 1900 1 July to 31 August
A9	Thurso	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A82	Achintore Rd, Fort William to Torlundy	Monday - Sunday 0600 - 2000	
A82	Fort Augustus	None	0600 - 1900 1 July to 31 August
A82	Clansman Hotel Drumnadrochit to Urquhart Castle	None	0600 - 1900 1 July to 31 August
A82	General Booth Road to Longman Roundabout	Monday - Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A82	Stoneymollan to Tarbet	Monday -Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 Saturday & Sunday 0600 - 1900 1 July to 31 August
A82	Tarbet to Tyndrum	None	0600 - 1900 Saturday & Sunday 0600 - 1900 1 July to 31 August
A82	Tyndrum to Glencoe	None	0600 - 1900 1 July to 31 August
A83	Inveraray	None	0600 - 1900 1 July to 31 August
A84	Stirling - Craigforth East to A84/B8075 junction	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A84	Callander - Eastern most speed limit to Tulipan Crescent	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A84	Doune	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A85	Methven to Perth	Monday-Friday 0700 - 0930 and 1600 - 1900	
A85	Crieff High Street - Golf Course to Glenturret Jct	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 Saturday & Sunday 1 July to 31 August
A85	Connel Bridge A828 Jct to Argyll Square, Oban	Monday - Sunday 0600 - 2000	
A87	Invergarry to Kyle of Lochalsh	None	0600 - 1900 1 July to 31 August

Route No.	Section	General Restrictions (Dates Days and Hours)	Additional Restrictions and Comments (Dates Days and Hours)
A87	Kyle of Lochalsh to Uig	Sunday 0000 - 2400	0600 - 1900 1 July to 31 August
A830	Fort William to West Side of Corpach	Monday-Friday 0700 - 0930 and 1600 - 1900	0600 - 1900 1 July to 31 August
A830	Mallaig – B8008 jct	None	0600 - 1900 1 July to 31 August
A835	Tore Roundabout to Maryburgh Roundabout	Monday-Friday 0700 - 0930 and 1600 - 1900	
N.B Summer restrictions will also apply to National and Local holidays, and shall be considered along with public events and Council seasonal embargos			

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?			
18	Are working and block vehicle drivers aware of the minimum/maximum separation distances?			

No.	Question	Yes	No	Comments
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?			
31	Has the need for a relief driver fully trained and capable of replacing any other driver been considered and provided if required?			

No.	Question	Yes	No	Comments
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]

TRUNK ROAD AND BUS OPERATIONS DIRECTORATE TEMPORARY TRAFFIC REGULATION ORDER OR NOTICE REQUEST

This form should be completed by the Operating Company and sent with a draft press notice to the relevant Network Manager via email.

1. Name and number of Trunk Road:

2. Type of order/notice required:

3. Reasons for, and purpose of, the proposed order or notice (in detail):

4. Date when the order/notice is required for and reason for date (for blue notice give specific time if relevant):

5. Date when order/notice will cease to be required (for blue notice give specific time if relevant):

6. Full description of length(s) of road covered by the proposed order/notice (for a large number of lengths of road, such as omnibus orders, attach in separate document):

7. Is any prohibition/restriction on a length of road to be included in the proposed order already included in a current Temporary Traffic Regulation Order(s) which will be continued by the proposed order? If yes, give details of all orders which have continued the same prohibition/restriction, including those preceding the current one.

Please note if a length of road has had or will have the same prohibition/restriction in place for a cumulative total of more than 18 months, the request for the order CANNOT be approved.

8. Prohibition(s) and/or restriction(s) required (e.g. prohibition of traffic, turns or waiting or speed restriction) and diagram numbers of traffic signs which will indicate each prohibition/restriction:
-

9. If request is for a prohibition of traffic or prohibition of specified turns (or both) state alternative route(s) for traffic. If alternative route for traffic is not required, please state why:
10. Have the alternative routes been checked to ensure they are accurate?
11. Does any of the lengths of road affected by the Order run through a National Park? If so please described the relevant length of road.
12. Name of local newspapers in which the order should be publicised?
13. Please advise of any exemptions to the restrictions contained in the Order.
14. Name, address and telephone number of the Operating Company official who can be contacted if additional information is required:
15. Please attach an accurate plan showing the length(s) of road affected by the Order and the alternative routes(s), if applicable. A plan to the scale of 1:10000 would be preferable. Please ensure the names of roads/reference points referred to in the Schedule are clearly marked on the plan.

Form Completed by:

Name: _____

Designation: _____

Tele No: _____

Signature: _____

Date: _____

Operating Company – Roads and Traffic Order Checklist

	Checked by Area Engineer (initial & date)	Checked by Journey Time Reliability Coordinator (initial & date)
<p>Order and Press Notice</p> <ol style="list-style-type: none"> 1. Is the suggested Traffic Order title in the TTRO1 / PTRO1 identical to the title on the Press Notice? 2. Is the date quoted in the TTRO1 identical to the date quoted in the Press Notice? 3. Is the description of the affected lengths of road in the Press Notice identical to that in the Schedule to the Traffic Order? <i>The name(s) of Trunk Road(s) shall be quoted in the descriptions, e.g. A96 Aberdeen – Inverness Trunk Road.</i> 4. Does the information in the correspond with the details in the Order and Press Notice? 5. 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? <i>e.g. It is anticipated that the work will be carried out over two weekends during the above period.</i> 		

Template for Press Notice

PRESS NOTICE

THE [INSERT NUMBER OF TRUNK ROAD] TRUNK ROAD [(INSERT LOCATION)]
[(INSERT TYPE OF TEMPORARY RESTRICTION)] ORDER [INSERT YEAR]

THE SCOTTISH MINISTERS give notice that they have made the above Order [INSERT DETAILS OF THE TEMPORARY RESTRICTION E.G temporarily prohibiting traffic] on the following length[s] of the [INSERT FULL OFFICIAL NAME OF TRUNK ROAD INVOLVED e.g A83 Tarbet – Lochgilphead – Campbeltown Trunk Road] –

[INSERT DESCRIPTION OF LENGTH OF ROAD BEING RESTRICTED, THIS SHOULD BE THE SAME AS THE DESCRIPTION OF THE LENGTH OF ROAD SHOWN IN THE SCHEDULE TO THE ORDER]

The Order, which is required to [INSERT DETAILS OF REASON THE ORDER IS REQUIRED] will be in operation from [INSERT DETAILS OF DURATION OF ORDER] and will only have effect in relation to such part or parts of the length of road as is indicated by the appropriate traffic signs.

The Order does not apply to [INSERT DETAILS OF ANY EXEMPTIONS TO THE RESTRICTIONS e.g. vehicles being used in an emergency for fire brigade, ambulance, police or coastguard purposes.

ALTERNATIVE ROUTES

[ADVISE WHETHER OR NOT AN ALTERNATIVE ROUTE FOR TRAFFIC IS REQUIRED AND WHERE DETAILS OF THE ALTERNATIVE ROUTE CAN BE OBTAINED]

A copy of the Order and this Notice will be available on the Transport Scotland website at [TRANSPORT SCOTLAND TO COMPLETE THIS INFORMATION]

For information about roadworks on motorways and trunk roads visit www.trafficscotland.org.uk

A member of the staff of the Scottish Ministers

Transport Scotland

Buchanan House

58 Port Dundas Road

Glasgow

G4 0HF

**EXAMPLE OF SCHEDULE TO PRESS NOTICE FOR MONTHLY PLANNED ROADWORKS
TTRO WITH MULTIPLE RESTRICTIONS E.G. PROHIBITION ON USE OF ROAD,
OVERTAKING AND SPEED RESTRICTIONS**

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

(a) The following length(s) of the [INSERT OFFICIAL NAME OF TRUNK ROAD
] Trunk Road:

[INSERT DETAILS OF EACH LENGTH OF TRUNK ROAD (NAMED ABOVE) BEING
RESTRICTED BY THE ORDER DESCRIPTION(S) OF LENGTH(S)]]

[INSERT DETAILS OF ALL DESCRIPTION(S) OF RESTRICTION(S) AFFECTING THE
LENGTHS OF ROAD DESCRIBED ABOVE E.G. PROHIBITION ON USE OF ROAD,
OVERTAKING AND 50MPH SPEED RESTRICTION

REPEAT FOR EACH TRUNK ROAD

EXAMPLE

The following lengths of the A82 Dalnottar – Inverness Trunk Road:

1. From its junction with the A84/A85 Stirling – Crianlarich Trunk Road at Crianlarich, north westwards to its junction with the A85 Tyndrum – Oban Trunk Road at Tyndrum, a distance of 7.6 kilometres or thereby.
2. From its junction with the A828 Connel – South Ballachulish Trunk Road at South Ballachulish Roundabout, eastwards to its junction with the unclassified road to Glen Etive at the west side of Rannoch Moor, a distance of 21.93 kilometres or thereby.
3. From its junction with the A86 Spean Bridge – Kingussie Trunk Road at Spean Bridge northwards to its junction with the A87 Invergarry – Kyle of Lochalsh – Borve – Uig Trunk Road at Invergarry, a distance of 24.5 kilometres or thereby.

Prohibitions on use and overtaking and a 30 mph speed restriction and 10 mph when there is convoy working.

The following length of the A83 Tarbet – Lochgilphead - Campbeltown Trunk Road:

4. From its junction with the A819 Dalmally Road at Inveraray, south westwards to its junction with the unclassified road to Minard Castle, south of Minard, a distance of 20.25 kilometres or thereby.

Prohibitions on use and overtaking and a 30 mph speed restriction and 10 mph when there is convoy working.

**EXAMPLE OF SCHEDULE TO THE ORDER FOR MONTHLY PLANNED ROADWORKS
(E.G PROHIBITION ON USE OVERTAKING AND SPEED RESTRICTION ORDERS)**

SCHEDULE

Articles 2, 3 and 4

SPECIFIED LENGTHS OF ROAD

PART 1

(Part 1 usually covers prohibition on use of road)

<i>1</i>
Specified lengths of road
<i>Insert description of the length(s) of road to be restricted</i>

PART 2

(Part 2 usually covers prohibition on use, overtaking and speed restriction)

<i>1</i>	<i>2</i>
Specified lengths of road	Speed restriction (miles per hour)
<i>Insert description of the length(s) of road to be restricted</i>	<i>Insert reduced speed limit</i>

PART 3

*(Part 2 usually covers prohibition on use, overtaking and speed restriction and 10mph speed limit for
convoy working)*

<i>1</i>	<i>2</i>
Specified lengths of road	Speed restriction (miles per hour)
<i>Insert description of the length(s) of road to be restricted</i>	<i>Insert reduced speed limit</i>

**EXAMPLE OF SCHEDULE TO THE ORDER FOR PROHIBITION OF SPECIFIED TURNS
ORDERS**

SCHEDULE

PART 1

Description of length of road effected by the prohibition

PART 2

Description of each turn being prohibited.

EXAMPLE OF SCHEDULE TO THE ORDER FOR SPEED RESTRICTION

SCHEDULE

PART 1

Description of length of road effected by the prohibition

(INSERT AN ADDITIONAL PART FOR EACH SPEED LIMIT COVER BY THE ORDER)

**EXAMPLE OF SCHEDULE TO THE ORDER FOR PROHIBITION ON USE OF ROAD OR
PROHIBITION ON WAITING LOADING OR UNLOADING**

SCHEDULE

PART 1

Description of length of road effected by the prohibition

Appendix 1/20 – Recovery Vehicles for Breakdown

SHEET 1

- 1 Recovery Vehicles to be Provided
 - 1.2.1 Recovery vehicles shall be provided as part of the traffic management arrangements and for the period required when Ordered by the Overseeing Organisation.
 - 1.2.2 The Operating Company shall provide the number of heavy recovery vehicles, light recovery vehicles stated in the Order
 - 2 Locations for Recovery Vehicles
 - 2.2.1 When not engaged in recovery Operations the Ordered recovery vehicles shall be positioned at locations stated in the Order.
 - 3 Limits of Service
 - 3.2.1 The limits of the vehicle recovery Operations 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 as stated in the Order.
 - 5 Records
 - 5.1 The Operating Company shall complete record sheets as referred to in clause 120.26 in the format shown in Sheets 2 to 4 of this Appendix 1/20 Recovery Vehicles for Breakdown.
-

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 [name of] 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 the roadworks is free.
3. Vehicles will be recovered clear of the the roadworks tounless 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 Traffic Signs Manual Chapter 8.
 - (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 Tow** Y/N	Vehicle Type#	Q'ing Y/N	Weather	Road Surface		Remarks	
	Call Out	Arrival at Scene	Road Clear			Marker Post No.	HS	1	2	3		4	Acc					B/d	Dry		Wet

*P – Police **Y – Tow/Lift #C – Car M/C – Motorcycle
 F – Fire Service R – Restart V – Van
 A – Ambulance F – False Call HGV – Heavy Goods Vehicle

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 1/21 – Information Boards

Network Customer Information Signs shall be in the form shown below:

Signs shall be scaled appropriate to the location where they will be erected.

'Road Name' will be replaced by the appropriate road number e.g A1, A75 , A9 , M90

'OC Name' will be replaced by the Operating Company's logo which receives the Directors consent.

Guidance on typeface, colour, exclusion zones and logo ratios can be found in the *Transport Scotland Brand Identity Guidelines updated 2019* or subsequent replacement document.

Where new signs are to be manufactured they should, where practicable, be manufactured as a series of plates to enable replacement of solely the OC Name (logo) in future.



**TRANSPORT
SCOTLAND**

**Road Name
Maintained by**

OC Name

**0800
028 1414**

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 Brand Identity Guidelines updated 2019*.

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 Brand Identity Guidelines updated 2019* 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 Brand Identity Guidelines updated 2019*. 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 – Incident Support Unit and Trunk Road Incident Support Service 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 – 4 CIF 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 console 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 1/79 – Specification for DASHCAMs

Dashcams for Winter Patrol vehicles, Incident Support Units and Trunk Road Incident Support Units shall be forward and rear facing, live network video cameras to be approved by the Director. These shall provide full uninterrupted mobile data provision that relays live conditions and information to the Operating Company Control Room and the Director and Performance Audit Group. The system shall:

- i. deliver high definition recording with minimum resolution of 1920 x 1080 at 30 frames per second
- ii. have battery, or appropriate in-vehicle charging, and memory to allow continuous recording for a duration of 24 hours
- iii. have geo-referencing attachment to video files to align with referencing for the Trunk Road network
- iv. allow multiple users viewing access
- v. be able to display the transmitted image via an online portal accessible by a PC web browser at all times to the Director and Performance Audit Group. The images shall be recorded at high resolution on a cloud based server, to allow historical viewing of footage at full resolution for a period of 7 years.

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 Unless otherwise agreed with the Overseeing Organisation, temporary fencing to protect existing vegetation during works shall be cleft chestnut pale fencing in accordance with clause 303.1 (iii). The fencing shall be sited appropriately to avoid any damage occurring to the vegetation to be protected, including any part above or below ground
- 2 Fencing for the general protection of planted areas shall be in accordance with clause 306.4 (ii) and *Manual of Contract Documents for Highway Works, Volume 3 - Highway Construction Details , Section 1 - Carriageway and Other Details - H Series - Fence Stiles and Gates - Drawing Number H40 - Planting Works Fencing Rabbit and Deer Fencing Types 3*, except that the bottom section of mesh shall be buried vertically below ground level to a depth of 300 mm before being turned out horizontally (away from the planting) to a length of 300 mm. Where there is no risk of deer browsing the Contractor may, with the approval of the Overseeing Organisation, utilise fencing in accordance with clause 306.4 (i), *Manual of Contract Documents for Highway Works, Volume 3 - Highway Construction Details , Section 1 - Carriageway and Other Details - H Series - Fence Stiles and Gates - Drawing Number H39 - Planting Works Fencing Rabbit and Deer Fencing Types 1 and 2 - Type 1* The turned out portion of mesh on rabbit-proof fencing shall be buried vertically below ground level to a depth of 300 mm before being turned out horizontally (away from the planting) to a length of 300 mm.
- 3 Where required, wire mesh shall be attached to permanent or existing fencing in accordance with *Manual of Contract Documents for Highway Works, Volume 3 - Highway Construction Details , Section 1 - Carriageway and Other Details - H Series - Fence Stiles and Gates - Drawing Number H46 - Attachment of Wire Mesh to Fencing (Sheet 1 of 3) - Type 4* or *Drawing Number H47 - Attachment of Wire Mesh to Fencing (Sheet 2 of 3) - Type 5*.
- 4 Badger Gates shall be constructed where required in accordance with the RSPCA publication *Problems with Badgers*. All badger gates shall incorporate concrete sills to prevent digging or erosion.

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 *CD377 Requirements for Road Restraint Systems* 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 Displacement 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 1317-1:2010 Road Restraint Systems. Terminology and General Criteria for Test Methods*, *British Standard EN 1317-2:2010 Road restraint systems. Performance classes, impact test acceptance criteria and test methods for safety barriers including vehicle parapets*, *British Standard EN 1317-3:2010 Road restraint systems. Performance classes, impact test acceptance criteria and test methods for crash cushions and DD ENV 1317-4:2002 Road restraint systems. Performance classes, impact test acceptance criteria and test methods for terminals and transitions of safety barriers* 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 *Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works Series 400 Road Restraint System (Vehicle and Pedestrian) (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 Compliance with the National Highway Sector Scheme for *Quality Management in Highway Work Scheme 2 – Supply and Installation of Fences*:

- (i) *Sector Scheme 2B for Supply, Installation, Maintenance and Repair of Vehicle Restraint Systems.*
- 13 Certificate of compliance for the National Highway Sector Scheme for *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.*
- 14 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 are required for safety barrier systems and transitions.
- 3 Items 13 and 14 are required for vehicle parapets.

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 Sector Scheme 2B for the Supply and Installation of Vehicle Restraint Systems. ²		
13	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.		
14	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 are required for safety barrier systems and transitions.				
3. Items 13 and 14 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:				

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)	.....(0,+7%)			
		Angle (degrees)	.....(-1,+1.5)			
		Centre of Gravity				
		Vertical height (m)	.....(± 10%)			
		Longitudinal (m)	.....(± 10%)			
		Lateral (m)	±			
		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:						

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)	.....(0,+7%)			
		Angle (degrees)	.....(-1,+1.5)			
		Centre of Gravity				
		Vertical height (m)	.....(± 10%)			
		Longitudinal (m)	.....(± 10%)			
		Lateral (m)	±.....			
		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		ACTUAL		
		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				
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:						

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)	.....(0,+7%)			
		Angle (degrees)	.....(-1,+1.5)			
		Centre of Gravity	.....(± 10%)			
		Vertical height (m)	.....(± 10%)			
		Longitudinal (m)	±			
		Lateral (m)				
		Model				N/A
DD ENV 1317-4:2002, Clauses 5.4 & 5.5.2	Terminal Behaviour	<p>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.</p> <p>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.</p> <p>3)Anchorages and fixings shall perform to the terminal design specifications and other specified requirements as listed in the test report.</p>				
BS EN 1317-4:2002 Clause 5.5.3	Vehicle Behaviour	<p>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.</p> <p>2)The exit box values for the specified test are as defined in Figures 5.6 and 7 (as appropriate).</p>				
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	<p>SPECIFIED</p> <p>Level A: THIV ≤44km/h (Tests 1,2 &3) THIV ≤33km/h (Tests 4 &5) ASI ≤ 1.0</p> <p>Level B: THIV ≤ 44km/h (Tests 1,2&3) THIV≤ 33km/h (Tests 4 & 5) ASI ≤ 1.4</p> <p>Levels A & B: PHD≤ 20g</p>	ACTUAL			
DD ENV 1317-4:2002, Clause 7.7. & Figure 7	Photographic coverage	<p>1)Photographic coverage shall be sufficient to describe clearly terminal and vehicle motion during and after impact.</p> <p>2)High speed cameras and/or high speed video cameras at a minimum of 200 frames per second.</p> <p>3)Stills</p>				
	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

2 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
600	5	A	ASB					ASB	ASBF	S	S	ST

Permitted Alternative Pipe/Bedding Combinations												
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 -1:2015 Gully tops and manhole tops for vehicular and pedestrian areas. Definitions, classification, general principles of design, performance requirements and test methods* 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 *Manual of Contract Documents for Highway Works, Volume 3 - Highway Construction Details , Section 1 - Carriageway and Other Details - F Series - Drainage - Drawing Number F1 – Type 1 Chamber (Brick or In-situ Concrete Manhole) , Drawing Number F4 - Type 2 Chamber (Precast Concrete Manhole) , Drawing Number F5 - Type 3 Chamber (Precast Concrete Manhole) and Drawing Number F11 - Type 7 Chamber (1050 Catchpit).*

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 Core Operations and Schedule 2 Scope, Section 3 Inspection & Maintenance – Roads incl. Landscaping.

All cleaning activities shall be recorded, in the APMS. The Operating Company shall use using Data Capture Devices, or alternative methods approved by the Director, to record activities including:

- Asset ID
- Operative
- Date/time stamps of each activity
- Co-ordinates of where activity took place
- Results of activity, see *Trunk Road Inspection and Maintenance Manual (TRIMM)* for standard list of allowable results
- Any remaining Defects, issues
- Any other notes or comments

Appendix 5/2 – Service Duct Requirements

- 1 The permitted alternative design groups for service ducts shown on Manual of Contract Documents for Highway Works, Volume 3 - Highway Construction Details , Section 1 - Carriageway and Other Details - I Series - Underground Cable Ducts - Drawing Number I2 - Duct Trench Cross Sections and Details of Mandrel shall be types D1 to D4 as shown on drawing number 500/01/337-379 in this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract.
- 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 this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract.
- 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 this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract . 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 contained within this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract.

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 within this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract .

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 6259-1:2015, BS EN ISO 527-1:2012	
Vicat	BS EN 727	
Longitudinal reversion	BS EN ISO 2505:2005	
K-value	BS EN ISO 13229:2011	
PVC content	BS EN 1905:1999	
Density	BS EN ISO 1183-3:1999,	
Heat Reversion	ISO 12091:1995	
Effects of heating (injection moulded fittings only)	BS EN ISO 580:2005	

Table 2 – Polyethylene (PE)

Property	Test method reference	Specification
Tensile Properties	BS EN ISO 6259:2015, BS EN ISO 527-1:2012	
Oxygen induction time	BS EN 728:1997	
Melt Flow Rate	BS EN ISO 1133-1:2011	
Density	BS EN ISO 1183-3:1999	
Melt Flow Rate	BS EN ISO 1133-1:2011	
Heat Reversion	ISO 12091:1995	
Effects of heating (injection moulded fittings only)	BS EN ISO 580:2005	

Table 3: Polypropylene (PP)

Property	Test method reference	Specification
Tensile Properties	BS EN ISO 6259-1:2015, BS EN ISO 527-1:2012	
Oxygen induction time	BS EN 728:1997	
Melt Flow Rate	BS EN ISO 1133-2:2011	
Density	BS EN ISO 1183-3 :1999	
Heat Reversion	ISO 12091:1995	
Effects of heating (injection moulded fittings only)	BS EN ISO 580:2005	

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 6/1 Requirements for Acceptability and Testing etc of Earthworks Materials. The amended Table 6/1 contains requirements for 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.
- 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.
- 5 Spent oil shale shall not be used as Class 6 Selected Granular Fill.

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, or combination of materials. Recycled aggregate. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates); A (construction and demolition recycling industries); B1 (municipal incinerator bottom ash (MIBA)); D2 (air cooled blast furnace slag) D3 (basic oxygen furnace slag) D4 (electric arc furnace slag (EAF C)) E (non ferrous steel industry – except E2 molybdenum slag) G (mining and quarry industry)	(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	General Fill		(i) grading	BS 1377: Part 2 (OE)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	1	B	–		

			granular material		Any material, or combination of materials. Recycled aggregate. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates); A (construction and demolition recycling industries); B1 (municipal incinerator bottom ash (MIBA)); C1 (coal fly ash) C4 (coal bottom ash) D2 (air cooled blast furnace slag) D3 (basic oxygen furnace slag) D4 (electric arc furnace slag (EAF C)) E (non ferrous steel industry – except E2 molybdenum slag) F (foundry industry) G (mining and quarry industry) H1 (dredge spoil sand)	(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 Any material, or combination of materials. Recycled aggregate. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10:	(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				

						P (natural aggregates); A (construction and demolition recycling industries); D2 (air cooled blast furnace slag) G (mining and quarry industry)								
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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				
2	A	-	Property (see exceptions in previous column)				Defined and tested in accordance with:	Acceptable Limits Within:		Lower		Upper		2	A	-
GENERAL COHESIVE FILL	2	A	-	Wet cohesive material	General Fill	Any material Any material, or combination of materials	(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.	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, or combination of materials	(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, or combination of materials	(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	-		

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				
							(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)	App 6/1	App 6/1	See clause 620 and App 6/1	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			
6	A	–				Property (see exceptions in previous column)	Defined and tested in accordance with:	Acceptable Limits Within:			6	A	–	
								Lower	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, well burnt colliery spoil or any combination thereof. Recycled aggregate Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates – except shale, siltstone or slate); A (construction and demolition recycling industries); G1 (red coal shale) G3 (pre-selected all-in from quarrying/mining)	(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, well burnt colliery spoil, slag or any	(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					

					<p>combination thereof. Recycled aggregate Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates – except shale, siltstone or slate); A (construction and demolition recycling industries); D2 (air cooled blast furnace slag) D3 (basic oxygen furnace slag) D4 (electric arc furnace slag (EAF C)) G1 (red coal shale) G3 (pre-selected all-in from quarrying/mining)</p>	(iii) Los Angeles Coefficient	Clause 635	–	50 kN				
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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, well burnt colliery spoil, slag or any combination thereof. Recycled aggregate Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates – except shale, siltstone or slate); A (construction and demolition recycling industries); D2 (air cooled blast furnace slag) D3 (basic oxygen furnace slag) D4 (electric arc furnace slag (EAF C)) G1 (red coal shale) G3 (pre-selected all-in from quarrying/mining)	(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 - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials contaminated with tar and tar bitumen binders, unburnt colliery spoil and argillaceous rock.	(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				

					Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(v) Class Ra (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. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 12620 from one or more of the following source codes, see Notes 8, 9 and 10: P (natural aggregates – except shale, siltstone or slate); A2 (crushed concrete).	(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												
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.	(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	N			
								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												

					Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9 and 10: P (natural aggregates – except shale, siltstone or slate); A2 (crushed concrete) A3 (crushed bricks, masonry) D2 (air cooled blast furnace slag) G1 (red coal shale).	(v) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	To be determined by the Operating Company	–				
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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 Schedule 5 Specification and Drawings, Appendix 6/1 Requirements for Acceptability and Testing etc. of Earthworks Materials, 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 *British Standard 1377: Part 2 Methods for test for solid for civil engineering purposes. Classification tests* or *British Standard EN 1097-5:2008 Tests for mechanical and physical properties of aggregates. Determination of the water content by drying in a ventilated oven* 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 Schedule 5 Specification and Drawings, Appendix 6/14 Limiting Values for Pollution of Controlled Waters and Schedule 5 Specification and Drawings, Appendix 6/15 Limiting Values for Harm to Human Health and Environment.
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.
8. Where material source codes are referenced these are as listed in Table 6/7.
9. Where materials are required to be aggregates conforming to *British Standard EN 13242:2013 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction* materials certificated as being compliant with *British Standard EN 13285:2018 Unbound mixtures*. Specification are acceptable for use provided that they meet all the specification requirements and the Declaration of

Performance for constituent parts to *British Standard EN 13242:2013 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction* are provided to the Overseeing Organisation.

10. Materials shall comply with the current *Environmental Regulations* at the time of use. Reference shall be made to Annex ZA (informative) of *British Standard EN 13242:2013 Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction*.

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/m².

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 vehicles 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 be 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 6/14 Limiting Values for Pollution of Controlled Water in the Operating Company's Management System as part of its Inspection and Test Plan in accordance with the requirements of Schedule 5 Specification and Drawings, Appendix 1/5 Testing to be carried out by the Operating Company.

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 6/15 Limiting Values for Harm to Human Health and the Environment in the Operating Company's Management System as part of its Inspection and Test Plan in accordance with the requirements of Schedule 5 Specification and Drawings, Appendix 1/5 Testing to be carried out by the Operating Company.

Appendix 7/1 TS – Flexible Pavement Options

- 1 Permitted Pavement Options – Schedule 1 – Not Used.
- 2 General Requirements – Schedule 2

Schedule 2 : General Requirements		
Grid for checking surface levels of pavement courses (702.4)	Longitudinal Dimension	10 m
	Transverse Dimension	Centre joint Middle of lane 300mm from each channel
Surface regularity (702.7)	Category of Road	A* * required on daily surfacing lengths of 250m or greater.
Interval for measurement of longitudinal regularity		Continuous in any line or lines parallel to the edge of pavement
Interval for measurement of transverse regularity		10 meters
Measurement of surface texture is required Note – No compliance requirement applicable to TS2010, results gathered for information		Yes, on daily surfacing lengths of 75m or greater.
Full documentation of the manufacturer's design shall be supplied to the Overseeing Organisation for his 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, SCS	Scheme Specific*
Binder Course	BCa, BCb, BCc, BEMa, BEMb, BSCH	Scheme Specific*
Base	Ba, Bb, Bc, BEMa, BEMb, Quick Visco Elastic material to Clause 948 class B3 table 9/27.	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 mixtures supplied in accordance with <i>British Standard EN 13108-1:2016 Bituminous mixtures. Material specifications. Asphalt Concrete</i> shall be CE marked and the Contractor shall submit the declaration of performance which shall demonstrate that the mixture provides the performance required by the specification. The Operating Company shall maintain up to date copies of the CE mark and Declaration of Performance.
901.4 and 942.6	In addition to the requirements of clauses 901.4 and 942.6 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.
901.19 and 903.43	In addition to the requirements of CI 901.19, temporary running surfaces shall have a minimum PSV of 50.
903.36	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 Specification and Drawings, Appendix 7/1TS Flexible Pavement Options for materials other than TS2010 shall be Scheme specific and shall be determined in accordance with Tables 3.3 a/b and 3.13 of *CD236 Surface Course Materials for Construction* or equivalent of the *Design Manual for Roads and Bridges* respectively.
- (ii) PSV will not be specified for TS2010, the required site class of surface course TS2010 shall be established for each Site according to the *Transport Scotland Interim Amendment 35-18 TS2010 Surface Course Specification and Guidance (TSIA35-18)*.
- (iii) 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.
- (iv) 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		<p>Minimum PSV: 70</p> <p>Classification: Type 1– to be determined by the Operating Company in accordance with the other provisions of this Contract.</p> <p>Min PSV and Max AAV: See note (i) in Schedule 4 above .</p> <p>Coloured surfaces may be required in some areas.</p>
SCT	942	<p>Thin Surface Course System</p> <p>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.</p>	Nominated by supplier to meet requirements	<p>The following parameters shall be determined by the Operating Company in accordance with the other provisions of this Contract:</p> <ol style="list-style-type: none"> 1. Traffic count in cvd//day 2. Site Classification 3. Resistance to permanent deformation in accordance with 942.8 4. Road/tyre noise level relative to HRA required 5. Macrotexture shall be in accordance with clause 942.19 and CI 942.20 unless stated on the Order or otherwise agreed. 6. Amended Clause 942.3 shall apply unless otherwise stated on the Order, or otherwise agreed. <p>The Operating Company will operate an inspection program to visually assess new surfacing at 4 and 5 years of age to ensure this requirement</p>

				will be met. Where a surfacing fails to meet the performance requirements a report will be submitted to the Overseeing Organisation.
SCS	974AR	Transport Scotland SMA (2010)	Nominated to suit requirements	As clause 974AR and TSIA 35-18. The Operating Company will operate an inspection program to visually assess new surfacing at 4 and 5 years of age to ensure the 974AR - 4 performance requirements will be met. Where a surfacing fails to meet the performance requirements a report will be submitted to the Overseeing Organisation
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 CI 915 shall be used. Min PSV and Max AAV of chippings: See note 4.i of this Appendix 7/1TS. 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. The Declaration of Performance and supporting CE mark are required to demonstrate compliance with the requirements stated in: 929.3 and 929.4 (Required deformation resistance, Class 2, Table D2 of PD 6691

				<p>Ba : AC32 HDM base 40/60 des.</p> <p>Bb : AC32 dense base 40/60 des.</p> <p>Bc : AC32 HMB base 30/45 des.</p>
BCa BCb BCc	929	Binder Course Asphalt Concrete	As Requirement	<p>Sub clauses 945.1 and 945.2 shall apply.</p> <p>The Declaration of Performance and supporting CE mark are required to demonstrate compliance with the requirements stated in:</p> <p>929.3</p> <p>and</p> <p>929.4 (Required deformation resistance Class 2, Table D2 of PD 6691</p> <p>BCa : AC20 HDM bin 40/60 des.</p> <p>BCb : AC20 dense bin 40/60 des.</p> <p>BCc : AC20 HMB bin 30/45 des.</p>
BSCH	943	Binder Course (Hot Rolled Asphalt)		Wheel tracking to comply with Class 2 Table C3 of PD 6691;

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 CI 937 shall be used where thicknesses are less than 55mm. CI 929 binder course shall be used where thicknesses exceed 55 mm. RCa : AC20 dense bin 40/60 des. RCb : Appropriate binder/aggregate size from CI 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.
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, , all in accordance with the requirements of Clause 017AR, the following information:

- (i) The CE mark and details of the System Installation Performance Trial (SIPT) to cover the aspects of the installation not covered by the material's declaration of performance. This shall demonstrated that the system meets the stated specification requirements

- (ii) 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 shall be supplied.
- (iii) 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. 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 *BS EN 58:2012, BS 2000-474:2012 . Bitumen and bituminous binders. Sampling bituminous binders.* 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 (*BS EN 1426:2007, BS 2000-49:2007 Bitumen and bituminous binders. Determination of needle penetration*), 100g 5secs and at 5°C 200g 60secs, before and after hardening in the Rolling Thin Film Oven Test in accordance with *BS EN 12607-1:2014, BS 2000-460-1:2014 Bitumen and bituminous binders. Determination of the resistance to hardening under influence of heat and air. RTFOT method*, 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 *BS EN 12593:2015, BS 2000-80:2015 Bitumen and bituminous binders. Determination of the Fraass breaking point* 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 EME2 Base and Binder Additional Requirements for Joints

- 8.1 Joints in EME2 shall when possible be formed "hot to hot".
- 8.2 "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.
- 8.3 "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.
- 8.4 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.
- 8.5 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.
- 8.6 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).
- 8.7 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.
- 8.8 The joint shall be cleaned of all deleterious material and specialised hot polymer modified bitumen complying with *BS EN 14188-1:2004 Joint fillers and sealants. Specifications for hot applied sealants*, 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.
- 8.9 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 Joint fillers and sealants. Specifications for hot applied sealants*, Grade N1 or polymer modified bitumen sealing strips shall be used in accordance with the manufacturer's instructions.
- 8.10 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 *Manual of Contract Documents for Highway Works, Volume 3 - Highway Construction Details , Section 1 - Carriageway and Other Details - K Series - Miscellaneous - K4 - Typical Trench Reinstatement Details for Bituminous and Concrete Pavements.*

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 *Design Guide for Road Surface Dressing Road Note 39 (Seventh Edition) (TRL Road Note 39)* together with the requirements of this Appendix 7/3 Surface Dressing – Performance Specification.

The *Code of Practice for Surface Dressing (RSDA 2018)* 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 *TRL Road Note 39*, *TRL 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/cm².

- 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) Fattening 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 13.3 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 months and 24 months after laying).

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 BS EN ISO 9001:2015 Quality management systems. Requirements 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 their 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 *National Highway Sector Schemes for Quality Management in Highway Works Scheme 13 Particular Requirements for the Application of ISO 9001:2015 for the Supply and Application of Surface Treatments to Road Surfaces (NHSS 13:2018)* or in the event of no Certificates being issued, a statement of any previous applications on roads similar in site type and road hardness to those under this Contract. Such statement shall contain the same data as listed in Sheet 3 of this Appendix 7/3 Surface Dressing – Performance Specification.
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.

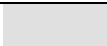
Binder Data Sheet – Appendix 7/3 Surface Dressing – Performance Specification			
Manufacturer of Binder:	Product Name:		
Binder type:	Batch no:		
Binder Grade (highlight as required)	Conventional		Intermediate
	Premium		Super-premium
Binder source:	Supplied Binder	Aged Binder	Recovered Binder
Test	As 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/cm ²	†#	#	#
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.

Binder Data Sheet – Appendix 7/3 Surface Dressing – Performance Specification

‡ 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 (TAIT) containing as a minimum 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 *NHSS 13:2018* or certified by British Board of Agreement (BBA):

Proprietary Name:

Description of material:

Design procedure or method:

Material thickness (if applicable):

Macrottexture 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 Road Surface Influence (RSI), ability to accommodate a variable substrate, skid resistance if greater than PSV and macrottexture 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 *Design Manual for Roads and Bridges - CD236 Surface Course Materials for Construction* 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 and cohesivity data as specified.
- 2 For each product, a copy of the *BS EN ISO 9001:2015 Quality management systems. Requirements 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 its 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,
 - (ii) Breaking time test results for different weather conditions and substrates, and
 - (iii) Test results for bond to newly laid concrete. The data supplied shall be not more than 26 weeks old.

Binder Data Sheet

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/cm ²			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 undertaken in accordance with clause 918.
2. Special Restrictions: Guarantee period of 2 years shall be required unless stated otherwise 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 the Order.
5. Minimum macrotexture depth at end of guarantee period shall be in accordance with *Manual of Contract Documents for Highway Works, Volume 2 - Notes for Guidance on the Specification for Highway Works - Series NG 900 - Road Pavements - Bituminous Bound Materials - Table NG9/1 TS: Criteria for the Stability and Flow of Rolled Asphalt Surface Course (Design Mixtures)*.
6. Maximum texture depth after 4 weeks trafficking: 3mm shall be required if stated on the 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 *Manual of Contract Documents for Highway Works, Volume 2 - Notes for Guidance on the Specification for Highway Works - Series NG 900 - Road Pavements - Bituminous Bound Materials - Table NG9/2 :Defect Classification: Area*.
9. Class of linear Defects (metre per 100 metres) acceptable shall be in accordance with *Manual of Contract Documents for Highway Works, Volume 2 - Notes for Guidance on the Specification for Highway Works - Series NG 900 - Road Pavements - Bituminous Bound Materials - Table NG9/3 : Defect Classification: Linear Defects Longitudinal Regularity - Requirements*.
10. Class of transverse regularity shall be in accordance with *Manual of Contract Documents for Highway Works, Volume 2 - Notes for Guidance on the Specification for Highway Works - Series NG 900 - Road Pavements - Bituminous Bound Materials - Table NG9/4 : Transvers Regularity - Requirement and Table NG9/5 : Transverse Regularity - Class Limits*.
11. Class of longitudinal regularity shall be in accordance with *Manual of Contract Documents for Highway Works, Volume 2 - Notes for Guidance on the Specification for Highway Works - Series NG 900 - Road Pavements - Bituminous Bound Materials - Table NG9/6 : Longitudinal Regularity - Requirements and Table NG9/7 : Longitudinal Regularity - Class Requirements*.

Appendix 7/7 – Slurry Surfacing Incorporating Microsurfacing (Cont'd)

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 (Cont'd)

SHEET 2 – Information to be provided by the Operating Company

The Operating Company shall provide the following information, all in accordance with the requirements of clause 017AR to the Overseeing Organisation, upon request:

- 1 A copy of:
 - (i) BS EN ISO 9001:2015 Quality management systems. Requirements. Certificate showing as a minimum 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 the 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 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 *National Highway Sector Schemes for Quality Management in Highway Works Scheme 13 Particular Requirements for the Application of ISO 9001:2015 for the Supply and Application of Surface Treatments to Road Surfaces*, 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 45°C or 60°C or other suitable measure of the ability of the proposed system to resist deformation and flow,
 - (v) Permeability test carried out on the system, if it is claimed that the process seals the existing surface together with the method of test,
 - (vi) Accelerated ageing test results in accordance with the appropriate BBA/HAPAS or equivalent test,
 - (vii) 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 or equivalent Certificate,
 - (viii) Shaking abrasion test results,
 - (ix) Slurry surfacing mix cohesion, and
 - (x) 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 sub-clause 709.11.

Appendix 7/12 - Arrester Beds

1 The location of existing arrester beds within the Unit are detailed in Table 1 below:

Table 1

Route	Location and Grid Reference	Maintenance Frequency
A9	Dowally (n/b) (300227.02,747128.03)	6 monthly
A9	Berriedale (n/b) (311831.47, 922501.82)	6 monthly
A9	Dunbeath (n/b) (315810.02,929779.19)	6 monthly

2. The location for any new arrester beds shall be proposed by the Operating Company in accordance with this Contract.

3. Arrester beds shall be maintained in accordance with Clause 712 of the Specification for Highway Works.

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 of 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. Prior to overlaying and saw–cut and sealing of the bituminous overlay the location of the preparation of jointed concrete pavements shall be determined by the Operating Company in accordance with this Contract.
2. Prior to overlaying the treated surface shall be bond coated in accordance with Appendix 7/4 Preparation of Jointed Concrete Pavements Prior to Overlaying and Saw-Cut and Seal of the Bituminous Overlay.

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 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. These materials will be agreed for use on the Unit with Transport Scotland.

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 X/Y/Z'.
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 and Edgings shall be as shown on Standard Drawings Series 1100/01 contained within this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract.
2. Footways and Paved Areas shall be laid using materials and to thicknesses detailed in *CD239 Footway and Cycleway Pavement Design*. Footway Type F1 means a footway comprising 20mm thick asphalt surface course, 50mm thick asphalt binder course and 100mm thick sub base. Footway Type F3 means a footway comprising 20mm thick asphalt surface course and 50mm thick asphalt binder course. Footway Type F4 means a footway comprising 20mm thick asphalt surface course.
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 Asphalt for roads and other paved areas – Specification for 903 transport, laying and compaction and type testing protocols*.
4. Concrete flags shall comply with *British Standard EN 1339:2003 Concrete paving flags. Requirements and test methods* and Table 11/1D below. Surface levels of paved areas shall be to *British Standard 7533-4: 006 Pavements constructed with clay, natural stone or concrete pavers. Code of practice for the construction of pavements of precast concrete flags or natural stone slabs, Tables B1 and B2*.
5. Concrete paving blocks shall comply with *British Standard EN 1338:2003 Concrete paving blocks. Requirements and test methods* and Table 11/1B below. Surface levels of paved areas shall be to *British Standard 7533-3:2005+A1:2009 Pavements constructed with clay, natural stone or concrete pavers. Code of practice for laying precast concrete paving blocks and clay pavers for flexible pavements: Annex B*.
6. Kerb upstands at pedestrian crossings and vehicular accesses shall be 0 and 25mm respectively.
7. Polymeric Kerbs, Islands and Lane Separators will only be permitted for use on a case by case basis with prior approval from the Overseeing Organisation.
8. The design levels of pavement courses shall be calculated from the vertical profile and crossfalls which shall be scheme specific and determined by the Operating Company in accordance with the relevant standards and other provisions of this Contract.

Design levels shall be checked by taking measurements of the surface levels of all courses on a grid of points at the minimum intervals detailed in Table 11/1E.

Table 11/1A General Requirements for Permitted Construction Materials	
Sub -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
901.4 and 942.6	In addition to the requirements of clauses 901.4 and 942.6 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 Schedule 5 Specification and Drawings, Appendix 7/4 Bond Coats, Tack Coats and Other Bituminous Sprays (Sheets 1, 2 and Binder Data Sheet)

Table 11/1B Particular Requirements for Concrete Blocks: <i>British Standard EN 1338</i>	
Requirement	Specification
Shape	Rectangular
Dimensions	200mm 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.

Table 11/1C General Requirements for Block Paving	
No	Requirement
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 Polyvinyl Acetate (PVA) joint stabilising fluid or applied in accordance with the manufacturer's instructions.

Table 11/1D Particular Requirements for Concrete Flags: <i>British Standard EN 1339</i>	
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

Table 11/1E Grid of Points for Design levels		
Grid for checking surface levels of pavement courses (1114.3)	Longitudinal Dimension	5 m
	Transverse Dimension	Front and Rear and at 1 m intervals between

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 Numbers NDX1070-01ga Rev B and NDX1070-02ga Rev B contained in this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract.

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 12899-1:2007 Fixed, vertical road traffic signs. Fixed signs*, or microprismatic material to *British Standard 8408:2005 Road traffic signs. Testing and performance of microprismatic retroreflective sheeting materials. Specification*, 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 within this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract .

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 mm 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 mm 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 40-5:2002 Lighting columns. Requirements for steel lighting column*, 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 Passive safety of support structures for road equipment. Requirements, classification and test methods*.

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 signs 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 or equivalent.

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 56 (Schedule 2, Part 6 Item 2) of *Traffic Signs Regulations and General Directions 2016*.
- 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 complying with the sizes quoted in paragraph 16.1 in Chapter 4 of the *Traffic Signs Manual: Warning Signs*.
- 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..
- 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, Distance Marker Posts*.

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 within this Schedule 5 Specification and Drawings, Appendix 0/4 List of Drawings included in this Contract.
- 4.2 The edge of carriageway marker shall be installed in accordance with the manufacture's written instructions.
- 4.3 A 150 mm high 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.

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 shall be fitted with new inserts.

- 2.2 Road studs with red and green reflectors shall be uni-directional. Road studs with white reflectors 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 TR2502 Issue A June 2005 Specification for Portable Traffic Signal Control Equipment for use at Roadworks* and *TR2504A for vehicle detection equipment*. The signals shall be located and operated in accordance with *Traffic Signs Manual Chapter 8 - Traffic Safety Measures and Signs for Road Works and Temporary Situations Parts 1 - 3 (Chapter 8)*.
- 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	Width	Depth
	(mm)	(mm)	(mm)

Door Opening	
Any	
Manufacturer's drawing ref no	

Corrosion protection (steel columns only) – basic system type sub-clauses (1911.9 and 1911.10)

m/s

Reference Wind Velocity $V_{ref,0}$ as defined in BS EN 40-3-1:2013

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
(mm)	(mm)	(N)

Flange plate

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

	Terrain Categories as defined in BS EN 40-3-1:2013				
	I	II	III	IV	
Luminaire Maximum Weight (kg)	Maximum Windage Area (m ²) for terrain categories as defined in BS EN 40-3-1:2013				

Post Top Column

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 (m ²) for terrain categories as defined in BS EN 40-3-1:2013					
			Grade	Design Strength (N/mm ²)		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 40-2:2004 Lighting columns. General requirements and dimensions.* as appropriate.
The height shall also be dependent upon local factors, for example overhead power lines, in accordance with the requirements of *British Standard 7671:2018 Requirements for Electrical Installations. IET Wiring Regulations.*
- 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 sub-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		
	STR1	STR2	
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 Schedule 5 Specification and Drawings, Appendix 1/5 Testing to be carried out by the Operating Company and Appendix 1/6 Supply and delivery of Samples to the Overseeing Organisation 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 Schedule 5 Specification and Drawings, Appendix 17/70 Schedule for the Specification of an Alternative Designed Concrete, the Operating Company may develop an alternative designed concrete in accordance with *British Standard 8500-1:2015+A2:2019 Concrete. Complementary British Standard to BS EN 206. Method of specifying and guidance for the specifier and British Standard 8500-2 2015+A1:2016 Concrete. Complementary British Standard to BS EN 206. Specification for constituent materials and concrete* 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	Yes	Yes	Yes	Yes	Yes
UKAS or equivalent third party product conformity certification [YES/NO]					
#	The Operating Company shall determine this detail when selecting from the above table and inform the Overseeing Organisation.				
##	Cross-reference shall be made to Schedule 5 Specification and Drawings, Appendix 1/5 Testing to be carried out by the Operating Company and Appendix 1/6 Supply and delivery of Samples to the Overseeing Organisation as appropriate.				
a	Aggregate carbonate range A, DC-3, DC-4 and DC-4m to use only Combination CIIB+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 Schedule 5 Specification and Drawings, Appendix 17/70 Schedule for the Specification of an Alternative Designed Concrete, the Operating Company may develop an alternative designed concrete in accordance with <i>British Standard 8500-1:2015+A2:2019 Concrete. Complementary British Standard to BS EN 206. Method of specifying and guidance for the specifier and</i>				

Requirement	Schedule
<i>British Standard 8500-2 2015+A1: 2016 Concrete. Complementary British Standard to BS EN 206. Specification for constituent materials and concrete and this Specification and submit to the Overseeing Organisation for written consent.</i>	

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 *Design Manual for Roads and Bridges, CD373 Impregnation of Reinforced and Prestressed Concrete Highway Structure Using Hydrophobic Pore-lining Impregnants*.
3. Where an alternative to silane impregnation is 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 Kitemark or the Quality Scheme for Ready Mixed Concrete (QSRMC) Quality and Product Conformity Regulations *British Standard EN ISO 9001:2015 Quality management systems. Requirements.*
- 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 Structural Concrete.
- 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 Schedule 5 Specification and Drawings, Appendix 17/1 Schedule for the Specification of Designed, and complying with sub- clauses 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 sub-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 Testing fresh concrete. Sampling.*

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 – 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.

<p>Structure Name or Location</p> <p>(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)</p>	
<p>Aggressive Chemical Environment for Concrete Class for Site</p> <p>(derived from Table A.2 of BS 8500-1 2015+A2:2019)</p>	
<p>Structural Performance Level</p> <p>(High, normal or low)</p> <p>(derived from Table 3 of BS 8500-1 2015+A2:2019)</p>	
<p>Design Chemical Class</p> <p>(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 2015+A2:2019 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)</p>	
<p>Other Requirements and Design Constraints</p> <p>(eg Limitations on drainage or Additional Protective Measures required)</p>	

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 ^s		
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 Schedule 5 Specification and Drawings, Appendix 1/5 Testing to be carried out by the Operating Company and Appendix 1/6 Supply and delivery of Samples to the Overseeing Organisation as appropriate.		
Notes	1	Structural performance level shall be 'High'.	

	Schedule		
2	See tables A2, A4 and A5 of BS 8500-1:2015+A2: 2019 and BRE Special Digest 1: 2005 Concrete in aggressive ground.		
3	RC30 above ground shall comply with Table A6 of British Standard 8500-1:2015+A2: 2019		

Appendix 18/1 - Requirements for Structural Steelwork

Note: The Operating Company shall complete Appendix 18/1 Requirements for Structural Steelwork.

Contract Title:.....

Structure Reference:.....

Component Specification Reference: CS1800-mm/yyyy:****-** [See NG 1800.6.3]

Note: The component specification comprises Series 1800 (issue as dated in the component specification reference) and this Appendix 18/1, which includes the drawings and documents referred to in the table below.

[The compiler should complete the following table providing an appropriate entry(s) for every Series 1800 Clause Reference given in the left column]

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1804 – Specifications and Documentation				
1804.1.1	Execution Specification, General – drawing numbers of all drawings in Appendix 0/4, and document references of all appended documents that give all the necessary requirements for the execution of the steelwork			
1805 – Constituent Products				
1805.1	Constituent Products, General – properties of products not covered by listed standards.			
1805.3.1	Structural Steel Products, General – grades, qualities and, if appropriate, coating weights, finishes and any required options permitted by product standards for steel products.			
1805.3.3.	Surface conditions – additional requirements related to special restrictions on either surface imperfections or repair of surface defects by grinding in accordance with BS EN 10163, or with BS EN 10088 for stainless steel.			
1805.3.3	Surface conditions – surface finish requirements for other products.			
1805.3.3	Surface conditions – where decorative or specialist surface finishes are required.			

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1805.3.4	Special properties – Additional requirements for special properties if relevant			
1805.4	Steel castings – Grades, grade suffixes', finishes and options for steel castings.			
1805.6.3	Structural bolting assemblies for non preloaded applications – property classes of bolts and nuts, and surface finishes for structural bolting assemblies for non-preloaded applications.			
1805.6.3	Structural bolting assemblies for non preloaded applications – mechanical properties for large diameter bolting assemblies.			
1805.6.3	Structural bolting assemblies for non preloaded applications – full details for the use of insulation kits.			
1805.6.4	Structural bolting assemblies for preloading – property classes of bolts and nuts and surface finishes for structural bolting assemblies for preloading.			
1805.6.4	Structural bolting assemblies for preloading – where stainless steel bolts can be used in preloaded applications.			
1805.6.7	Foundation bolts – where reinforcing steels may be used for foundation bolts together with the steel grade			
1805.6.8	Locking devices – where locking devices are required.			
1805.6.8	Locking devices – if products other than those in the referred standards are to be used.			
1805.6.11	Fasteners for thin gauge components – mechanical fastener type for use in stressed skin applications.			
1805.6.12	Special fasteners – special fastener not standardised in CEN or ISO standards, as well as any tests necessary.			
1805.8	Grouting materials – grouting materials to be used.			
1805.10	High strength cables, rods and terminations – tensile strength grade and coating of wires.			
1805.10	High strength cables, rods and terminations – designation and class of strands.			
1805.10	High strength cables, rods and terminations – minimum breaking load and diameter of steel wire ropes and requirements related to corrosion protection.			
1805.11	Structural bearings – Schedule of design requirements and acceptance test.			
1806 – Preparation and Assembly				

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1806.2	Identification – where soft or low stress stamps may not be used for stainless steel.			
1806.2	Identification – zones where identification marks are not permitted or shall not be visible after completion.			
1805.4.4(2)	Hardness of free edge surfaces – edge surfaces where the relaxation for machine plasma cutting described in 1806.4.4 (2), is not permitted.			
1806.5.4 c)	Cold forming – minimum bending radii for stainless steels other than those to grades listed in 1806.5.4 b).			
1806.5.4 d)	Cold forming – protective membranes for cold formed thin gauge components.			
1806.6.1	Dimensions of holes – special dimensions for movement joints.			
1806.6.1	Dimensions of holes – nominal hole diameter for hot rivets.			
1806.6.1	Dimensions of holes – dimensions of countersinking.			
1806.7 (1)	Cut outs – re-entrant corners where a smaller radius than that described in 1806.7 is permitted.			
1806.8	Full contact bearing surfaces – where full contact bearing surfaces are required.			
1806.9 (2)	Connections for temporary components – special requirements applying to connections for temporary components, including those related to fatigue.			
1806.9 (3)	Connections for temporary components – where the removal or addition of permanent material or the introduction of permanent notches is permitted.			
1806.10	Assembly check – if, and to what extent, trial assembly is to be used.			
1807 – Welding				
1807.1 (1)	Welding Quality Requirements – if the BS EN ISO 3834 quality requirements shall conform to the requirements for EXC2.			
1807.5.6 (1)	Temporary attachments – areas where welding of temporary attachments is not permitted.			
1807.5.6 (2)	Temporary attachments – use of temporary welded attachments.			
1807.5.9.1	Butt welds, general – the location of butt welds used as splices.			
1807.5.9.1	Butt welds, general – where a flush surface is required.			
1807.5.9.2 (1)	Single sided welds – where the use of permanent steel backing is permitted.			
1807.5.13	Slot and plug welds – the dimensions of holes for slot and plug welds.			
1807.5.14.1	Arc spot welds – if weld washers are accepted for stainless steels.			

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1807.5.14.1	Arc spot welds – the minimum visible width of arc spot welds.			
1807.5.15	Other weld types – requirements for other weld types.			
1807.5.17	Execution of welding – requirements for grinding and dressing of the surface of completed welds			
1807.7.2	Amendments to EN 1011-3 requirements – the surface finish of the weld zones on stainless steels			
1807.7.3	Welding dissimilar metals – requirements for welding different stainless steels to each other or to other metallic material			
1808 – Mechanical Fastening				
1808.2.1	Use of bolting assemblies, General – where, in addition to tightening other measures or means are to be used to secure the nuts.			
1808.2.1 (1)	Welding of mechanical fasteners – where welding of property class 4.6 nuts, bolts and washers is permitted.			
1808.2.2	Bolts – minimum diameter of fasteners for thin gauge components and sheeting.			
1808.2.2	Bolts – dimensions of bolts in connection utilising the shear capacity of the unthreaded shank.			
1808.2.4	Washers – dimensions and steel grade of plate washers to be used with slotted or oversized holes.			
1808.2.4	Washers – dimensions and steel grade of taper washers.			
1808.3	Tightening of non-preloaded bolts – where full contact bearing is required (see 1806.8).			
1808.4	Preparation of contact surfaces in slip resistant connections – requirements related to contact surfaces in slip resistant connections for stainless steels.			
1808.5.1 (2)	Cover Plates in Preloaded Joints – measures permitted to limit the out-of-plane bending stiffness of cover plates			
1808.5.1 (6)	Tightening of preloaded bolts, General – preloaded bolts that shall be tightened by the torque method.			
1808.7.2	Installation of rivets – where a flush surface of countersunk rivets is required.			
1808.7.3	Acceptance criteria – where outer faces of plies are required to be free of indentation by the riveting machine			
1808.8.4	Fastening side laps – requirements for the side lap fasteners as structural fasteners in stressed skin applications			

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1808.9	Use of special fasteners and fastening methods – requirements for procedure tests.			
1808.9	Use of special fasteners and fastening methods – requirements for use of hexagon injection bolts			
1809 – Erection				
1809.4.1(1)	Reference system – the reference temperature for setting out and measuring the steelwork if different from 15°C.			
1809.5.3	Maintaining suitability of supports – if compensation for settlement of supports is required.			
1809.5.4	Temporary supports – where levelling nuts on foundation bolts under the base plate are required to be removed.			
1809.5.4	Temporary supports – where packings for bridges may be left in position.			
1809.5.5(1)	Grouting and sealing – requirements for the treatment of steelwork, bearings and concrete surfaces before grouting.			
1809.5.5	Grouting and sealing – the method of sealing the edges of a base plate if no grouting is needed.			
1810 – Surface Treatment				
1810.1 (5)	Surface treatment, General – requirements for friction surfaces and class of treatment or tests required for surfaces in slip resistant connections			
1810.1(7)	Surface treatment general – the extent of surfaces that are affected by pre-loaded bolts in non-slip resistant connections			
1810.1 (8)	Preparation of fasteners – if the lower embedded part of foundation bolts is required to be untreated.			
1810.1 (9)	Galvanizing – Requirements for procedure qualification of the dipping process if hot dip galvanizing of components after manufacture is required.			
1810.1 (10)	Galvanizing – Requirements for the inspection, checking or qualification of the preparation to be carried out before subsequent overcoating, for galvanized components			
1810.2	Preparation of steel substrates – Requirements for surface cleanliness of stainless steels.			
1810.2 (1)	Preparation of steel substrates – requirements for the preparation of surfaces to receive corrosion protection if they are to be different from those described in Series 1900 and/or BS EN ISO 8501-3:2007 preparation grade P3.			

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1810.3	Weather resistant steels – requirements for the surface treatment of non-weather resistant steels in contact with uncoated weather resistant steels.			
1810.5	Galvanizing – where enclosed spaces shall be sealed after galvanizing and, if so, with what sealant.			
1810.6	Sealing of spaces – where weld imperfections permitted by the welding procedure specification require sealing by application of suitable filler material.			
1810.6	Sealing of spaces – the method to be used for sealing the interface if mechanical fasteners penetrate the wall of sealed enclosed spaces.			
1810.6 (2)	Sealing of spaces – internal spaces that are to be hermetically sealed.			
1810.7	Surfaces in contact with concrete – specific requirements for coating surfaces in contact with concrete.			
1810.9 (2)	Repairs of coatings to pre-coated constituent products – method and extent of repair after welding.			
1810.10.2	Cleaning of stainless steel components – the method, level and extent of cleaning of stainless steels.			
1811 – Geometrical Tolerances				
1811.1	Tolerance types – additional information related to special tolerances if these tolerances are specified			
1811.3.3	Alternative criteria – where the specified alternative criteria for functional tolerances may be applied			
1812 – Inspection, Testing and Correction				
1812.2.1 (1)	Constituent products – specific testing requirements for proprietary products.			
1812.5.1	Inspection of non-preloaded bolted connections – requirements for checking the installation of an insulation system.			
1812.5.2.1	Inspection of friction surfaces – requirements for the inspection and testing of preloaded bolts used for stainless steels connections.			
1812.5.5.1	Special fasteners and fastening methods, General – requirements for the inspection of connections using special fasteners or special fastening methods.			
1812.7.1 (1)	Inspection of trial erection – additional requirements for the inspection of a trial erection			
1812.7.3.4	Location and frequency – additional measurements, other than the position of components adjacent to site interconnection nodes.			

			Drawings and Documents that give related structural steelwork requirements	
Series 1800 Clause Reference:	Additional Information Required	Not Applicable <i>(Ticked if not applicable)</i>	See Drawings Listed in Appendix 0/4 <i>[The Operating Company should provide drawing reference(s)]</i>	See Appended Documents <i>[The Operating Company should provide document reference(s)]</i>
1812.7.3.4	Location and frequency – conditions other than under the self weight of steelwork, under which positional measurements should be made.			
1812.7.3.6	Definition of nonconformity – envelope of permissible positions where significant movement of a structure is anticipated			
1812.7.4	Other acceptance tests – specific requirements including tolerance range on the load, if components of a structure are to be erected to a specific load.			

Appendix 18/1 Appended Documents

[The Operating Company should provide a complete list of the appended documents referred to from the table above. The list should include as a minimum the full title, date of issue, revision and reference number for each document. The documents should be attached to the Appendix 18/1.]

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 Quality requirements for fusion welding of metallic materials. Documents with which it is necessary to conform to claim conformity to the quality requirements of ISO 3834-2, ISO 3834-3 or ISO 3834-4* 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 EN ISO 9934-1:2016 Non-destructive testing. Magnetic particle testing*. General principles 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 inspections 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 *BS EN ISO 16810:2014 Non-destructive testing. Ultrasonic testing. General principles*.
5. Welders shall be qualified for the relevant procedure in the proposed location in accordance with *British Standard EN 287-1:2011 Qualification test of welders. Fusion welding. Steels*. 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: 2009 Welding. Recommendations for welding of metallic materials. General guidance for arc welding*. and *British Standard EN 1011-2 Welding. Recommendations for welding of metallic materials. Arc welding of ferritic steels*. 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 CI 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	1 st Coat	2 nd Coat	3 rd Coat	4 th 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 CI 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 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) 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 *British Standard 4800:2011 Schedule of paint colours for building purposes* 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 19/5: General Requirements

The Operating Company shall complete NG Sample Contract Specific Appendix 19/5 General Requirements noting that use of thermally sprayed aluminium metal coating is not permitted.

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 and the requirements of *Transport Scotland's Interim Amendment No 24 Guidance on Implementing Results of Research on Bridge Deck Waterproofing*.

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 *Manual of Contract Documents for Highway Works Volume 1 - Specification for Highway Works - Series 2000 Waterproofing of Concrete Structures*.

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 high voltage integrity tests compatible with the waterproofing system shall be carried out on each bridge deck which has received a new or replacement waterproofing system or where an area of waterproofing greater than 20m² has been replaced.
- 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

Waterproofing with bituminous paint 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)	2

		0.45 litres/m ² (second coat)	
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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.

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

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.

2 Cement Mortars

- 2.1 The mortar designation shall be selected by the Operating Company from Table 24/5 of the Specification.

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.

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 natural building stone with the existing sound 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 uncoursed 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 8000-3:2001 Workmanship on building sites. '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 sub-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 where the presence of sulfates or other aggressive chemicals in the groundwater, the ground or any adjacent material give a ACEC classification higher than AC-1 as defined in *British Standard 8500-1:2015+A2: 2019 Concrete. Complementary British Standard to BS EN 206. Method of specifying and guidance for the specifier.*

Appendix 30/1 – General

SHEET1

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 liaise with any adjacent landowners, as necessary for the delivery of the works. 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 Pesticide record forms as detailed below shall be submitted to the Overseeing Organisation on an annual basis as part of the Annual Landscape Management Report to be submitted in accordance with Schedule 2 Scope, Section 3 Inspection & Maintenance – Road incl. Landscape, 3.7 Landscape development process.

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 for each and any area of operation after consultation with Scottish Natural Heritage (SNH). There are a number of species that breed outwith this period (for example, many waterfowl and marine birds breed well into August). Any works that may potentially impact wild birds must be preceded by an appropriate survey by a suitably qualified individual(s). Evidence of consultation with SNH shall be provided by the Operating Company to the Overseeing Organisation prior to any Operations commencing on Site.

4 Inspection Reports are required for all inspections carried out under clauses 3001 – 3012, inclusive, on the form below. Inspection Reports shall be submitted at the following intervals:

- (i) In the case of activities carried out under clause 3009 (Establishment Maintenance for Planting):
 - (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 inspections carried out under all other clauses within this Series: at the frequencies stated in the relevant clauses and/or as noted in Schedule 2 Scope, Section 3 Inspection & Maintenance – Roads incl. Landscape, 3.5 Detailed Inspections.

SHEET 2: Information to be provided by the Operating Company

LANDSCAPE WORKS - PESTICIDE RECORD

Date of visit .../.../...

Name of Operating Company:

(All applications to be recorded; minimum one record per day/per site; to be uploaded within 24 hours following Operations)

Scheme Name/reference:

Operating Company's telephone number:.....

Operations carried out	Pesticide used (name & reference)	Quantity used	Location(s) of operation(s)
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 of Operatives on Site	Relevant qualifications:
Supervisor		
Operatives		
Storeman		
Application by		

Signed for Operating Company:.....

Operating Company's observations on damage or any other Incidents:

.....

.....
.....

Date when uploaded to APMS (or other relevant system):

.....
.....

SHEET 3: Information to be provided by the Operating Company

LANDSCAPE WORKS – INSPECTION REPORT

Date of Inspection.../.../...

Type of Inspection:

Contract Name and Reference:

Name of Operating Company:

(All inspections to be recorded; minimum one record per visit/per site; to be uploaded within 24 hours following Operations)

Relevant Clause ref	Operations carried out	Location of Operations

	Names of operatives on Site:	Relevant qualifications
Supervisor		
Operatives		

Has this work been checked by the Operating Company Landscape Architect? Yes / No *
**Delete as appropriate*

Observations on damage by others additional work required and/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 Landscape Architect)..... DATE../../..

NAME IN CAPITALS:.....

Date when uploaded to APMS (or other relevant system):

.....

Appendix 30/2 – Weed Control

- 1 The Operating Company shall control all injurious weed species which shall be defined for this Appendix 30/2 Weed Control 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 and, where necessary, to eradicate them.

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 (systemic) 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, including ditches.

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 Where any of the weeds listed in paragraph 1 of this Appendix 30/2 Weed Control 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.

No herbicide treatment shall be applied to control vegetation associated with safety barriers unless site-specific permission is provided in writing by the Overseeing Organisation

7 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 new woodland,
- (iv) within plant protectors and tree/shrub shelters,
- (v) where necessary throughout the Unit , or in areas associated with it 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 or other means of weed control may cause damage.

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 30/2 Weed Control.

8 With the exception of the species listed below, the Operating Company shall cut weeds listed in paragraph 1 of this Appendix 30/2 Weed Control 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 more effective control by subsequent herbicide application.

No cutting is permitted for the control of any invasive non-native species or other invasive species which spread via vegetative propagation or where cutting Operations may assist in the dispersing of seed, including (but not limited to) Japanese knotweed, Giant hogweed and Himalayan balsam

9 Any arisings from weed control Operations shall be removed from Site .

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 and dispose of 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. This period shall be three years from completion of the works. 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.

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.

- 2 No guns or snares shall be used for the control of rabbit, hare and deer without the written consent of the Overseeing Organisation.

- 3 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 in accordance with 3010.4 SR.

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.

- 4 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.

- 5 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 a non-residual 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 or seeded other than on rock faces.

The minimum depth of ripping shall be 450 mm unless otherwise consented to by the Overseeing Organisation.
4. The spacing between tine furrows used for ripping shall be 500 mm.
5. The requirements of sub-clauses 3004.8 to 3004.11 shall apply to any area of subsoil to be seeded or where topsoil is to be spread.
6. Any stones of or greater than 100 mm in any one dimension brought to the surface during final preparation of soils may be retained on the Unit and used to form habitat piles, following approval from the Overseeing Organisation, in locations where the habitat piles are not likely to be visible from the carriageway, or become visually intrusive, or interfere with any Operations.

All inorganic foreign matter and other undesirable material brought to the surface shall be removed off the Unit to an appropriate location.

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 origin.,
- (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. If this risk is deemed high, 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 (*Leucanthemum vulgare*) which, 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.

- 5 The wild flower seeds within any mix shall be of UK native origin as a minimum requirement but where possible and practicable they shall be of Scottish origin, propagated from wild seed collected from as close to the intended works Site as possible.

The Operating Company shall complete and submit to the Overseeing Organisation the appropriate Wildflower Seed Origin Certificates in the format shown in this Appendix 30/5 – Grass Seeding, Wildflower Seeding and Turfing.

- 6 Grass seed mixture shall be sown at a rate of not less than 20g/m² for side slopes of cuttings and embankments and 15g/m² elsewhere.

Wildflower/grass mix shall be sown at a rate of not less than 10 g/m².

- 7 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 rates for hydraulic application for grass seed mix and wildflower/grass mix shall be the same as for conventional sowing.

- 8 Site won turf may be used where appropriate only with written approval of the Overseeing Organisation. Where turf arising from site is used the requirements of clause 3005 shall apply.

- 9 Imported turf may be used only with written approval of the Overseeing Organisation when the grass and/or herb mixture will be agreed. Where imported turf is used the requirements of clause 3005 shall apply.

- 10 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 ORIGIN 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 – Grass Seeding, Wildflower Seeding and Turfing, 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).

<p>SUB-CONTRACTOR</p> <p>Company:.....</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signed:.....</p> <p>Date: .././..</p>

Part (ii). (to be completed by the Operating Company, regardless of whether or not the planting Operations have been sub-contracted).

<p>OPERATING COMPANY</p> <p>Company:.....</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signed:.....</p> <p>Date: .././..</p>
--

WILDFLOWER SEED ORIGIN 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 – Grass Seeding, Wildflower Seeding and Turfing, 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).

<p>SUB-CONTRACTOR</p> <p>Company:.....</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signed:.....</p> <p>Date: .././..</p>

Part (ii). (to be completed by the Operating Company, regardless of whether or not the planting Operations have been sub-contracted).

<p>OPERATING COMPANY</p> <p>Company:.....</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signed:.....</p> <p>Date: .././..</p>
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Appendix 30/6 – Planting

- 1 All new plant stock to be used within the Unit shall be as per the individual Scheme details (to be approved by the Overseeing Organisation) and shall conform to the relevant and current part(s) of *British Standard 3936-1:1992 Nursery Stock Specification for Trees and Shrubs* and *British Standard 8545:2014 Trees: from nursery to independence in the landscape. Recommendations*. An exception to this will be 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 30/1, 30/2 and 30/3.

TABLE 30/1 – Extra Heavy Standard, Heavy Standard, Standard, Rootballed Conifers and Feathered Trees

Type	Girth at 1m metre above Ground Level (centimetres)	Clear Stem from Ground Level (metres)	Minimum Height from Ground Level (metres)	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	1.5	2.5	3.0
Large rootballed conifers	–	–	1.5	1.75
Feathered Tree	–	–	1.2	1.8

TABLE 30/2 – Whip transplants, Container Grown and Cell Grown Stock

Type	Minimum Age (years)	Minimum Height Above Ground Level (millimetres)	Minimum Container Size (cubic centimetres)
<u>Cell grown stock:</u>			175
Broadleaves	1.5	250	175
Conifers	1.5	180	
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 30/3 – 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)
Hedge plants, bare root beech, hawthorn	6 per linear metre double staggered row	3.0	400-600	–	–
Cell grown		1.5	200-400		
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.

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 30/6 – Planting. The Overseeing Organisation may require additional plant records (including, but not limited to, plant health reports, inter-

nursery transport accounts and germination records) and it shall be the Operating Company's responsibility to collate and submit these on request.

Where there is a choice of form and/or species of plant (where each is equally appropriate and meets the Scheme objectives) preference shall be given to the most local provenance available.

3. When requested by the Overseeing Organisation, the Operating Company shall make suitable arrangements for the Overseeing Organisation to make a visit or number of visits, as required, to any nursery selected for the supply of plant material pertinent to this Contract.
- 4 Unless there is a detrimental impact in the health of the plant, all labels, canes and ties shall be removed after 12 months following planting unless there is a particular reason to retain them beyond this as discussed and agreed with the Overseeing Organisation.
- 5 Topsoil for tree pits shall be General Purpose Grade conforming to *British Standard 3882:2015 Specification for topsoil* and shall be either Class 5A (site-won) or Class 5B (imported).
- 6 An appropriate compost or fertiliser shall be deposited over planting areas, for incorporation into the soil during ground cultivation, or incorporated into soil during pit preparation and backfilling where, in the opinion of the Operating Company, the soil structure is poor or nutrient deficient and will be detrimental to the successful establishment of the planting. The Operating Company shall inform the Overseeing Organisation prior to spreading any soil ameliorants.
- 7 Any compost intended to be used anywhere within the Unit must conform with *PAS 100:2018 Specification for composted materials*. The pH, conductivity and nutrient composition of any added compost shall be determined by the Operating Company to reflect the Site conditions and amelioration requirements. The compost components shall be agreed with the Overseeing Organisation prior to use.
- 8 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.

Scattering fertiliser of any description on the surface of the ground around the plants is not permitted.

- 9 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.

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.

- 10 All planting Operations shall be undertaken according to best horticultural practice at the time of year best suited to the plant material. 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, generally between the beginning of November and the end of March unless otherwise consented to in writing by the Overseeing Organisation.

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.

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.

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.

Surrounding ground shall be firmed back after planting.

- 12 Planting pits and trenches shall be in accordance with Table 30/4 below. Unwanted sub-soil arising from planting pits and trenches shall be retained on Site, wherever practicable, and deposited in new mounding.

TABLE 30/4 – 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 x 750	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*

SHEET 2: Information to be provided by the Operating Company

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 *Fitting Landscapes Securing More Sustainable Landscapes*

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).

<p>SUB-CONTRACTOR</p> <p>Company:.....</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signed:.....</p> <p>Date: .././..</p>
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PART B. (to be completed by the Operating Company, regardless of whether or not the planting Operations have been sub-contracted).

<p>OPERATING COMPANY</p> <p>Name:.....</p> <p>Position:.....</p> <p>Signed:.....</p> <p>Date: .././..</p>
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SHEET 2 Cont'd: Information to be provided by the Operating Company

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

13 All new hedge planting shall be undertaken in accordance with the requirements of clause 3006.28

14 Where any planting is to be undertaken in undisturbed land and where the existing topsoil is 300 mm deep or deeper, the requirements of clause 3006.29 shall apply. The Operating Company shall assess the soil conditions and advise whether any ameliorants are required. If required and approved by the Overseeing Organisation, ameliorants shall be spread following supplier's recommendations and following good horticultural practice.

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.

15 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 a premixed 80% topsoil / 20% compost mixture using Class 5A or Class 5B topsoil as long as this meets the quality requirements and lightly firmed prior to planting.

16 Root barriers shall only be used where the clearances needed for underground services and drainage infrastructure affects the requirement of the planting.

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.

17 Semi-mature trees shall be planted as shown on Manual of Contract Documents for Highway Works - Volume 3 - Highway Construction Details - K Series - Miscellaneous - Drawing Number K5 - Planting Details for Planting Large Trees.

18 Backfill to tree pits shall comprise any Class 5A or Class 5B topsoil, in so far that this meets the quality requirements. The topsoil shall be mixed with compost, in accordance with sub-clause 3006.14, in a 80% topsoil/20% compost mixture thoroughly mixed Controlled release fertiliser in accordance with sub-clause 3006.15 shall be thoroughly mixed into the topsoil.

19 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.

All container grown cell grown and root-balled plants shall be watered to field capacity immediately before planting.

20 A 75 mm diameter perforated flexible, plastic irrigation pipe shall be inserted around the root-balls of all trees planted at extra heavy standard size or larger at a depth of 150 mm below the ground surface.

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.

- 21 Individual plant protectors a minimum of 750 mm in height and 80-100 mm diameter and in accordance with clause 3006.52 shall be used to protect all cell grown stock whip trees and feathered trees of 3 years or under in age.
- 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.
- Fagus species shall be protected by plant protectors with base ventilation.
- Shelters shall be supported by timber stakes, of sufficient number to effectively support the shelter, attached by releasable ratchet ties.
- 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.
- Stakes shall be of sufficient length to adequately support the plant protector and remain stable in the ground for the full duration required.
- Previously used tree and shrub shelters in sound condition may be re-used with agreement from the Overseeing Organisation.
- 22 Mulch shall typically be used for formal, ornamental planting beds when agreed with the Overseeing Organisation. Timber mulch shall be composted wood chips or bark free of fungi and diseases, methyl bromide contamination and foreign material in accordance with clause 3006.55(ii).
- 23 Individual mulch mats may be used in areas of amenity planting except for planting areas in rock cutting. 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.
- 24 Mulch mats shall be secured in any one of the three methods detailed in directed in clause 3006.60 as appropriate to the local conditions and agreed with the Overseeing Organisation
- 25 Sheet mulch shall be biodegradable and shall have a minimum thickness of 7 mm.
- 26 Sheet mulch used for hedges shall be laid in either of the methods specified in sub-clause 3006.62.
- 27 Edges of sheet mulch shall be laid in accordance with clause 3006.63 and secured by burying a strip 100 mm wide around the edge of the mat vertically into the ground.
- 28 The number of bulbs to be planted per m² per species shall be as follows:

Bluebell		130
Crocus		100
Tulips		50
Daffodil		
	Narcissus (large)	40
	Narcissus (medium)	60
	Narcissus (small)	100 for example Lent lily (Pseudonarcissus)

- 29 The depth of planting shall be in accordance with good horticultural practice.
- 30 The Operating Company shall plant wildflower plans/plugs in locations agreed with the Overseeing Organisation. The ground to be planted shall be prepared in accordance with clause 3006.68 (ii).
- 31 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. The density of the planting shall be to best horticultural practice in accordance with the relevant species.
- 32 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.
- 33 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 accordance with clause 3006.89 and all other relevant directions in clause 3006.
- 34 The Operating Company shall carry out establishment maintenance for all new planting and seeding in accordance with clauses 3007 and 3009 for three years post completion.

Appendix 30/7 – Grass, Bulbs and Wildflower Maintenance

- 1 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.
- 2 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 3007.18 except that the cut shall be undertaken in the late autumn and shall be to a height not exceeding 150 mm
- 3 Visibility splays in front of all road signs shall be cut in accordance with clause 3007.20 and the requirements for general grass areas (clause 3007.18). At no point shall any part of the sign board be obscured by grass or any other vegetation. Visibility cutting should not be undertaken when there is no likelihood of grass or ground cover vegetation obscuring any part of the sign board
- 4 Where not subject to an ecological or environmental designation and/or where there is likely to be no detrimental impact on nature conservation (habits or species), all 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, or removed from Site.
- 5 All grass and herbaceous ground cover vegetation within areas of planting undertaken as part of this Contract (whether by the Operating Company or a sub-contractor) shall be cut in accordance with clause 3007.23.
- 6 Any areas of grass and/or herbaceous plants within planted area/plantations required to be cut by the Operating Company in accordance with clause 3007.25 will be shown in the landscape Inventory or agreed with the Overseeing Organisation.
- 7 Cutting of all wildflower areas and areas of nature conservation value shall be undertaken in accordance with clause 3007.26 (iii).

If no specific requirements are identified in the landscape Inventory then wildflower areas and areas of other floral interest in rough grass shall receive a topping cut in accordance with paragraph (iii) above.

The Operating Company shall seek the Overseeing Organisation's consent to alter the requirement to a Biennial Cut in accordance with sub-clause 3007.26 paragraph (iv) if it is believed this would be in the best interests of nature conservation.
- 8 Within all wildflower areas and areas of nature conservation value the cutting shall be in accordance with clause 3007.27. Operations shall be timed to avoid any detrimental impact on desirable species.
- 9 Where directed and subject to an Order, weed control in wildflower areas shall be carried out using spot treatment with a translocated herbicide applied in accordance with sub-clause 3002.7, at the appropriate frequency. Any injurious weed species within these areas shall be controlled in accordance with clause 3002.1.

- 10 In high amenity, amenity and general grass areas, molehills shall be removed before grass-cutting and the soil distributed to suitable sites including nearby cultivated areas.
- 11 All bulb foliage within the Unit shall be treated in accordance with clause 3007.31.

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 (above and beyond normal requirements) for trees, shrubs and or grassed areas in exceptionally dry periods of weather 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 undertaken as part of his contract 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 retained and 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.

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.

- 4 No residual herbicide shall be used without the written approval of the Overseeing Organisation.

- 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.

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.

- 6 Mulch mats and sheet mulch shall be inspected three times per year and re-secured or replaced in accordance with sub-clause 3009.13.

- 7 For the full period of establishment maintenance, all new beds of ornamental or amenity planting shall be inspected monthly during the growing season with the required maintenance Operations undertaken in accordance with sub-clause 3009.16.

- 8 For the full period of establishment maintenance, the soil in all new ornamental or amenity planting beds where the beds are not mulched shall be cultivated in accordance with sub-clause 3009.19.

- 9 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.

- 10 In this part of the contract, individual trees shall include all trees planted with the intention of registering as an individual specimen rather than part of a group or plantation. This includes formal lines of trees and is not restricted to trees in urban areas. All new planting of individual trees as defined in sub-clause 3009.24 and above, 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. Cultivated or ornamental beds shall receive weed treatment as per clause 3010.2. Grass and weed growth within the beds shall be removed by hand or by chemical means in accordance with the requirements of clause 3002.

2. 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.

Overgrown shrubs within all ornamental or formal shrub areas associated with urban areas shall be treated in accordance with sub-clause 3010.8 paragraph (vii).

3 Hedge trimming and cutting shall be undertaken at a minimum frequency of once every two years.

4 If a hedge is to be laid the Operating Company shall first discuss the proposal with the Overseeing Organisation and seek approval as to the required style/methodology.

5 If a mixed hedge is to be laid the Operating Company shall first discuss the proposal with the Overseeing Organisation and seek approval as to the required style/methodology.

6 Individual trees shall be defined in accordance with clause 3010.32 and shall also include any tree that stands alone or isolated from other trees and located in any part of the Unit. This includes trees planted as an avenue or formal alignment.

7 All Tree Preservation Orders and Conservation Areas shall be noted within the Landscape Inventory and the location of the relevant assets mapped accordingly. No works shall be undertaken that may impact a Tree Preservation Order or a tree within a Conservation Area without the required consent and approval from the Overseeing Organisation.

8 Tree size shall be categorised using the following method:

(i) Key factors relating to tree size/habit:

Height of tree – measured in metres from ground level to the apex of the crown,

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,

The measurements referred to in paragraphs (a) and (b) of this sub-clause shall be taken to the nearest whole metre,

Branch density factor shall be taken as follows: 1.00 for normal branch density
1.25 for heavy branch density with individual tree species classified as having normal or heavy branch density in accordance with the following table:

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'
	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
E	201-340

Tree Size Category	Tree Size Factor
F	341-450
G	451-650

(ii) To be classed as a tree, in relation to the application of the above table, vegetation must have a stem diameter of more than 100 mm.

9. Crown lifting may be undertaken, where appropriate, as a means of delivering required Operations in accordance with clause 3010. The height of clearance below the crown of any affected trees shall be as appropriate, following good horticultural practice and in accordance with clauses 3010.46 and 3010.47.
10. Crown thinning may be undertaken, where appropriate, as a means of delivering required Operations in accordance with clause 3010. Operations shall follow good horticultural practice and be in accordance with clauses 3010.46 and 3010.47.
11. Crown reduction or reshaping may be undertaken, where appropriate, as a means of delivering required Operations in accordance with clause 3010. Operations shall follow good horticultural practice and be in accordance with clauses 3010.46 and 3010.47.
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 may be carried out in areas of establishing and maturing woodland, when appropriate, as a means of delivering required Operations in accordance with clause 3010 and where identified as being required through the Operating Company's inspections.
14. Scrub control shall be undertaken, when appropriate, as a means of delivering required Operations in accordance with clause 3010 and where identified as being required through the Operating Company's inspections
15. Tree and shrub species to be controlled as scrub shall have a stem diameter of less than 100 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
15. Scrub control is required on rock ledges and scree where appropriate.
16. Any part of this clause may apply depending on the species concerned and the local circumstances. The Operating Company shall seek approval from the Overseeing Organisation for the scrub control methodology prior to the works proceeding

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 the Unit in accordance with the requirements of Schedule 2 - Scope, Section 3 Inspection & Maintenance – Roads incl. Landscaping.
- 3 The Operating Company shall control injurious weeds as listed in clause 3002 growing within or immediately adjacent to water bodies.
- 4 Weed growth within waterbodies shall be controlled and removed by the Operating Company, by handweeding in accordance with sub-clause 3002.8 or by mechanical means, where they are impacting, or have the potential to impact, on the efficient operation of the water body and/or network.
- 5 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. The Operating Company shall prepare a method statement to detail the removal operations, including depth of silt to be removed, available deposition areas for drying-out, requirements for disposal and access etc
- 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.

Appendix 30/12 – Special Ecological Measures

- 1 The Operating Company shall inspect all fencing, tunnels, underpasses, wildlife reflectors and all other provisions for wildlife contained within the Unit each annual period for the full term of the contract. All such facilities and assets shall be recorded within the landscape Inventory.
- 2 The Operating Company shall undertake any required maintenance or management works in relation to Special Ecological Measures in the appropriate season relevant to the particular ecological issue(s) and/or species concerned.
- 3 Tunnels, ledges, fences and underpasses and any other measure in support of wildlife shall be installed in accordance with manufacturer's instructions and best practice guidance and in the locations agreed with the Overseeing Organisation.
- 4 Wildlife grilles and ramps shall be installed in accordance with manufacturer's instructions and best practice guidance and in the locations agreed with the Overseeing Organisation.

- 5 All Tunnels, fencing, underpasses, ledges, grilles and any other measures in support of wildlife within the Unit shall be inspected twice each annual period in February and October in accordance with clause 3012.5.
- 6 Reflectors shall be installed in accordance with the manufacturer's instructions and following recommended good practice.
- 7 All reflectors within the Unit for any species shall be inspected on a monthly basis and cleaned, straightened/re-firmed, and repaired as necessary, with any obstructing vegetation cut back and removed.
- 8 Bat boxes and other artificial nesting or sheltering facilities shall be installed in accordance with manufacturer's instructions and best practice guidance and in the locations agreed with the Overseeing Organisation.
- 9 All bat boxes and other artificial nesting or sheltering facilities within the Unit shall be inspected annually by a suitably qualified person in accordance with clause 3012.9.
- 10 Any damage or Defects to any bat boxes and other artificial nesting or sheltering facilities within the Unit shall be recorded and reported to the Overseeing Organisation and repaired as necessary, or as instructed.
11. The Operating Company shall ensure the known locations of any protected species and/or areas within and adjacent to the Unit are recorded within the landscape Inventory. The Operating Company shall consult and comply with Scottish Natural Heritage in respect of any Operations likely to affect any protected species or area.
12. 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.

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 32/1 Incident Response.

TABLE 1.1 - RESPONSE TIMES FOR TRUNK ROAD INCIDENT SUPPORT SERVICES

Road Type	Operational Hours	Target primary response time
Designated Strategic Trunk Road Routes	06.30 to 18.30	20mins

1.1.3 The Incident Support Unit, secondary and back-up response plant response times shall always be as short as practicable but in any event shall not exceed the maximum times stated in Table 1.2 of this Appendix 32/1 Incident Response.

1.1.4 Response time is the time taken from receipt of notification that a response (primary, secondary or back-up) is required until the arrival of that resource on site.

1.1.5 Traffic Scotland Operations and Infrastructure Services Contractor or the Police may notify that secondary or back-up plant is required prior to the Operating Company's arrival at the incident.

TABLE 1.2 - RESPONSE TIMES FOR INCIDENT SUPPORT UNITS/SECONDARY RESPONSE PLANT AND BACK-UP RESPONSE PLANT

Road Type	Operational Hours	Maximum primary response time	Maximum secondary response time	Maximum back-up response time
Motorways and Dual Carriageways	06:30 -18:30	45 minutes	1 hour	3 hours
Other Trunk Roads	06:30 – 18:30	1 hour	1 hour	3 hours
Motorways and Dual Carriageways	18:30 - 06:30	1.5 hours	2 hours	3 hours
Other Trunk Roads	18:30 – 06:30	1.5 hours	2 hours	3 hours

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 (TRISS) and Incident Support Units shall be as described in Table 2.1 of this Appendix 32/1 Incident Response.

2.1.2 A minimum of two TRISS vehicle shall be provided.

2.1.3 Incident Support Units shall operate on routes outside the designated strategic trunk road routes covered by the Trunk Road Incident Support Service. They will also cover the designated strategic trunk road routes outside TRISS operational hours

2.1.4 The general vehicle liveries shall be as given in Schedule 5 Specification and Drawings, Appendix 1/75 Operating Company Vehicle Liveries and clearly marked as an Incident Support Vehicle.

2.1.5 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
TRISS (Minimum of 2 Vehicles)	2 wheel drive high roof van powered by a Euro 6 compliant engine, capable of carrying the equipment detailed in Table 3.1 and performing the duties set out in this Contract.	1 No. mobile CCTV Camera system of a type compliant with the specification contained within Schedule 5 Specification and Drawings, Appendix 1/77 Specification for TRISS Vehicle Mobile CCTV System or a dashcam and rear facing camera compliant with the specification contained within Schedule 5 Specification and Drawings, Appendix 1/79

Vehicle Type	Description	Minimum Equipment Requirements for each vehicle
	<p>Unglazed rear and nearside loading door, shelving and full height steel bulkhead.</p> <p>Dual passenger seat with three point inertia seat belts.</p> <p>Driver and passengers' air bags.</p> <p>Air conditioning.</p> <p>Drop pin and 50mm ball towing equipment.</p> <p>Access steps and grab handles.</p> <p>Audible reversing alert.</p> <p>Handwash station</p>	<p>Specification for DASHCAMs. Mobile VMS of a type compliant with the specification contained within Schedule 5 Specification and Drawings, Appendix 1/78 Specification for Vehicle Mounted Variable Message Signs.</p> <p>Appropriate type of built-in hands-free kit.</p> <p>Fire extinguisher and first aid kit.</p> <p>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).</p> <p>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.</p>

Vehicle Type	Description	Minimum Equipment Requirements for each vehicle
ISU	<p>A vehicle with a Euro 6 compliant engine, capable of carrying the equipment detailed in Table 3.1 and performing the duties set out in this Contract.</p> <p>Passenger seat with three point inertia seat belt.</p> <p>Driver and passenger's air bags.</p> <p>Air conditioning.</p> <p>Drop pin and 50mm ball towing equipment.</p> <p>Audible reversing alert.</p>	<p>A dashcam compliant with the specification contained within Schedule 5 Specification and Drawings, Appendix 1/79 Specification for DASHCAMs.</p> <p>Appropriate type of built-in hands-free kit.</p> <p>Fire extinguisher, first aid kit and a load restraint.</p> <p>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).</p> <p>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.</p>

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 32/1 Incident Response.

3.1.2 The list in Table 3.1 is the minimum of equipment to be carried in the vehicles at all times.

3.1.3 TRISS and ISU operatives uniforms shall be in accordance with Appendix 1/76.

TABLE 3.1 EQUIPMENT TO BE CARRIED IN TRUNK ROAD INCIDENT SUPPORT SERVICE AND INCIDENT SUPPORT UNIT VEHICLES

Equipment	Minimum Quantity	
	TRISS	ISU
Defibrillator	1 no	1 no
Mobile/Tablet Device to take and send digital images	1 no.	1 no.
Tow rope	1 no.	1 no.
2 Stroke oil	2 x 1 litre bottles	2 x 1 litre bottles
Lube oil spray	1 no. 400 ml tin	1 no. 400 ml tin
Diesel Fuel	5 litres in container	5 litres in container
Petrol	5 litres in container	5 litres in container
Fence Nails & Staples	Heavy Cable Ties	Sufficient
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.
Reflective long sleeved vests for use by stranded motorists	2 no.-	-
Drain Rods	1 set	1 set
Claw hammer	1 no.	1 no.
Manhole Lifting Keys	1 set	1 set
Handsaw	1 no.	1 no.
Wire Brush	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. or an additional stiff brush	1 no. or an additional stiff brush
Spirit Level	1 no.	1 no.
Chainsaw with PPE	-	1 no.
Small electric Alligator Saw	1 no.	-
Pruner	1 no.	1 no.
Pickaxe	1 no.	1 no.
Bow Saw	1 no.	1 no.
Large torch (can be LED)	2 no.	2 no.
14lb Sledge hammer	1 no.	1 no.
Stilson wrench	1 no.	1 no.
Temporary Plastic fencing with support	1 roll	-

Equipment	Minimum Quantity	
	TRISS	ISU
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.
2kg Dry Powder Fire Extinguisher	1 no.	1 no.
Submersible 50mm Pump and minimum 25m layflat hose	1 no.	1 no.

4 SECONDARY RESPONSE PLANT AND EQUIPMENT

4.1.1 The plant listed in Table 4.1 below is the minimum Secondary Response Plant and equipment required in order to comply with the maximum secondary response times specified in Table 1.1 and 1.2 above.

Table 4.1 Secondary Response Plant and Equipment

4.1.2 All applicable plant and equipment shall have general liveries in compliance with Chapter 8 requirements.

Type of Plant and Equipment	Particular Requirements
Traffic Management	To enable Chapter 8 compliant closures (both lane and full road); including convoy working
Impact Protection Vehicle	Chapter 8 and sector scheme compliant.
Hiab Lorry	EURO 6 compliant. With minimum lifting capacity of 4 tonnes at close range. Minimum reach 5.0 metres. Minimum 8 tonne payload. Remote crane operation via operator held device.
18 Tonne GVW Tippers	EURO 6 compliant.

Front Loading Shovel	Minimum operating weight 5,000 kg and minimum bucket capacity of 1m ³ .
Gully Emptier	<p>Euro 6 compliant. Medium volume gully / jetting combination capability of up to 120 litres / minute. Minimum 100 metre hose length with digital hose length meter. Full Chapter 8 markings and TS branding requirements. Integrated Canbus GPS datalogging to BS EN 15430 to record gully status and all reporting to be transmitted to APMS.</p> <p>Freeze drain purging system for periods of freezing temperatures.</p>
Road Sweeper	<p>Euro 6 compliant. EU-normed PM10 standard dust suppression and fitted noise suppression system. 5m³ hopper with minimum 1,200 litre water tank. Simultaneous dual channel (min 2.4m) and full widesweep (min 3.6m) capability with full dust suppression jetting and eco water recirculation system. On board hand lance. Integrated Wander hose. Integrated detergent facility with full detergent spraying via front nozzles and hand lance. Integrated Canbus GPS datalogging to BS EN 15430 to record all cleaning operations with reporting transmitted to APMS. Rear view driver safety camera.</p> <p>Freeze drain purging system for periods of freezing temperatures.</p>
1.5 Tonne GVW Van	Euro 6 compliant.
Platform Wagon	Euro 6 compliant.
Rapid Response Pumps	<p>High performance capability of up to 130,000 litres per hour. Max weight 600 kg unfuelled. 6m x 4" suction hose, minimum 25 metre 4" layflat hose.</p>

	Noise level @1m = 81 dBA / @7m = 72 dBA
Tree Cutting Machinery	Including high powered electric chainsaw with minimum 45 cc.
Brick/Masonry Cutting Machinery	Including high powered cut-off saw (minimum 5.0 kW).
Drainage Rods & Manhole Keys	As required
Flood Lights & Generator	LED illumination. Minimum 20,000 lumens per light.
Jetter/Vactor	Euro 6 compliant. Minimum tank size of 10,000 litres. Hydraulic tipping facility. Minimum suction performance of 500mb. Minimum pump performance of 150 bar @ 50 gallon per minute. Clean water storage capacity. Minimum 100 metre hose length with digital hose length meter. Full Chapter 8 markings and TS branding requirements. Integrated Canbus GPS datalogging to allow reporting to be transmitted to APMSEuro 6 compliant.

Appendix 33/1 – Structural Investigations Test Requirements

1 Scope

The Operating Company shall propose to the Overseeing Organisation the undertaking of various tests to investigate potential deterioration in the reinforced concrete structures. No work shall begin until the work is consented to in writing by the Overseeing Organisation.

The following types of test may be used:

1.1 Site Surveys/Tests

- (i) half-cell potential survey,
- (ii) cover survey,
- (iii) detailed visual and delamination survey,
- (iv) exposing reinforcement,
- (v) depth of carbonation,
- (vi) resistivity measurement,
- (vii) initial surface absorption,
- (viii) ultrasonic pulse velocity survey, and
- (ix) endoscope survey.

1.2 Chemical Tests

- (i) chloride ion content,
- (ii) cement content/sulphate content/alkali content/mix proportion,
- (iii) water/cement ratio,
- (iv) aggregate grading, and
- (v) alkali silica expansion testing.

1.3 Physical Tests

- (i) visual examination of cores,
- (ii) density and compressive strength,
- (iii) permeability and absorption,
- (iv) petrographic examination,
- (v) micro cracking assessment, and

- (vi) electron microscope examination.

2 Site Tests

2.1 Half-Cell Potential Survey

Half-Cell Potential measurements shall be carried out and recorded in the following manner:

- (i) The tests shall be carried out in accordance with the American Society for Testing and Materials Standard Test Method C876 - 15 Standard Test Method for Corrosion Potentials of Uncoated Reinforcing Steel in Concrete (*ASTM C876-15*).
- (ii) The equipment shall comprise a reference electrode based on silver/silver chloride at 0.5M potassium chloride (Ag/AgCl/0.5M KCl)¹, calibrated against a standard, a sponge moistened with contact solution for making electrical contact with the concrete, and a digital voltmeter with input impedance of at least 100M Ω and electrical lead wires with compression-type clamps for bar attachment, as set out in *ASTM C876-159*.
- (iii) Half-cell measurements shall be taken at a maximum of 500 mm x 500 mm grid centres in the test areas proposed. Locations of cracks, cold joints and areas of corrosion staining in particular may warrant closer grid centres to assess the half-cell potential over the feature.
- (iv) Before measurements are taken, two break-out exposures of reinforcement shall be made at diagonally opposite ends of each test area, having first located the bar with an electromagnetic covermeter (see 2.2). The electrical continuity between the two points shall be checked using a multimeter and electrical lead wires, after first preparing the exposed bar by scraping, scoring or wire brushing to expose a bright metal contact surface. If continuity is not confirmed, the test area shall be sub-divided until continuous areas are established.
- (v) Two half-cell readings shall be taken with the reference electrode and sponge at each node of the grid to the nearest 10 mV 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. The result shall be corrected to an equivalent Cu/CuSO₄ half-cell by subtracting 60mV from the mean reading².
- (vi) The contractor shall ensure all recorded potential measurements are stable in line with the principles given in *Concrete Bridge Development Group, Guide No 2, "Guide to Testing and Monitoring the Durability of Concrete Structures" (CBDG Technical Guide 2)*.
- (vii) Ambient conditions and concrete surface temperature shall be recorded together with details of the type of half-cell and its most recent calibration check,
- (viii) Excavation to expose reinforcement for electrical connections shall be made good in accordance with the requirements of Series 1700 Structural Concrete,

- (ix) Where agreed, permanent electrical connections shall be made to the reinforcement by brazing or using a self-tapping screw into a drilled hole, to facilitate future monitoring of changes in potential at the location,
- (x) The results shall be presented as a map of equipotential contours marked on projected plans or elevations of the areas at a scale of 1:50,
- (xi) Potential contours shall be plotted with colour coding and a contour interval of 50 mV, and
- (xii) Colour block diagrams are not an acceptable alternative to colour contours.

¹ ISO12696:2016: *Cathodic protection of steel in concrete*

² Concrete Society Technical Report 73: *Cathodic Protection of Steel in Concrete – including model specification (2011)*

2.2 Cover Survey

- (i) Cover measurements shall be determined within each 500 mm x 500 mm grid established in test areas proposed.
- (ii) Measurement of cover shall be carried out using equipment and procedures in accordance with *British Standard 1881: Part 204:1988 Testing concrete. Recommendations on the use of electromagnetic covermeters* and *Section 4.1 of the CBDG Technical Guide 2*; to identify reinforcement size, position and depth of cover. In addition, the lowest cover detected in each grid square shall be recorded.
- (iii) Before the start of each day's work, the covermeter shall be calibrated against a standard block containing bars of known cover depth.
- (iv) A calibration check of the covermeter reading shall be made once in each test area by breaking back to expose a reinforcing bar and physically measuring the depth of cover with a calibrated Vernier or rule. Where only cover survey is to be carried out the standard reference block shall be used instead of having to break out concrete to calibrate the gauge. Breakout locations for half-cell measurement may be used for this purpose, where performed to double check the gauge.
- (v) Where the depth of cover by covermeter varies by more than 5mm from the measured value, a correction shall be applied to the readings within the test area

2.3 Detailed Visual and Delamination Survey

2.3.1 Detailed Visual and Delamination Survey of Concrete Surfaces

- (i) The Contractor shall carry out a detailed visual and delamination survey of parts of the structure under consideration, as agreed with the Overseeing Organisation.
- (ii) The detailed visual and delamination survey shall identify all areas of cracking, delamination, spalling, exposed reinforcement (noting the condition of exposed reinforcement), rust staining, efflorescence, dampness, honeycombing, etc. Dimensions shall be recorded for major Defects, such as areas of delamination and spalling, including depth measurements where necessary. In addition, cracks with

widths greater than 0.3mm shall be mapped and the width also recorded. Locations of previous concrete remedial works shall also be identified and recorded.

(iii) The results of the detailed visual and delamination survey including the Defects identified in sub-clause 2.3.1 (ii) above shall be presented on developed elevation drawings. All major Defects shall be photographed and detailed accurate measurements shall be recorded on the developed elevation drawings to show the extent and location of the Defects identified during the survey to the satisfaction of the Overseeing Organisation. The locations of the Defects identified in sub-clause 2.3.1 (ii) above shall be clearly shown on the detailed visual and delamination survey drawings.

(iv) The Contractor shall also identify any services or any other obstructions that impede the survey work at the areas under investigation.

2.3.2 Detailed Visual Survey of Masonry Clad/Faced Surfaces

(i) The Contractor shall carry out a detailed visual survey of parts of the structure under consideration, as agreed with the Overseeing Organisation..

(ii) The detailed visual survey shall identify all areas of Defects to the masonry clad facing. All Defects such as loose masonry, weathered masonry, weathered or open joints, cracking through mortar joints (including length and widths), missing masonry, water seepage and staining etc. shall be recorded. The depths of masonry joints in areas where open or weathered joints are identified shall be also recorded. In addition, locations of previous pointing shall also be recorded.

(iii) The results of the detailed visual survey including all the Defects identified in sub-clause 2.3.2 (ii) above shall be presented on developed elevation drawings. All major Defects shall be photographed and detailed accurate measurements shall be recorded on the developed elevation drawings to show the extent and location of the Defects identified during the survey to the satisfaction of the Overseeing Organisation. The locations of the Defects identified in sub-clause 2.3.2 (ii) above shall be clearly shown on the detailed visual survey drawings.

(iv) The Contractor shall also identify any services or any other obstructions that impede the survey work at the areas under investigation.

2.4 Exposing Bars for Inspection

Reinforcing bars may be exposed for inspection when the results of the half-cell potential tests (see 2.1) are available and indicate possible corrosion activity.

(i) In areas of high negative potential and/or where a significant difference in potential of more than 100mV exists between two adjacent readings, then the highest negative potential area shall be identified for exposure to inspect for bar condition.

(ii) The concrete cover shall be removed by coring to the depth of the bar, using a core barrel of not greater than 100 mm diameter (see 4.1) and breaking off the core.

(iii) The cover to the bar and its condition in terms of presence of active corrosion shall be recorded and a photograph of the condition shall be taken.

(iv) The exposed bar shall be cleaned of corrosion product by chipping back to bright metal to allow section loss to be determined. A calibrated calliper shall be used to measure the residual diameter, from which the remaining cross sectional area shall be calculated.

2.5 Carbonation Tests

- (i) Measurement of carbonation depth shall be made at the testing locations proposed.
- (ii) The method of test is described in BS *EN 14630:2006 Products and systems for the protection and repair of concrete structures. Test methods. Determination of carbonation depth in hardened concrete by the phenolphthalein method* shall be used. The test requires breaking the concrete to expose a freshly fractured surface and spraying the surface with phenolphthalein indicator solution within 30 seconds of fracturing. Within 2 minutes the carbonation depth shall be measured, being the distance from the surface of the sample to the start of the pink colouration.
- (iii) Further guidance shall be obtained from *Section 5.1 of the CBDG Technical Guide 2*.
- (iv) Testing shall not be carried out on powder from drilled dust samples or the holes themselves, unless the concrete is broken out between two adjacent drill holes (e.g. for chloride ion content testing) to expose a freshly fractured surface.
- (v) Testing may be carried out on core samples, provided the side of the core or core hole is broken away with a chisel or light breaker to expose a fractured surface. Locations where concrete is broken out either to examine the bars (see 2.4) or to connect wires for half-cell potential testing (see 1.1) can also be used provided the exposure time requirement above is met.

2.6 Resistivity Survey

- (i) Resistivity measurements shall be taken at locations where the half-cell potential test (see 1.1) has indicated areas of high negative potential, typically greater than -350mV, corrected to Cu/CuSO₄ equivalent. In such locations, in the presence of elevated chloride ion levels and/or carbonation and with a supply of oxygen and moisture, corrosion of reinforcing steel is likely.
- (ii) The test procedure shall be in accordance with *British Standard 1881 Part 201:1986 Testing concrete. Guide to the use of non-destructive methods of test for hardened concrete* (withdrawn) with a caution until an updated BS EN or BS version is published and *Section 5.3 of the CBDG Technical Guide 2*, based on Wenner four probe method. Two probe moisture meters are not suitable for resistivity measurement.

- (iii) 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 Test (ISAT)

- (i) The ISAT test can be used to measure the relative absorbency of a concrete surface and shall be made at the testing locations proposed.
- (ii) Initial surface absorption test shall be carried out in accordance with *British Standard 1881-208:1996 Testing concrete. Recommendations for the determination of the initial surface absorption of concrete (BS 1881: Part 208:1996)*.
- (iii) In accordance with *Section 6.1 of the CBDG Technical Guide 2*
- (iv) it must be ensured that the water in the reservoir and the capillary tube are set at the specified head level to obtain the correct ISAT value.
- (v) The absorption classification is valid for tests carried out at 20°C. Tests should be carried out in the temperature range 5°C to 30°C . A table of correction factors is included in *BS 1881: Part 208:1996* to correct readings to an equivalent value at 20°C.

2.8 Ultrasonic Pulse Velocity Survey

- (i) Ultrasonic pulse velocity (UPV) surveys shall be carried out using equipment and procedures complying with *BS EN 12504-4 :2004 Testing concrete. Determination of ultrasonic pulse velocity*.
- (ii) The purpose of this testing is the detection the sizes of Defects such as honeycombing and voidage in the concrete surface or beneath the surface, including detection of the depth of fire damaged concrete.
- (iii) The method may also be used to estimate the depth of surface cracks. When used for this purpose, it shall be ensured the concrete is dry and the cracks are free from standing water to avoid misleadingly low results.
- (iv) The testing shall be carried out by suitably qualified personnel with previous experience in the interpretation of the survey results.
- (v) The testing shall be performed on a grid at centres not exceeding 150 mm, unless otherwise agreed for assessment of specific features.
- (vi) A water-soluble non-staining couplant shall be used to connect the transducers to the concrete surface and this shall subsequently be removed by power washing.
- (vii) Further guidance on UPV surveys is provided in *Section 4.5 of the CBDG Technical Guide 2*.

2.9 Endoscope Survey

- (i) Endoscopes are used to explore areas of structures that cannot be seen directly with the naked eye, such as the ends of bridge decks, bearings, constructed voids and voids in grouted ducts.

- (ii) Endoscopes take two principal forms.
 - a) Borescopes comprise a narrow rigid shaft filled with optical fibres. Light is transmitted down some fibres to illuminate the test area and the target is viewed by the remaining fibres using an optical eyepiece. The borescope usually incorporates a measuring graticule that allows for precise sizing of the target.
 - b) Fibrescopes incorporate a flexible shaft and are extendable, allowing much longer distances to be inspected, but with less precision or sizing of the target. Similar to CCTV drain surveys, the devices are adaptable to image or video recording and can use infra-red illumination.
- (iii) Only experienced operatives shall be used to carry out endoscope investigations.
- (iv) Further guidance is provided in *Section 5.8 of the CBDG Technical Guide 2*.

3 Chemical Tests

3.1 Chloride and Sulphate Ion Content and Alkali (Na₂O equivalent) content

The tests shall be carried out in accordance with *British Standard 1881-124 :2015 Testing concrete. Methods for analysis of hardened concrete (BS 1881 Part 124:2015)*. Guidance is provided in *Section 7.1 of the CBDG Technical Guide 2*.

The acid soluble test method shall be used to determine the chloride ion content at various depth increments, using concrete dust samples obtained by rotary percussive drilling. The normal depth increments shall be 5mm to 25mm, 25mm to 50mm, 50mm to 75mm and 75mm to 100mm.

- (i) The location for the drilled dust samples shall normally be selected as the highest negative half-cell potential determined from the potential contour maps, being the locations at greatest risk of corrosion. The exact position shall be determined to avoid reinforcing bars by using cover meter (see 2.2).
- (ii) For each depth increment, dust samples shall be removed using a drill bit of at least 25mm diameter.
- (iii) The minimum sample mass in each depth increment shall be 25g, which will normally require the collection of dust from two immediately adjacent drilled holes.
- (iv) The dust shall be collected and stored in sealable bags or containers, one for each depth range, clearly labelled with the location, depth range, date of sampling and the name of the operator.
- (v) The chloride ion content for each depth increment shall be determined by chemical analysis to determine the total acid soluble chloride ion content, expressed as a percentage of the sample mass.
- (vi) The test result by mass of sample shall be converted to the chloride ion content by mass of cement in the sample. The correction shall be based on either the known original cement content in the structure, or the calculated cement content from

chemical analysis (see 3.2) or, in the absence of this information, an assumed cement content of 14% for insitu concrete and 21% for precast concrete.

- (vii) Where required, the sulfate ion content with depth shall be determined by mass of sample following a similar approach, using the method of analysis given in *BS1881: Part 124:2015*. The sulfate content shall be converted to the sulfate ion content by mass of cement in the sample.
- (viii) Where required, the sodium oxide and potassium oxide contents shall be determined following a similar approach, using the method of analysis given in *BS1881: Part 124:2015*. The sodium oxide equivalent shall be reported by mass of cement in the sample.

3.2 Detailed Chemical Analysis

The Cement Content, Mix Proportions and Water/Cement Ratio shall be determined in accordance with *BS 1881: Part 124:2015* on concrete core samples; dust drillings shall not be used as the sample size will be inadequate.

- (i) Samples shall be prepared from sections of 100mm diameter cores or freshly broken lumps and each shall have a minimum mass of 1kg. Where possible information on the original mix design used, including details of aggregate types, cement and other binders used should be forwarded to the testing laboratory.
- (ii) Cement and aggregate content shall be determined by chemical analysis in accordance with *BS 1881: Part 124:2015, section 5*.
- (iii) The original water content shall be determined by determining the capillary and combined water content in accordance with *BS 1881: Part 124:2015, Section 7*, expressed as the free water/cement ratio of the concrete.
- (iv) The aggregate grading shall be determined for acid-insoluble aggregates to the method of *BS 1881: Part 124:2015, Section 6*.
- (v) Where aggregate interference prevents an accurate assessment of cement content and aggregate (e.g. because of acid-soluble siliceous and/or carbonate based coarse and fine aggregates) then the alternative method of petrography should be used.
- (vi) General guidance is given in *Section 7 of CBDG Technical Guide 2*.

3.3 Alkali Silica Expansion Testing

Tests for residual expansion of concrete due to alkali aggregate reaction shall be carried out on samples where alkali aggregate reaction is suspected, where a high alkali (Na_2O equivalent) content has been confirmed (see 3.1) and petrographic examination has identified susceptible aggregates and AAR reaction (see 3.3).

- (i) Cores shall be drilled at the required locations of 75mm diameter, positioned so as to avoid the reinforcing bar by surveying with a covermeter (see 2.2). The cores

shall be drilled to a depth of 400mm to provide intact cores of at least 300mm length.

- (ii) The cores be subject to accelerated expansion tests in accordance with the *Concrete Society Technical Report 30 Alkali-silica reaction 'Minimising the risk of damage to concrete' (CS TR 30)*. Measurements shall be continued for up to 12 months with interim reports at 3 month intervals.

4 Physical Tests

4.1 Core Samples

- (i) Core samples shall be 100mm in diameter and cut to at least 150mm depth, in locations that have been mapped to avoid cutting reinforcing bars (see 2.2). The core shall be broken off to provide a sample that is at least 120mm in length to permit proper preparation.
- (ii) Examination of cores, preparation and measurement of density and compressive strength shall be carried out in accordance with *BS EN 12504-1:2009 Testing concrete in structures. Cored specimens. Taking, examining and testing in compression*.
- (iii) Visual examinations shall be carried out on all core samples before testing.
- (iv) Samples shall be immersed in water for at least 72 hours prior to testing.
- (v) The saturated density (water immersion method) shall be determined immediately before the cores are crushed to determine the compressive strength.
- (vi) The compressive strength shall be determined on specimens that have a length to diameter of between 1:1 and 1:1.2. Samples outside of this dimension range will be unsuitable for strength testing.

4.2 Permeability and Absorption

The permeability to water under pressure, bulk water absorption and uniaxial water absorption may all be used to indicate the porosity and absorbency of concrete in service.

- (i) The permeability to water under pressure shall follow the penetration method set out in *BS EN 12390-8:2009 Testing hardened concrete. Depth of penetration of water under pressure*. Uncracked 150mm diameter core samples are required, that are cored to a depth of at least 200mm, to allow preparation of the outer 150mm section as the test specimen. Water is applied under a pressure of 500 ± 50 kPa for 72 hours, after which the sample is split and the depth of penetration under pressure is measured.
- (ii) The bulk water absorption of concrete core samples pore size shall be determined on 75mm diameter core samples cored to at least 150mm depth, so that a trimmed 75mm length test specimen can be prepared in accordance with *British Standard 1881-122:2011 Testing Concrete. Method for determination of water absorption*.

The method determines the tri-axial water uptake into an oven-dried sample after 30 minutes.

- (iii) The uniaxial water absorption shall be determined on 75mm diameter uncracked core samples, cored to at least 150mm length, such that the trimmed outer 100mm long section is used for the test. The sample is oven dried and the outer (weathered) face is placed face down in a tray containing a shallow depth of water and the water uptake with time is measured, from which the “sorptivity” of the concrete can be calculated. The method follows *British Standard EN 13057: 2002 Products and systems for the protection and repair of concrete structures. Test methods. Determination of resistance of capillary absorption*.
- (iv) Guidance on the interpretation of water permeability and absorption test data is given in *Concrete Society Technical Report 31 2008 Permeability testing of site concrete*.

4.3 Petrographic Analysis

The Cement Content, Mix Proportions, Water/Cement Ratio, entrained air content and confirmation of a range of deleterious reactions can be determined by a full petrographic analysis including point counting of constituents. Guidance on the use of petrography on reinforced concrete samples is contained in *Concrete Society Technical Report 71- Concrete Petrography – An introductory guide for the non-specialist (TR71 – Concrete Petrography)*.

- (i) Samples shall be prepared from sections of 100mm diameter cores trimmed to give an outer section that is 50mm in diameter, or other section within the core that merits detailed investigation. Where possible information on the original mix design used, including details of aggregate types, cement and other binders used should be forwarded to the testing laboratory.
- (ii) Visual and reflected light examination shall be used to give basic information on the concrete including depth of carbonation, cracking, segregated aggregate and reinforcement condition, where the bar is included.
- (iii) Full petrographic examination in accordance with *American Society for Testing and Materials, Test Method C856:2004 Standard Practice for Petrographic Examination of Hardened Concrete* or *Applied Petrography Group. A code of practice for the petrographic examination of concrete. SR2, July 2010 (APG-SR2)* shall be used to identify the aggregate rock types present, alkali aggregate and sulfate reactions, use of additions such as PFA or GGBS, degree of cement hydration, cement and aggregate content by volumetric proportion analysis, entrained air content and estimation of the original water content and water/cement ratio
- (iv) Further guidance is provided in *Section 6.6 of the CBDG Technical Guide 2*.

4.4 Microcracking Assessment

As an alternative to the petrographic examination to give an indication as to the level of microcracking in the surface of a sample, the following test shall be performed.

- (i) The external surface of selected core samples shall be cleaned of any extraneous debris and air dried in the laboratory.
- (ii) The surface shall then be sprayed with a fluorescent penetrant solution (a dispersion of fluorescent particles in an organic liquid).
- (iii) When the excess solution has drained from the surface, the core samples shall be viewed under ultra-violet light and the penetration into cracks in the surface shall be photographed.
- (iv) The test will give a relative indication of the level of microcracking or crazing into the concrete surface, as may be caused by poor curing of the concrete or a particularly cement rich surface.

4.5 Electron Microscope Examination

- (i) Where examination of a sample for alkali silica reaction susceptibility by petrographic analysis or expansion test, or for any other purpose is related to deleterious reactions present in the concrete, examination shall be carried out by electron microscopy.
- (ii) 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.
- (iii) 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.
- (iv) Further guidance is given in *TR71-Concrete Petrography*.

5 Report Requirements

5.1 All reports shall be submitted for the approval of 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 such as cover depth, carbonation depth, half-cell potential and resistivity, shall be provided, with suitable explanatory notes.
- (ii) Chloride content analysis shall be presented within fourteen days of sampling.
- (iii) One paper copy and one Electronic Copy 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.
- (ii) 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.

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 velocity	(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
Endoscope	(i) developed elevations of internal surface of holes examined
	(ii) enlarged colour prints of typical Defects
	(iii) plans/elevations/cross sections to show location of

endoscope/fibroscope and direction of view of photographs

(iv) 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.

(iii) 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 further inspection and/or remedial work.

(iv) 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**

1. CONTRACT TITLE: STRUCTURE NO: GRID REF:									
2. DATE OF ISSUE OF DOCUMENTS TO TENDERERS:									
3. ENVIRONMENT AND ACCESSIBILITY:									
4. EXISTING PROTECTIVE SYSTEM(S): Metal coatings: Paint coatings: Average total thickness (microns):									
5. REQUIRED DURABILITY OF SYSTEM: NO MAINTENANCE: .....YEARS MINOR MAINTENANCE: .....YEARS MAJOR MAINTENANCE:.....YEARS (Ref: NG.5008.5 sub-para (iii))				6. COLOUR OF FINISH:					
7. BILLED AREA						8. PROTECTIVE SYSTEM TYPE: (eg. I (M), II (M), III (M), etc):			
REF: AREA DESCRIPTION:		SURFACE PREPARATION METHOD							
9. PAINT COAT SUMMARY		CONDITION OF SURFACES OF EXISTING SYSTEM AFTER SURFACE PREPARATION							
		Condition:		Condition:		Condition:		Condition:	
		Area Ref.		Area Ref.		Area Ref.		Area Ref.	
COAT & ITEM NO.		mdft	B or AS	mdft	B or AS	mdft	B or AS	mdft	B or AS
1st Coat: Item									
2nd Coat: Item									
3rd Coat: Item									
4th Coat: Item									
MINIMUM TOTAL DFT TO BE OBTAINED									

10. DETAILS				
	1 st Coat	2 nd Coat	3 rd Coat	4 th 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 where present/applicable including:-

- Suspended span
- Approach viaduct steelwork
- Towers
- Main cables
- Hangers
- Balustrades, handrails and footplates

2. The compiler shall refer to the notes under the example *Appendix 50/1 (Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet in Series NG5000 Maintenance Painting of Steelwork of the Notes for Guidance on the Specification for 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 :

(SPECIFICATION FOR HIGHWAY WORKS) FORM SEDD/P3 PAINT SAMPLE DESPATCH LIST : SHEET 2

PROCEDURES

To be followed closely before despatch of paints to 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) An approved local paint testing firm, and
 - (ii) The Chief Bridge Engineer, Transport Scotland Roads Directorate, 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 4800:2011 Schedule of paint colours for building purposes* 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 2002*; the *Health and Safety Executive's Control of lead at work Approved Code of Practice and guidance (Third Edition, 2002)*; and the *Control of Substances Hazardous to Health Regulations (2002) (COSHH)*. 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 strands on the Kessock 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 Schedule 5 Specification and Drawings, Appendix 50/1 (Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet which shall confirm the method of surface preparation.
- 4 The Gulf Metalcoat A30 shall be applied using gloves to apply the paint to the strands.

Appendix 62/1 – Requirements for Professional Services

Requirements for Professional Services Staff

The assessment of academic qualifications shall take account of the Scottish Credit and Qualifications Framework.

The assessment of professional qualifications shall take account of professional bodies licenced by the Engineering Council or where appropriate, the Science Council.

Professional qualifications shall mean the level of registration with the Engineering Council or the Science Council.

Membership of a professional body alone shall not be taken as achievement of a professional qualification.

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 Overseeing Organisation. 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.

In assessing the level of experience of staff proposed for Professional Services roles, the Overseeing Organisation will consider the relevance of the experience for the particular areas of work that the staff will be undertaking. The Overseeing Organisation shall also consider when the experience has been gained in relation to the attainment of academic and professional qualifications and consider the relevance of transferable skills, knowledge and experience.

Experience alone shall not be acceptable where the requirements for academic or professional qualifications have been stipulated.

In the assessment of experience the following terms are used to describe increasing levels of experience:

- Entry level
- Basic
- Intermediate
- Significant
- Extensive
- Comprehensive

The Overseeing Organisation's assessment of the relevance of experience shall be final.

The names given to Professional Services roles in this Contract have the meaning given in this Contract and shall not be equated to names or role descriptions used by the Operating Company or other industry bodies.

To ensure the continuity of experienced personnel available to the Overseeing Organisation through the provision of Professional Services and the stability of service delivery teams, in addition to approving individuals for Professional Services roles, the Operating Company shall

provide organograms showing the Professional Services teams for the approval of the Overseeing Organisation.

The Overseeing Organisation recognises the benefits of rotating and training junior staff and will not unreasonably withhold approval of changes to the service delivery teams, approved in the organograms, for those in the roles of Graduate and Junior Technician, on a yearly basis.

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 Overseeing Organisation for their activities and deliverables.

1.2 Qualifications

The Scheme Manager shall be a Chartered Engineer registered as C.Eng with the Engineering Council and hold current membership of 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 Overseeing Organisation. The candidate will require comprehensive, demonstrable and relevant experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key and specific tasks identified in 1.3 and 1.4 below.

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 staff fulfil their responsibilities with the required degree of skill care and diligence and to ensure that the necessary Operating Company's 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 Overseeing Organisation, 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 Design Manual for Roads and Bridges (DMRB) and associated documents.
- (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 registered as C.Eng with the Engineering Council and hold current membership of an appropriate UK engineering institution licensed by the Engineering Council including the Institution of Civil Engineers, the Institution of Structural Engineers, the Institute of Highway Engineers and the Chartered Institution of Highways and Transportation. The candidate will require significant demonstrable and relevant experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, of the key and specific tasks identified in 2.3 and 2.4 below.

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 Overseeing Organisation,
- (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 Design Manual for Roads and Bridges (DMRB) and associated documents and the Manual of Contract Documents for Highway Works (MCHW),
- (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 Structures Engineer

3.1 Role

A Structures Engineer shall be responsible to the Senior Project Engineer for the production of all Design, procedural or other Operations required to secure the preparation or promotion of Schemes which include structures.

3.2 Qualifications

A Structures Engineer shall:

- (i) be a Chartered Civil or Structural Engineer registered as C.Eng with the Engineering Council and hold current membership of the Institution of Civil Engineers or the Institutions of Structural Engineers. A Structures Engineer shall have significant, demonstrable and relevant experience in the design and specification of road structures to the Design Manual for Roads and Bridges to 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.
- (iv) have significant demonstrable and relevant experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key and specific tasks identified in 3.3 and 3.4 below.

3.3 Key Tasks

The key tasks of a Structures 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 2 - Scope of trunk road network management, Schedule 3 - Contract management, Section 13. Procurement and management of schemes of this 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.

4. Roads Engineer

4.1 Role

A Roads Engineer shall:

- (i) be responsible to the Senior Project 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.

4.2 **Qualifications**

A Roads Engineer shall:

- (i) be an Incorporated Engineer registered as I.Eng with the Engineering Council and hold current membership of an appropriate UK engineering institution licensed by the Engineering Council including the Institution of Civil Engineers, the Institution of Structural Engineers, the Institute of Highway Engineers or the Chartered Institution of Highways and Transportation. A Roads Engineer shall have significant demonstrable experience of roads Design and specification to the Design Manual for Roads and Bridges (DMRB) and the Manual of Contract Documents for Highway Works (MCHW) to meet the requirements for this post,

An Engineering Technician registered as Eng.Tech with the Engineering Council and holding current membership of an appropriate UK engineering institution licensed by the Engineering Council including the Institution of Civil Engineers, the Institution of Structural Engineers, the Institute of Highway Engineers and the Chartered Institution of Highways and Transportation, and possessing extensive relevant experience may be considered for this role at the sole discretion of the Overseeing Organisation,

- (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.
- (vi) have significant demonstrable and relevant experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key and specific tasks identified in 4.3 and 4.4 below.

4.3 **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.

4.4 **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 Design Manual for Roads and Bridges (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 2 - Scope, Schedule 3 - Contract management.
- (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.

5. Graduate Engineer 1

5.1 Role

The role of a Graduate Engineer 1 shall be to assist and support the Operating Company engineer(s) in the delivery of their tasks.

5.2 Qualifications

A Graduate Engineer 1 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. Graduate Engineer 1's shall have entry level experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks identified in 5.3 below:

5.3 Key Tasks

The key tasks of a Graduate Engineer 1 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.

6 Graduate Engineer 2

6.1 Role

The role of a Graduate Engineer 2 shall be to assist and support the Operating Company engineer(s) in the delivery of their tasks.

6.2 Qualifications

A Graduate Engineer 2 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. Graduate Engineer 2's shall have moderate experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks identified in 6.3 below:

6.3 Key Tasks

The key tasks of a Graduate Engineer 2 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.

7. Graduate Engineer 3

7.1 Role

The role of a Graduate Engineer 3 shall be to assist and support the Operating Company engineer(s) in the delivery of their tasks.

7.2 Qualifications

A Graduate Engineer 3 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. Graduate Engineer 3's shall have significant experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks identified in 6.3 below:

7.3 Key Tasks

The key tasks of a Graduate Engineer 3 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 Engineering Technician registered as Eng. Tech with the Engineering Council and hold current membership of an appropriate UK institution licensed by the Engineering Council or possess an academic qualification in an appropriate discipline at level 7 in the Scottish Credit and Qualifications Framework as an exemplifying qualification acceptable to the Overseeing Organisation. A Senior Technician shall have significant, demonstrable and relevant experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks identified in 8.3 below:

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 registered as Eng.Tech with the Engineering Council and hold current membership of an appropriate UK institution licensed by the Engineering Council or possess an academic qualification in an appropriate discipline at level 7 in the Scottish Credit and Qualifications Framework as an exemplifying qualification acceptable to the Overseeing Organisation. A Technician shall have basic demonstrable experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks identified in 9.3 below.

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 entry level 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 traffic measurement, geotechnical

surveys, topographical surveys, geographical information systems, landscaping obligations, environmental obligations and Legislation in terms of analysis and verification related to this Contract.

11.2 Qualifications

A Principal Specialist shall be a Chartered professional registered with the Engineering Council or the Science Council and hold current membership of an appropriate UK institution licensed by the Engineering Council or Science Council appropriate to the specialist role. A Principal Specialist shall have comprehensive demonstrable experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks of the particular specialism identified in 11.3 below

11.3 Key Tasks

- (a) 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.

- (b) 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,
- (c) 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.

- (d) Key tasks for a Principal Environmental Specialist shall be to:
- (i) provide expert advice, support and recommendations on bespoke workstreams associated with the Design operation or maintenance of the Unit that may have environmental impact implications. This role shall require approval from the Overseeing Organisation and be as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision and performance of this contract to ensure compliance with all statutory requirements
 - (ii) develop and manage environmental studies and impact assessments,
 - (iii) undertake sufficient checks on the environmental studies, impact assessments and associated workstreams,
 - (iv) prepare and co-ordinate environmental study and designs/inputs and report on contract deliverables,
 - (v) ensure the following are fully understood and/or implemented in accordance with the requirements of this Contract in respect of item (i) above:
 - (a) environmental studies,
 - (b) ecological and biodiversity studies
 - (c) measurement,

- (d) analysis,
 - (e) management, maintenance and reporting, and
 - (f) certification of design
- (e) Key tasks for a Principal Landscape Specialist shall be to:
- (i) provide expert advice, support and recommendations for bespoke workstreams associated with the of the landscape resource of the Unit, or where there may be environmental impact implications as a result of other planned Operations. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this contract,
 - (ii) preparing, delivering and undertaking the following, in respect of item (i) above:
 - (a) landscape-related surveys and assessments;
 - (b) landscape studies, including feasibility studies, mitigation and management strategies, biodiversity reviews and planning,
 - (c) Design, detailing, specification, certification and implementation of landscape schemes or elements,
 - (d) analysis, review, checks, measurement and reporting of landscape and/or biodiversity-associated works and Operations,
 - (e) inspections and management of relevant Site Operations,
 - (f) liaison, consultation and engagement with the Overseeing Organisation, Statutory Authorities and other third parties as required for the successful delivery of all landscape-related works, and to meet any relevant environmental, corporate and/or legal obligations on behalf of Scottish Ministers.
- (f) Key tasks for a Principal Hydrology Specialist shall be:
- In relation to:
1. scour assessments for structures
 2. changes in run off characteristics and hydrological effects on adjacent land and water courses due to road or bridge works
 3. studies and investigations of flooding in vulnerable locations
 4. design of scour protection schemes for structures and design of mitigation works for alleviation of flooding in connection with 2 and 3 above.
 - (i) undertake sufficient checks on the hydrological surveys and
 - (ii) develop and manage hydrological studies and investigations,

- (iii) prepare hydrological deliverables,
- (iv) liaise with the Scheme Manager on issues arising from hydrological measurement, analysis and reporting,
- (v) liaise with the Operating Company's staff to ensure issues arising from:
 - (a) hydrological surveys and measurement,
 - (b) analysis, and
 - (c) reporting,are fully understood or implemented in accordance with the requirements of this Contract
- (vi) liaise with the Scheme Manager on issues arising from hydrological measurement, analysis, and reporting, and
- (vi) certification of Design.

- (g) Key tasks for a Principal Geographical Information Systems (GIS) Specialist shall be to:
 - (i) Support the Operating Company in maintaining and improving the accuracy of asset data in compliance with the Directors asset manuals, including the Trunk Road Information Manual and other guidance documents.
 - (ii) Analyse the asset data to identify trends.
 - (iii) Actively identifying data gaps and issues and proactively ensuring data is updated to maintain and improve accuracy.
 - (iv) Carry out geospatial analysis of asset data to identify potential Schemes.
 - (v) Analyse data and providing reports to ensure that asset data is used to inform business decisions.

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 traffic measurement, geotechnical surveys, topographical surveys, geotechnical information systems, landscaping obligations, archaeology services, environmental obligations and Legislation in terms of analysis and verification related to this Contract.

12.2 Qualifications

A Senior Specialist shall be a Chartered professional registered with the Engineering Council or the Science Council and hold current membership of an appropriate UK institution licensed by the Engineering Council or Science Council appropriate to the specialist role. The candidate will require extensive demonstrable experience and knowledge relevant to the position and performance of the role for which they are proposed covering, as a minimum, the key tasks of the particular specialism identified in 12.3 below.

12.3 Key Tasks

- (a) 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.

- (b) 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.

- (c) 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.

(d) Key tasks for a Senior Environmental Specialist shall be to:

- (i) provide specialist advice, support and recommendations on bespoke workstreams associated with the Design operation or maintenance of the Unit that have environmental impact implications. This role shall require approval from the Overseeing Organisation and be as or when required by the Scheme Manager or the Overseeing Organisation or as required in the provision and performance of this Contract to ensure compliance with all statutory requirements,
- (ii) develop and manage environmental studies and impact assessments,
- (iii) undertake sufficient checks on the environmental studies, impact assessments and associated workstreams,
- (iv) prepare and co-ordinate environmental study and designs/inputs and report on contract deliverables,
- (v) ensure issues arising from the following are fully understood and/or implemented in accordance with the requirements of this Contract, in respect of item (i) above:
 - (a) environmental studies,
 - (b) Ecological and biodiversity studies

- (c) measurement,
 - (d) analysis
 - (e) management, maintenance and reporting and,
 - (f) certification of Design
- (e) Key tasks for a Senior Landscape Specialist shall be to:
- (i) provide specialist advice, support and recommendations for bespoke workstreams associated with the Design of the landscape resource of the Unit, or where there may be environmental impact implications as a result of other planned Operations . This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this Contract,
 - (ii) preparing, delivering and undertaking the following in respect of item (i) above:
 - (a) landscape-related surveys and assessments;
 - (b) landscape studies, including feasibility studies, mitigation and management strategies, biodiversity reviews and planning,
 - (c) Design, detailing, specification, certification and implementation of landscape Schemes or elements,
 - (d) analysis, review, checks, measurement and reporting of landscape and/or biodiversity–associated works and Operations,
 - (e) inspections and management of relevant Site Operations,
 - (f) liaison, consultation and engagement with the Overseeing Organisation, Statutory Authorities and other third parties as required for the successful delivery of all landscape-related works, and to meet any relevant environmental, corporate and/or legal obligations on behalf of Scottish Ministers
- (f) Key tasks for a Senior Ecological Specialist shall be to ensure the Operating Company respects, protects and where practicable enhances the ecology of the Unit during the course of routine management and maintenance works as well as for proposed new Schemes and other planned Operations. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this Contract. A Senior Ecological Specialist shall:
- (i) undertake inspections of the Unit, where necessary, to inform and advise the Operating Company on good ecological practice and meeting relevant ecological legislation,

- (ii) support core staff in the production of required Contract documentation,
 - (iii) liaise, consult and engage with the Overseeing Organisation, Statutory Authorities and other third parties as required for the successful delivery of all ecologically-related works, and to meet any relevant ecological, corporate and/or legal obligations on behalf of Scottish Ministers.
- (g) Key tasks for a Senior Structures Specialist shall be to:
- (i) Planning and delivery of specialist structural investigations, interpretation, appraisal and reporting of results,
 - (ii) Testing and replacement of protective coatings and structural steelwork;
 - (iii) Design, appraisal and operation of cathodic protection systems for structures;
 - (iv) Providing specialist advice on metallurgy, welding and structural strengthening;
 - (v) Providing specialist advice on hydrology, scour and protection in relation to structures;
 - (vi) Liaising with the Operating Company's staff to ensure issues arising from undertaking the above are fully understood or implemented in accordance with the requirements of this Contract.
 - (vii) Providing expert advice and reporting on issues relating to the assessment, design, construction, inspection, testing, monitoring, strengthening, modification and demolition of structures.
- (h) Key tasks for a Senior Geographical Information Systems (GIS) Specialist shall be to:
- (i) Support the Operating Company in maintaining and improving the accuracy of asset data in compliance with the Directors asset manuals, including the Trunk Road Information Manual and other guidance documents.
 - (ii) Analyse asset data to identify trends.
 - (iii) Actively identifying data gaps and issues and proactively ensuring data is updated to maintain and improve accuracy.
 - (iv) Carry out geospatial analysis of asset data to identify potential Schemes.

- (v) Analyse data and providing reports to ensure that asset data is used to inform business decisions.

- (i) Key tasks for a Senior Hydrology Specialist shall be:

In relation to:

1. scour assessments for structures
2. changes in run off characteristics and hydrological effects on adjacent land and water courses due to road or bridge works
3. studies and investigations of flooding in vulnerable locations
4. design of scour protection schemes for structures and design of mitigation works for alleviation of flooding in connection with 2 and 3 above.

- (i) undertake sufficient checks on the hydrological surveys and

- (ii) develop and manage hydrological studies and investigations,

- (iii) Prepare hydrological deliverables,

- (iv) liaise with the Scheme Manager on issues arising from hydrological measurement, analysis and reporting,

- (v) liaise with the Operating Company's staff to ensure issues arising

from:

- (a) hydrological surveys and measurement,

- (b) analysis, and

- (c) reporting,

are fully understood or implemented in accordance with the requirements of this Contract

- vi) liaise with the Scheme Manager and/or Principal Specialist on issues arising from hydrological measurement, analysis, and reporting.

- (j) Key tasks for a Senior Archaeological Specialist shall be to provide specialist advice, support and recommendations in relation to the historic environment and cultural heritage associated with the management, maintenance and construction of road schemes. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this contract. This will include the following:

- (i) Oversee the preparation of archaeological surveys and assessments, including cultural heritage chapters for Environmental Impact Assessments and Written Scheme of Investigations.

- (ii) Oversee the analysis, review, checks, measurement and reporting of archaeological findings.
- (iii) Undertake the liaison, consultation and engagement with the Overseeing Organisation, statutory authorities and other third parties as required for the successful delivery of works and operations, and to meet any relevant environmental, corporate and / or legal obligations on behalf of the Scottish Ministers.

13 Specialist

13.1 Role

The role of a Specialist shall be to provide expert advice support and recommendations on any matters associated with traffic measurement, geotechnical surveys, topographical surveys, geographical information systems, landscaping obligations, archaeology services, environmental obligations and Legislation in terms of analysis and verification related to this Contract.

13.2 Qualifications

A Specialist shall be a Chartered professional registered with the Engineering Council or the Science Council and hold current membership of an appropriate UK institution licensed by the Engineering Council or Science Council The candidate will require significant demonstrable experience and knowledge relevant to the position and performance of the role for which they are proposed covering as a minimum, the key tasks of the particular specialism identified in 13.3 below.

13.3 Key Tasks

- (a) 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.
- (b) 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.
- (c) 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.
- (d) Key tasks for an Environmental Specialist shall be to:
 - (i) provide relevant support and recommendations for bespoke workstreams associated with the Design, operation or maintenance of the Unit, or where there may be environmental impact implications as a result of other planned Operations. This input will

require approval of the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this Contract.

(e) Key tasks for a Landscape Specialist shall be to:

- (i) to provide support and recommendations for bespoke workstreams associated with the Design of the landscape resource of the Unit, or where there may be environmental impact implications as a result of other planned Operations. This input will require approval of the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this Contract.

(f) Key tasks for a Hydrological Specialist shall be:

In relation to:

1. scour assessments for structures
2. changes in run off characteristics and hydrological effects on adjacent land and water courses due to road or bridge works
3. studies and investigations of flooding in vulnerable locations
4. design of scour protection schemes for structures and design of mitigation works for alleviation of flooding in connection with 2 and 3 above.

(i) undertake sufficient checks on the hydrological surveys and

(ii) Prepare hydrological deliverables,

(iii) liaise with the Scheme Manager on issues arising from hydrological measurement, analysis, and reporting,

(iv) liaise with the Operating Company's staff to ensure issues arising

from:

(a) hydrological surveys and measurement,

(b) analysis, and

(c) reporting,

are fully understood or implemented in accordance with the requirements of this Contract

vi) liaise with the Scheme Manager and/or Principal/Senior Specialist on issues arising from hydrological measurement, analysis, and reporting.

(g) Key tasks for a Ecological Specialist shall be to ensure the Operating

Company respects, protects and where practicable enhances the ecology of

the Unit during the course of routine management and maintenance works as well as for proposed new Schemes and other planned Operations. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this Contract. A

Ecological Specialist shall:

- (i) undertake inspections of the Unit, where necessary, to inform and advise the Operating Company on good ecological practice and meeting relevant ecological legislation,
 - (ii) support core staff in the production of required Contract documentation,
 - (iii) liaise, consult and engage with the Overseeing Organisation, Statutory Authorities and other third parties as required for the successful delivery of all ecologically-related works, and to meet any relevant ecological, corporate and/or legal obligations on behalf of Scottish Ministers.
- h) Key tasks for an Archaeological Specialist shall be to provide specialist advice, support and recommendations in relation to the historic environment and cultural heritage associated with the management, maintenance and construction of road schemes. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this contract. This will include the following:
- (i) Preparation of archaeological surveys and assessments, including cultural heritage chapters for Environmental Impact Assessments and Written Scheme of Investigations.
 - (ii) Undertake the analysis, review, checks, measurement and reporting of archaeological findings.
 - (iii) Undertake archaeological studies, including feasibility studies, mitigation and management strategies and planning.
 - (iv) Undertake the inspection and management of relevant site operations.
 - (v) Undertake the liaison, consultation and engagement with the Overseeing Organisation, statutory authorities and other third parties as required for the successful delivery of works and operations, and to meet any relevant environmental, corporate and / or legal obligations on behalf of the Scottish Ministers.
- i) Key tasks for a Geographical Information Systems (GIS) Specialist shall be to:
- (i) Support the Operating Company in maintaining and improving the accuracy of asset data in compliance with the Directors asset

manuals, including the Trunk Road Information Manual and other guidance documents.

- (ii) Analyse the asset data to identify trends.
- (iii) Actively identifying data gaps and issues and proactively ensuring data is updated to maintain and improve accuracy.
- (iv) Carry out geospatial analysis of asset data to identify potential Schemes.
- (v) Analyse data and providing reports to ensure that asset data is used to inform business decisions.

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, geographical information systems, landscaping obligations, archaeology services, environmental 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 appropriate to the specialist role and acceptable to the Overseeing Organisations. Junior Specialists shall have entry level experience relevant to the position and performance of the role. The candidate will require entry level demonstrable experience and knowledge relevant to the position and performance of the role covering , as a minimum, the key tasks identified in 14.3 below for the particular specialism they are proposed.

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) to support and assist senior landscape staff and/or consultants in the relevant Operations where there may be a potential impact on the environment.

- (e) Key tasks for a Junior Landscaping Specialist shall be to:
- (i) to support and assist senior landscape staff and/or consultants in the delivery of relevant landscape Operations.

- (f) Key tasks for a Junior Hydrological Specialist shall be:

In relation to:

1. scour assessments for structures
2. changes in run off characteristics and hydrological effects on adjacent land and water courses due to road or bridge works
3. studies and investigations of flooding in vulnerable locations
4. design of scour protection schemes for structures and design of mitigation works for alleviation of flooding in connection with 2 and 3 above.

- (i) undertake sufficient checks on the hydrological surveys and
- (ii) prepare hydrological deliverables,
- (iii) liaise with the Scheme Manager on issues arising from hydrological measurement, analysis and reporting,

- (iv) liaise with the Operating Company's staff to ensure issues arising

from:

- (a) hydrological surveys and measurement,
- (b) analysis, and
- (c) reporting,

are fully understood or implemented in accordance with the requirements of this Contract

- (vi) liaise with the Scheme Manager and/or Principal/Senior Specialist/Specialist on issues arising from hydrological measurement, analysis, and reporting.

- (g) Key tasks for a Junior Ecological Specialist shall be to ensure the Operating Company respects, protects and where practicable enhances the ecology of the Unit during the course of routine management and maintenance works as well as for proposed new Schemes and other planned Operations. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this Contract. A Junior Ecological Specialist shall:

- (i) support the undertaking of inspections of the Unit, where necessary, to inform and advise the Operating Company on good ecological practice and meeting relevant ecological legislation,
 - (ii) support core staff in the production of required Contract documentation,
 - (iii) liaise, consult and engage with the Overseeing Organisation, Statutory Authorities and other third parties as required for the successful delivery of all ecologically-related works, and to meet any relevant ecological, corporate and/or legal obligations on behalf of Scottish Ministers.
- (h) Key tasks for a Junior Archaeological Specialist shall be to support senior staff in the provision of advice and recommendations in relation to the historic environment and cultural heritage associated with the management, maintenance and construction of road schemes. This input will require approval from the Overseeing Organisation and be as and when required by the Operating Company Representative or the Overseeing Organisation for the provision and performance of this contract. This will include the following:
- (i) Provide assistance and support in the preparation of archaeological surveys and assessments, including cultural heritage chapters for Environmental Impact Assessments and Written Scheme of Investigations.
 - (ii) Undertake the analysis, review, checks, measurement and reporting of archaeological findings.
 - (iii) Liaise with the Scheme Manager and/or Senior Specialist/Specialist on issues arising from archaeological measurement, analysis, and reporting.
- (i) Key tasks for a Junior Geographical Information Systems (GIS) Specialist shall be to:
- (i) Support the Operating Company in maintaining and improving the accuracy of asset data in compliance with the Directors asset manuals, including the Trunk Road Information Manual and other guidance documents.
 - (ii) Support exercises analysing the asset data to identify trends.
 - (iii) Support exercises to identify data gaps and issues
 - (iv) Support the geospatial analysis of asset data to identify potential Schemes.

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. With demonstrable 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 to 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 APMS and associated electrical energy Inventory. The candidate will require significant demonstrable and relevant experience and knowledge relevant to the position and performance of the role covering , as a minimum the key tasks identified in 15.3 below.

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 APMS 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 TD501 – Road lighting design 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.

Appendix 0/4 – List of Drawings included in this Contract

1 CONTRACT SPECIFIC DRAWINGS SUPPLIED TO THE OPERATING COMPANY

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 pages 394 – 423 below.

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 Rev A	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 Rev A	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
1100/05/085 & 088	Recessed Gullies GS1 and GS2 with Kerb Surround
1200/07/001	Precast Concrete Bollard Type B1

Drawing No.	Title
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
NDX1070-01ga Rev B	Typical Site Access Steps
NDX1070-02ga Rev B	Typical Site Access Safety Handrail Detail

2.2 Inspected by Operating Company

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	
F13	Precast and In Situ Cast Gullies	May 06	

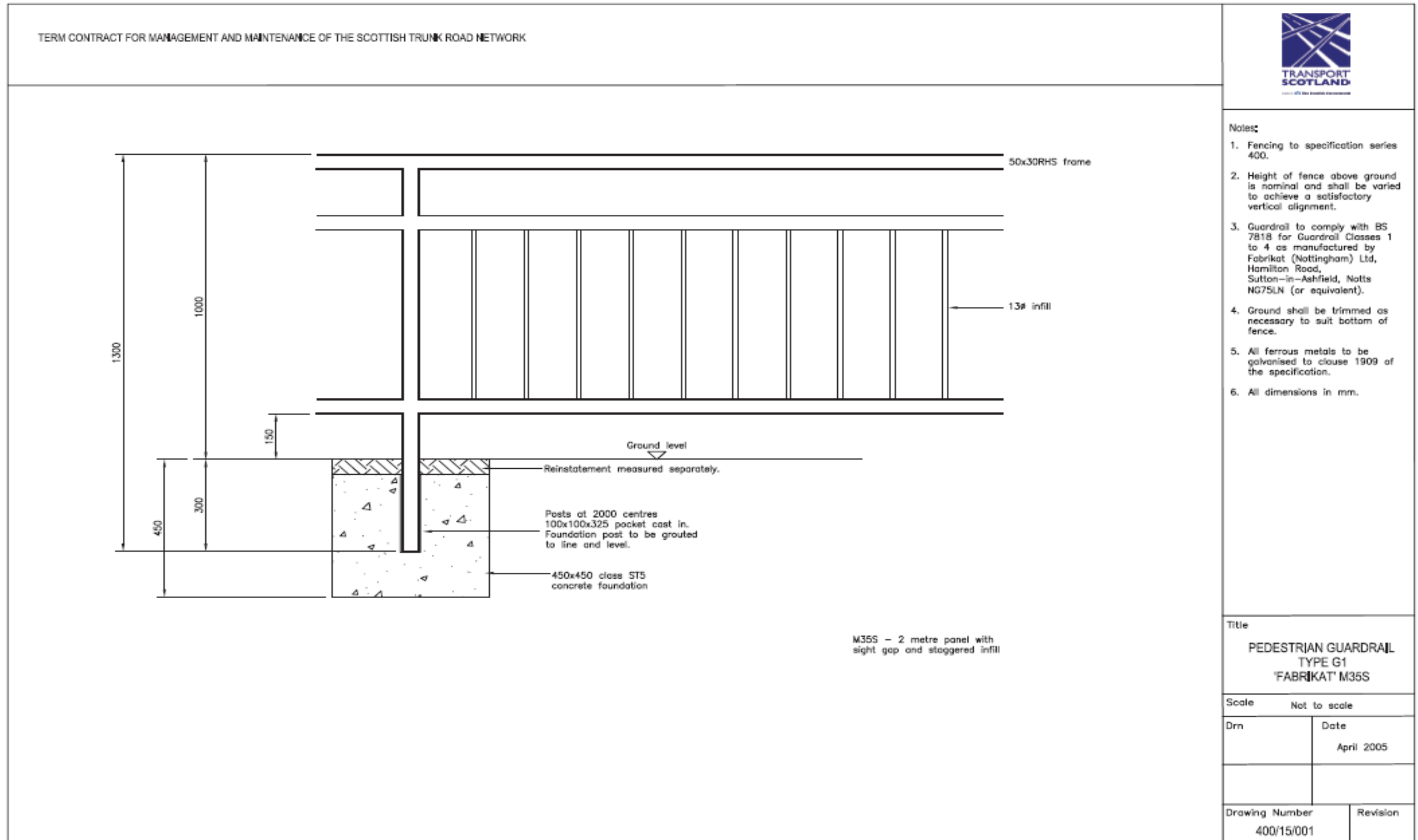
Drawing No.	Title	Date	Aspect/Alternative(s) required if whole Drawing is not included in Contract
F14	Sumpluss Gully Chamber and Alternative Rising Section	May 06	
F15	Drainage Channel Blocks Types A, B and C	Nov 04	
F16	Drainage Channel Blocks Types D, E and F	Nov 04	
F17	Detail of Keyways and Keys 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 11 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 Type A 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	

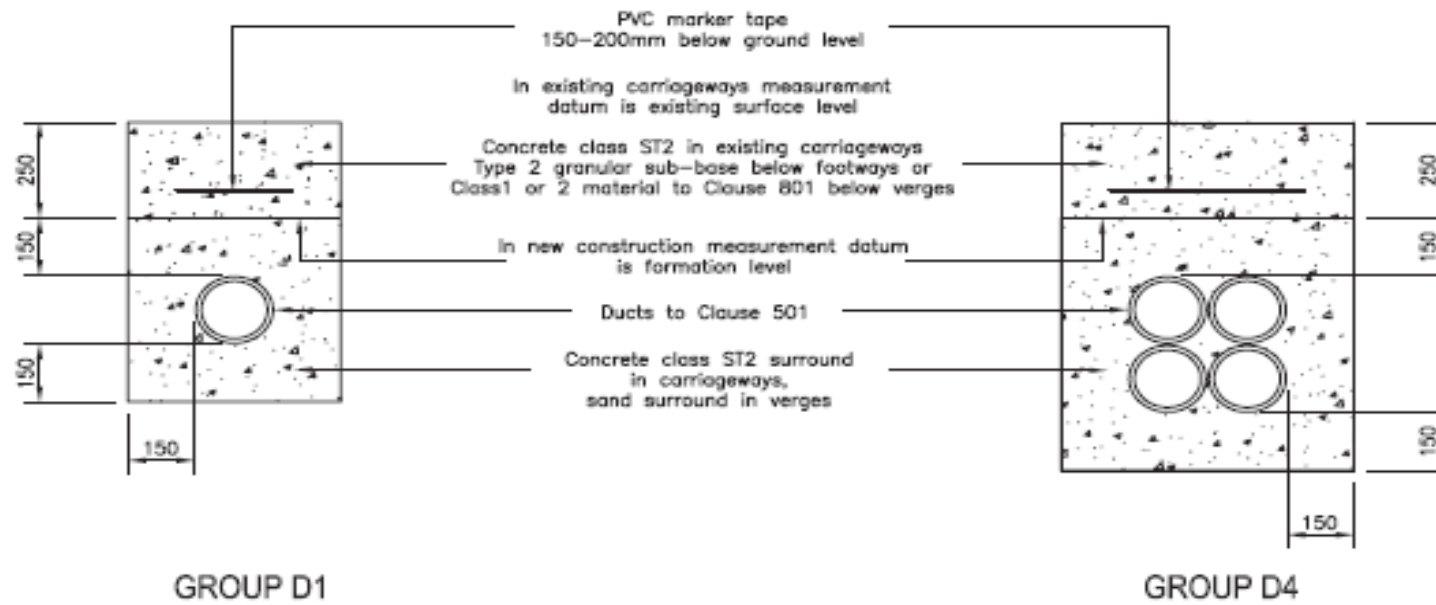
Intentionally Blank

Drawing: 400/15/001 – Pedestrian Guard Rail Type G1



Drawing: 500/01/337-379 – Drainage and Service Ducts – Duct Groups D1 – D4

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK

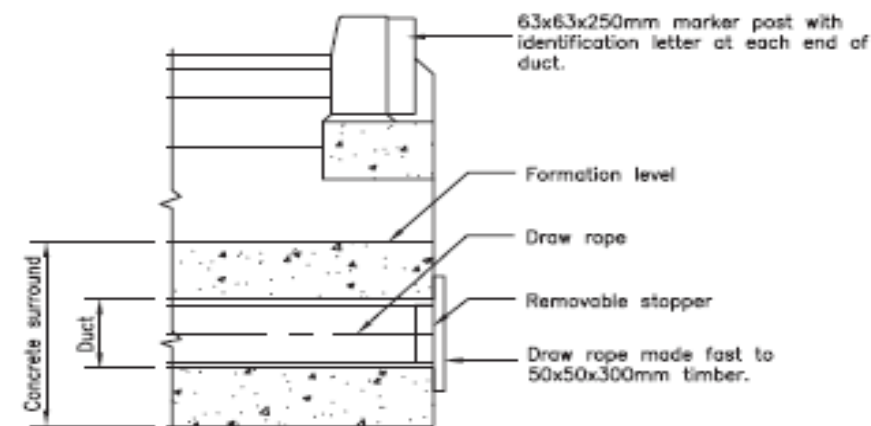


GROUP D1

GROUP D4

DUCT GROUP

D1	1 No. DUCT
D2	2 No. – NOT SHOWN
D3	3 No. – NOT SHOWN
D4	4 No. DUCTS



TYPICAL SECTION AT KERB

Notes:

1. Ducts to comply with specification series 500.
2. Diameter of ducts to be specified in the contract.
3. Coloured ducts to be used where required.
4. No bends in 50mm dia ducts. Maximum bend in 100mm dia duct to be 45°.
5. For street lighting ducts shall be orange polyethylene with the words "STREET LIGHTING" printed uppermost.

Title
**DRAINAGE AND SERVICE DUCTS
 DUCT GROUP D1 - D4**

Scale Not to scale

Drn	Date April 2005
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Drawing Number 500/01/337-379	Revision
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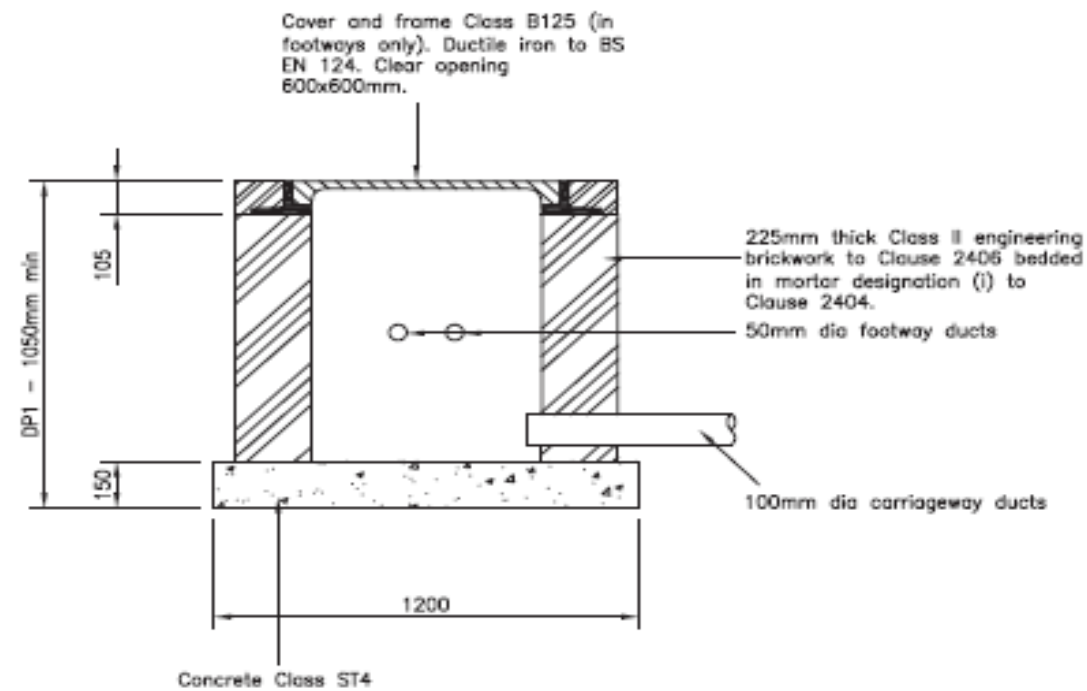
Drawing: 500/05/160-166 – Drainage and Service Ducts – Drawpits DP1 – DP2

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



Notes:

1. Top of drawpit base to be 50mm below invert of lowest duct.



DRAWPIT TYPE

- DP1 DRAWPIT WITH CARRIAGEWAY DUCTS
 DP2 DRAWPIT WITH FOOTWAY DUCTS ONLY

Title	
DRAINAGE AND SERVICE DUCTS DRAWPITS DP1 AND DP2	
Scale Not to scale	
Drn	Date April 2005
Drawing Number 500/05/160-166	Revision

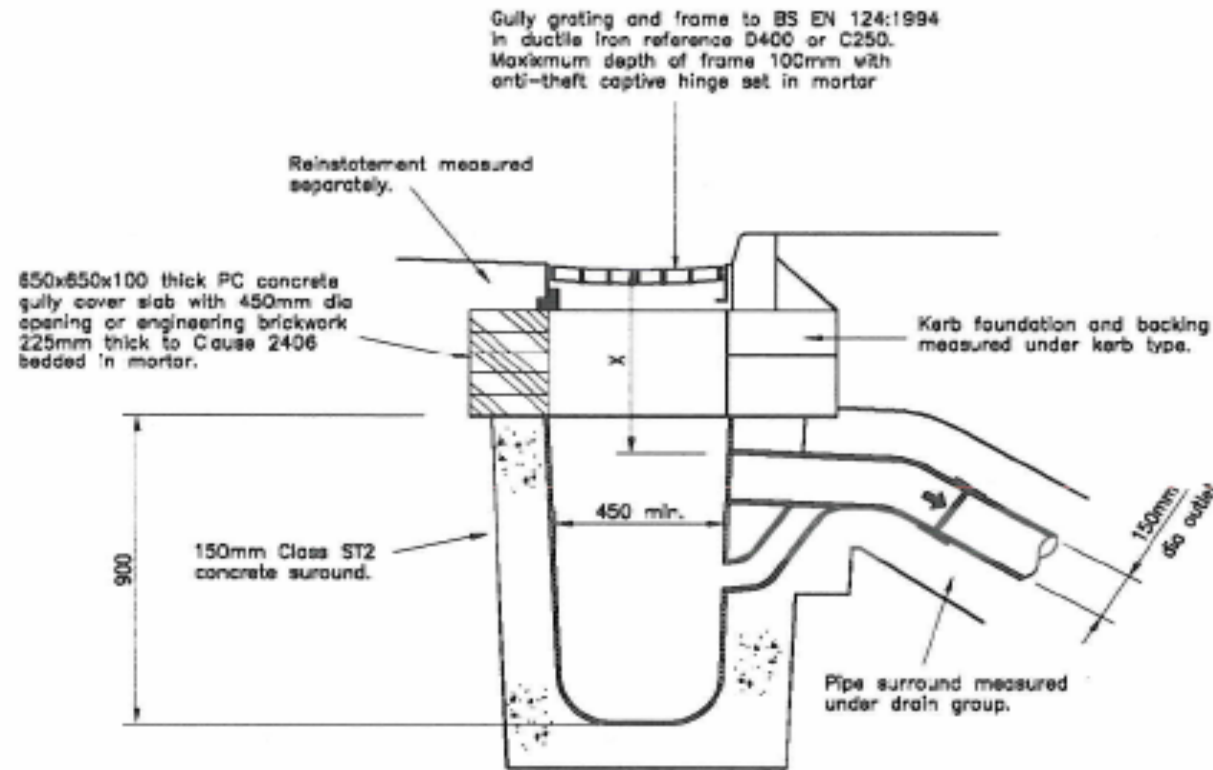
Drawing: 500/05/169-178 – Drainage and Service Ducts – Gully Types G1 – G4

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



Notes:

1. All dimensions in mm.
2. Drainage to be specification Series 500.
3. Gullies to be:-
 - (a) Precast concrete to BS EN 230.
 - (b) Vitrified clay to BS EN 295.
 - (c) Polypropylene, polyethylene, PVCu or other approved plastic materials and of a type approved by the Engineer with a 150mm minimum Class ST2 concrete surround.
4. Mortar to be Clause 2404 designation (i).



TRAPPED GULLY TYPE G1

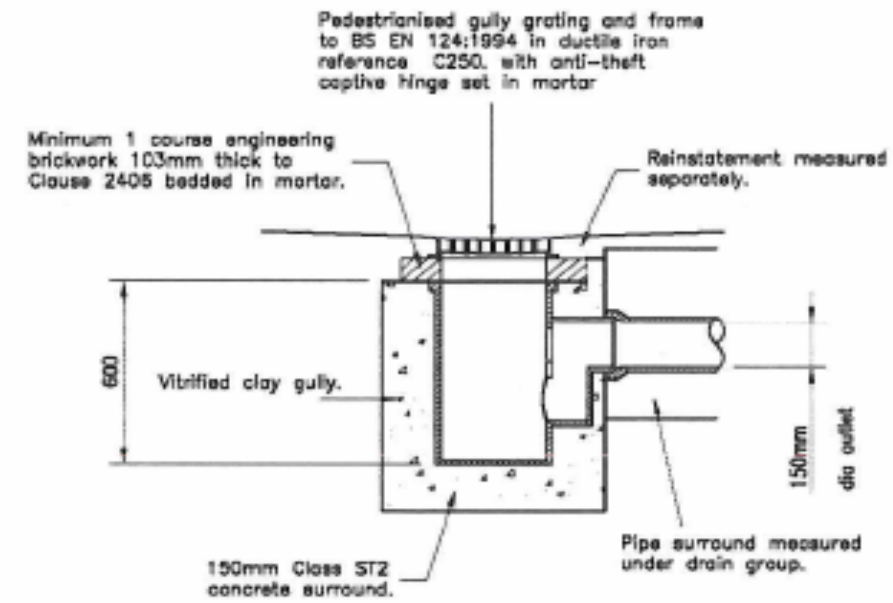
X = 800mm from top of grating to top of carriage gully outlet when connecting pipe outside.

TRAPPED GULLY TYPE G2

X = 750mm when connecting pipe under carriage gully.

TRAPPED GULLY TYPE G4

Used as a replacement for proprietary cast iron street gully



TRAPPED GULLY TYPE G3

Title
**DRAINAGE AND SERVICE DUCTS
 GULLY TYPES G1 - G4**

Scale **Not to scale**

Drn
 Date
April 2005

Drawing Number
500/05/169 - 178

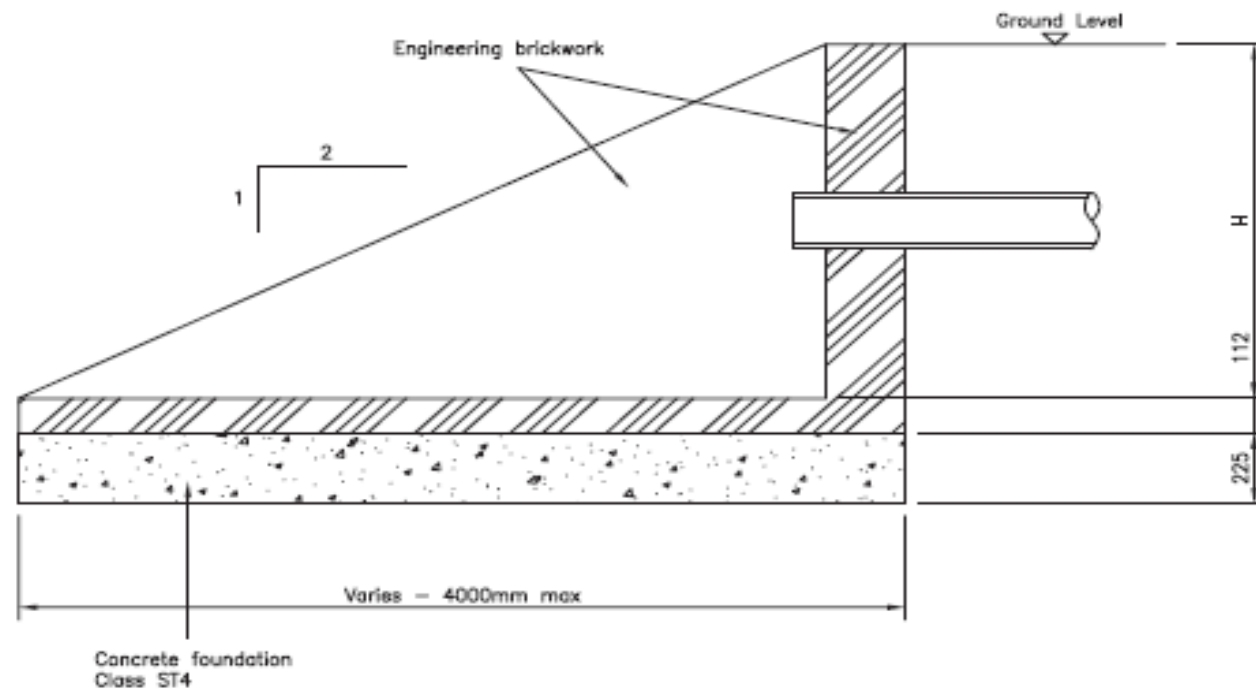
Drawing: 500/06/001 – Headwall Type 1 – Brickwork

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK

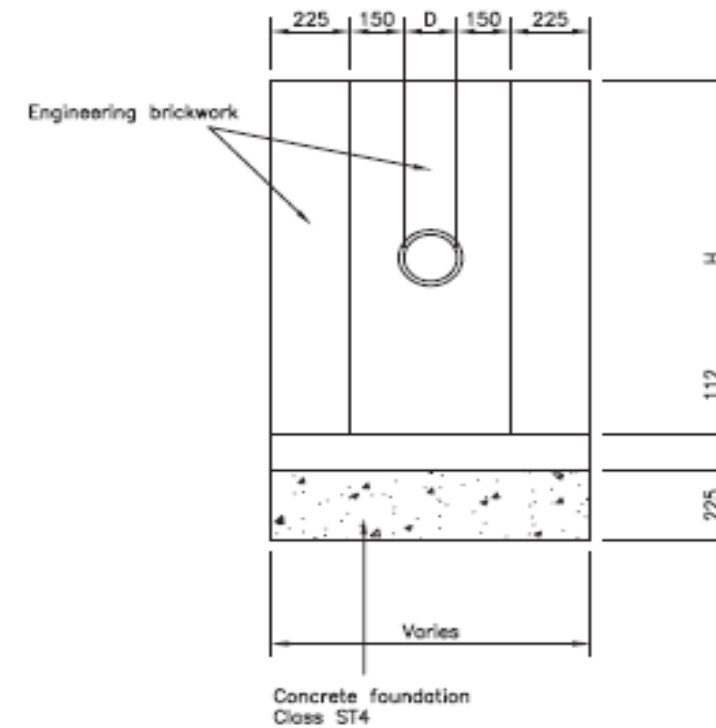


Notes:

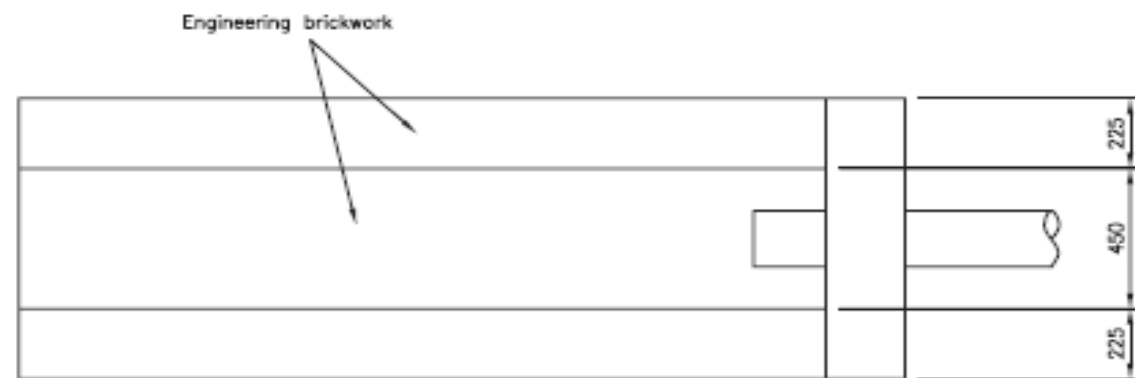
1. All dimensions in mm.
2. 2:1 batter on side walls.
3. Dimension H not to exceed 2000mm.
4. Pipe diameter D not to exceed 225mm.
5. Engineering brickwork to comply with Clause 2406 with mortar designation (i) to Clause 2404.



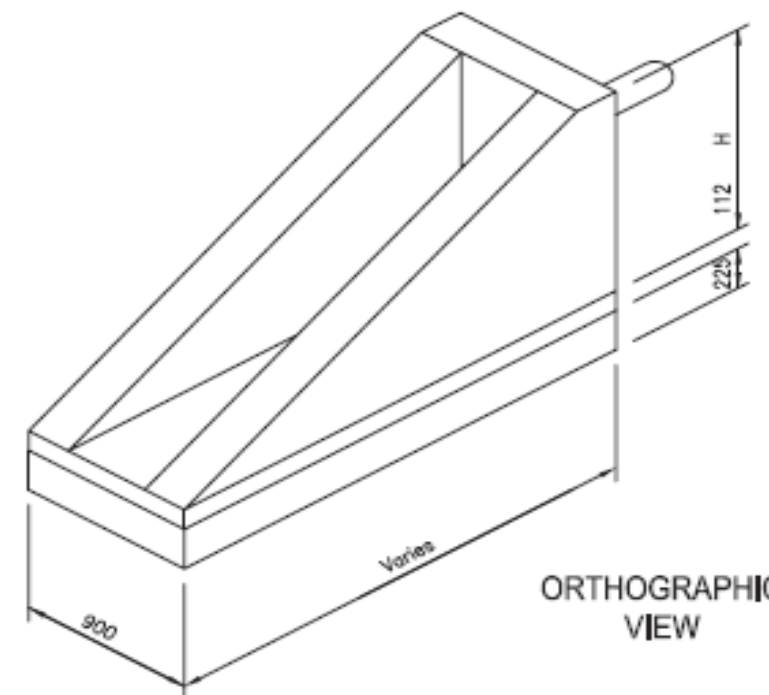
SECTION VIEW



END VIEW



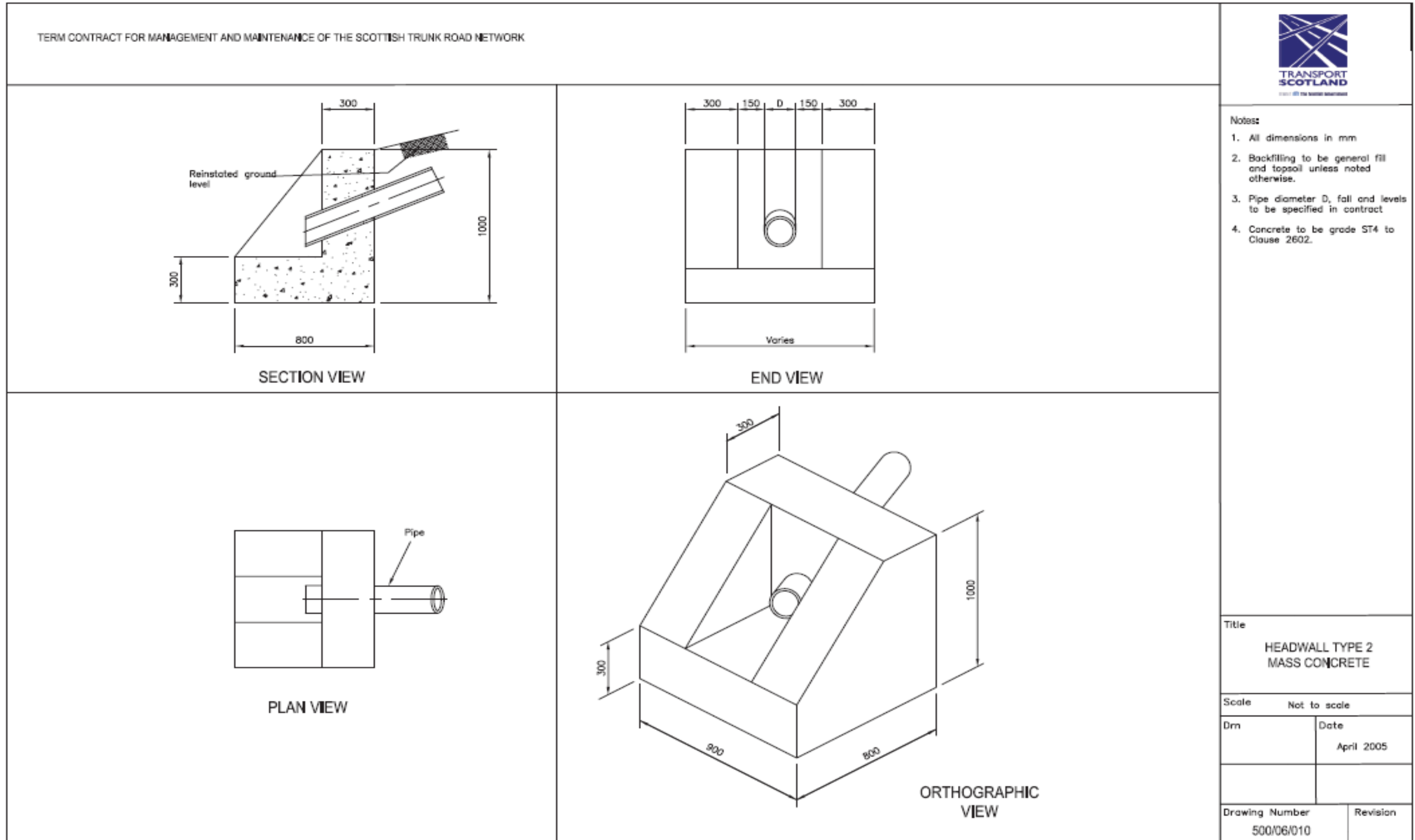
PLAN VIEW



ORTHOGRAPHIC VIEW

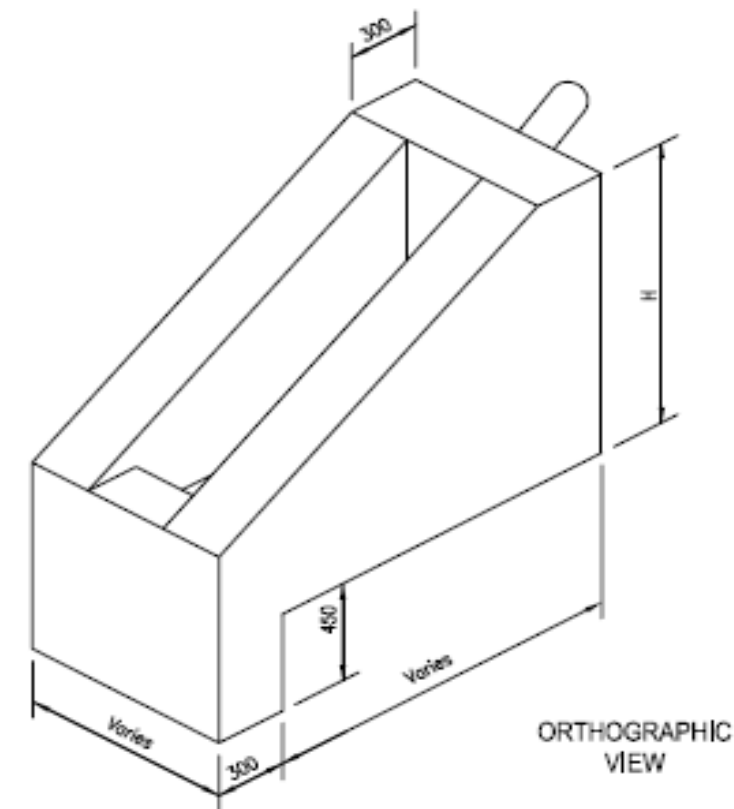
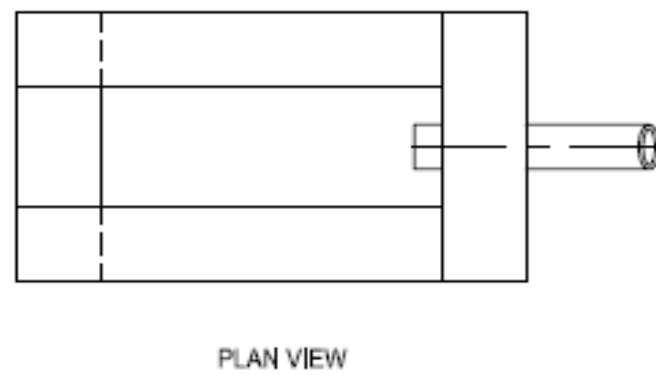
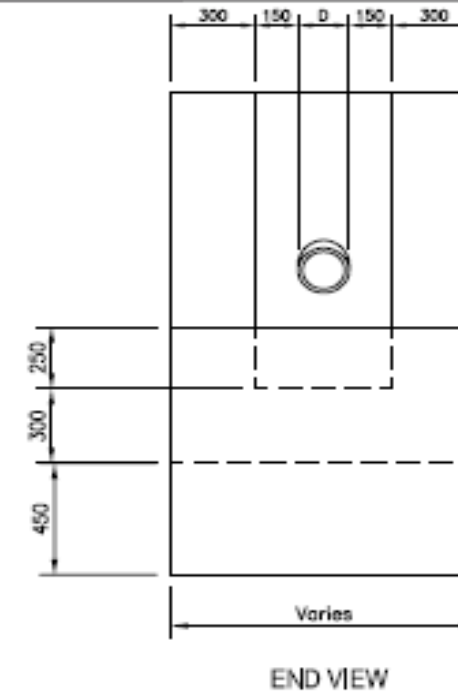
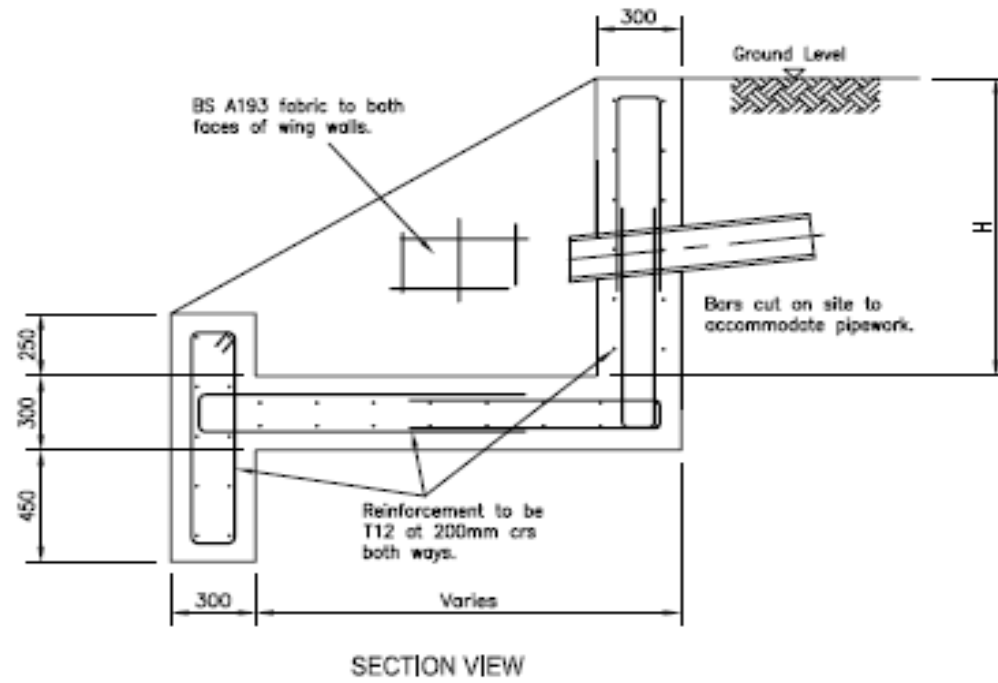
Title	
HEADWALL TYPE 1 BRICKWORK	
Scale Not to scale	
Drn	Date April 2005
Drawing Number 500/06/001	
Revision	

Drawing: 500/06/010 – Headwall Type 1 – Mass Concrete



Drawing: 500/06/019 – Headwall Type 3 – Reinforced Concrete

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



- Notes:
1. All dimensions in mm
 2. Backfilling to be general fill and topsoil unless noted otherwise.
 3. Pipe diameter D, fall and levels to be specified in contract
 4. Concrete to be strength Class C28/35 in accordance with BS 8500.
 5. Dimension H not to exceed 1.5 metres.
 6. Minimum depth of cover to all reinforcement to be 75mm.

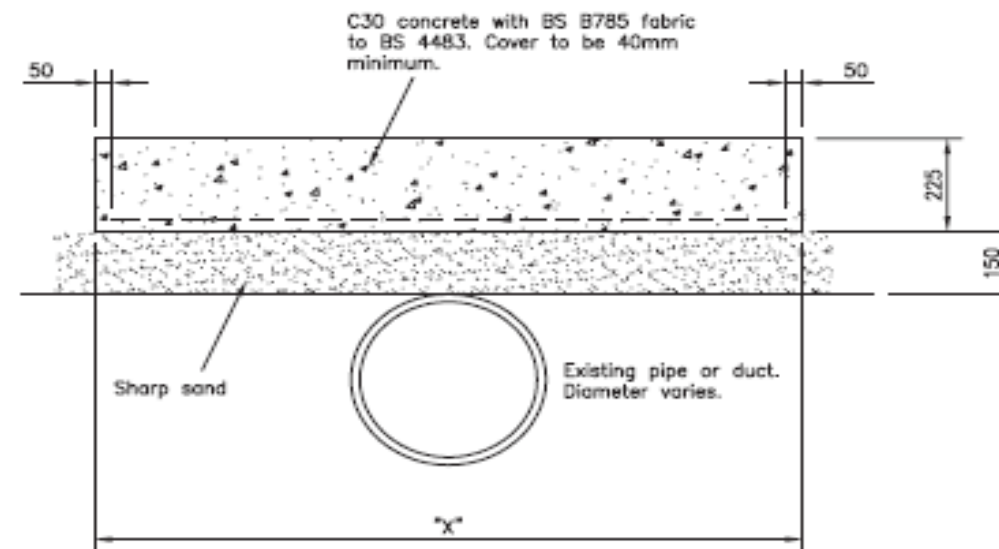
Title	
HEADWALL TYPE 3 REINFORCED CONCRETE	
Scale Not to scale	
Drn	Date
	April 2005
Drawing Number	
500/06/019	
Revision	

Drawing: 500/16/001-012 – Protection of Public Utility Apparatus and Drainage – Protection Type P1 – P4

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK
 SOUTH WEST UNIT



Notes:



- PROTECTION TYPE P1 X=500mm
- PROTECTION TYPE P2 X=1000mm
- PROTECTION TYPE P3 X=1500mm
- PROTECTION TYPE P4 X=2000mm

Title
**PROTECTION OF PUBLIC UTILITY
 APPARATUS AND DRAINAGE
 PROTECTION TYPE P1-P4**

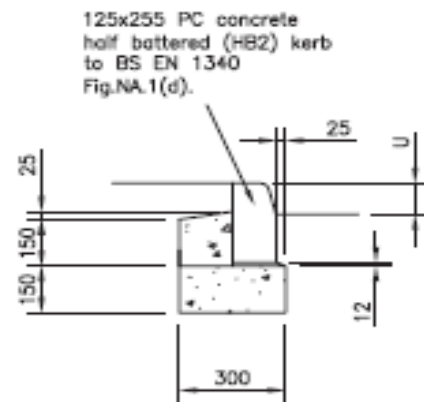
Scale Not to scale

Drn	Date April 2005
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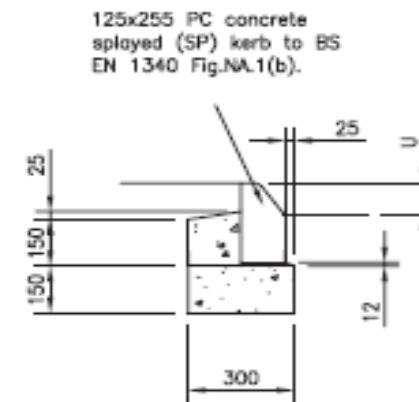
Drawing Number 500/16/001-012	Revision
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Drawing: 1100/01/001-019 – Kerb Types K1 to K4

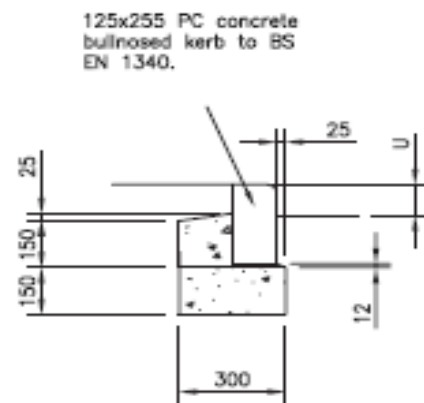
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



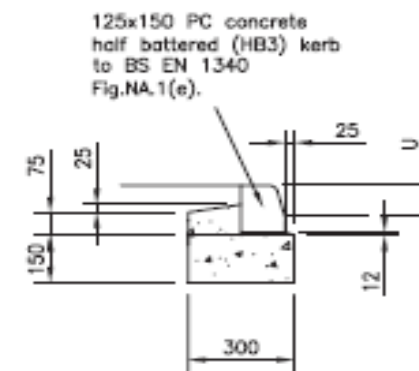
KERB TYPE K1



KERB TYPE K2



KERB TYPE K3



KERB TYPE K4

Notes:

1. All dimensions in mm.
2. Kerbs to be to specification cl. 1101.
3. Upstand U to be 100mm unless stated otherwise in the contract.
4. Mortar bedding to be to Clause 2601.
5. Kerb type K3 is a non-standard dimension.
6. Kerb foundation and backing to be mix ST1 to Clause 2602.

Title

KERB TYPES
K1 TO K4

Scale

Not to scale

Drm

Date

April 2005

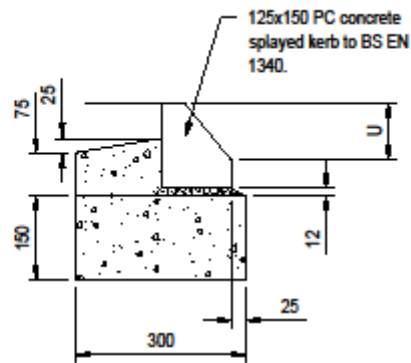
Drawing Number

1100/01/001-019

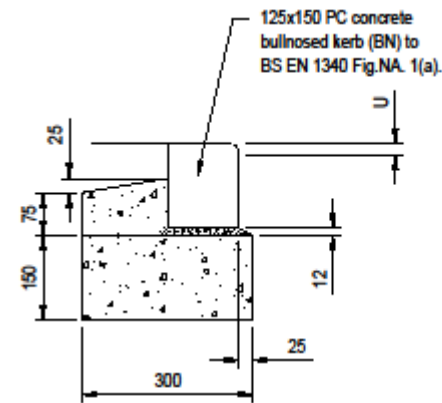
Revision

Drawing: 1100/01/025-037 Rev A – Kerb Types K5 to K7

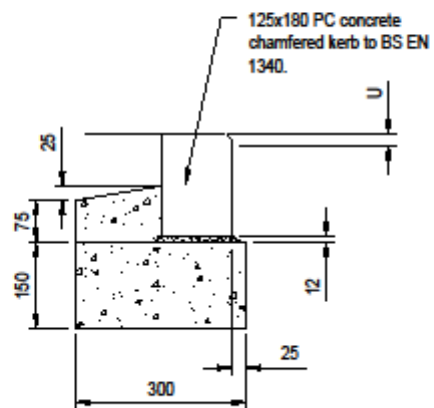
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



KERB TYPE K5



KERB TYPE K6



KERB TYPE K7

NOTES:

1. All dimensions in mm.
2. Kerbs to be specification Clause 1101.
3. For kerb types K5 upstand U to be 100mm unless stated otherwise in the contract.
4. Kerb foundation and backing to be mix ST1 to Clause 2802.
5. Mortar bedding to be to clause 2801
6. For kerb types K6 and K7 the upstand U shall be :
 (i) for pedestrian crossings - 0
 (ii) for vehicular access - 25
7. Kerb types K5 and K7 are non-standard dimensions

Title

**KERB TYPES
K5 TO K7**

Scale

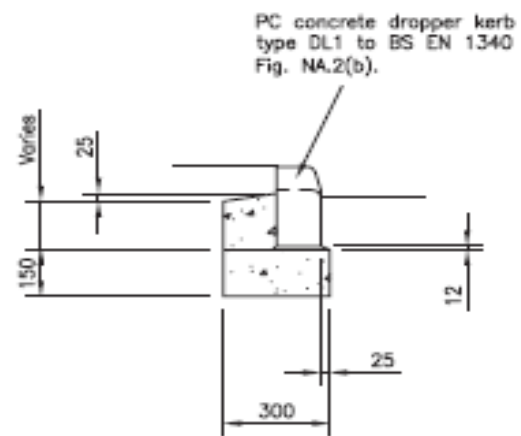
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Revision:	Date:
Original	April 2005
Rev A	Dec 2020

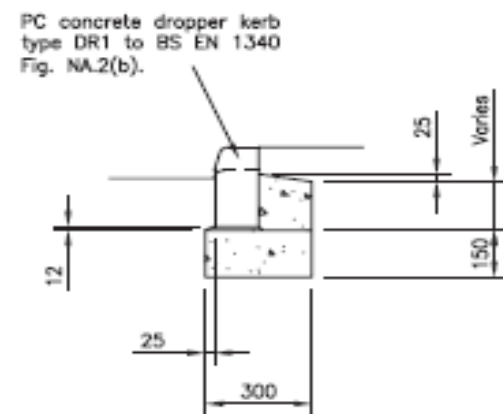
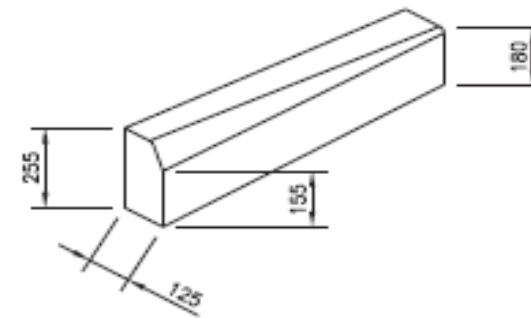
Drawing Number	Revision
1100/01/025-037	REV A

Drawing: 1100/01/040 – Kerb Types K8 and K9

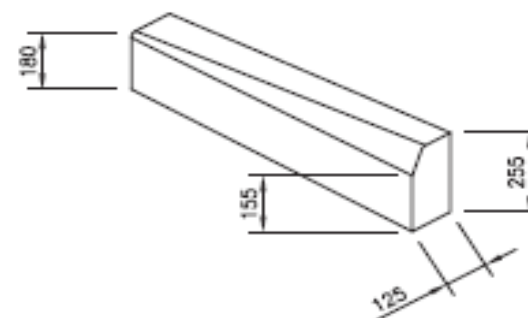
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



KERB TYPE K8



KERB TYPE K9



Notes:

1. All dimensions in mm.
2. Kerbs to be to specification Clause 1101
3. Kerb upstand to be 100mm unless stated otherwise in the contract
4. Kerb foundation and backing to be mix ST1 to Clause 2602
5. Mortar bedding to be to Clause 2601

Title
**KERBS TYPES
 K8 AND K9**

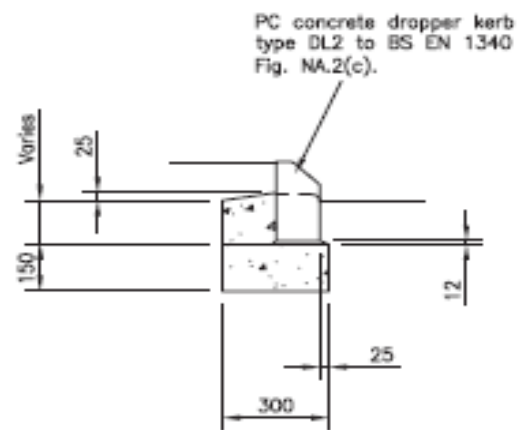
Scale Not to scale

Drn	Date
	April 2005

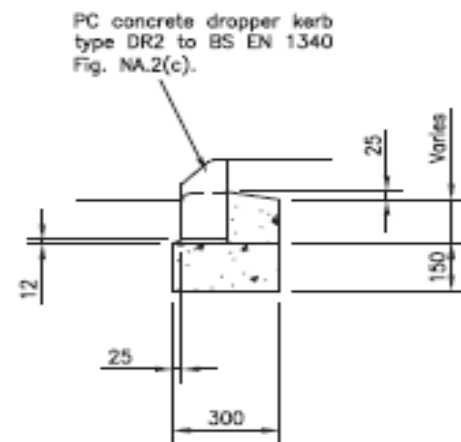
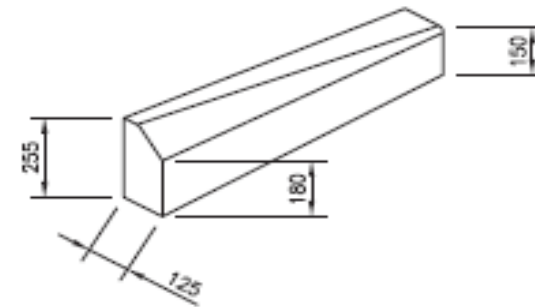
Drawing Number	Revision
1100/01/040	

Drawing: 1100/01/043 – Kerb Types K10 and K11

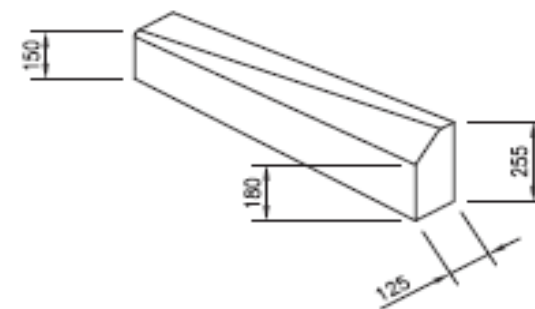
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



KERB TYPE K10



KERB TYPE K11



Notes:

1. All dimensions in mm.
2. Kerbs to be to specification Clause 1101
3. Kerb upstand to be 100mm unless stated otherwise in the contract
4. Kerb foundation and backing to be mix ST1 to Clause 2602
5. Mortar bedding to be to Clause 2601

Title

**KERBS TYPES
 K10 AND K11**

Scale

Not to scale

Drn

Date

April 2005

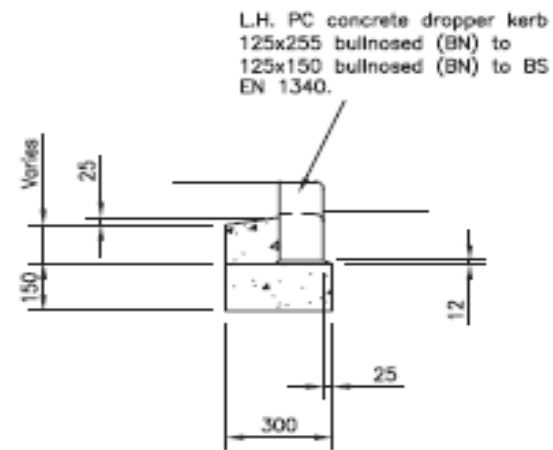
Drawing Number

1100/01/043

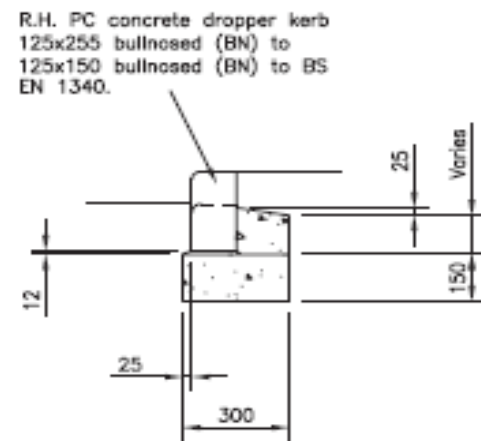
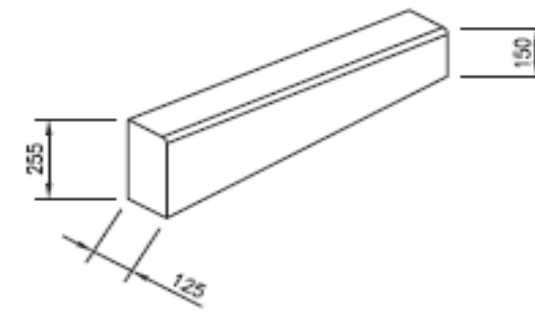
Revision

Drawing: 1100/01/046 – Kerb Types K12 and K13

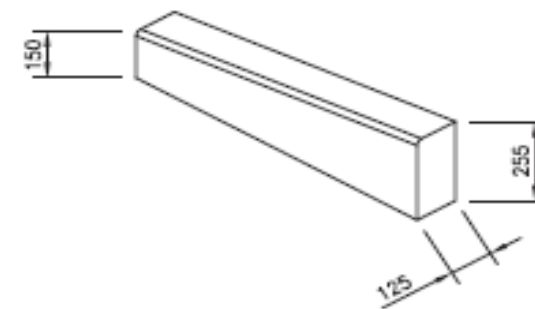
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



KERB TYPE K12



KERB TYPE K13



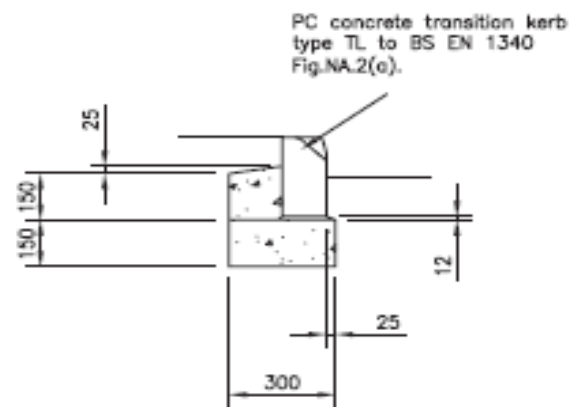
Notes

1. All dimensions in mm.
2. Kerbs to be to specification Clause 1101.
3. Kerb upstand to be 100mm unless stated otherwise in the contract.
4. Kerb foundation and backing to be mix ST1 to Clause 2602.
5. Mortar bedding to be to Clause 2601.
6. Kerb types K12 and K13 are non-standard dimensions.

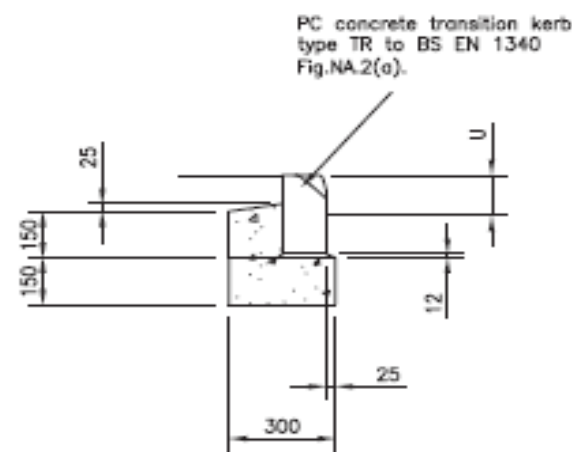
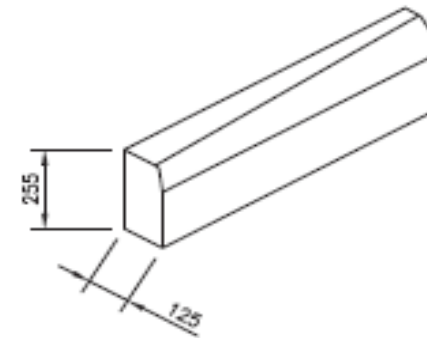
Title	
KERBS TYPES K12 AND K13	
Scale Not to scale	
Drn	Date April 2005
Drawing Number 1100/01/046	
Revision	

Drawing: 1100/01/052 Kerb Types K16 and K17

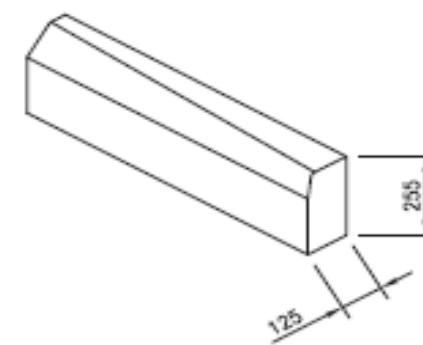
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



KERB TYPE K16



KERB TYPE K17



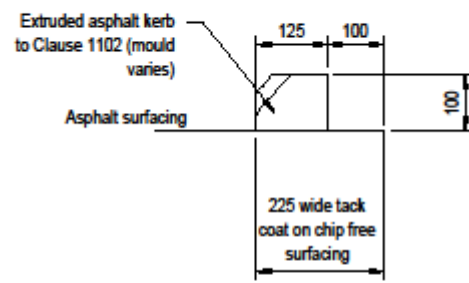
Notes:

1. All dimensions in mm.
2. Kerbs to be to specification Clause 1101
3. Kerb upstand U to be 100mm unless stated otherwise in the contract
4. Kerb foundation and backing to be mix ST1 to Clause 2602
5. Mortar bedding to be to Clause 2601

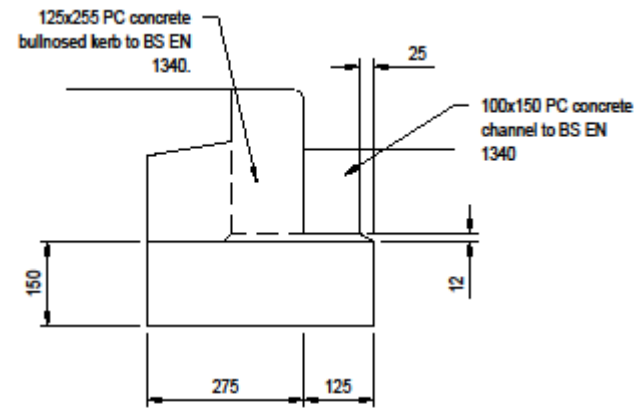
Title	
KERBS TYPES K16 AND K17	
Scale Not to scale	
Drn	Date April 2005
Drawing Number 1100/01/052	
Revision	

Drawing: 1100/01/061-082 Rev A – Kerb Types K20 to K24

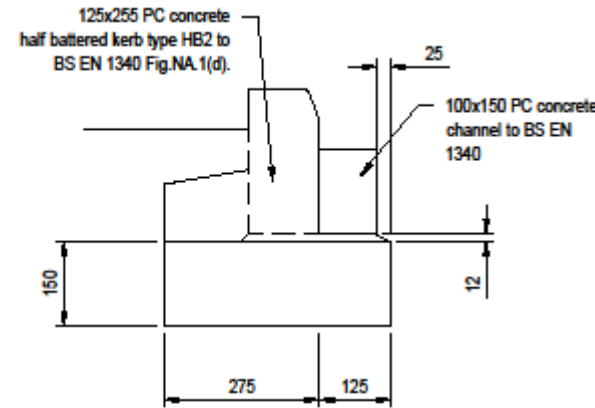
TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



KERB TYPE K20



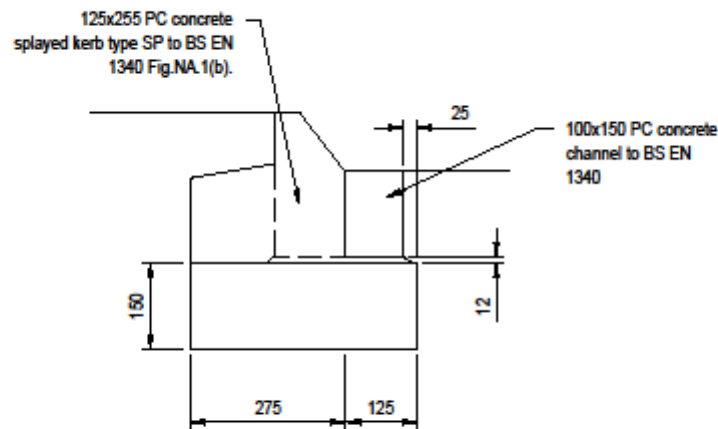
KERB TYPE K21



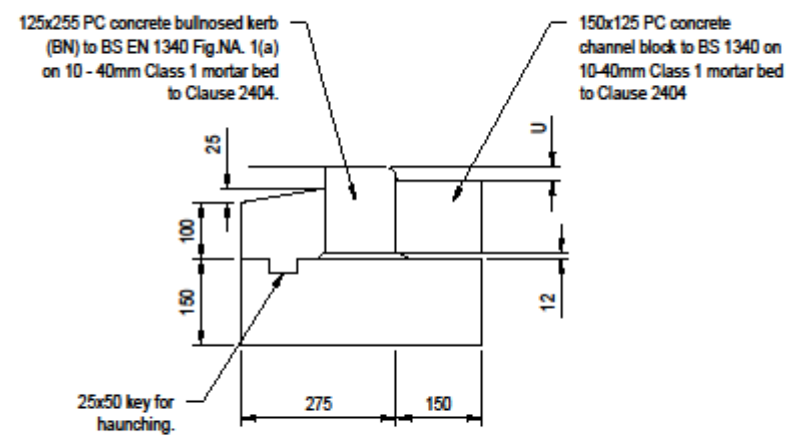
KERB TYPE K22

NOTES:

1. All dimensions in mm.
2. Kerbs to be specification Clause 1101.
3. For kerb types K20-K23 upstand to be 100mm unless stated otherwise in the contract.
4. Kerb foundation and backing to be mix ST1 to Clause 2802.
5. Mortar bedding to be to clause 2801
6. For kerb type K24 upstand U shall be :
 (i) for pedestrian crossings - 0
 (ii) for vehicular access - 25



KERB TYPE K23



KERB TYPE K24

Title

**KERB TYPES
K20 TO K24**

Scale

Not to scale

Revision:	Date:
Original	April 2005
Rev A	Dec 2020

Drawing Number
1100/01/061-082

Revision
REV A

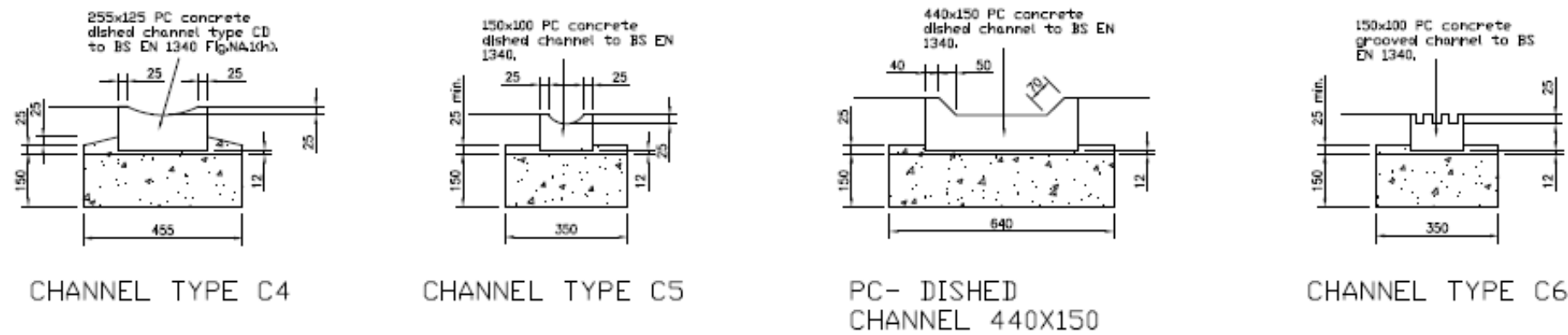
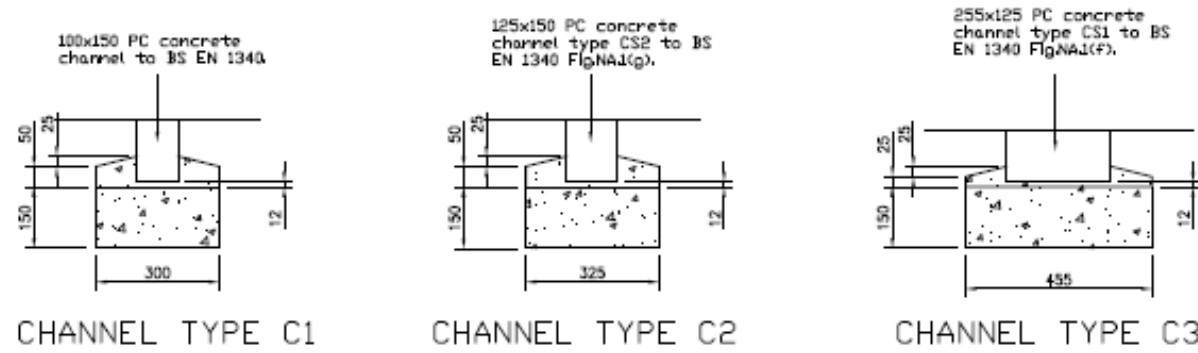
Drawing: 1100/01/085-115 – Channel Types C1 – C6

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



Notes:

1. All dimensions in mm.
2. Channels to be to specification CL 1101.
3. Channel foundations and banking to be mix ST1 to Clause 2602.
4. Mortar bedding to be to Clause 2601.
5. Sealant to be to Clause 1017.
6. Channel types C1, C5, C6 and PS-DISHED CHANNEL are non-standard dimensions.



Title
 CHANNEL TYPES
 C1 TO C6
 AND PC-DISHED CHANNEL

Scale
 Not to scale

Drawn	Date April 2005
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Drawing Number 1100/01/085-115	Revision A
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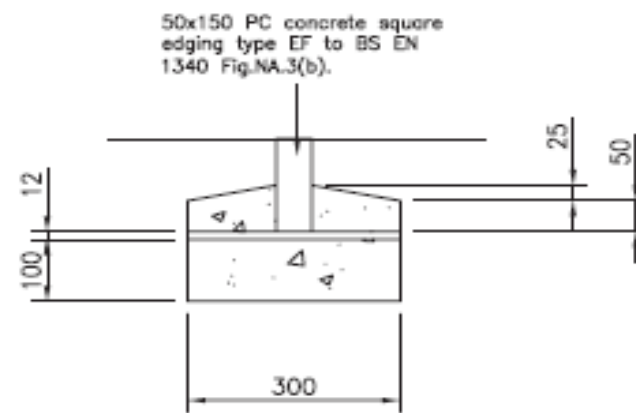
Drawing: 1100/01/118 – Edging Type E1

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



Notes:

1. All dimensions in mm.
2. Edging to be to specification Clause 1101.
3. Foundation and backing to be mix ST1 to Clause 2602.
4. Mortar bedding to be to Clause 2601.



EDGING TYPE E1

Title	
EDGING TYPE E1	
Scale Not to scale	
Drn	Date
	April 2005
Drawing Number	Revision
1100/01/118	

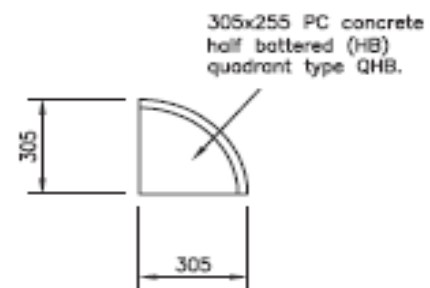
Drawing: 1100/01/136-139 – Kerb Type Quadrants Q1 and Q2

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK

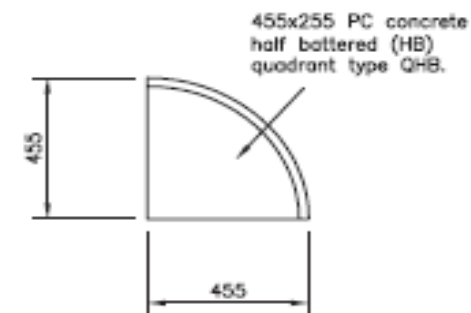


Notes:

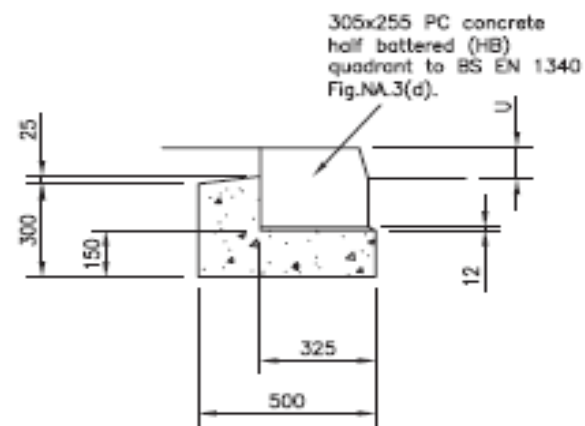
1. All dimensions in mm.
2. Kerbs to be to specification Clause 1101.
3. Kerb upstand to be 100mm unless stated otherwise in the contract.
4. Kerb foundation and backing to be mix ST1 to Clause 2602.
5. mortar bedding to be to Clause 2601.



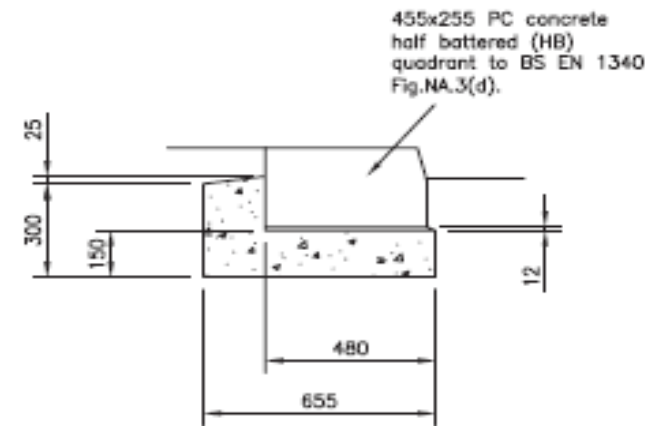
KERB TYPE Q1



KERB TYPE Q2



KERB TYPE Q1

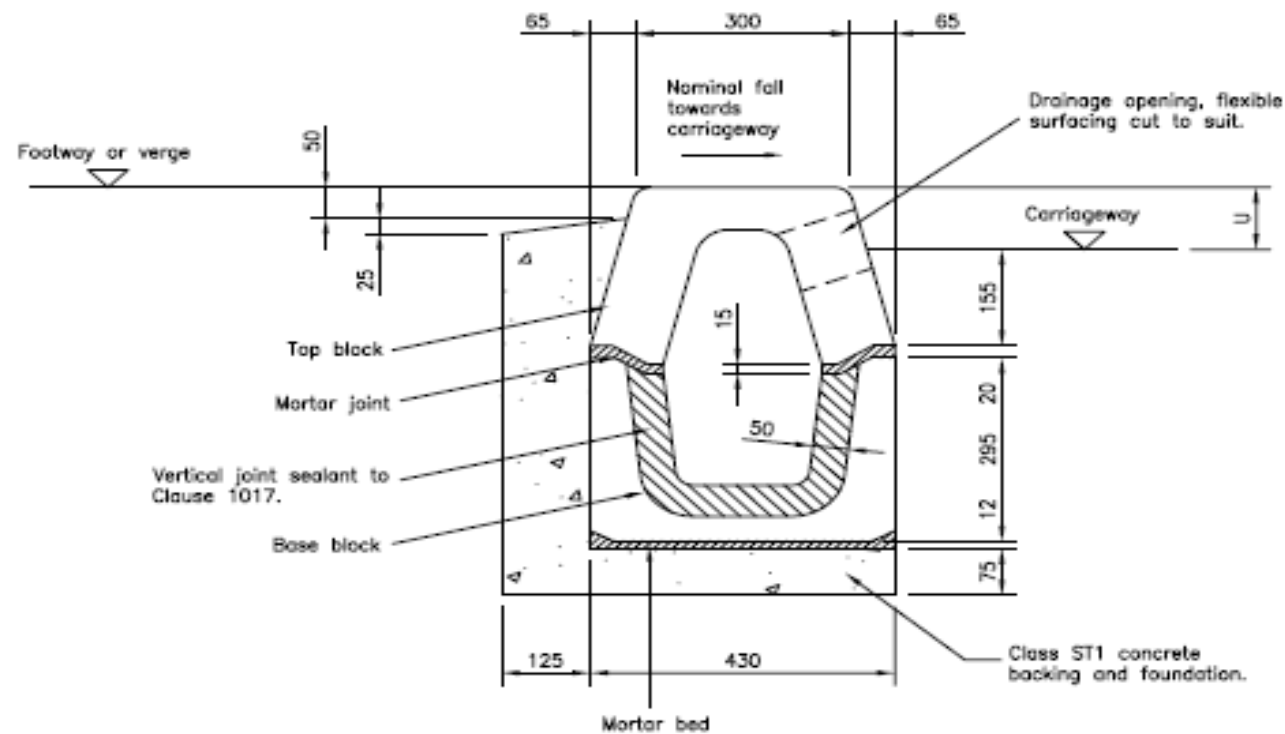


KERB TYPE Q2

Title	
KERB TYPE QUADRANTS Q1 AND Q2	
Scale Not to scale	
Drn	Date April 2005
Drawing Number 1100/01/136-139	
Revision	

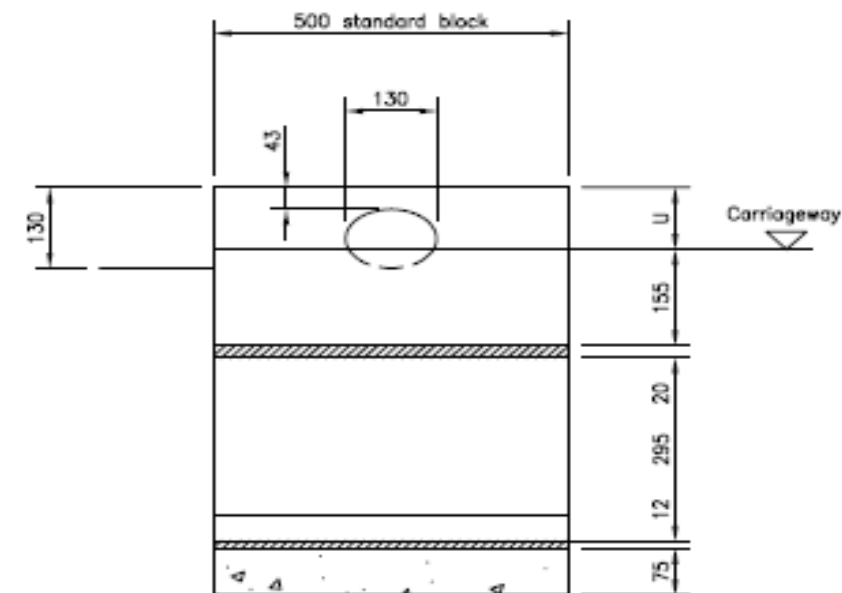
Drawing: 1100/02/124-127 – Combined Kerb and Drainage System Types DK1 and DK2

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK

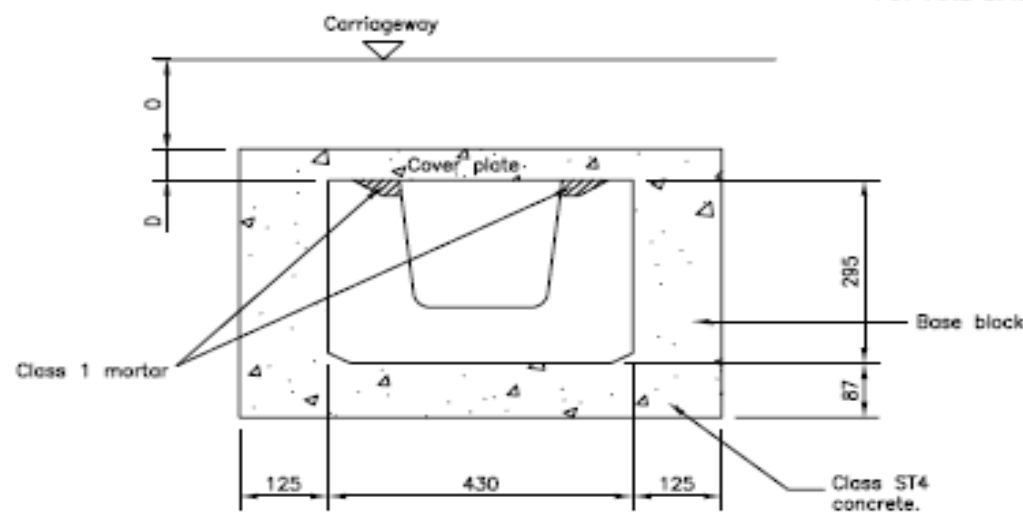


SECTION

TOP AND BASE BLOCK TYPE DK1



LONGITUDINAL ELEVATION



BASE BLOCK AND COVER PLATE TYPE DK2

Notes:

1. All dimensions in mm.
2. Combined kerb and drainage system to comply with specification Clause 516.
3. All blocks to be precast concrete as BEANY BLOCK system or equivalent.
4. To be installed in accordance with the manufacturers recommendations.
5. Foundations and backing to be Class ST1.
6. Cover plates to be 12.5m thick Grade 43A1 mild steel to BS EN 10025.
7. Cover plates to be galvanised.
8. Sealant to be to Clause 1017.
9. Kerb upstand U to be indicated in the contract.

Title
 COMBINED KERB AND
 DRAINAGE SYSTEM
 TYPES DK1 AND DK2

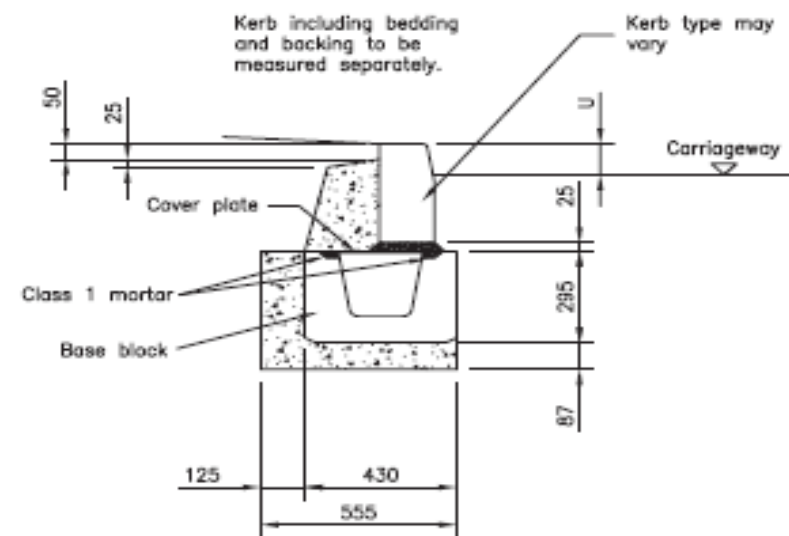
Scale Not to scale

Drn	Date
	April 2005

Drawing Number	Revision
1100/02/124-127	

Drawing: 1100/02/130 – Combined Kerb and Drainage System Types DK3

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



BASE BLOCK AND COVER PLATE TYPE DK3

Notes:

1. All dimensions in mm.
2. Combined kerb and drainage system to comply with specification Clause 516.
3. All blocks to be precast concrete as BEANY BLOCK system or equivalent.
4. To be installed in accordance with the Manufacturers recommendations.
5. Foundation and backing to be Grade ST1.
6. Cover plates to be 12.5mm thick Grade 43A1 mild steel to BS EN 10025.
7. Cover plates to be galvanised.
8. Sealant to be to Clause 1017.
9. Kerb upstand U to be indicated in the contract.

Title

**COMBINED KERB
 AND DRAINAGE
 SYSTEM TYPE DK3**

Scale

Not to scale

Drm

Date

April 2005

Drawing Number

1100/02/130

Revision

Drawing: 1100/02/133 – Combined Kerb and Drainage System Outfall Types DK4

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



Notes:

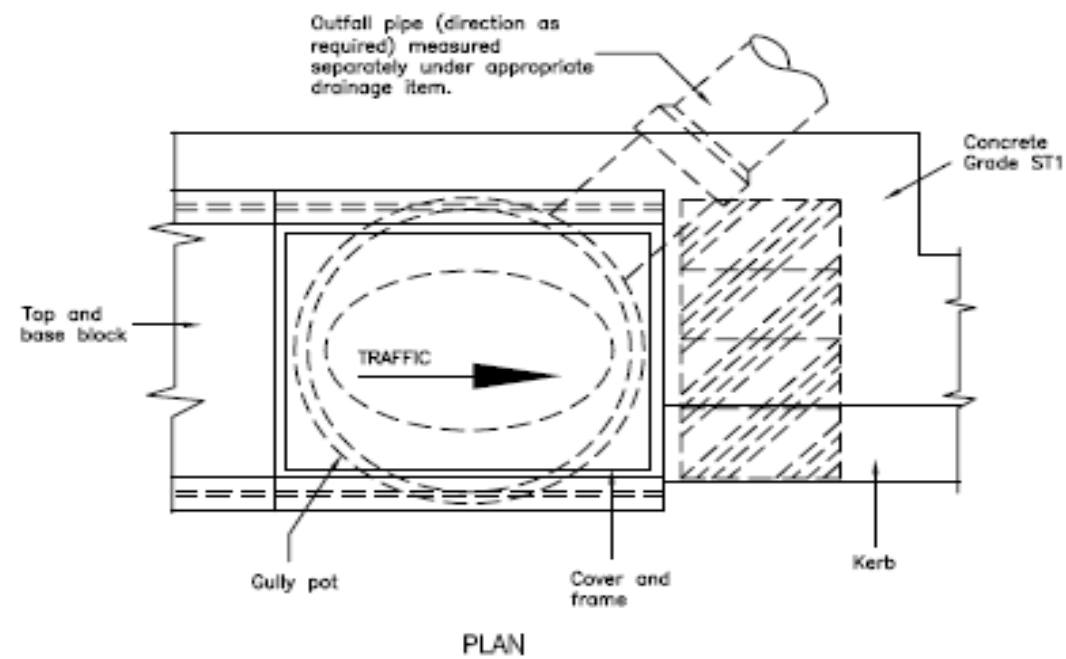
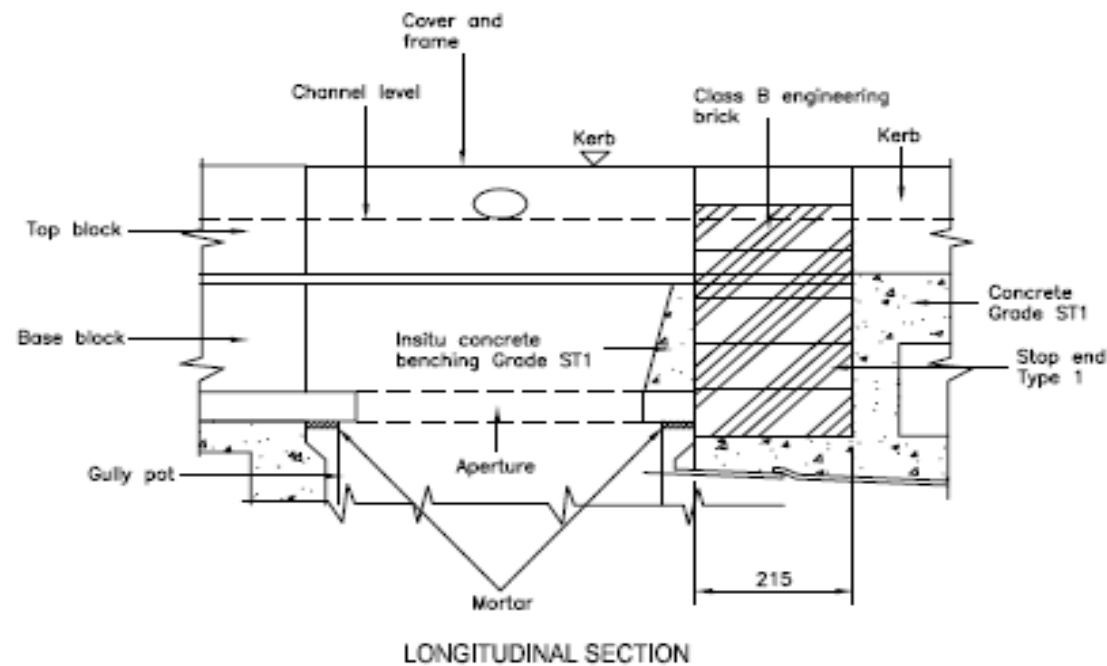
1. All dimensions in mm.
2. Precast combined drainage and kerb blocks to comply with Clause 516.
3. Outfall Type 1J (of 1J) – as DF1 but with base block. Outfall – junction in lieu of base block outfall.
4. Outfall Type 2J (of 2J) – as DF2 but with base block. Outfall – junction in lieu of base block outfall.
5. Access cover Type 1J (AC1J) – as AC1 but with base block junction in lieu of base block.

Title
**COMBINED KERB AND DRAINAGE SYSTEM
 OUTFALL TYPE DK4**

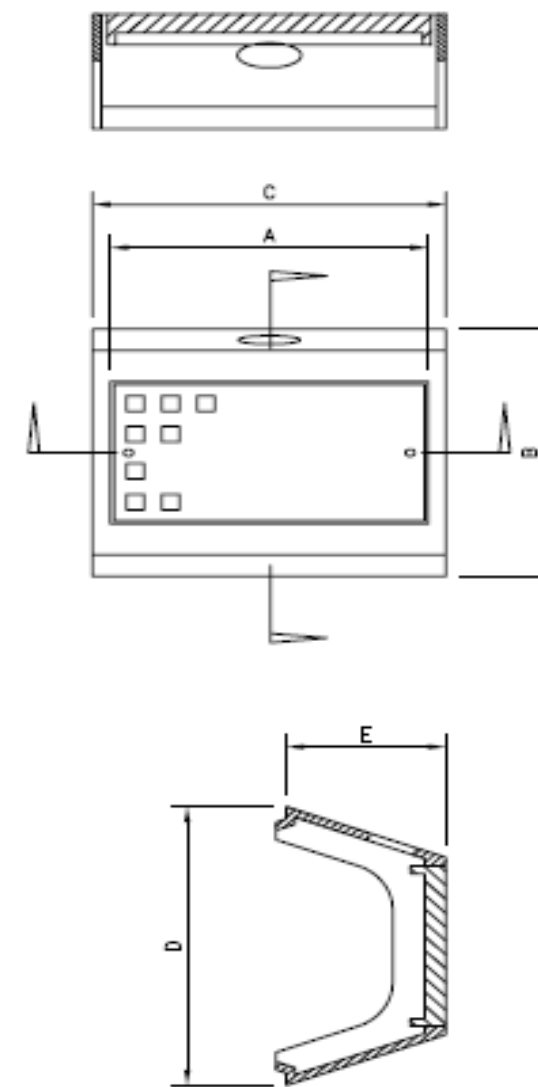
Scale Not to scale

Drn Date
 April 2005

Drawing Number Revision
 1100/02/133



OUTFALL TYPE DK4
 STOP END TYPE 1



BS EN 124 TEST LOADING	Clear opening (AxB mm)	Overall dimensions (Cx D mm)	Depth to seating (E mm)
Clause D	400x250	500x450	255

KERB TYPE COVER AND FRAME (AC1)

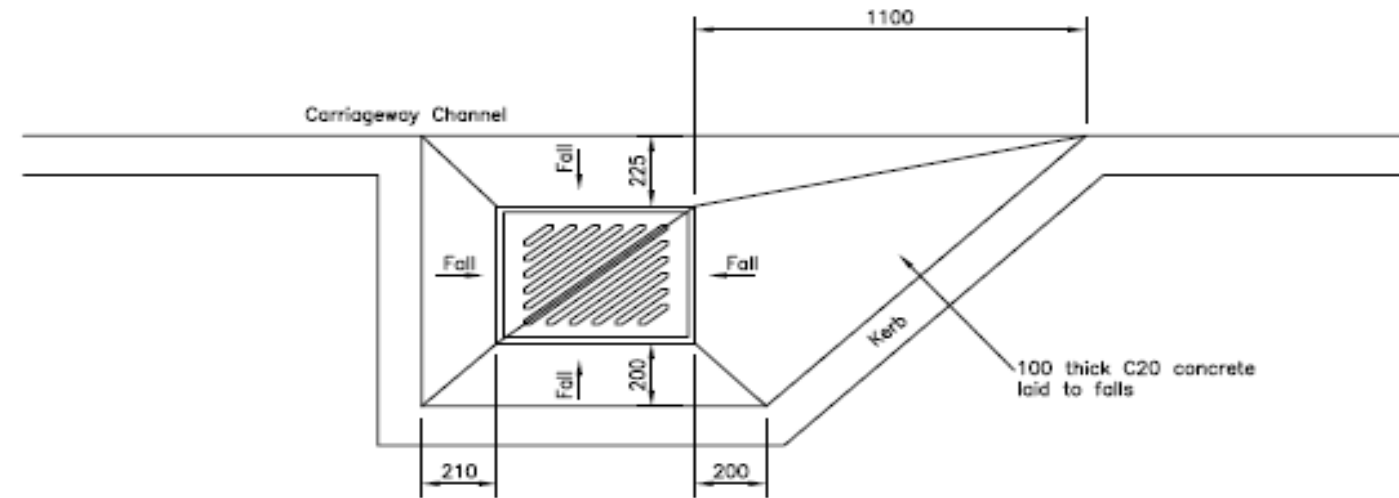
rawing: 1100/05/085 & 088 – Recessed Gullies GS1 and GS2 with Kerb Surround

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK

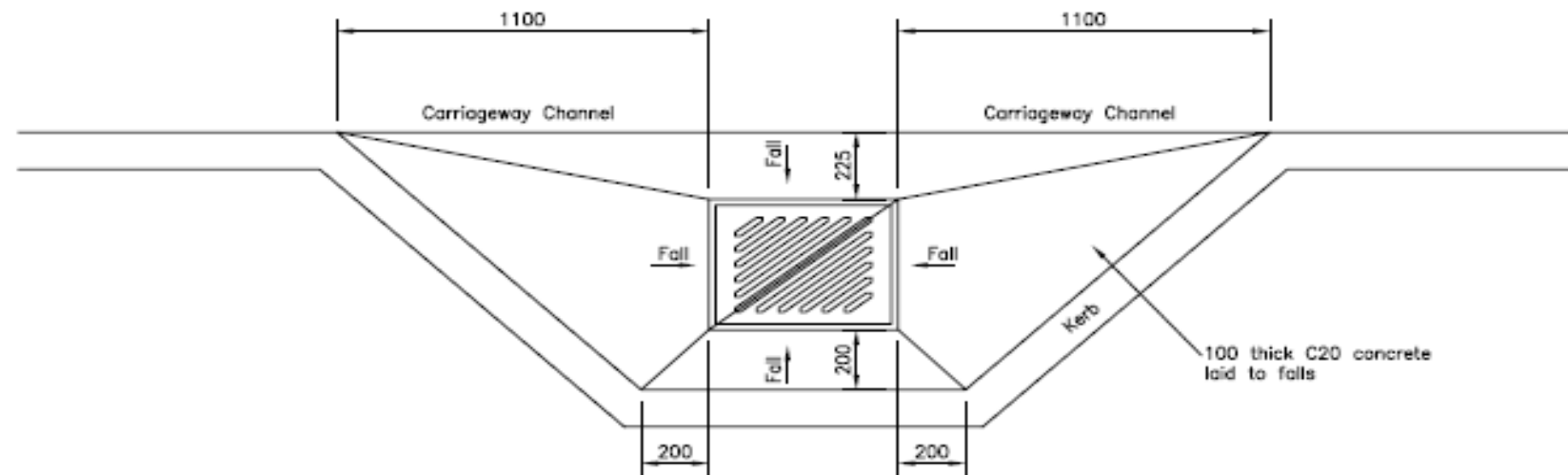


Notes:

1. All dimensions in mm.
2. Gullies to comply with Drawing No. 500/5/169-178



TYPE GS1 SINGLE SPLAY ENTRY
 RECESSED GULLY WITH KERB SURROUND



TYPE GS2 DOUBLE SPLAY ENTRY
 RECESSED GULLY WITH KERB SURROUND

Title
 RECESSED GULLIES
 GS1 AND GS2 WITH
 KERB SURROUND

Scale Not to scale

Drn	Date
	April 2005

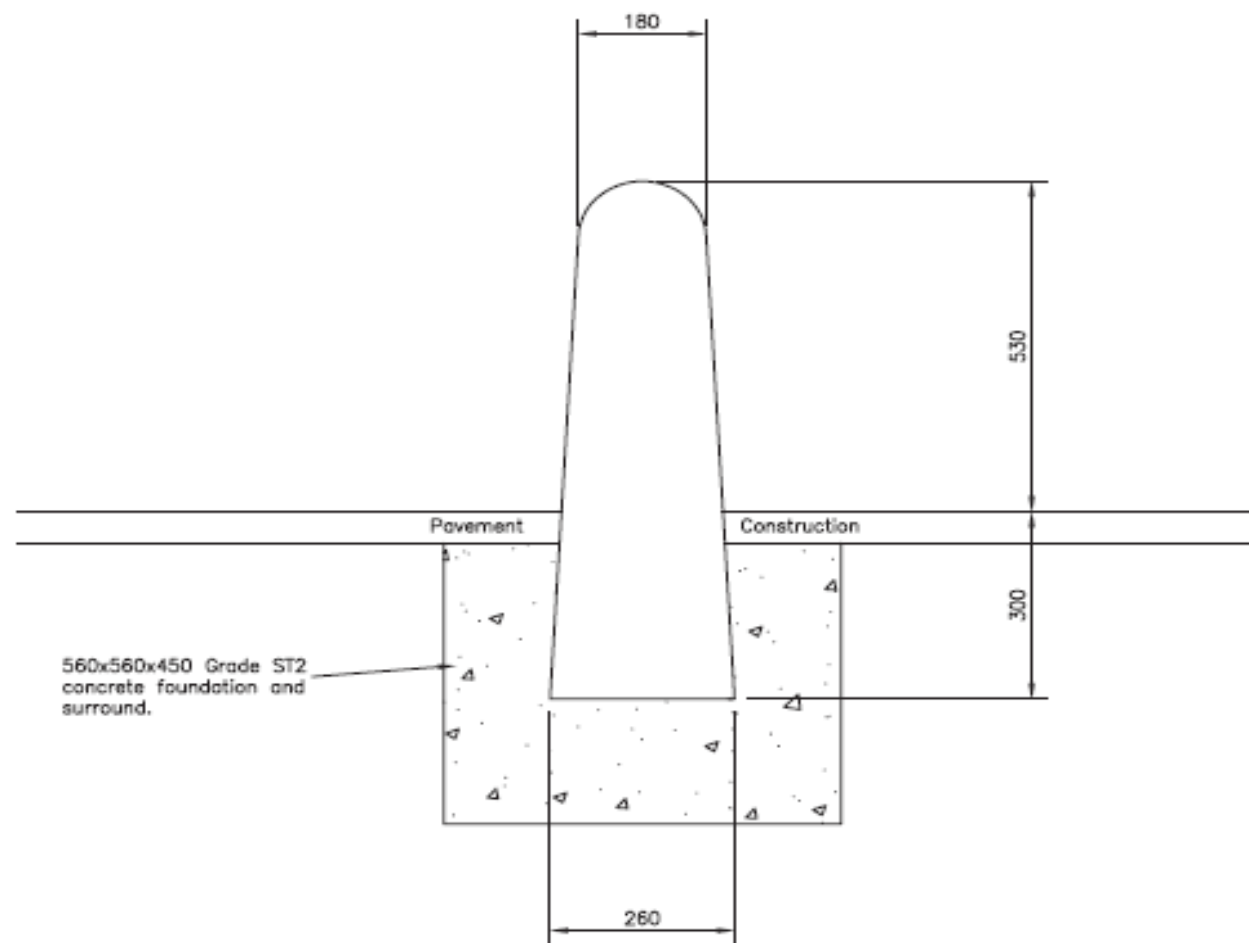
Drawing Number	Revision
1100/05/085 & 088	

Drawing: 1200/07/001 – Precast Concrete Bollard Type B1

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK

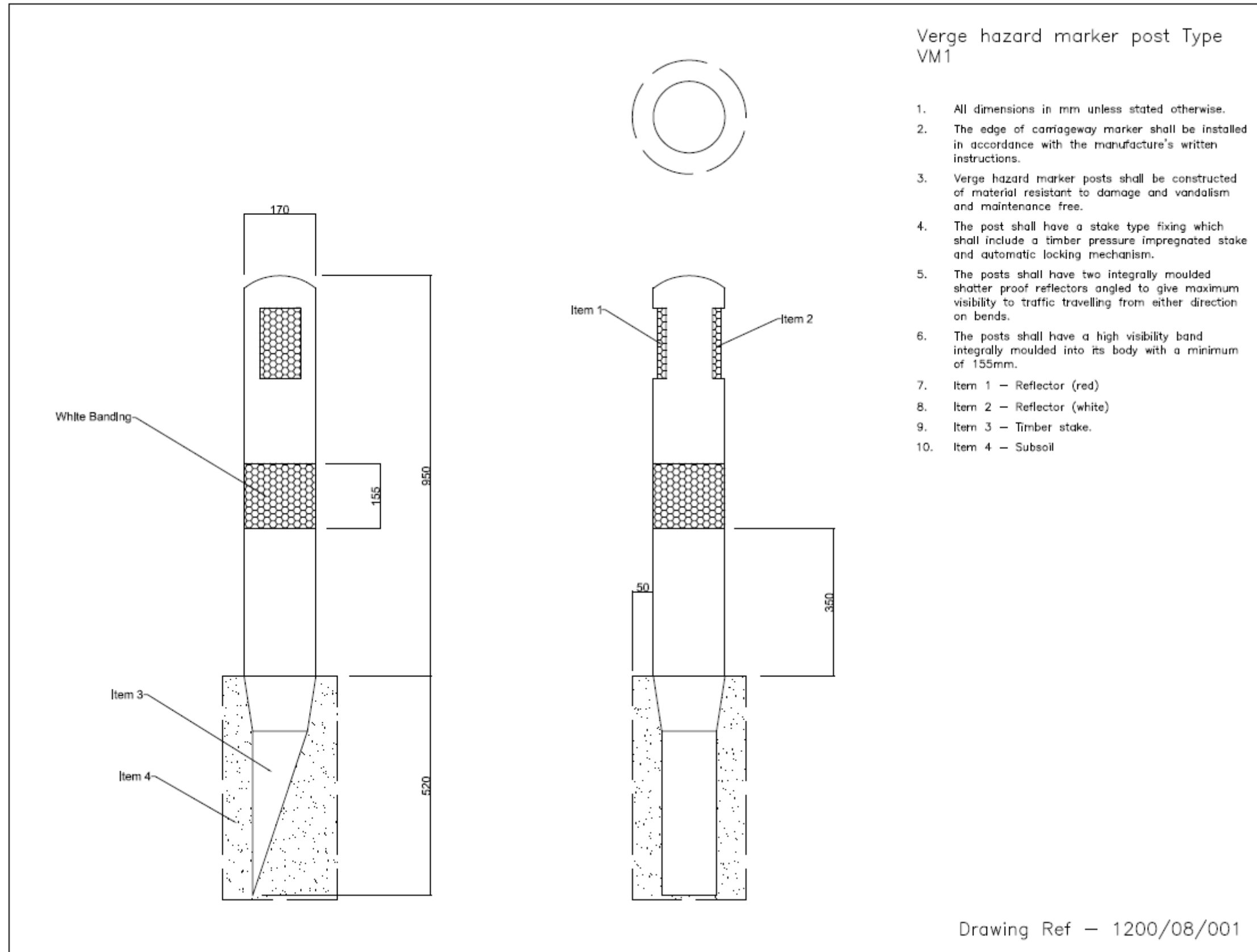


Notes:
 1. All dimensions in mm.

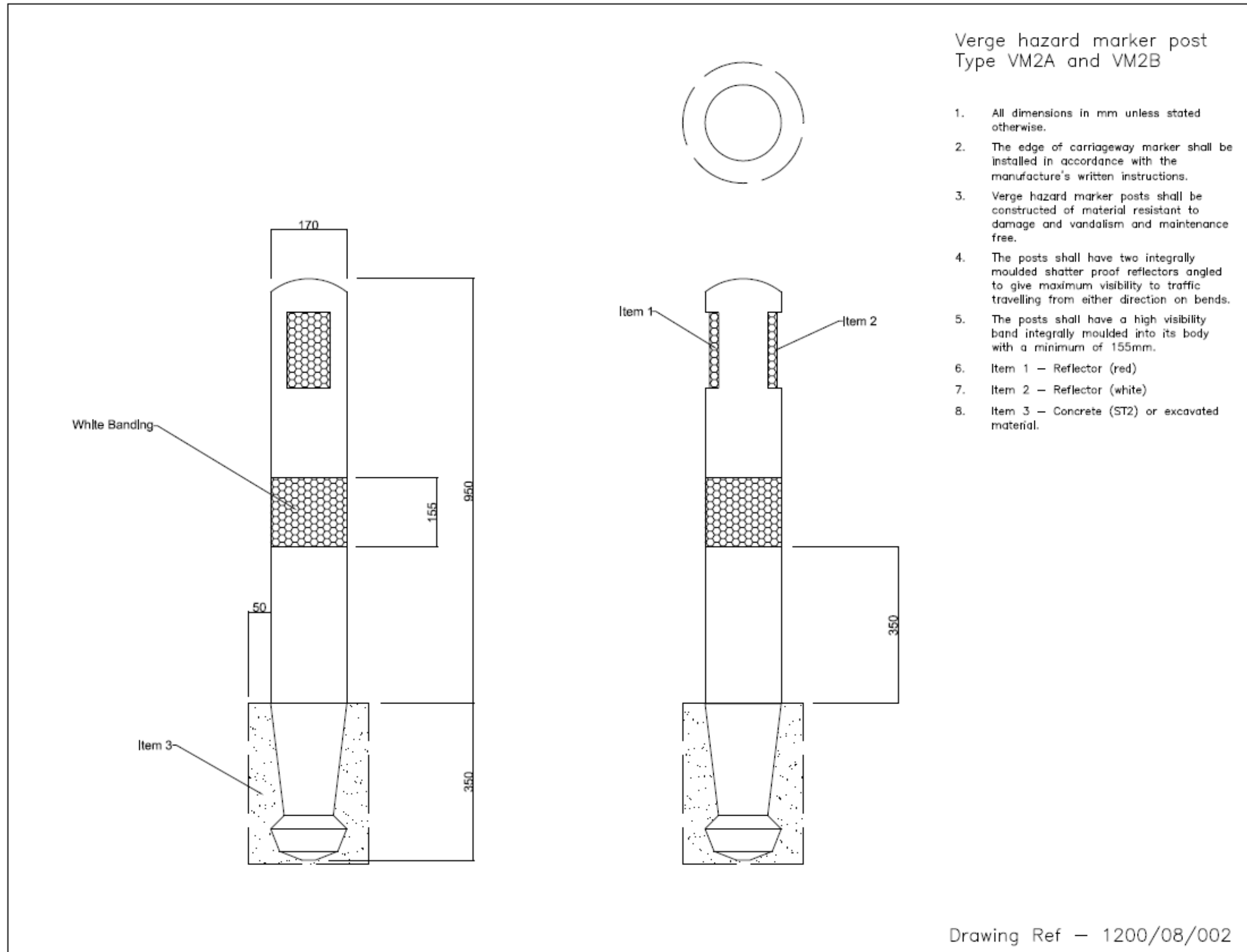


Title	
PRECAST CONCRETE BOLLARD TYPE B1	
Scale Not to scale	
Drn	Date
	April 2005
Drawing Number	Revision
1200/07/001	

Drawing: 1200/08/001 - Verge hazard marker posts Type VM1



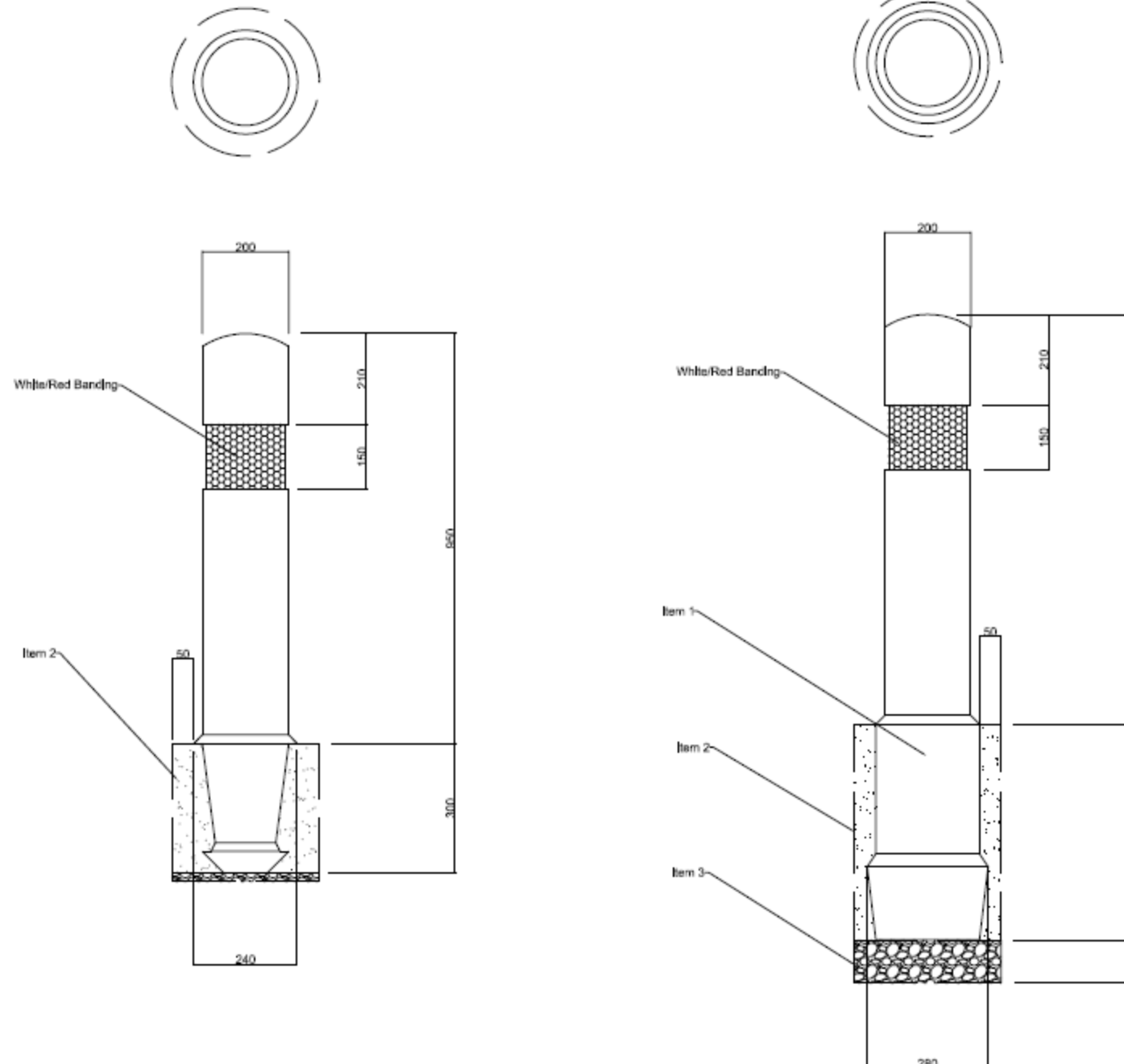
Drawing: 1200/08/002 - Verge hazard marker posts Type VM2A and VM2B



Drawing: 1200/09/001 – Edge of Carriageway Hazard Markers Type ECB1

Edge of Carriageway Hazard Markers – Type ECB1

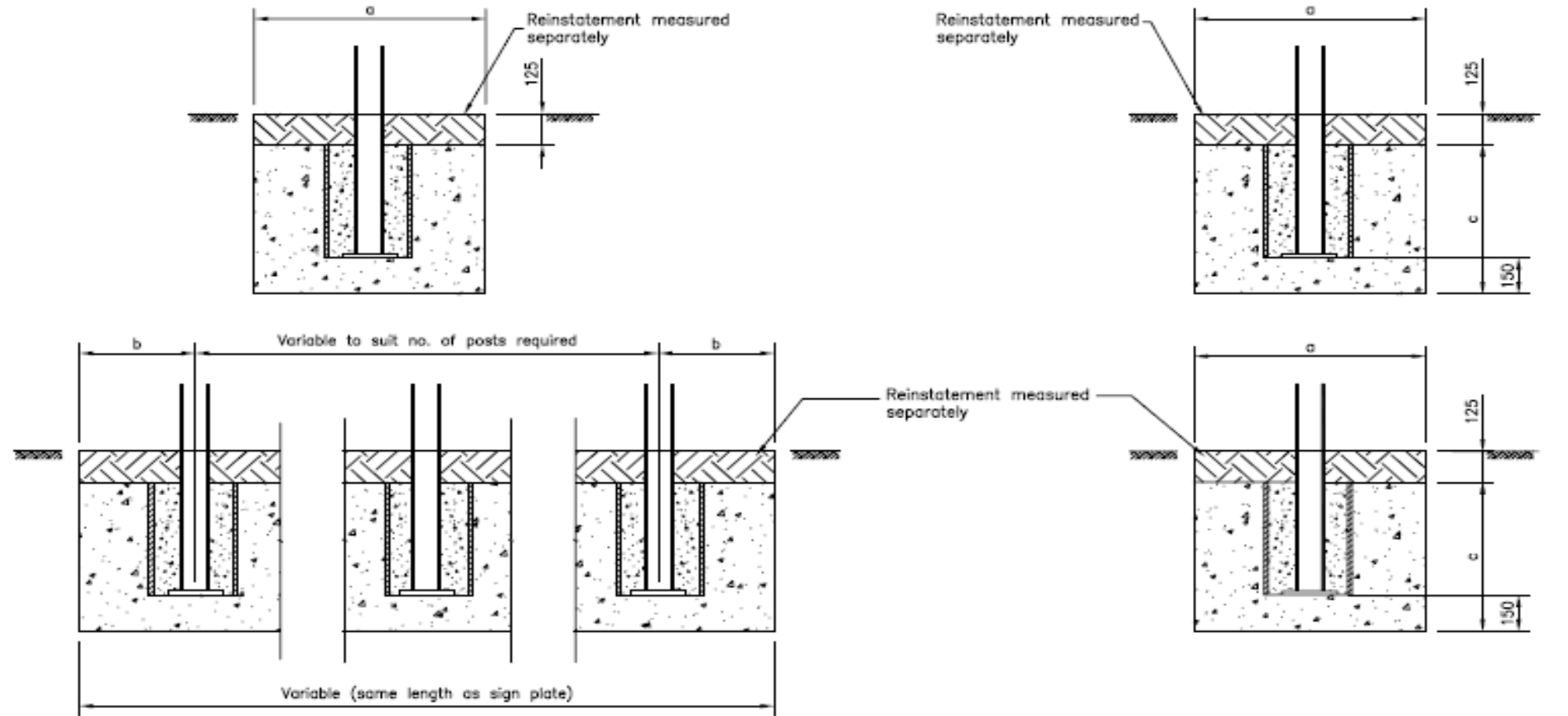
1. All dimensions in mm unless stated otherwise.
2. The edge of carriageway marker shall be installed in accordance with the manufacture's written instructions.
3. Verge hazard marker posts shall be constructed of material resistant to damage and vandalism and maintenance free.
4. A 150mm retro-reflective red and white band shall be attached to the marker.
5. Item 1 – Permanent ground socket
6. Item 2 – Concrete (ST2)
7. Item 3 – Gravel



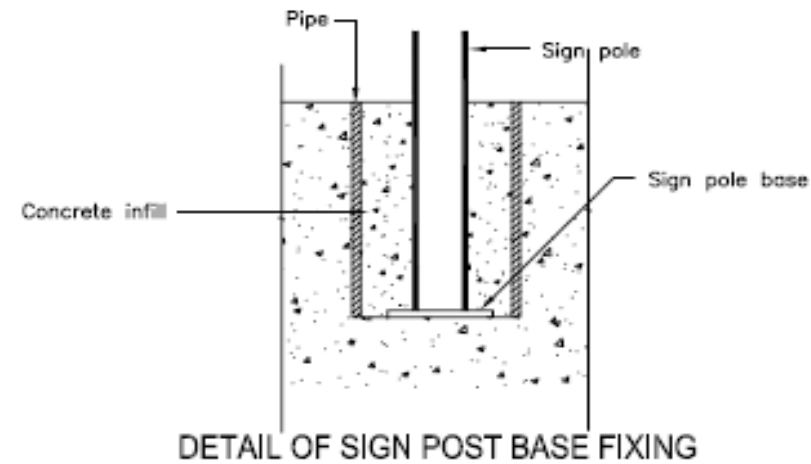
Drawing ref – 1200-09-001

Drawing: 1200/10/1 – Details for Sign Post Foundation Sheet 1 of 2

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



For Post Diameter	76mm	83-102mm	114-140mm	163-194mm
'a'	610	830	990	1525
'b'	305	415	495	765
'c'	460	610	915	915



Notes;

1. To be read in conjunction with series 1200.
2. Concrete to be to Clause 2602 mix to be ST5.
3. The size, number and materials for columns is to be in accordance with chapter 13 of the Traffic Signs Manual.
4. For signs erected in grass verges, concrete foundations are to be brought up to ground level as indicated on Sheet 2.

Title
DETAILS FOR SIGN POST FOUNDATION SHEET 1 OF 2

Scale Not to scale

Drn Date
 April 2005

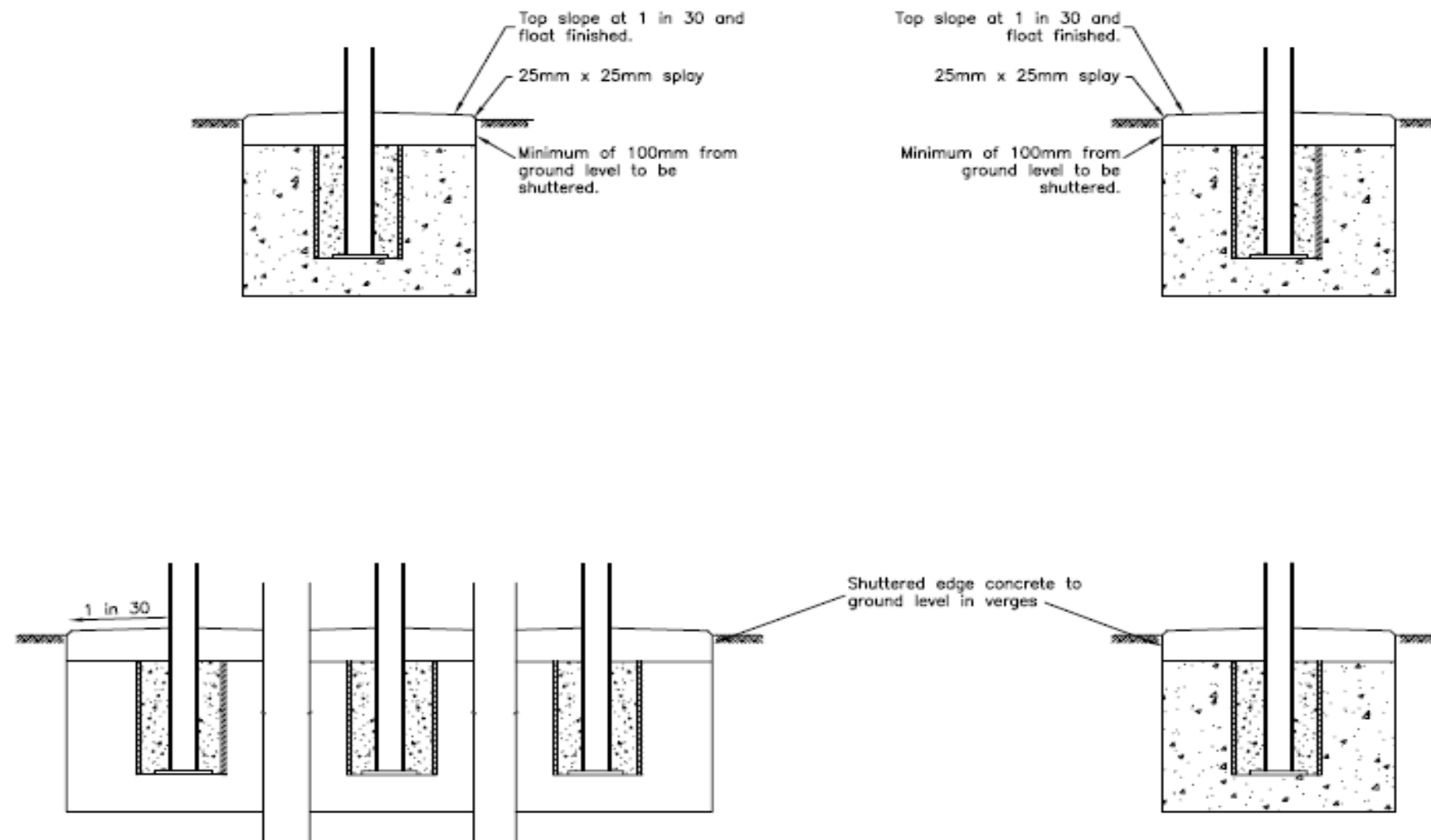
Drawing Number Revision
 1200/10/1

Drawing: 1200/10/2 – Details for Sign Post Foundation Sheet 2 of 2

TERM CONTRACT FOR MANAGEMENT AND MAINTENANCE OF THE SCOTTISH TRUNK ROAD NETWORK



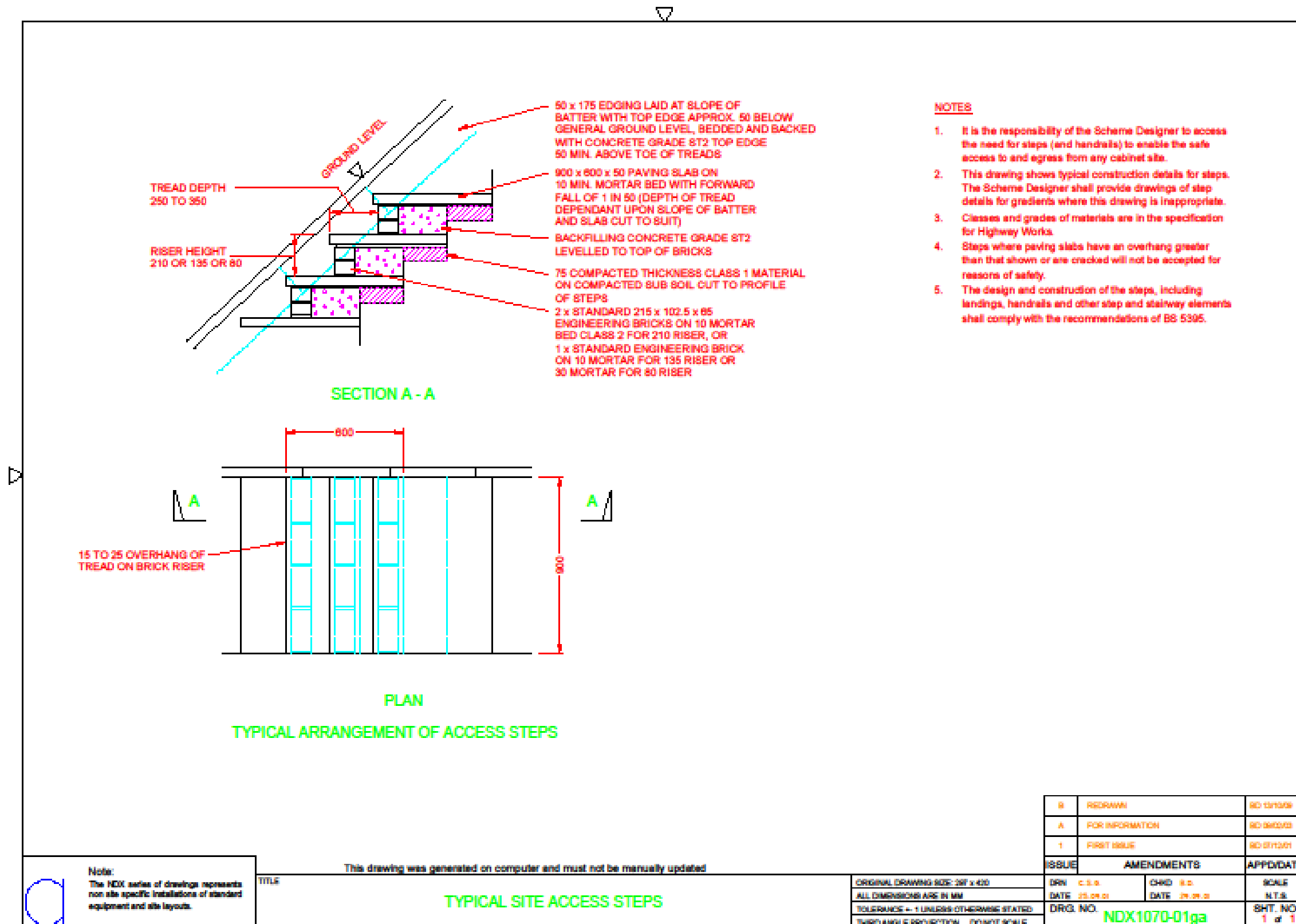
- Notes:
- To be read in conjunction with series 1200.
 - Concrete to be to ci2602 mix to be ST5.



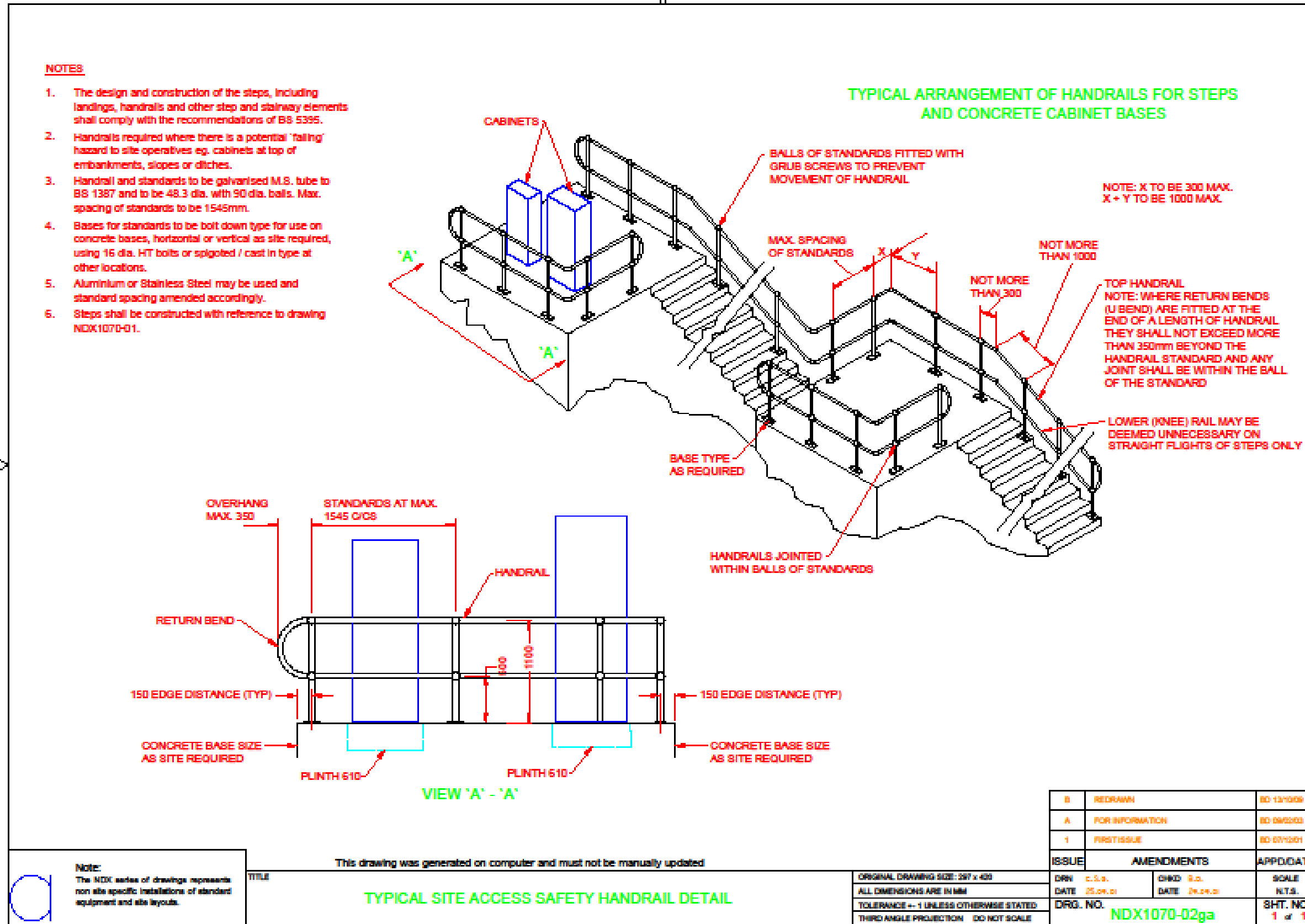
MOWING STRIP DETAIL FOR SIGNS IN GRASSED AREAS
 (SEE DETAIL 12/1(1) FOR DIMENSIONS Etc.)

Title	
DETAILS FOR SIGN POST FOUNDATION SHEET 2 OF 2	
Scale Not to scale	
Drn	Date
	April 2005
Drawing Number	Revision
1200/10/2	

Drawing: NDX1070-01ga RevB – Typical Site Access Steps



Drawing: NDX1070-02ga RevB – Typical Site Access Handrail Detail



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Appendix 0/5 – Special National Alterations of the Overseeing Department Of Scotland

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