

**Sainsbury's Supermarkets Limited
Hambledon Road, Waterlooville,
Hampshire**

S278 Agreement Highway Works

SPECIFICATION

January 2013

Revision A

Ref ZSSLWVILLE2.2/SP

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Revision A

Project Code:	ZSSLWVILLE2.2
Prepared by:	PSD
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Checked by:	AB
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Contents

- 1. Summary of Revisions**
- 2. Preamble to the Specification**
- 3. Specification of Highway Works**
- 4. Traffic Signing Schedules and Sign Face Details**

List of Revision

Revision 0 - First Issue

Revision A (04/01/13)

Appendix 0/4

AAA dwg 779B-27 added.

MCHW C7/1 removed. Tie-in detail for flexible carriageway to concrete carriageway added to MB/C/01

Appendix 6/7

Note 7 amended to clearly indicate equilibrium CBR testing is required.

Appendix 7/1

Schedule 2 – texture depth info added.

Schedule 3 – Thicknesses amended

Table 2 – SC1 amended

Table 2 – SC2 amended

Table 3 – BC1 amended

Table 4 – RB1 amended

Appendix 13/1

Column E added.

Appendix 14/4

Lantern ref E added.

Traffic Signing Removal; Schedule

Updated to Rev A

Traffic Signing Schedule and Sign Face Details

Updated to Rev D

VOLUME 2 – WORKS INFORMATION

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PREAMBLE TO THE SPECIFICATION

1. All references to the Overseeing Organisation in these documents should refer to the *Project Manager*.
2. The Specification referred to in the Tender shall be the 'Specification for Highway Works', published by The Stationery Office (formerly HMSO) as Volume 1 of the Manual of Contract Documents for Highway Works, as modified and extended by the following:
 - Appendix 0/1: Contract-specific Additional, Substitute and Cancelled Clauses, Tables and Figures
 - Appendix 0/2: Contract-specific minor alterations to existing Clauses, Tables and Figures
 - Appendix 0/3: List of numbered appendices referred to in the specification and included in the contract
 - Appendix 0/4 contains a list of the Drawings
3. The relevant publication date of each page of the Specification for Highway Works is given in the Schedule of Pages and Relevant Publication Dates.
4. An Additional Clause as indicated by a suffix 'AR' in Appendix 0/1 is a Contract-specific alteration.
5. A Substitute Clause as indicated by a suffix 'SR' in Appendix 0/1 is a Contract-specific alteration.
6. A Cancelled Clause indicated by a suffix 'CR' in Appendix 0/1 is a Contract-specific alteration.
7. 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.
8. Any reference in the Contract to a Clause number or Appendix shall be deemed to refer to the corresponding Substitute Clause number or Appendix 0/1 or 0/2.
9. 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.
10. Where a Clause in the Specification relates to work goods or materials which are not required for the *works* it shall be deemed not to apply.
11. Any Appendix referred to in the Specification which is not used shall be deemed not to apply.
12. Other than where references to the Overseeing Organisation are made in the context of the Overseeing Organisation granting statutory or type approvals, the roles and functions of the Overseeing Organisation shall be undertaken by the Overseeing Organisation and/or delegated deputies.

Where the Specification requires the provision of documentation to the Overseeing Organisation for statutory or type approval such documentation shall be provided to the Overseeing Organisation, Contract Co-ordinator and delegated deputies.

PREAMBLE TO THE SPECIFICATION

13. If the Specification is used in conjunction with a Contract under which the *Contractor* is responsible for the design of any part of the works, the delegation of the roles and functions of the Overseeing Organisation as stated in paragraph 12 above shall be amended as follows:
 - i) If any agreement, consent or approval required to be obtained from the Overseeing Organisation impacts on the health and safety of the general public, the environment or any property or equipment not owned or operated by the *Contractor*, such agreement, consent, approval shall be obtained from the *Employer*.
 - ii) Where the Specification provides for the Overseeing Organisation to require a test, waive the requirement for a test or alter testing frequency, the party to whom the Overseeing Organisation's roles and functions have been ascribed by paragraph 12 above shall exercise such decisions in accordance with the *Employer's* requirements/Construction requirements stated in the Contract.
14. The Standard Drawing referred to in the Specification shall be the series 9 edition of 'Highway Standard Details' published by Hampshire County Council.

SPECIFICATION FOR HIGHWAYS WORKS: SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES

Series/ Appendix	Page Number	Publication Date
000	1	March 1998
000	3F	May 2005
000	2	November 2006
100	2	May 2001
100	W1F	May 2005
100	12 to 14, 20F	November 2005
100	1, 3 to 7, N1, N3	May 2006
100	8 to 9, 11, 15 to 19 N2, N4	November 2006
100	10, N5 to N6F	November 2008
200	1, 3F	May 2001
200	2	May 2004
300	1	May 2001
300	4	November 2002
300	2 to 3, 5 to 6F	May 2008
400	1 to 6, 8, 10 to 13F	November 2007
400	7, 9	November 2008
500	23 to 24, 26	November 2004
500	28F	May 2005
500	3, 22, N1F	May 2006
500	2, 5, 27	November 2006
500	6, 25	November 2007
500	1, 4, 7 to 21	November 2009
600	33	November 2003
600	2, 27 to 28, 30 to 32, 34 to 36, N1	November 2005
600	25 to 26	November 2006
600	42 to 49, 52 to 68F	November 2007
600	37, 50	November 2008
600	1, 3 to 24, 29, 38 to 41, S1 to S3F, N2 to N4F	November 2009
700	2 to 3, 5 to 6, N1, N3 to N5F	November 2006
700	4, N2	August 2008
700	1, 7, 32F	November 2009
800	1 to 25F	November 2009
900	2 to 5, 9 to 22, 24 to 26, 28 to 67F	August 2008
900	1, 6 to 8, S1F	November 2008
900	23, 27	May 2009
1000	3, 5 to 6	November 2005
1000	1 to 2, 4, 7 to 15, 19 to 33F	May 2006
1000	16 to 18	November 2006
1100	1, 4F	November 2004
1100	2, N1F	November 2006
1100	3	August 2008

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1200	5	May 2001
1200	2 to 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
1300	3 to 4	November 2004
1300	1, 5 to 10, 12F	November 2005
1300	2, 11 and N1	May 2006
1400	2, N1F	May 2001
1400	1, 3 to 9F	May 2006
1500	7	May 2001
1500	2	February 2003
1500	3 to 4, 8 to 11, 13	November 2004
1500	1, 5 to 6, 12, 14 to 17F	November 2006
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 46	November 2003
1600	3, 20 to 23, 43	November 2005
1700	2 to 7, 10 to 15	May 2004
1700	8 to 9	May 2005
1700	1, 16 to 22F	May 2006
1800	1, 4, 6, 8 to 9	May 2004
1800	2 to 3, 5, 7, 10 to 12F	November 2005
1900	17	May 2003
1900	1, 5, 8 to 14, 16, 18 to 30F, S1 to S2F	May 2005
1900	6 to 7, 15	May 2008
1900	2 to 4	November 2008
2000	1, 3 to 4F	May 2001
2000	2	November 2004
2100	1, 4F	March 1998
2100	2	November 2003
2100	3	November 2005
2300	1	March 1998
2300	2 to 3F	May 2001
2400	1, 4, 7F	May 2005
2400	2	May 2006
2400	3, 5 to 6	May 2008

SPECIFICATION FOR HIGHWAYS WORKS: SCHEDULE OF PAGES AND RELEVANT PUBLICATION DATES

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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	1	March 1998
2600	2 to 4	November 2003
2600	5	November 2004
2600	6	May 2005
2600	7F	November 2006
3000	1, 4 to 7, 10, 12 to 17, 19, 22 to 27F	May 2001
3000	20	November 2004
3000	2 to 3	May 2006
3000	8 to 9, 11, 18, 21	May 2008
5000	1, 4 to 19F, S1F	May 2005
5000	2 to 3	November 2008
Appendix A	1 to 32F	May 2008
Appendix B	1	May 2006
Appendix B	2 to 7F	November 2006
Appendix C	1	May 2005
Appendix C	2F	November 2006
Appendix D	N1F	March 1998
Appendix D (N1)	1F	May 2005
Appendix E	1F	May 2005
Appendix E (N1)	N1F	May 2005
Appendix F	1 to 55F	May 2009
Appendix G	1F	May 2004
Appendix H	1	May 2004
Appendix H	2, 6 to 8F	November 2005
Appendix H	3 to 5	November 2006

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

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APPENDIX 0/I

CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND CANCELLED CLAUSES AND TABLES INCLUDED IN THE CONTRACT

170AR ABATEMENT OF NUISANCE

1. Without prejudice the Conditions of Contract, existing roads, footpaths, accesses to adjacent houses, buildings, any other right of way and any new roads, drains, ditches and grips, whether part of the site or not, and which are being used by any vehicles or items of plant of the *Contractor* or his sub-contractors or suppliers in connection with the Works, shall be kept clean and free of all dirt, mud and material dropped from vehicles or tyres and tracks.
2. For the purposes of removing any accumulation of dust, dirt, mud or any other material inadvertently dropped from vehicles or tyres and tracks, the *Contractor* shall provide and maintain road cleaning equipment incorporating a suction device and collection compartment. Road sweepers propelled by tractors and with brushes angled to the direction of travel will not be acceptable.
3. Neither existing roads nor temporary or permanent loading/unloading bays shall be used for the storage of materials or plant without the approval of the Overseeing Organisation.
4. The *Contractor* is required to take all precautions to prevent the spread of airborne dust to any habitable property and/or for premises requiring a very high standard of hygiene and to conform to all relevant Statutory Instruments.
5. Any area of the Works from which dust may arise shall be the subject of close control by the *Contractor*, who shall provide such water spraying or other suitable equipment as shall be required to reduce the dust level to an absolute minimum to the satisfaction of the Overseeing Organisation.
6. At all *Contractors*, Sub-contractors and Suppliers points of entry onto the public highway from the Site, suitable wheel washing facilities shall be provided. No vehicle that is likely to deposit mud or other material on the road surface will be permitted back on the public highway. In meeting his obligations under the Conditions of Contract the *Contractor* shall provide, maintain and use as necessary suitable equipment including mechanical road sweeps throughout the Contract period.
7. The *Contractor* or Sub-contractors shall not store material/plant of any kind on land identified as private without the approval of the Overseeing Organisation.
8. Storing of Materials on the Highway shall be in a manner acceptable to the Overseeing Organisation. The Sites shall be restored to the Overseeing Organisation's satisfaction as soon as possible after the completion of the works. Materials shall be stacked so as to cause minimum inconvenience to users of the highway. If necessary excavated materials shall be removed from the highway to an approved site and brought back for refilling as needed.
9. No material shall be stored on the highway so as to obstruct sight lines, natural falls for surface water or cause loose material from the Works to be deposited in roadside drains, ditches etc.

APPENDIX 0/I

**CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND
CANCELLED CLAUSES AND TABLES INCLUDED IN THE
CONTRACT**

171AR PUBLICITY

1. No advertisement shall be erected within the Site by the *Contractor* or any Sub-contractor. *Contractor's* name boards of appropriate size and suitable colour scheme shall not be erected and sited without the approval of the Overseeing Organisation.
2. All name boards within the Site shall be removed when instructed by the Overseeing Organisation.

APPENDIX 0/I

**CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND
CANCELLED CLAUSES AND TABLES INCLUDED IN THE
CONTRACT**

270AR SIDING

1. Siding may be required where excessive or hardened dirt, vegetation or any other undesirable material has overgrown the edges of adjoining carriageways, footways and cycle tracks and requires removal as part of a specific scheme, site or, a programme of sites requiring siding will be presented to the *Contractor* via the Works Information.
2. Footways, cycle ways and carriageways may be sided out either manually or mechanically. However, the *Contractor* shall ensure that any siding out machine employed does not cause damage to the existing footway, cycleway and carriageway surface.
3. No deposits/arising shall be left on the road margins, verges, footway and cycle tracks, unless specifically instructed by the Overseeing Organisation where arisings shall be spread and levelled on adjacent verges.
4. All sided out edges shall be trimmed to a neat line.
5. Where the sided out edge does not exceed a height of 75mm above the existing footway or cycle track surface, they may be trimmed with a vertical face. Where they generally exceed a height of 75mm above the existing footway or cycle track surface they shall be trimmed to an approximately 45 degree battered face.

APPENDIX 0/I	CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND CANCELLED CLAUSES AND TABLES INCLUDED IN THE CONTRACT
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271AR BURNING OF MATERIALS

1. The burning of any material is prohibited.

APPENDIX 0/I

**CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND
CANCELLED CLAUSES AND TABLES INCLUDED IN THE
CONTRACT**

**572AR REPLACING, RAISING OR LOWERING COVERS, GRATINGS AND FRAMES
ON EXISTING CHAMBERS AND GULLIES**

1. Where existing covers, gratings or frames have to be replaced, the *Contractor* shall carefully remove any damaged parts and clean any parts to be re-used. If necessary, any concrete or mortar bedding shall be broken out, the surface shall be prepared and the frame, grating or cover bedded or replaced to its original position on a polyester resin mortar or a proprietary quick setting mortar approved by the Overseeing Organisation.
2. Where the levels of existing covers or gratings have to be adjusted the *Contractor* shall carefully excavate for and remove the existing cover or grating and frame, which shall be cleaned to remove all adhering material. The underlying brickwork, concrete or mortar in bedding, chamber or shaft walls shall then be broken down to the required level and the surface prepared to receive new construction.
3. New construction in brickwork or concrete shall be built on the existing chamber or shaft and shall conform with the relevant requirements of the Works Information for new manholes, catchpits, gullies, Statutory Undertakers' chambers and the like. Unless otherwise directed by the Overseeing Organisation, the existing pre-cast concrete cover slabs and the existing covers, gratings and frames shall be re-used in the *works*.
4. METHOD OF RE-LEVELLING FRAMES AND COVERS IN THE CARRIAGEWAY
 - (i) Prior to initial removal all covers shall be marked in such a way that when the covers are replaced in the frame, they occupy the same positions as they did before removal.
 - (ii) Remove the cover(s) from the frame.
 - (iii) Excavate the area approximately 150mm wide around the frame and to the depth of the frame taking care not to damage the frame or walls of the chamber. All loose or weakly adhering material shall be removed from the sides and base of the excavation.
 - (iv) Remove the frame from the jointing chamber. Prepare the frame for re-use by removing all of the old bedding material or other detritus. Ensure the surfaces of the frame are clean and free of any rust. Cut off any existing levelling bolts flush with the underside of the frame.
 - (v) Prepare a sound surface at 165mm below the carriageway surface by cutting back or building up as required. Any adjustment to the uppermost surfaces of the chamber shall be achieved using solid engineering bricks or quarry tiles, being bonded with resin mortar.
 - (vi) Remove all foreign matter from the top of the chamber walls or shaft and, if wet, wipe off all surface water with a clean cotton rag.
 - (vii) Locate the frame square with the chamber walls or shaft and, by supporting it under the corners with pieces of broken tile or other suitable materials, raise the frame until it is level with the carriageway surface.
 - (viii) Clean the cover and frame seatings, carefully replace the cover/s and check for rocking. If necessary, adjust to eliminate any rock by providing similar supports under the long sides of the frame, particularly under any frame joints.

(ix) Remove the covers taking care not to disturb the frame.

APPENDIX 0/I

CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND CANCELLED CLAUSES AND TABLES INCLUDED IN THE CONTRACT

- (x) On the inside of the chamber, face off the gap under the frame and any voids between the bricks or quarry tiles with resin mortar. DO NOT FORCE THE MORTAR UNDER THE FRAME - the purpose of the facing is to provide an inside shutter to contain the resin bedding.
- (xi) Allow the mortar to develop initial set, which is indicated when it feels firm against finger pressure, then mix the resin bedding and pour it around the frame until the bedding just lips over the lower flange.
- (xii) Allow a minimum of 2 hours to elapse before replacing the cover/s (and removable grid/s where fitted) or commencing reinstatement. It is important that during this curing period the frame is not disturbed in any way. (This may best be achieved using a proprietary system.) The cover shall also not be trafficked for at least a further hour (i.e. minimum 3 hours from placing frame to permitting trafficking)
- (xiii) Check that the covers do not rock and/or foul the jointing chamber walls or removal grids, if either occurs take whatever corrective action is necessary and ensure that the cover and the frame seatings are free of dirt or spilt resin.

REINSTATEMENT

- 5. Prior to reinstatement in a bituminous surface, the sides of the excavation and the outside of the frame shall be primed with bitumen emulsion and the space surrounding the frame reinstated using a suitable bitumen bound material.
- 6. In the event of any damage whatsoever to third party Apparatus the *Contractor* shall immediately inform the Overseeing Organisation and report the occurrence immediately by contacting the Company concerned.
- 7. The above requirements do not relieve the *Contractor* of any of any of its obligations under the Contract.

APPENDIX 0/I

CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND CANCELLED CLAUSES AND TABLES INCLUDED IN THE CONTRACT

670AR TRIAL PITS

1. From time to time the *Contractor* will be instructed to excavate trial pits for purposes such as locating services, determining surfacing depths and investigating pavement or ground conditions.

Trial pits shall be excavated by saw cutting to at least 50mm depth in bound materials.

Material shall be removed in layers as directed by the Overseeing Organisation.

Location of Services

2. The Overseeing Organisation will obtain initial services information which will be supplied to the *Contractor*. The *Contractor* shall be responsible for arranging for undertakers to trace and mark the approximate location of their services, if considered necessary, before the start of excavation.

Trial pits which are specifically for locating services or where services could reasonably be expected shall be dug by hand.

Recording of Information

3. The *Contractor* shall agree the timing of the excavation with the Overseeing Organisation to enable the Overseeing Organisation to arrange attendance. Measuring and recording of information will be carried out by the Overseeing Organisation unless the *Contractor* is instructed to do so.

Reinstatement

4. Reinstatement in accordance with HCC standard details shall be carried out as soon as recording of information is complete unless instructed otherwise. The materials used and the degree of compaction shall be such as to restore the Site as near as possible to its original condition. Settlement of reinstatements in excess of 10mm at any position within 1 month of reinstating shall be made good by the *Contractor* at no additional cost to the Overseeing Organisation.

APPENDIX 0/I

CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND CANCELLED CLAUSES AND TABLES INCLUDED IN THE CONTRACT

770AR OVERBAND SEALING OF CRACKS IN BITUMINOUS PAVEMENTS

Preparation of Cracks

1. Refer to the procedures in BS 2499 : Part 2, the details of which shall be followed where applicable.
2. All cracks to be sealed shall be cleaned of any dirt, vegetation and loose material by air blasting with filtered, oil-free hot compressed air at a minimum pressure of 0.5 N/mm². The crack shall be clean and dry at the time of priming and sealing.
3. All cracks shall be primed with the relevant primer for the sealant in accordance with the manufacturer's recommendations.

Sealing of Cracks

4. Sealing shall be carried out continuously along the full length of the crack using a scraper/screed box 150mm long by 50mm wide with a 1.0mm clearance on the trailing edge. The scraper/screed box shall be dragged carefully and evenly along the line of the crack. If any depressions or blow holes appear, at the Overseeing Organisation's discretion, spot treatment may be applied, followed by a repeat of the scraper/screed box process. No contiguous bands shall be applied to seal a crack without the prior approval of the Overseeing Organisation. The sealant shall be applied within the minimum and maximum drying times of the primer recommended by the manufacturer.
5. Priming and sealing shall not be carried out when the temperature of the carriageway adjacent to the cracks to be sealed is below 10°C, except when the carriageway temperature is between 8°C and 10°C and rising.
6. Hot-applied sealants shall be heated in, and applied, from a thermostatically controlled, indirectly heated dispenser with a recirculating pump. The sealant shall not be heated to a temperature higher than the safe heating temperature nor for a period longer than the safe heating period, both as specified by the manufacturer. The dispenser shall be cleaned out at the end of each day and reheated material shall not be used.

Sealants

7. Cracks shall be sealed with hot-applied sealants Type N1 complying with BS EN 14188-1 or proprietary products holding the necessary BBA/HAPAS certification or approved by the Overseeing Organisation following successful trial application.
8. The maximum width of sealant on the road surface shall not exceed 50mm and the thickness of sealant on the carriageway shall not exceed 3mm (to the nearest 0.5mm).
9. The sealant material used shall have a fine textured surface and shall have a minimum Skidding Resistance Value (SRV) of 60 when measured with the portable skid resistance tester. The method used shall be that described in BS EN 13036-4 but utilising the narrow slider (31.75mm) specified using the C Scale, over the 126mm sliding length.

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891AR GRANULAR SUB-BASE TYPE CDD

1. Type CDD granular material shall be Crushed Demolition Debris (CDD) or other mixed materials as defined within this Clause.

The material shall be well graded and lie within the grading-limits of Table 8/5.

TABLE 8/5: Sub-Base Type CDD

BS sieve size	Cumulative % by mass passing
63 mm	100
31.5 mm	80 – 99
16 mm	53 – 92
8 mm	34 – 60
4 mm	23 – 41
2.0 mm	16 – 33
1.0 mm	11 – 27
75 micron	0 – 10
63 micron	0 – 9

In addition, the grading shall not vary from the lower limit on one sieve to the upper limit on any adjacent sieve, or vice versa. The particle size shall be determined by the washing and sieving method of BS EN 933 -1.

2. The material shall contain a minimum of 80% by mass of crushed concrete or crushed rock. The remaining 20% by mass may comprise crushed brick, road planings or other inert materials subject to no instability on laying or compaction. However, the organic content must be kept to an absolute minimum (0.1% max) and may require hand sorting of larger lumps on site.
3. Any glass incorporated shall be crushed to produce particles without sharp edges and all passing a 10mm BS sieve.
4. The material passing the 425µm BS sieve shall be non-plastic as defined by BS 1377 : Part 2 and tested in compliance therewith.
5. The material shall be laid and compacted to the requirements of Clause 802, without drying or segregation.
6. The material shall have a Los Angeles coefficient ≤ 50 (LA_{50}) when tested in compliance with BS EN1097-2.
7. The combined coarse aggregate shall, when tested in accordance with BS EN 1367-2, have a magnesium sulphate soundness value less than 35 (MS_{35}). For routine testing of such aggregates, the water absorption value of the coarse aggregate shall be determined as in BS EN 1097-6, as appropriate. If the absorption value of the coarse aggregate is greater than 2%, the magnesium sulphate soundness test in BS EN1367-2 shall be carried out on the material to be delivered to site.

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892AR GRANULAR SUB-BASE TYPE RP

1. Type RP granular material shall be Crushed, Milled or Pulverised road construction materials as defined within this Clause.

The material shall be well graded and lie within the grading-limits of Table 8/7.

TABLE 8/7 : Sub-Base Type RP

BS sieve size	Cumulative % by mass passing
63 mm	100
31.5 mm	80 – 99
16 mm	53 – 92
8 mm	34 – 60
4 mm	23 – 41
2.0 mm	16 – 33
1.0 mm	11 – 27
75 micron	0 – 10
63 micron	0 – 9

In addition, the grading shall not vary from the lower limit on one sieve to the upper limit on any adjacent sieve, or vice versa. The particle (Lump) size shall be determined by the washing and sieving method of BS EN 933-1.

Well graded material marginally outside this grading envelope may be acceptable, providing the *Contractor* can demonstrate that the material can be laid and compacted effectively to form a sound base.

2. The material shall comprise one or a mixture of milled/crushed concrete, asphalt planings, crushed rock, gravel or other inert granular road construction/subgrade materials subject to no instability on laying or compaction.
3. The material may contain traces of historic tar surface dressings, providing the mixture overall does not contain more than 0.1% * by mass of Poly Aromatic Hydrocarbons (PAHs). Any obvious agglomerations of tar rich materials shall be removed.

*Specifically the sum of the percentage content of Benzo (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (k) fluoranthene, Dibenzo (a,h) anthracene, shall not exceed 0.1% by mass of the total mixture.

4. The material passing the 425 um BS sieve shall be non-plastic as defined by BS 1377 : Part 2 and tested in compliance therewith.
5. The material shall be laid and compacted to the requirements of Clause 802, without drying or segregation.

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6. The material shall have a Los Angeles coefficient of 50 or less when tested in compliance with BS EN 1097-2 . The acceptability of bitumen bound materials shall be judged on the properties of the included aggregates.
7. The combined coarse aggregate shall, when tested in accordance with BS EN 1367-2, have a Magnesium sulphate soundness value less than MS₃₅. For routine testing of such aggregates, the water absorption value of the coarse aggregate shall be determined as in BS EN 1367-2. If the absorption value of the coarse aggregate is greater than 2%, the soundness test shall be carried out on the material delivered to site.
8. The material shall not exceed more than a Total Compacted Course Thickness of 200mm.

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893 AR GRANULAR SUB-BASE TYPE IBAA

1. Granular Sub-Base Type IBAA shall be the fully matured (pH less than 10) and processed aggregate recovered (under an approved quality management system) from the Bottom Ash left after the controlled incineration of Municipal Waste. The inclusion of Flue Ash is not permitted.

The material shall be well graded and lie within the grading-limits of Table 8/8.

TABLE 8/8 : SUB BASE TYPE IBAA

BS sieve size	Cumulative % by mass passing
63 mm	100
31.5 mm	75 -99
16 mm	52 -81
8 mm	25-55
4 mm	13-43
2.0 mm	10 -36
1.0 mm	8-28
63 micron	0 –9

In addition, the grading shall not vary from the lower limit on one sieve to the upper limit on any adjacent sieve, or vice versa. The particle size shall be determined by the washing and sieving method of BS EN 933-1.

2. The material shall contain a minimum of 80% by mass of fully recovered Incinerator Bottom Ash Aggregate (IBAA) as defined in 1 above. The material may be enhanced, if necessary, by the addition of up to 20% by mass of any crushed and/or screened recycled or secondary aggregate produced in accordance with the WRAP quality protocol to deliver the necessary properties as set out in this Clause.
3. The material shall have a Los Angeles coefficient $\leq$ or = 50 (LA_{50}) when tested in compliance with BS EN1097-2.
4. The fraction of the material passing the 425 μ m BS sieve shall be non-plastic as defined by BS 1377: Part 2 and tested in compliance therewith.
5. The material shall be non frost susceptible as demonstrated by compliance with Clause 801.8 when tested in accordance with BS812 -124.
6. The organic content of the mixed material shall be no more than 0.1%.
7. The material shall be supplied at a moisture content within minus 2% to plus 1% of the declared optimum and laid / compacted to the requirements of Clause 802, without drying or segregation.
8. Once laid and compacted, the material shall exhibit an in situ CBR greater than 30% or a dynamic stiffness greater than 100MPa as determined using the German Dynamic Plate tester – ie equivalent to a Class 2 foundation (IAN 73/06).

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9. The material may be used within 500mm of buried concrete or steel in contravention of the requirements for sulphates/sulphides in Clause 801.2 providing the pH of the material as a whole is greater than 8.
10. The material shall not be used in areas of high water table, over major aquifers or in the vicinity of other environmentally sensitive areas without consideration of the potential for leachability and shall only be used subject to the satisfactory outcome of a site specific environmental assessment to be carried out by the supplier in accordance with protocols agreed with the Environment Agency.

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**973 AR GRITTING OF NEWLY LAID STONE MASTIC ASPHALT AND THIN
SURFACE COURSES**

1. Where instructed, clean, dry, uncoated crushed quartzite aggregate to the grading shown in Table 973/1 shall be applied evenly to the hot surface of new Stone Mastic Asphalt and Thin Surface Courses. Locations for gritting shall be shown on the scheme drawing. Typical locations where gritting may be required are shown below with the exception that sites in category (i) shall always be gritted.
 - (i) areas to be overlaid by a High Friction Surfacing;
 - (ii) bends with a radius less than 250m (where speed limit is 40 mph or greater);
 - (iii) gradients of greater than 5% where more than 50m long (single carriageways both directions and dual carriageways downhill only);
 - (iv) roundabouts (not mini-roundabouts);
 - (v) within 75m on the approaches to any roundabout, junction, pedestrian crossing, traffic signals, railway level crossings, or similar features during the initial rolling of the surfacing.
2. The grit shall be applied evenly to the hot surfacing prior to rolling. The rate of application shall be to provide 60-80% surface coverage (approximately 500g/m².)
3. After the final rolling of the surfacing any surplus aggregate will be removed and sufficient 'loose chipping' signs erected before the road is opened to traffic.
4. The *Contractor* shall remove surplus aggregate from the carriageway by approved suction sweeper in accordance with the following:
 - (i) An operation shall be carried out to remove surplus material within 24 hours of completion of the gritting. Further operations to remove any subsequently loosened material shall be carried out over the next 14 days after completion of the gritting.
 - (ii) The *Contractor* shall maintain adjacent side roads, footways and paved areas free of loose and surplus aggregate for a period of 14 days after completion of the surfacing work, hand sweeping where necessary.

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Table 973/1: Grading of Surface Applied Grit

BS Test Sieve	% Passing
6.3mm	100
5.0mm	95-100
3.35mm	66-90
1.18mm	0-20
600 microns	0-8
75 microns	0-1.5

Note: Possible sources of supply are from the Hillhead and Blackhill quarries.

5. Determination of surface texture shall not apply to sections where grit has been applied

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1170AR NATURAL STONE PAVING

1. The stone shall be supplied to the thickness stated in the Works Information in rectangular shapes in widths between 200mm to 600mm. The length to width ratio of each flag shall be between 1:1 and 2:1.
2. Paving shall be supplied sawn and sanded with the top 4 edges dressed.
3. Paving shall be laid in randomly selected courses, each course being of a continuous width. Paving shall be laid in random lengths such that the joints are staggered longitudinally.
4. Natural stone slabs shall be laid in accordance with BS 7533 : Part 4, to the required cross falls with a bond as described in Appendix 11/1 and with joints at right angles to the kerb. Flags and natural stone slabs shall be bedded on a layer of mortar not less than 10mm and not more than 40mm thick to Clause 2404 Designation (iii). Where permitted in Appendix 11/1, flags and natural stone slabs 450mm x 450mm and smaller may be bedded on a layer of clean sharp sand complying with sub-clauses 5.4.6.2 & 5.4.6.3 of BS EN 7533-4, 25mm $\pm$ 10mm thick.
5. On circular work where the radius is 12m or less all flags and natural stone slabs shall be radially cut on both edges to the required line.
6. Joints between the paving shall be 10mm and filled to full depth with Class 1 mortar and finished with a 'bucket handle' tool.
7. The layout of paving and details of edges and other openings shall be agreed with the Overseeing Organisation prior to laying.
8. Natural Stone Paving shall have a minimum Polished Paver Test Value (PPTV) of 45 or 55 minimum (when tested in accordance with BS 7932) as specified by the Overseeing Organisation.
9. Natural stone paving shall not be supplied with a polished finish. Paving units shall have a surface roughness (Rz) of greater than 30 microns when tested in accordance with the test method in sub-clause 10.
10. The method of measuring the roughness of a surface using the Surtronic 10 or Surtronic Duo Rz roughness meter follows:

Foreword

- i) Testing shall be undertaken using the Surtronic 10 or Duo Rz roughness meter manufactured by Taylor Hobson has been adopted by the UK Slip Resistance Group in conjunction with the Health and Safety Laboratory of the Health and Safety Executive of the UK or equivalent.

Scope

- ii) The method describes a procedure for measuring the peak to trough roughness (Rz) of a surface and, if required, the shoe sole/heel material.
- iii) It is not applicable to sports surfaces or those used by vehicular traffic.

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Principle

- iv) A stylus with a 5 µm radius tip traverses a 4mm length of the test surfaces, divided into 5 cut-off lengths of 0.8mm. The maximum peak to trough of each cut-off length is stored, summed, averaged and the result displayed digitally.

Apparatus

- v) The Taylor Hobson Surtronic 10 or Duo Rz roughness meter complete with calibration plate or equivalent.

Test Surfaces

- vi) Test surfaces for each reading shall be at least 65mm x 20mm and substantially flat. Test surfaces used for the pendulum tests are usually satisfactory.

Test Conditions

- vii) Perform tests on site at the prevailing ambient temperature, provided that temperature is between 5°C and 40°C (as per the manufacturer's instructions).
- viii) Unless otherwise specified, test surface on site in the condition as found, then test again after the test area has been wiped with a clean industrial towel.

Setting the Roughness Meter

Surtronic 10

- ix) Draw back the stylus guard to reveal the stylus. Calibrate the roughness meter prior to use at each site in accordance with the manufacturer's instructions.
- x) Put the instrument box on a firm surface.
- xi) Place the instrument upright in the carrying box so that the stylus will traverse the calibration plate. Without moving the instrument relative to the calibration plate, press the button on the top to take a measurement.
- xii) Compare the reading given, to that specified for the calibration plate. A reading within $\pm 5\%$ is satisfactory. If the reading is not satisfactory, repeat the procedure. If the second reading is also not satisfactory, consult the operating instructions, which accompany the instrument.

Setting the Roughness Meter - Duo

- xiii) Switch on the Duo and assemble to expose the stylus. Check the calibration of the roughness meter prior to use at each site in accordance with the manufacturer's instructions.
- xiv) Put the reference specimen on a firm surface.

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- xv) Place the instrument upright on the reference surface so that the stylus will traverse the calibration plate. Without moving the instrument relative to the calibration plate, press the start button twice on the top to take a measurement.
- xvi) Compare the reading given, to that specified for the calibration plate. A reading within $\pm 5\%$ is satisfactory. If the reading is not satisfactory, repeat the procedure. If the second reading is also not satisfactory, consult the operating instructions, which accompany the instrument.

Test Procedure

- xvii) It is advisable to wipe the test area with a clean industrial towel before testing. Position the instrument upright on the test surface and press the button on the top once or twice according to the manufacturer's instructions. Ensure that the meter is free from movement or vibration. Record the reading.
- xviii) Repeat procedure (xvii), nine more times in a variety of orientations and points on the surface, and take the average of the ten readings as the test result.
- xix) Repeat the instrument calibration procedure as per manufacturer's instructions. If the calibration is not satisfactory repeat procedure as per manufacturer's instructions again. If the calibration is still not satisfactory, consult the operating instructions or the manufacturer.
- xx) Repeat the test procedure at each test location at which pendulum tests are being carried out.

Calculation

- xxi) Take the mean of the ten readings at each test location as the test results for that location.

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I274AR INSTALLATION OF PASSIVELY SAFE SIGNPOSTS

1. Passively safe signposts shall comply with the following requirements:
 - (i) Comply with the requirements of BE EN 12767.
 - (ii) Shall be installed in accordance with the manufacturer's recommendations.
 - (iii) Shall include all necessary post foundations.
 - (iv) Only manufacturers of passively safe posts and columns whose products are approved by Highways Agency for UK roads shall be used.
 - (v) Be suitable for the size and height of the sign for which they are intended, equivalent to the posts in accordance with Clause 1204.

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I 426AR MAINTENANCE OF STREET LIGHTING

1. Existing and new road lighting units and lit signs within the Site shall be maintained by the *Contractor* until the entire new installation has been completed to the satisfaction of the Overseeing Organisation.

2. **Defect Repair Response Times**

Upon notification of a defect by any party, the *Contractor* shall report the nature of the defect to the Overseeing Organisation in writing, and arrange for the defect to be rectified within the following response times:

Generally	- Maximum of 5 working days
Regulatory signs	- 2 working days
Door off columns	- Emergency attendance within 2 hours
Bollards knocked down	- Emergency attendance within 2 hours to make safe, sign and cone

3. In the event of the *Contractor's* failure to meet these response times the Overseeing Organisation may arrange for the Highway Authority's Street Lighting Maintenance Contractor to rectify the defects and recover the full cost from money due under the Contract..

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**5016AR SURFACE PREPARATION AND PROTECTIVE SYSTEMS - PARTICULAR
REQUIREMENTS**

1. ***Environment:*** Inland 'B', unless otherwise specified on Task Order.
2. ***Accessibility:*** Difficult
3. ***Required Durability***
No maintenance up to 8 years
Major maintenance after 15 years
4. ***Description of Existing Protective System***
Described in Task Order
5. ***Sequence of Operations***
 - (i) Surface preparation shall be followed progressively by painting, the work being arranged in such a manner that the painting in progress and newly applied paint is not adversely affected.
 - (ii) The sequence of operations shall be indicated on the Programme of Works and shall be submitted for approval by the Overseeing Organisation prior to commencement on site.
6. ***Surface Preparation***

Areas: The particular Areas for each job will be specified on the Task Order. The Areas will be selected from the following lists:

Area A: Sides of Box Beams, Webs of prefabricated beams, any other plain areas on vertical surfaces.

Area B: Top and underside of flanges of prefabricated beams, including 75mm return on edges of beam flanges.

Area C: Edges of composite steel/concrete joints.

Area D: Steel Bridge Parapets - 3 rail, 1m high.

Area E: Steel Troughing.

Area F: Concrete Post and Rail Parapets/Tubular rail

Area G: Steel/Galvanised vertical infill railings.

Methods of Surface Preparation

Method A: Abrading aided by scraping and wire brushing in accordance with Clause 5003SR.2i and 2ii.

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Standard: In accordance with Clause 5004SR.1iia, 1iic, 1iia, 1iib, 1iic, 1iv, 1vb, 1vc and 1vf.

Method B: Combined wet/dry blast cleaning to clean steel in accordance with Clause 5003SR.3id, 3ii and 3iii.

Standard: In accordance with Clause 5004SR.1iif, 1iic, 1iv, 1vc and 1vf.

7. *Paint Systems and Application Instructions*

The paint system to be applied will be specified on the Task Order, and shall be selected from the following:-

Type 1 Epoxy System for maintenance of an AR system over a steel substrate.

Environment: Inland 'B'. Accessibility: Difficult Access

Condition Of Surfaces Of Existing System After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Abraded to bright steel	Sound finish or last undercoat	Other sound paint coats
	mdft	mdft	mdft
1 st coat: Item 116 High Build Epoxy (surface Tolerant) maintenance Primer/undercoat	75 – 100	75 – 100	75 – 100
2 nd coat: Item 168 Polyurethane finish (2 pack) Medium grey	50	50	50
3 rd coat: Item 168 Polyurethane finish (2 pack) 18B25 to BS 4800	50	50	50
MIN TOTAL DFT TO BE OBTAINED	175µm	175µm	175µm

The *Contractor* must confirm with chosen paint supplier that Item 116 is compatible for application over aged thermoplastic coatings

STRIPE COATS: Item 116: 75µm mdft. Brush or airless spray.

One stripe coat in areas prepared to clean or bright steel.

Stripe coat to be applied over first coat

Item 116. 75µm mdft. Brush.

One stripe coat in areas prepared to sound paint before second coat.

PATCH COATS: Item 116. 75µm to 100µm mdft. Brush, or airless spray over second coat

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The total dft of existing coats plus new coats including patch coats, shall not be less than 175µm

Type 2 Epoxy system for maintenance of an AR system on galvanised parapets.

Environment: Inland 'B', exposed to road salts. Accessibility: Ready Access

Condition Of Surfaces Of Existing System After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Abraded to bright steel	Abraded to bright metal coating	Sound finish or last undercoat
	mdft	mdft	mdft
1 st coat: Item 155 "T" Wash	5	NIL	NIL
2 nd coat: Item 112 MIO High Build, quick Drying Epoxy (2 pack) Undercoat/Finish	75 – 100	75 – 100	75 – 100
3 rd coat: Item 168 Polyurethane Finish (2 pack) medium grey	50	50	50
4 th coat: Item 168 Polyurethane Finish (2 pack) 18B25 to BS 4800	50	50	50
MIN TOTAL DFT TO BE OBTAINED	180µm	180µm	180µm

STRIPE COATS: Item 112. 75µm mdft. Brush.

One stripe coat in areas prepared to bright steel or bright metal coating.

Stripe coat to be applied over first coat.

Item 112. 75µm mdft. Brush.

One stripe coat in areas prepared to sound paint before second coat.

PATCH COATS: Item 112. 75 - 100µm mdft. Brush.

The total dft of existing coats plus new coats including patch coats shall not be less than 177µm.

Type 3 High Build Epoxy (2 pack)/Polyurethane (2 pack) finish system applied over a blast cleaned substrate where all existing paint coatings have been removed down to clean steel or sound aluminium metal spray coating.

High Build Epoxy (2 pack) and Polyurethane (2 pack) paints are not suitable for application to surfaces where moisture is present or is likely during the curing period.

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Environment: Inland 'B'. Accessibility: Difficult Access

Condition Of Surfaces Of Existing System After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Blast cleaned to clean steel	Blast cleaned to sound Aluminium metal spray coating
	mdft	mdft
1st Coat: Item 111 Zinc Phosphate HB Epoxy Blast Primer	100	100
2nd Coat: Item 112 MIO High Build, quick Drying Epoxy (2 pack) Undercoat medium grey	125	125
3rd Coat: Item 168 Polyurethane (2 pack) Finish, 18B25 to BS 4800	50	50
MIN TOTAL DFT TO BE OBTAINED	275µm	275µm

STRIPE COATS: Item 112. 80µm mdft. Brush or airless spray.

One stripe coat in area prepared to clean steel or sound metal coating. Stripe coat to be applied over first coat.

PATCH COATS: NIL

Note: When a light tint gloss finish is required an extra coat of Item 168 should 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.

Type 4 Grease Paint for use on bearing components and on contact face of sign support posts.

Environment: Inland 'B'. Accessibility: Difficult Access

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Condition Of Surfaces Of Existing System After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Abraded to bright steel	Sound finish or last undercoat
	mdft	mdft
1st Coat: Item 200 Primer	20(B)	NIL
2nd Coat: Item 201 Undercoat	150(B)	150(B)
3rd Coat: Item 201 Finish, Black	150(B)	150(B)
MIN TOTAL DFT TO BE OBTAINED	320µm	320µm

Type 5 Pitch Epoxy to be used on sheet piling and on bridge troughing.

Environment: Inland 'B'. Accessibility: Difficult.

Condition Of Surfaces Of Existing System After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Abraded to bare steel	Sound finish or last undercoat
	mdft	mdft
1st Coat: Item 150 Pitch Epoxy Brown	150(B)	NIL
2nd Coat: Item 150 Pitch Epoxy Black	150(B)	150(B)
MIN TOTAL DFT TO BE OBTAINED	300µm	150µm

Type 6 Urethane Alkyd ion exchange gloss to be used on concrete and steel bridge parapet railings.

Environment: Inland 'B'. Accessibility: Medium

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Condition Of Surface After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Abraded to bare steel or bare concrete	Sound finish or last undercoat
	mdft	mdft
1st Coat: Urethane Alkyd	60µm	60µm
2nd Coat: Urethane Alkyd	40µm	NIL
3 rd coat: Urethane Alkyd	40µm	NIL
MIN TOTAL DFT TO BE OBTAINED	140µm	60µm

Type 7 Synthetic Resin with fast drying solvents and organic/inorganic pigments. To be used on bridge railings and steel troughing decks.

Environment: Inland 'B'. Accessibility: Medium.

Condition Of Surface After Surface Preparation

COAT, ITEM No, REGISTERED DESCRIPTION, COLOUR	Abraded to bare steel	Sound finish or last undercoat
	mdft	mdft
1st Coat: Synthetic Resin Colour - As required	75µm	75µm
2nd Coat: Synthetic Resin Colour - As required	75µm	75µm
MIN TOTAL DFT TO BE OBTAINED	150µm	150µm

Note: Over coating times as per manufacturers instructions

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924SR	SPECIFICATION FOR SPECIAL (HIGH FRICTION AND GATEWAY) SURFACINGS
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General

1. High friction surfacing systems shall have current British Board of Agrément HAPAS Roads and Bridges Certificates. Such systems shall only be installed by a *Contractor* approved by the BBA and certificate holder as an Approved Installer of that system.
2. The BBA/HAPAS Type Classification required for each location shall be as specified by the Overseeing Organisation (Table NG9/24: Volume 2: Notes for Guidance on the Specification for Highway Works).
3. The installation and quality procedures shall be in accordance with the HAPAS certificate for each system and the current method statement agreed by the BBA. These documents and the results of all quality control checks carried out on site by the *Contractor* and quality assurance information completed in accordance with the requirements of HAPAS, including results from BBA surveillance visits, shall be supplied to the Overseeing Organisation.
4. For each location where 'Special Surfacing' systems are applied, the total quantities of each system component used, the measured area of the surface treated and the calculated coverage rate in kg/m² shall be notified in writing to the Overseeing Organisation within 5 days of completion at that location. For systems in which aggregate is broadcast over a film of binder applied to the surface, the calculated coverage rate shall be that of the binder film and shall not include the mass of aggregate.

Site Suitability

5. The *Contractor* will be deemed to have visited the site(s) in order to be satisfied with the conditions and to assess the existing surface for suitability and design purposes. The *Contractor's* attention is drawn to this particularly in connection with newly laid surface courses and fatted surface dressings.

The *Contractor* shall ensure that it is satisfied that the surface is suitable for the application.

Surface Treatment

6. Special Surfacing, made with resin-based binders (i.e. Polyurethane, epoxy, methyl Methacrylate or thermoplastic) and aggregate of high polishing resistance, shall be applied by spray, brush, squeegee or screed box onto a sound substrate to provide a textured, durable matrix of adequate skid resistance.

Binder

7. The binder shall contain a Polyurethane, thermoplastic, epoxy or other approved resin component, as approved under HAPAS certification.

Aggregate

8. All Special Surfacing shall incorporate an aggregate of suitable Polished Stone Value (PSV). For 'High Friction Surfacing' the aggregate shall be 100% calcined bauxite with a PSV exceeding 70. For 'Gateway' type surfacings, where braking stresses are lower, an aggregate with a PSV of at least 60 shall be used for 100% of the aggregate. Unless otherwise agreed with the Overseeing Organisation the colour of the aggregate in 'Gateway' type surfacings shall match that of the resin colour specified.

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All PSV tests shall have been carried out in accordance with BS EN 1097-8 by a UKAS accredited laboratory, or equivalent, for that test within the previous 24 months for calcined bauxite and 12 months for other aggregates. The *Contractor's* attention is also drawn to sub-clause 19.6 of this specification.

9. The grading of any aggregate used shall be such that a surface texture of over 1.0mm (when determined in accordance with the procedures noted in sub-clause 19.5) shall be maintained for at least three years from the time of application. The aggregate shall be clean, hard, durable and free from any foreign matter.

Mixing of Material

10. All materials shall be thoroughly mixed in the proportions specified by the manufacturer. At no stage shall the temperature of the materials exceed that recommended by the material manufacturer. A temperature gauge, calibrated every six months to an accuracy of $\pm 2^{\circ}\text{C}$, shall be used to ensure overheating does not take place. A record of the mixing/spray temperature of each batch shall be kept by the *Contractor* and be readily available for inspection on site by the Overseeing Organisation.

The *Contractor* shall provide UKAS accredited test results of the cured epoxy or other resin component binder.

The *Contractor* shall provide samples of binder from a mixed batch or from the spraybar of spray equipment, at a rate of not less than two samples for each shift worked or each 1,000 square metres completed, whichever is lesser. Each sample shall be poured to a depth of $3.2 \pm 0.4\text{mm}$ into a shallow tray of at least 150mm x 150mm which shall be supplied by the *Contractor*. The binder shall be cured, with no further mixing, at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and after 7 days tested as described in BS 2782:Part 3 Method 320A:1976 (1986) except that the rate of grip separation shall be 5mm per minute with a tolerance of 20%. Although the test piece shall be cut to the dimensions shown in Figure 1. Method 320A, the requirement that the narrow parallel portion shall nowhere deviate by more than 2% from the mean shall be deleted. The conditioning period shall be at least 2 hours at $23^{\circ}\text{C} \pm 1^{\circ}\text{C}$ immediately before testing takes place. The tensile strength and elongation at break of the specimens shall not be less than 10.5N/mm² and 30% respectively. The results of this testing shall be supplied to the Overseeing Organisation within two weeks of completion.

Colour

11. Where coloured special surfacings are specified, the *Contractor* shall provide the Overseeing Organisation, for approval, samples of each colour in an unworn condition and in a worn state when the aggregate colour is clearly visible. Samples shall be of at least 80mm diameter size and shall be comprised of the same constituent materials, mixed in the same proportions, as will be used on any site works.
12. 'High Friction' and 'Gateway' surfacings, when applied, shall be of a uniform colour, which matches the samples approved by the Overseeing Organisation.

Surface Preparation

13. The surface shall be prepared to remove dust, laitance and other loose matter, or suspect material. Any oil, diesel or petrol on the surface shall be completely removed by a method agreed by the Overseeing Organisation. The surface shall be dry before application of the binder. Any excessive build up of rubber on the surface shall be removed by an abrasive pre-treatment method approved by the Overseeing Organisation.

Weather

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14. It is the *Contractor's* responsibility to decide when weather conditions and other circumstances are suitable for carrying out the work. (See also sub-clause 5)

Protection of Street Furniture

15. Surface treatment shall be applied to the full width of the carriageway or in lanes as agreed by the Overseeing Organisation. It shall be applied up to the carriageway edge without overlapping on to the kerbs, channels, footways or any structure adjoining the highway. The *Contractor* shall provide, fix, remove on completion, and dispose of, self-adhesive masking material (or other approved) to protect all road studs and cover all carriageway ironwork and similar fixtures prior to dressing to give complete protection from the binder. Unless instructed to the contrary by the Overseeing Organisation, all existing road markings shall also be masked prior to application. All covering material shall be removed to the *Contractor's* tip off site.

Transverse End Joints

16. If the special surfacing includes the machine sprayed application of binder then transverse end joints shall be made with a protective mat or paper strip not less than 1 metre wide at each end of the site. Application shall then commence and finish on the protective mats or strips.

Quality of Materials

17. All materials used within the selected process(es) shall comply with the appropriate British Standards and Highways Agency Specification clauses, where such exist, and recent (less than six months old) evidence provided in terms of test results, etc to prove such compliance.

Surface Finish

18. The finished surface of the treated area shall be of uniform appearance, free from irregularities and ridges. The substrate shall be fully covered with a continuous and impervious film through which no visible holes shall be permitted.

Any remedial work required to restore road markings, clean ironwork, kerbs, channels and adjacent areas resulting from poor protection during the surfacing treatment will be agreed with the Overseeing Organisation and undertaken by the *Contractor* at no additional cost to the *Employer*.

Performance Specification

19. The surface treatment work carried out at each site shall only be deemed acceptable if the minimum standards of performance are achieved and maintained throughout the defects correction period, which shall be **3 years** for this Clause. For the purposes of this Clause the wheel-track zone shall be taken to be between 0.5m and 1.1m and between 2.55m and 3.15m from the centre of the nearside lane markings for each traffic lane. By applying a High Friction Surfacing the *Contractor* shall be deemed to be accepting that the condition of the existing surface is suitable for the purposes of achieving the performance criteria over the Defects Correction Period. Any areas of existing surfacing causing concern to the *Contractor* shall be notified in writing to the Overseeing Organisation, together with the reasons, and action agreed if necessary. Performance criteria in this respect shall be monitored by the Overseeing Organisation and shall be evaluated in terms of the following properties:

19.1 Aggregate Stripping

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Aggregate stripping shall be deemed to have taken place where more than 25% of the surface aggregate particles have been lost from the original mosaic pattern over the following areas:

- i) Any single area of 0.5m² or more;
- ii) Any cumulative area $\geq 15\%$ within the wheel tracks.

19.2 Loss of Adhesion to Substrate

Areas of total loss due to the matrix/binder film having lost adhesion to the original road surface are easily identified. Remedial works to any such areas shall be carried out as soon as possible when any area of 0.2m², or more, within the works, or where a cumulative area of $\geq 15\%$ within the wheel tracks, has been identified by the Overseeing Organisation.

Additionally, any regular pattern of loss (e.g. coinciding with joints between adjacent screed runs) shall be made good in a manner approved by the Overseeing Organisation. Any remedial treatment shall be applied in such a way so as to ensure the surface has consistent properties and appearance.

19.3 Total Abrasion Loss

Gradual abrasion of the matrix and/or aggregate is permissible within the service life of the applied materials, provided that a continuous mosaic of aggregate is exposed throughout the surface at all times. When such abrasion completely reveals the underlying binder film or original road surface, this shall be defined as "Total Abrasion Loss". Remedial works to any area of Total Abrasion Loss shall commence when any such area of 0.2m², or more, within the *works*, or where a cumulative area of $\geq 15\%$ within the wheel tracks, has been identified by the Overseeing Organisation.

19.4 Surface Cracking

Isolated cracking of the 'Special Surfacing' that extends into the surface course and produces cracks in excess of 0.5mm width shall be sealed by the *Contractor* using a suitable epoxy or similar resin and the 'Special Surfacing' made good.

Multiple cracking of whatever width and depth shall be made good by removing all cracked material as a continuous area and replacing with special surfacing (and new surface course if cracked) unless otherwise agreed by the Overseeing Organisation.

19.5 Aggregate Embedment

Where the continuous mosaic of aggregate on the surface becomes reduced to a discontinuous mosaic due to partial or complete embedment into the matrix or binder film, or substrate, then a reduction in macrotexture will become evident. The criterion for embedment shall therefore be defined in terms of macrotexture, measured by the Sand Patch Test in accordance with BS598: Pt.105. The number of individual measurements shall be decided by the Overseeing Organisation as appropriate to the size of area under consideration, but this shall not be less than one measurement per square metre, and shall not be less than five measurements for any single dispute.

Remedial work shall be carried out when any area of 1.0m² or more is found by the Overseeing Organisation to have a macrotexture mean value of below 1.0mm.

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19.6 Skid Resistance

The skid resistance of the surfacing may be measured by the Overseeing Organisation at any time during the defects correction period. Testing will be carried out using either a 12-monthly calibrated 'Pendulum' skid tester in accordance with BS EN 13036-4 or a Griptester in accordance with BS 7941-2. On roads with a speed limit of 40mph or greater, tested with the 'Pendulum' tester ONLY, corrections for surface texture will be applied to the 'as-measured' results as noted in Table 4 of TRRL report LR 510.

In **all** cases a 'Seasonal Correction Factor' as outlined in Table 2 of RRL Road Note 27 will be applied to the 'texture corrected' or 'as-measured' result, as appropriate. The resulting value of skidding resistance shall be known as the 'Best Estimate Summer Skidding Resistance'.

19.6.1. **'High Friction'** surfacings shall be deemed unacceptable unless, throughout the defects correction period, the average 'Best Estimate Summer Skidding Resistance Value' as measured by the Pendulum tester at 10m intervals exceeds 70 (or 0.76 Griptester reading) for any 50m section and that no individual reading is below 63 (or 0.68 Griptester reading). Testing shall be carried out in the nearside wheeltrack of any lane treated.

19.6.2. **'Gateway'** surfacings shall be deemed unacceptable unless, throughout the defects correction period, the average 'Best Estimate Summer Skidding Resistance Value' as measured by the Pendulum tester at 10m intervals exceeds 65 (or 0.65 Griptester reading) for any 50m section. Testing shall be carried out in the nearside wheeltrack of any lane treated.

19.7 Defects

Defects arising from damage caused by settlement, subsidence or structural failure of the carriageway on which the surface has been applied are excluded from the guarantee.

Remedial Works

20. The *Contractor* shall carry out any subsequent works, required to attain and/or maintain the performance requirements, at no additional cost to the Overseeing Organisation.
21. The materials and methods selected for any such remedial work will depend on the actual areas involved and the time of year. Details shall be agreed with the Overseeing Organisation. In the event of any first time remedial work not being successful the Overseeing Organisation may, at their discretion, agree to the *Contractor* undertaking further remedial works - otherwise the procedures in sub-clause 22 shall apply.
22. The Overseeing Organisation reserves the right to take appropriate action to remove or alleviate any potential danger arising at any time as a result of failure or partial failure of the surfacing and to recover the cost of this from the *Contractor*. Should the *Contractor* have any special requirements for dealing with such situations then these must be defined at time of tender. The Overseeing Organisation will notify the *Contractor* of any such action to be taken as soon as possible.

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Reimbursement

23. When remedial action is inappropriate or unsuccessful then the *Contractor* shall reimburse the employer the full cost of Providing the Works on the carriageway lengths (full width), which have failed to meet the performance requirements.

Opening to Traffic

24. The process used must have a sufficiently short curing time to enable the treated surface (including any remedial treatment) to be opened to traffic within the maximum curing time specified by the Overseeing Organisation. The site shall not be opened unless all excess chippings have been removed and sufficient loose chipping signs have been erected.

Storage of Materials

25. The *Contractor* shall notify the Overseeing Organisation of its sites for storage of materials and plant. Access for sampling or inspection purposes shall be provided to the Overseeing Organisation at least three days prior to their use in the *works*.

Loading of Chippings

26. The *Contractor* shall ensure that chippings are not spilled on carriageways or footways during any operation of loading or unloading of any temporary stockpiles, within the County.

Surplus Aggregate

27. The *Contractor* shall remove surplus aggregate from the carriageway by approved suction sweeper in accordance with the following:
- 27.1 An operation shall be carried out to remove by suction only all surplus material within 24 hours of completion of the surfacing. Further operations to remove any subsequently loosened material shall be carried out over the next fourteen days after completion of the surfacing.
- 27.2 The *Contractor* shall maintain adjacent side roads, footways and paved areas free of loose and surplus aggregate for a period of fourteen days after completion of the surfacing work, hand-sweeping where necessary.
28. All surplus materials shall be removed and disposed of by the *Contractor* at no extra cost to the Overseeing Organisation. The *Contractor's* attention is drawn to the Waste Management Regulations 1994 and the Environmental Protection Act 1990 - The Duty of Care.

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948SR COLD RECYCLED BITUMINOUS BASE/BINDER COURSE

Aggregates

1. Coarse and fine aggregates shall as far as is possible arise from planed, milled or crushed road construction materials (excluding any obviously binder rich materials which could affect the stability of the final product). The aggregates shall be crushed, screened and recombined as appropriate to ensure a well graded aggregate mix is provided for subsequent stabilisation with foamed bitumen.
2. Recycled road construction materials may be supplemented by other secondary aggregates or a minimal proportion of virgin aggregates of appropriate nominal size to achieve the appropriate overall particle size distribution.
3. PFA shall be added to the mixture in appropriate quantities to achieve the required overall particle size distribution and to promote effective mixing.

Mixing Plant

4. Cold recycled bituminous base/binder course shall be produced in an approved foamed bitumen mixing plant. The plant shall be capable of mixing controlled amounts of water and binder agents (liquid and powder) into granular material. The plant shall be equipped with suitable calibrated monitoring devices to ensure accurate proportioning of all constituents.

Binder

5. Bitumen shall comply with the requirements of BS EN 12591. The bitumen shall be foamed during mixing by the controlled injection of cold water and (if necessary) proprietary additive(s) into hot penetration grade bitumen through a specially designed spray bar and nozzles, to produce a foam that shall expand to a nominal volume at least 10 times greater than the volume of the hot penetration grade bitumen. The base grade of binder shall be between 70 and 125 penetration depending on the stiffness requirements of the mix.

Powders

6. For stock grade material to be used on footways and Unclassified roads a minimum 2% by mass of Hydrated Lime shall be included during mixing as a catalyst to pozzolanic reaction within the PFA..
7. Where the material is to be used on Classified Roads or Industrial Sites, the Hydrated Lime shall be replaced with a minimum of 2% by mass of Portland Cement, to promote a more rapid cure and to increase the overall level of stiffness achieved in service.

Target Aggregate Grading.

8. The mixed aggregate/s, including any fillers/powders, shall be well graded and lie within the grading envelope shown in the table below:

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9. The grading shall not vary from the lower limit on one sieve to the upper limit on any adjacent sieve, or vice versa. The washing and sieving method of BS EN 933-1 shall be used to determine aggregate grading.

BS Test Sieve (mm)	Grading Envelope	
	20mm material	14mm material
31.5	100	
20.0	95 - 100	100
14.0	85 - 100	90 - 100
10.0	68 - 100	70 - 98
4.0	38 - 74	38 - 74
2.0	26 - 58	30 - 58
500 micron	13 - 38	20 - 43
250 micron	9 - 28	15 - 35
63 micron	5 - 21	5 - 21

Mix Stiffness

10. For footways, cycleways and unclassified roads, the mixture shall have a nominal (mean) stiffness (ITSM dry) of 2400 Mpa. (no individual value less than 2000 Mpa).
11. For Classified Roads and Industrial Sites a heavy duty mixture will be required which shall have a nominal (mean) stiffness (ITSM dry) of 4000 Mpa. (no individual value less than 3200 Mpa).
12. In all cases the ITSM stiffness after soaking shall not be less than 80% of the appropriate dry value.
13. Stiffness measurements (ITSM) shall be determined in accordance with BS DD 213:1996 after curing to the regime as set down in TRL report 386 Part 2 clause 44.
14. The *Contractor* shall supply the results of routine laboratory testing from production control testing to demonstrate compliance with stiffness requirements on a regular basis.

Binder Content

15. The target added binder content shall be determined through mix design procedures to deliver the appropriate mix stiffness and durability characteristics.
16. The added binder content of the mixed material shall lie within the range plus 0.5% to minus 0.5% of the target binder content, subject to an absolute minimum added binder content of 3.0%. For quality control and compliance testing purposes the binder content shall be determined in accordance with BS598 : Part 102 or BS EN 12697-39 whereby the added binder content shall be defined as the difference between the total binder content of the mixed material and the binder content of the blended aggregate prior to stabilisation taking due consideration of likely variations in the feedstock.

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Moisture Content

17. The moisture content of the mixture shall be adjusted during mixing to lie within the range plus 2% to minus 2% of 0.75 times the optimum moisture content, as determined in accordance with BS 1924 : Part 2 : 1990.
18. The moisture content of the mixture shall be monitored routinely in accordance with BS 1377 : Part 2.

Storage

19. Stockpiles of stock grade materials (be they in depots or on site) shall be covered to prevent ingress of water or drying out, to preserve the moisture content within the permitted range.
20. Stock grade materials shall ideally be used within 7 days of mixing but it may be permissible to extend this to 28 days under temperate conditions providing it can be demonstrated that the performance requirements in sub-clauses 10,12 and 33 are not compromised.
21. Heavy Duty mixtures containing cement shall be placed and fully compacted within 4 hours of mixing.

Transport

22. Vehicles used to transport cold recycled bituminous materials shall be sheeted at all times from loading until discharge to maintain moisture levels. Delivery vehicles shall use only a small quantity of 0/20 planings as a lorry-bed release agent.

Site Preparation

23. Cold recycled bituminous materials must be laid on a firm sound base. Any soft spots (elastic stiffness less than 30 MPa as measured by the German Dynamic Plate) in the substrate shall be removed and reinstated with granular sub-base or otherwise treated with the approval of the Overseeing Organisation prior to laying.
24. Cold recycled bituminous materials shall not be laid in standing water and any ponding must be removed prior to laying.
25. Adequate lateral support (temporary if necessary) must be provided to ensure the cold recycled bituminous materials are compacted effectively.

Weather constraints

26. Cold recycled bituminous materials shall not be laid in freezing conditions or in rain heavy enough to render the moisture content non compliant or prevent effective application of the sealing spray.

Layer Thicknesses

27. In carriageway work, cold recycled bituminous materials shall be laid in layers of compacted thickness not less than 60mm and not greater than 120mm. Thinner lifts may be acceptable for footway works subject to agreement with the Overseeing Organisation.

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Control of Segregation

- 28. Special care must be taken to ensure cold recycled bituminous materials do not become segregated.
- 29. When laying through a paver, the paver shall not be allowed to discharge fully between loads.
- 30. When hand laying, any coarse material accumulating on the surface shall be raked to the bottom of the layer.
- 31. Where areas of segregated coarse aggregate appear on the surface, these shall be blinded with foam stabilised fines (8mm down) prior to compaction.

Compaction

- 32. Cold recycled bituminous materials shall be compacted using a vibrating roller of appropriate dimensions. Initial passes shall be carried out with dead weight only and the level of vibration gradually increased.
- 33. The material shall be compacted to at least 95% of the refusal density.
- 34. Experience has shown that:
 - (i) For relatively thick lifts in the carriageway a Bomag 120 or equivalent twin drum vibrating roller or heavier compaction plant should achieve the required compaction after about six passes.
 - (ii) For narrow haunches a boom mounted vibrating plate compactor (RF Systems Markvibrator or similar) operating in “low” mode should achieve the required compaction after about six slow passes.
 - (iii) For thinner lifts in footway work a Bomag 75 or equivalent twin drum pedestrian vibrating roller should achieve the required compaction after about six passes.
- 35. Compliance shall be demonstrated using the sand replacement method. Alternatively density may be determined using an isotopic density meter providing a robust equivalent target density can be determined/agreed in advance. Any meter used shall be calibrated in accordance with BS1377 : Part 9.

Curing

- 36. Immediately after compaction and density/compliance testing, the cold recycled bituminous material shall be sprayed with an emulsion tack coat (type K1-40) at a rate of 0.8 to 1.2 litres/m² to provide a membrane that retains moisture for hydration to take place and to prevent rain damage.
- 37. If the material is to be trafficked as a temporary running surface, final compaction shall be with a pneumatic tyred roller to seal the surface and the sealing membrane shall be supplemented with an application of coated grit.
- 38. If the surface is trafficked for an extended period it may be necessary to apply a further tack coat/bond coat prior to laying the final surface course – details to be agreed with the Overseeing Organisation.

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Compliance Testing

39. For all works, the mean elastic modulus for each days work, measured after final compaction within 24 hours using a German Dynamic Plate shall be not less than 50 MPa. Additionally, no single measurement of elastic modulus shall be less than 30 MPa.
40. In carriageway applications, prior to surfacing, a repeat test using a dynamic plate or penetration test shall show an increase in elastic modulus of not less than 20 per cent for each single test with an overall mean increase of not less than 30 per cent.
41. For Heavy Duty applications, the initial and gain in elastic modulus shall be agreed on a scheme specific basis.

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951SR PATCHING

BITUMINOUS AREAS

1. Patching is defined as replacement of Surface Course, Binder Course and Base where the materials are laid by hand or when instructed by the Overseeing Organisation by machine, in accordance with Clause 771AR in respect of infra-red patching. Exact areas to be patched will be stated in the Works Information, subject to the minimum dimensions stated in Appendix 7/2.

Note; Other proprietary alternative specifications may be proposed for the approval of the Overseeing Organisation.

2. The existing defective surfacing and/or filling of trenches or depressions shall be broken out so as to provide a cavity with straight vertical edges stepped at each course interface as shown in the Detail drawing..
3. Joint edges shall be formed by diamond saw cutting to a depth of at least 40mm or cold milling, and materials removed to the required depth as stated in the Works Information. The vertical edge faces of surface course and binder course joints shall be painted with grade 190 Pen bitumen, a cold applied thixotropic bitumen or a polymer modified adhesive bitumen tape. Proprietary spray applied products may be permitted with the approval of the Overseeing Organisation.
4. All loose material shall be removed off Site.
5. Replacement materials shall be as specified and detailed in Appendix 7/2.
6. A bitumen emulsion tack coat shall be sprayed in accordance with Appendix 7/4 to any underlying bituminous or cementitious layer exposed by the removal process and any layer which is to accept a subsequent layer.
7. All construction layers shall be laid and compacted in accordance with Clause 903, such that, wherever possible, on completion each layer shall be at the same level as the adjacent course.
8. On completion of the patch repair any missing 'Give ways', 'Stop Lines' and 'Centre Lines' shall be replaced with a material approved by the Overseeing Organisation.

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9. Bituminous material shall be compacted to achieve the following air voids specification:

Material	Air Voids Specification		
	Max	Avg	Min
Stone Mastic Asphalt	6%	4%	2%
Hot Rolled Asphalt	8%	6%	2%
Asphalt Concrete Binder Course and Base	9%	7%	2%
10mm & 14mm Close Graded Surface Course	10%	-	2%
6mm Dense Asphalt Concrete Surface Course	13%	-	2%

10. Testing shall be carried out on all layers in accordance with Clause 929 (see also Appendix 1/5). Copies of all test results shall be provided to the Overseeing Organisation.
11. Sampling and testing of the cores and receipt of the test certificates (from a UKAS accredited laboratory) by the Engineer shall be within 1 month of the Patching works being completed. It is acceptable for such testing to be organised in 'batches' providing the time limits for receipt of results are met.
12. Test certificates shall contain the following information as a minimum:
- (i) Road Number and/or Name
 - (ii) Nearest City/Town/Village (as appropriate)
 - (iii) Carriageway direction (and lane if more than 1)
 - (iv) Precise location of patch sampled (relative to junctions, house numbers, names, etc – a marked map is acceptable as an alternative)
 - (v) The size of the patch cored
 - (vi) The nature and thickness of materials recovered in the core
 - (vii) The bulk density, maximum density and air voids of each bituminous layer in the cores
 - (viii) The name/address of the testing laboratory, the test methods used and the UKAS accreditation status of the test certificate
 - (ix) The material types and thicknesses specified for the patching works.
 - (x) Any evidence of debonding between layers, poor compaction, disintegration of layers, limestone fine aggregate in any 6mm Asphalt Concrete Dense Surface Course material or 'deferred set' material.
 - (xi) A statement as to whether the coarse aggregate in the Surface Course was, or was not, limestone.
 - (xii) A statement as to whether any bound material could not be recovered and the nature/thickness of it.

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(xiii) A colour photograph of the core (close view to full frame).

13. Coreholes shall be reinstated flush with the surrounding surface using a HAUC approved carriageway grade permanent cold-lay surfacing material approved by the Overseeing Organisation. Core reinstatements that settle by more than 8mm within 3 months of the reinstatement shall be retreated, if directed by the Overseeing Organisation , at no extra cost.

CONCRETE AREAS

14. Repair Process:

- (i) Saw cut perimeter of repair to regular profile with straight vertical edges and minimal overcutting at corners, to a depth of 40mm.
- (ii) Break out remaining defective concrete, taking care to leave any protruding reinforcement in place around the perimeter. Leave the sides rough cut sloping inwards to improve the key with the parent concrete.
- (iii) Reshape/recompact or replace sub-base as appropriate.
- (iv) In reinforced concrete areas, cut new reinforcement to size and wire to existing reinforcement with sufficient laps.
- (v) Ensure existing concrete faces are fully saturated just prior to placement of reinstatement.
- (vi) Place C32/40 class concrete and compact to refusal. Materials shall be as specified and detailed in Appendix 7/2.
- (vii) Profile surface as appropriate to match existing. Finish with a brushed texture transverse to the traffic direction.
- (viii) Apply curing compound or cover with damp hessian/polythene.
- (ix) Protect until cured.
- (x) On completion of the repair any missing 'Give ways', 'stop lines' and 'centre lines' shall be replaced with a material approved by the Overseeing Organisation.

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I2I2SR ROAD MARKINGS

General

1. Road markings shall be white or primrose yellow (Class Y1) complying with BS EN 1436 Table 6, as appropriate except where an alternative shade has been specified in Appendix 12/3. The markings shall consist of continuous or intermittent lines, letters, figures, arrows or symbols and comply with sub-Clauses 2 to 12 of this Clause.

Statutory requirements controlling road markings are contained in The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) and subsequent amending Regulations.

Permanent Road Markings

2. Permanent road markings shall be one of the following Kite Marked or equivalent approved materials and comply with the colour, location and material type requirements described in Appendix 12/3:
 - (i) thermoplastic road marking material or paint in accordance with BS EN 1871;
 - (ii) other materials as described in Appendix 12/3 to BS EN 1871.

All materials and solid glass beads shall be obtained from manufacturers who operate Third Party QA schemes under BS EN ISO 9001: 2000.

They shall also be tested in road trials to the Roll-over class P5 in accordance with the procedure stated in BS EN 1824 to demonstrate compliance with the performance requirements as stated in sub-clauses 3 – 6. The test report, which shall be submitted with the Tender shall give particulars of the quality and quantity of the material, including drop on glass beads laid at the test site for future reference and comparison purposes should such a need arise.

3. Road markings shall have the following road performance as defined in BS EN 1436 for the period of the functional life starting from the date of application or when the road is trafficked, whichever is later. The materials to be used shall be to the same mix, material quality, quantity and rate of application as used on the test site.

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Property	BS EN 1436 Reference	Requirement	Minimum Value
Colour	Table 6	1. White 2. Yellow Class Y1,	x, y co-ordinates given BS 381C No. 310 (Primrose)
Luminance Factor	Table 5	1. Class B2 2. Class B1	0.3 0.2
Skid Resistance	Table 7	1. Class S3 2. Class S1	55 45
Retro-reflectivity	Table 2 Class of RL for dry markings	1. Class R2 2. Class R1	100 80

Note: 1 = White, 2 = Yellow

4. The length and width tolerances and thickness for screed, spray, preformed and extruded white or yellow lines shall be in accordance with The Traffic Signs Regulations and General Direction 2002. The permitted tolerances shall be as follows:

Length: +10%, -5%

Width: +10%, -5%

Road Marking materials shall be laid to the following thicknesses:

- | | |
|---|---------------|
| (i) Screed lines | 2.0mm minimum |
| (ii) Sprayed Yellow edge lines | 0.8mm minimum |
| (iii) Sprayed lines (other than yellow) | 1.5mm minimum |
| (iv) Extruded lines | 2.5mm minimum |

With the exception of the road markings listed in Regulation 32 (2) of The Traffic Signs Regulations and General Directions in no case shall any materials be laid more than 6 mm thick.

Unless specified, all white markings shall be reflectorised with glass beads in accordance with BS EN 1423 and BS EN 1424 by incorporation (apart from preformed markings) into the road marking mixture and to the wet surface of the marking.

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5. Where there is requirement for improved visibility in wet conditions at night, products showing the following performance in addition to that stated in sub-clause 3 shall be used.

Property	BS EN 1436 Reference	Requirement	Minimum Value
Colour	Table 6	White	x, y co-ordinates given
Luminance Factor	Table 5	Class B3	0.4
Wet Skid Resistance	Table 7	Class S2	50
Dry Retroreflectivity	Table 2	Class R2	100
Wet Retroreflectivity	Table 3	Class RW3	50

6. Where there is a requirement for improved skid resistance as referred to in Appendix 12/3 products showing the following performance in addition to that stated in sub-clause 3 shall be used.

Property	BS EN 1436 Reference	Requirement	Minimum Value
Wet Skid Resistance	Table 7	Class S4	60

7. The pavement shall be prepared in accordance with the following:
- Where the marking is to be applied on concrete carriageways, the transverse texturing shall be freed from all traces of curing compound by wire brushing or other approved means. Prior to the application of the thermoplastic material a tack coat compatible with the road surface and the marking material shall be applied in accordance with the manufacturer's instructions. Prior to application of road marking material the pavement should have a minimum 48 hours of dry conditions in order to ensure minimum moisture content. Road marking material should not be laid before the concrete has cured for at least 28 days.
 - On surface dressed carriageways, all loose chippings where the marking is to be applied shall be removed prior to application.
 - It is the *Contractor's* responsibility to ensure the road surface is sufficiently clean and dry to achieve the necessary level of adhesion with the road marking. Where the *Contractor* believes that mechanical sweeping is needed to remove extensive detritus, loose chippings, etc. or that warming/drying of the road surface is necessary, this shall be agreed with the Overseeing Organisation.
8. The application of permanent road markings shall be in accordance with the Sector Scheme described in Appendix A. A copy of the lining contractors current UKAS accredited certificate showing compliance with this scheme shall be submitted prior to the *starting date*.

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Note 1: This Scheme requires Road Marking operatives to hold a relevant qualification being either:-

NVQ Level 2 Pavement Marking - Certified by RSMA

or

Certified Operatives Training Scheme - Administered by CSCS or LGNTO

All trained operatives shall carry a registration card indicating their level of competence/training. Road marking operations shall only be undertaken in the presence of a trained operative whose registration card covers the operations being undertaken as part of the *works*.

Road marking materials shall only be applied to surfaces which are clean and dry. Markings shall be free from raggedness at their edges and shall be uniform and free from streaks. Longitudinal road markings shall be laid to a regular alignment.

9. The *Contractor* shall be responsible for the correct setting out of all lines, arrows, letters, symbols, hatching, triangles, zig-zag lines, chevrons, road studs and the like. The Overseeing Organisation will give any advice required by the *Contractor* to enable it to site the markings in their correct positions (in writing, if requested by the *Contractor* or their representative). Studs complying with the requirements of Clause 1213 and Appendix 12/3 shall be fixed in the carriageway generally parallel to the centre line and other markings and conforming to the Traffic Sign Regulations & General Directions 2002 and the Traffic Signs Manual.

On completion of each day's work the road shall be left clean and free from any surplus material spilled during the progress of the work. All markings shall be uniform and free from streaks or blisters, and shall be free from raggedness at the edges. Trimming of edges, where necessary shall be undertaken as the work proceeds. Arrows associated with solid line systems shall be replaced no later than 48 hours after the completion of the adjoining continuous white line.

The *Contractor* shall submit to the Overseeing Organisation within seven days a daily record of work carried out.

Raised Rib Road Markings

10. Raised Rib Road Markings shall only be used on all-purpose roads (both single and dual carriageway) with at least 1 metre wide hardstrips. They shall comply with sub-Clauses 1, 2(i), 3, 5, 6, 7 and 8 of this Clause.
11. Raised Rib Road Markings shall be white lines which are continuous over the sections where they are specified in Appendix 12/3. Where specified in Appendix 12/3 gaps shall be provided for drainage purposes.
12. Raised Rib Road Markings shall be in accordance with The Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113), Diagrams 1012.2 and 1012.3, as appropriate. Spacing of the transverse raised ribs shall be 500 mm or 250 mm as specified in Appendix 12/3.
13. Raised Rib Road Markings shall not be used adjacent to hatched areas or central reserve crossings except as prescribed for use with diagrams 1040.3, 1040.5 and 1042.

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Temporary Road Markings

14. Temporary road markings shall only be adopted with the prior approval of the Overseeing Organisation. They shall comply with sub-Clauses 1 to 8 of this Clause or if required to be removable, be constructed only from a proprietary preformed road marking material complying with BS EN 1790.
15. When temporary road markings are used on surfaces that will continue to be used by public traffic after their removal, any shadow trace remaining after their removal shall be permanently obliterated. Preformed materials shall not be used for this obliteration.
16. Temporary road markings constructed from a proprietary preformed road marking material shall only be adopted in locations and on types of road surface as described in Appendix 12/3 and shall comply with any other requirement therein. The marking material shall be new and together with any primer shall be stored and installed in accordance with the manufacturer's instructions and within the recommended shelf life.
17. Temporary preformed road markings shall only be applied to surfaces that are clean and dry. Upon removal they shall be disposed of off Site and if any making good is necessary to the road surface it shall be satisfactorily carried out before the road is opened to traffic.

Road Markings on Porous Asphalt Surfacing

18. Spray paint, thermoplastic applied by machine screed, spray or extrusion or preformed road markings shall be used for carriageway markings on porous asphalt surfacing. Manual screeding shall not be permitted except for directional arrows and similar markings.

Removal of Road Markings

19. The removal of road markings on surfaces that will continue to be used by traffic shall be undertaken in a manner that will avoid damage to the surface.

The removal of temporary road markings shall comply with sub-Clauses 14 and 15 of this Clause. For bituminous running surfaces, the removal of permanent road markings shall be by mechanical means or forced air abrasive (shot blasting) only. Hot Compressed Air (HCA) lance is not to be used unless agreed previously with the Overseeing Organisation where it may be permitted on other types of running surfaces. In all cases the *Contractor* shall submit details of the proposed method for the Overseeing Organisation's consent. Advice on removal methods is given in sub-Clause NG 1212.12.

Masking of Road Markings

20. When black masking materials are required to cover existing permanent road markings, they shall comply with BS 7962. The total thickness of original and masking materials shall not exceed 6 mm.

Longitudinal Road Markings Lateral Tolerances

21. For longitudinal road markings, the lateral tolerance shall be within ± 25 mm from the designed position. Any discontinuities between road markings shall be replaced with a smooth taper from one road marking to the other. The length of the transition shall be derived from table below. All road markings shall comply with the dimensions, angles and proportions stated in the Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No.3113) and any subsequent amending Regulations.

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Speed Limit (mph)	Taper
30	1 in 40
40	1 in 40
50	1 in 45
60	1 in 50
70	1 in 55

Performance Standard

22. Unless otherwise specified in Appendix 12/3 white road markings laid as part of this performance specification shall comply with the minimum standards of performance defined in 3 and 4 above. Where high performance road markings are specified they shall comply with the requirements defined in 4 and 5 or 6 above. Unless otherwise specified in Appendix 12/3, this performance standard shall apply for a period of 2 years, from the date of application, for all road markings.

Testing

23. Where specified in Appendix 1/5 the *Contractor* shall carry out monitoring of the road markings they applied as part of the *works* in accordance with Appendix 1/5 and Appendices W to Z of this Clause. Additional testing shall be undertaken between 8 months and 11 months after application and results shall be submitted within 15 days of testing to the Overseeing Organisation.

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APPENDIX W DETERMINATION OF THICKNESS

General

- W1. The thickness of road marking materials shall be determined using an agreed system, such as the ZMM 5000 digital thickness gauge .

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APPENDIX X

**DETERMINATION FOR TESTING THE LUMINANCE
FACTOR B AND CHROMATICITY CO-ORDINATES x
AND y OF IN SITU ROAD MARKINGS**

General

- X1. This procedure is recommended for the use of portable equipment as described in BS EN 1436 "Road marking Performance for Road Users" Annex C.
- X2. Equipment shall be calibrated and operated in line with the manufacturer's instructions and BS EN 1436 Annex C.
- X3. Equipment shall not be moved large temperature changes.
- X4. All markings shall be measured free from loose dirt and in a completely dry state. A suitable brush should be used to remove loose dirt and/or glass beads prior to testing (see X16 Cleaning of Lines).
- X5. Safety must be given prime consideration during this operation. Constant attention must be given to the safety of the operator and of other road users. Refer to the current edition of the RSMA Safety Code of Practice.

Selection of a Test Area

- X6. Test sections shall be chosen such that the area of marking appears to be representative of the total to be assessed.

The following areas shall be avoided:

- Areas of excessive dirt
 - Areas where the wear characteristics are excessive or minimal to the norm.
 - The very start of applications where initial problems could have been experienced before equipment 'warmed up'.
- X7. Selection of test areas should take account of the location of the marking in relation to the movement of traffic. Some markings will be more heavily trafficked than others, for example, cross hatched areas may be virtually untrafficked compared to adjacent longitudinal lines. In area where markings are unevenly worn, ensure a representative number of markings are tested such that there is a balance of degree of trafficking. The condition of the marking tested shall be recorded in the report.

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X8. The following test intervals are recommended:

Length of Site	Frequency of Testing
Less than 1km	At approx $\frac{1}{4}$ and $\frac{3}{4}$ of the marking length
1km to 1.9km	Every 0.5km
2km to 4.9km	Every 1km
5km to 9.9km	Every 2km
10km or more	At 5 points (approximately equidistant)

Number of Readings

X9. For continuous lines 15 readings shall be taken over a 5-metre (minimum) section. If the marking is a centre line 15 readings shall be taken with the equipment facing in each direction.

X10. For intermittent lines, 5 readings shall be taken per mark for 3 consecutive markings.

Note: Readings should not be taken at the very beginning or very end of the line, as sometimes due to problems with 'cut-off' of the bead dispensers, glass bead coverage may not be ideal.

X11. Readings shall generally be taken along the central axis of the line but some 'off centre' readings may also be included. Care shall be taken to ensure that any such 'off centre' measurements are still made within the confines of the marking. The equipment should not be used for line widths less than the width of the field of measurement.

X12. If a particular reading appears to be a rogue result the test shall be repeated.

Recording and interpretation of results

X13. A test report for each location shall be produced. Information to be included in the report shall be as follows:

- (i) Operator's name
- (ii) Equipment type and geometry
- (iii) Test procedure
- (iv) General location
- (v) Length of site
- (vi) Location of measurement point
- (vii) Date and time of test
- (viii) Ambient temperature

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- (ix) Type and dimensions of markings
- (x) Condition of marking
- (xi) Pre-treatment of marking i.e. washed/brushed
- (xii) Road Surface Type

X14. The average of all readings for a particular section shall be calculated.

X15. Readings for individual marks shall be sub-totalled before being combined, to test consistency.

Cleaning of Lines

X16. If after removing loose dirt, trafficked markings do not reach the specified level of performance, the test area should be cleaned and dried using the following procedure:

- (i) Using clean water with a mild detergent added and a suitable brush, thoroughly clean the test area;
- (ii) Rinse the test area with clean water;
- (iii) Dry the test area with sponges, absorbent cloths and/or a 'gentle' hot air heater;

Important Note: A marking may appear to be dry but could still have moisture present during winter months. Moisture will have an adverse affect on readings.

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APPENDIX Y

PROCEDURE FOR THE MEASURING IN-SITU WET SKID RESISTANCE OF THERMOPLASTIC ROAD MARKINGS

General

- Y1. The wet skid resistance of road markings shall be measured in accordance with BS EN 1436 Annex D.
- Y2. The Portable Skid Resistance Tester shall be calibrated yearly and the rubber slider replaced yearly or whenever the edge has worn beyond the limits specified in BS EN 1436: Annex D: Figure D1.
- Y3. All markings shall be measured free from loose dirt. A suitable brush should be used to remove loose dirt and/or glass beads prior to testing.
- Y4. Care shall be taken to ensure that the rubber slider measures the whole width of the test surface. This is of particular relevance on lines where the crown of the road is large.
- Y5. Safety must be given prime consideration during this operation. Constant attention must be given to the safety of the operator and of other road users. Refer to the current edition of the RSMA Safety Code of Practice.

Selection of a Test Area

- Y6. Test sections shall be chosen such that the area of marking appears to be representative of the total to be assessed.

The following areas shall be avoided:

- Areas of excessive dirt
 - Areas where the wear characteristics are excessive or minimal to the norm.
 - The very start of applications where initial problems could have been experienced before equipment 'warmed up'.
- Y7. Selection of test areas should take account of the location of the marking in relation to the movement of traffic. Some markings will be more heavily trafficked than others, for example, cross hatched areas may be virtually untrafficked compared to adjacent longitudinal lines. In area where markings are unevenly worn, ensure a representative number of markings are tested such that there is a balance of degree of trafficking. The condition of the marking tested shall be recorded in the report.

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Y8. The following test intervals are recommended:

Length of Site	Frequency of Testing
Less than 1km	At approx $\frac{1}{4}$ and $\frac{3}{4}$ of the marking length
1km to 1.9km	Every 0.5km
2km to 4.9km	Every 1km
5km to 9.9km	Every 2km
10km or more	At 5 points (approximately equidistant)

Number of readings

Y9. For continuous lines 3 readings shall be taken over a 15-metre (minimum) section. If the marking is a centre line 3 readings shall be taken with the equipment facing in each direction.

Y10. For intermittent lines, 3 readings shall be taken per mark for 3 consecutive markings.

Note: Readings should not be taken at the very beginning or very end of the line, as sometimes due to problems with 'cut-off' of the bead dispensers, glass bead coverage may not be ideal.

Y11. Readings shall generally be taken along the central axis of the line in the direction of traffic flow.

Y12. If a particular reading appears to be a rogue result the test shall be repeated.

Y13. Recording and interpretation of results

Y14. A test report for each location shall be produced. Information to be included in the report shall be as follows:-

- (i) Operator's name
- (ii) Equipment type
- (iii) Test procedure
- (iv) General location
- (v) Length of site
- (vi) Location of measurement point
- (vii) Date and time of test
- (viii) Ambient temperature
- (ix) Type and dimensions of markings
- (x) Condition of marking
- (xi) Pre-treatment of marking i.e. washed/brushed
- (xii) Road Surface Type

Y15. Readings shall be corrected for temperature as detailed in BS EN 1436: Annex D: Paragraph D.6.

Y16. The average of all readings for a particular section shall be calculated.

Y17. Readings for individual marks shall be sub-totalled before being combined, to test consistency.

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APPENDIX Z

DETERMINATION OF RETRO-REFLECTIVITY. PROCEDURE FOR STATIC TESTING THE RETRO- REFLECTIVITY OF IN-SITU ROAD MARKINGS

General

Z1. This Appendix describes the method for determining the Retro-reflectivity of marking materials.

Method

Z2. Testing shall be carried out in accordance with BS EN 1436: Annex B.

Procedure

- Z3. Always calibrate and operate the equipment in line with the manufacturer's instructions and BS EN 1436 - Annex B.
- Z4. Moving the instrument through large temperature changes shall be avoided. (i.e. allow time for equipment to acclimatise to prevailing operational temperatures.)
- Z5. If required, ensure that the instrument is effectively shielded from direct sunlight.
- Z6. For Longitudinal lines, the equipment shall be positioned such that its light source shines in the same direction as a vehicle's headlights would. If the marking is a centre line, take measurements shall be taken in both directions.
- Z7. Measurements on other markings such as symbols, letters etc should be taken, wherever appropriate, but in the general direction in which vehicles approach.
- Z8. All markings to be measured should be free from loose dirt and completely dry. A suitable brush should be used to remove loose dirt and/or loose glass beads prior to testing (see 5. Cleaning of lines).
- Z9. Safety must be given prime consideration during this type of operation. Constant attention must be given to the safety of the operator and of other road users. Refer to the Road Safety Markings Association's "Safety Code of Practice".

Selection of the Test Area

- Z10. Areas of markings which appear to be representative of the total shall be assessed. The following areas shall be avoided:
- Areas of excessive dirt e.g. a farm entrance.
 - Areas where wear characteristics are excessive or minimal to the norm.
 - The very start of applications where initial problems could have been experienced before equipment "warmed up".
- Z11. Selection of test areas should take into account the location of the marking in relation to the movement of traffic. Some markings will be more heavily trafficked than others, for example, cross hatched areas may be virtually untrafficked compared to adjacent longitudinal lines. In areas where

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markings are unevenly worn, ensure a representative number of markings are tested such that there is a balance of degree of trafficking. The condition of the marking shall be noted in the report.

The following test intervals are recommended:

Length of Site	Frequency of Testing
Less than 1km	At 2 points (approximately equidistant)
1km to 4.9km	At 3 points (approximately equidistant)
5km to 9.9km	At 4 points (approximately equidistant)
10km or more	At 5 points (approximately equidistant)

Number of Readings

Z12. For continuous lines, 15 readings shall be taken over a 5 metre section minimum. If the marking is a centre line, 15 readings shall be taken with the equipment facing in each direction.

Z13. For intermittent lines, take 5 readings per mark for 3 consecutive marks.

Note: Readings should not be taken at the very beginning or end at the Line, as sometimes due to problems with 'cut off' of the bead dispensers, glass bead coverage may not be ideal.

Z14. For lines wider than 150mm, readings shall generally be taken down the central axis of the line but some 'off centre' readings may be included also. Care shall be taken to ensure that any such 'off centre' measurements are still made within the confines of the marking. The equipment should NOT be used for line widths less than the width of the field of measurement (45mm).

Z15. For markings other than longitudinal, i.e. 'symbols', 'lettering' transverse lines etc, readings shall be taken at 5 approximately equidistant points on the surface of the marking.

Z16. If a particular reading appears to be a rogue result the test shall be repeated.

Z17. Recording & Interpretation of Results

Z18. A test report for each location should be produced. Information to be included in the report should be as follows:

- (i) Operator's name
- (ii) Equipment type and geometry
- (iii) Test procedure
- (iv) General location
- (v) Length of site
- (vi) Location of measurement point
- (vii) Date and time of test
- (viii) Ambient temperature
- (ix) Type and dimensions of markings
- (x) Condition of marking

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- (xi) Pre-treatment of marking i.e. washed/brushed
- (xii) Weather conditions at the time of testing
- (xiii) Road Surface Type

Z19. Calculate the average of all readings for a particular section.

Z20. Readings for individual marks should be 'sub-totalled' before being combined, to test consistency.

Cleaning of Lines

Z21. If after removing loose dirt, trafficked markings do not reach the specified level of performance, the test area should be cleaned and dried using the following procedure:

- Using clean water with a mild detergent added and a suitable brush, thoroughly clean the test area;
- Rinse the test area with clean water;
- Dry the test area with sponges, absorbent cloths and/or a 'gentle' hot air heater

Important Note: *A marking may appear to be dry but could still have moisture present during winter months.
Moisture will have an adverse affect on readings.*

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2602SR CONCRETE FOR ANCILARY PURPOSES – USE OF RECYCLED AGGREGATES FOR LOW STRENGTH APPLICATIONS

General

1. Concrete mixes referred to in the Contract as ST followed by a number shall mean concrete for ancillary purposes which shall comply with this Clause and any additional requirements in Appendix 26/1.
2. Concrete for ancillary purposes shall be a standardised prescribed concrete complying with BS EN 206-1 and BS 8500 and with the additional requirements of this Clause.

Cement

3. Cement types as defined in BS 8500, see Table A.6 of BS 8500-1 or Table 1 of BS 8500-2, shall comprise one of the following:

CEM I, CEM II/A-V, CEM II/B-V and CEM IIIA or equivalent combinations, unless otherwise specified within the standard detail drawings or where required in Appendix 26/1, SRPC (sulfate-resisting Portland cement).

Aggregates

4. Aggregates shall comply with BS EN 12620 and unless otherwise described in Appendix 26/1 the maximum size shall be 20 mm. The total acid-soluble sulfate content of the concrete mix, as SO₄, shall not exceed 5% of the mass of cement in the mix. The acid soluble sulfate (AS) shall be determined in accordance with Test No. 2 in TRL Report 447.

Any combination of washed recycled aggregate produced in accordance with the WRAP quality protocol, recycled concrete aggregate or recycled asphalt planings containing less than 1% by mass of “foreign material” e.g. plastic, metals, large particles of glass, etc. may be used for concrete of Class ST1 but no higher grade.

Where recycled asphalt planings are used as the primary aggregate the addition of crushed green glass sand will be permitted up to a maximum of 5% by mass of the total aggregate.

The mix proportions shall be determined by weight in accordance with Table 7 of BS8500-2:2006 or by volume in accordance with Table 8 of the same standard.

The aggregate may be incorporated as separate coarse and fine fractions or as an “all-in” material (Class 0/20 to Table E.1 of PD 6682-1:2002).

Where an “all-in” aggregate is used and the concrete is to be batched by volume, the volume of “all-in” aggregate to be incorporated shall be the sum of the coarse and fine aggregate fractions as shown in Table 8 of BS8500-2:2006 multiplied by 0.6.

Consistence

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5. The consistence of the concrete shall be defined by its consistence class (slump) and be within either consistence class S1, S2 or consistence class S3 of BS EN 206-1 and BS 8500 as appropriate to the purpose.

Standardised Prescribed Concrete

6. The standardised prescribed concrete used for each purpose shall be as described in Table 2602/1 unless otherwise described in Appendix 26/1.

Table 2602/1: Concrete for Ancillary Purposes

Purpose	Standardised prescribed concrete*
Footings for fence posts and augered foundations for traffic sign posts	ST2
Foundations for environmental barrier posts and planted lighting columns	ST5
Blinding concrete, backfill for structural foundations, overdig of post holes and preparation of formation to Clause 616	ST1
Bedding and backing to pre-cast concrete kerbs, channels, edgings and quadrants	ST1
Bed to drains Type A#. Foundations, channels and benching to chambers	ST4
Bed, haunch and surround to drains other than Type A#. Surround to chambers and gullies	ST2

* Unless otherwise described in Appendix 26/1

Refer to HCD drawing number F1 and F2

Transporting, Placing and Compacting Concrete

7. Concrete shall be transported and placed so that contamination, segregation and loss of materials does not occur. The maximum temperature of the concrete at any time between mixing and placing shall be no greater than 30°C. Concrete shall be placed and compacted within two hours of mixing. After compaction it shall not be disturbed within 12 hours.
8. Concrete shall be compacted by tamping or vibrating until it is thoroughly worked around any embedded metal and into corners of formwork or excavations, until a solid mass substantially free from voids is obtained without segregation and with no free water on the surface. The *Contractor* shall select the consistence as described in sub-clause 5 of this Clause to achieve this.
9. Surface finishes shall comply with Clause 1708 and, unless otherwise described in Appendix 26/1, the following:

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Buried surfaces:

Unformed surfaces shall be Class U1

Formed surfaces shall be Class F1

Exposed surfaces:

Unformed surfaces shall be Class U2, except benching to chambers, which shall be Class U3

Formed surfaces shall be Class F2

10. Formwork shall be struck without damage to the concrete not less than two days after placing the concrete. Exposed surfaces shall be cured as described in Clause 1027 or by covering them with an opaque impermeable membrane or with hessian or sand which shall be kept damp. Such covering shall not be removed for four days after placing the concrete.
11. This Clause shall be complied with where standardised prescribed concrete ST1 to BS EN 206-1 and BS EN 8500-2, is shown on the Drawings for purposes other than those in Table 2602/1.

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5002SR SURFACE PREPARATION – GENERAL REQUIREMENTS

1. The general requirements are specified in Clause 5002SR.2. The various methods are specified in Clauses 5003SR. The standards to be achieved are specified in Clause 5004SR.1 Definitions of terms used are given in Clause 5004SR.2. The particular requirements for surface preparation for the structure(s) included in the Contract are specified in Clause 5016AR.
2. General Requirements for Surface Preparation
 - (i) Areas contaminated by oil or grease shall be cleaned down using water and emulsion cleaner followed by rinsing with clean cold water, prior to surface preparation by other specified methods.
 - (ii) The *Contractor* shall ensure that the grade and particle shape of abrasive used are adequate for the purpose intended; the cleanliness shall be to the approval of the Overseeing Organisation. Non-metallic abrasives shall not be recycled.
 - (iii) All equipment including tools, abrasive wheels, papers and discs and grinding wheels shall be of a type, capacity and in a condition approved by the Overseeing Organisation.
 - (iv) Only clean cold water, which does not leave any harmful residues on the surface shall be used for cleaning down or rinsing.
 - (v) Only cleaning agents approved by the Overseeing Organisation shall be used for the work.
 - (vi) Surface preparation shall be continued until the required standard has been achieved. The surfaces are required to be free from condensation, oil, grease, dust residues and detrimental contamination such as chlorides and sulphides.
 - (vii) After surface preparation of internal surfaces by dry abrading, blast cleaning or dry scrubbing, all dust and debris shall be removed by sweeping and vacuum cleaning before any painting is carried out in that area.
 - (viii) Immediately prior to painting, the *Contractor* shall ensure that the surfaces are:
 - a. prepared to the specified standard
 - b. free from dust and grit
 - c. free from detrimental contamination as defined in Clause
 - d. 5004SR.2 vii
 - e. dry and ready for painting
 - (ix) The edges of existing coatings adjacent to abraded or blast cleaned areas shall be bevelled back where practicable into sound and firmly adhering material.
 - (x) Unless otherwise specified, fasteners shall be prepared and painted to the same standard as adjacent main surfaces.
 - (xi) After surface preparation by methods using water or when the structural steelwork has been exposed to the weather after surface preparation by other methods or when there are deck leaks, areas containing riveted or bolted joints or built up sections shall be freed of any water which has penetrated the plies; compressed air or other approved methods shall be used. When drying out has been completed to the satisfaction of the Overseeing

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Organisation or when surfaces are dry after surface preparation, line gaps around the perimeter of joints or along plies shall be sealed effectively by successive applications of undercoat paint. All wider gaps shall be sealed with a proprietary sealant compatible with the primer and approved by the Overseeing Organisation.

- (xii) The use of an inhibitor during wet blast cleaning or cleaning down is not permitted.

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5003SR SURFACE PREPARATION – MATERIALS AND METHODS

1. Cleaning Down

(i) Methods

- a. Wet cleaning down shall be carried out by scrubbing with a stiff bristle brush using water and a cleaning agent. Immediately after cleaning down, the surfaces shall be thoroughly rinsed using clean cold water.
- b. Dry cleaning down shall be carried out by scrubbing with a dry stiff bristled brush.

(ii) Other requirements

Where the existing surfaces are affected by embedded metallic grit or other abrasive particles, they shall be scraped to dislodge looser particles and then dusted off. This work shall be carried out after any final rinsing and when the surface is dry.

2. Abrading Aided by Scraping and Wire Brushing

(i) Method

- a. Any encrusted rust, foreign matter or paint which may be difficult to remove by abrading alone shall be dislodged by scraping, aided by hand or power wire brushing as necessary or such other method as agreed with the Overseeing Organisation. This work shall be completed before abrading of the areas so affected.
- b. Abrading shall be carried out using abrasive paper or other material, and/or a flexible abrasive disc mounted on a power driven flexible pad, and/or a power driven arbour or spindle mounted flexible abrasive flap wheel. Abrading tools may be used to remove weld spatter; also subject to the Overseeing Organisation's approval, wet abrading may be employed for finishes over sound undercoats and for unsound systems over galvanizing or galvanizing itself.

(ii) Other requirements

- a. A burnished appearance caused by the polishing in of old paint, rust or dirt will not be acceptable.
- b. Areas of corroded steel or unsound metal coatings, excepting galvanizing, which have been prepared by abrading down to bare steel, bright steel or bright metal coating, as appropriate, shall be protected by the primer and next two coats of paint before any cleaning down or other preparation of adjacent surfaces specified in Clause 5016AR is undertaken.
- c. Areas of unsound galvanizing which have been prepared down to bright steel by abrading shall be protected by the application of the primer and next two coats of paint before cleaning down or other preparation of adjacent surfaces specified in Clause 5016AR is undertaken.
- d. After surface preparation by wet abrading of galvanizing, but prior to any cleaning down of adjacent painted or galvanized surfaces specified in Clause 5016AR, any exposed areas of steel shall be dry abraded down to bright steel and protected by the primer and the next two coats of paint, including the stripe coat, before cleaning

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down or other preparation of adjacent surfaces specified in Clause 5016AR is undertaken.

3. Blast Cleaning

(i) Methods

- a. Dry blast cleaning using dry air/abrasive system.
- b. Wet blast cleaning using low pressure air/water/abrasive system. The air/water pressure at the nozzle shall not exceed 7.0 kgf/cm² (100 lbf/in²) and shall be fully adjustable below this level. The system shall incorporate a mechanical metering device, remote controlled by the operator from the nozzle, to enable them to regulate from zero to maximum the quantity of abrasive being fed into the air/water mixture. During abrasive cleaning the air/water/abrasive shall be thoroughly mixed and this mixture shall be projected onto the surface to be cleaned through a single bore nozzle/tube.
- c. Wet blast cleaning using high pressure water/abrasive system. The water pressure shall not exceed 562.0 kgf/cm² (8000 lbf/in²). The system shall incorporate a mechanical metering device controlled by the operator at the nozzle, to enable them to regulate from zero to maximum the quantity of abrasive being fed into the water.
- d. Combined wet/dry blast cleaning. Wet blast cleaning using low pressure air/water/abrasive system in accordance with Clause 5003SR.3ib shall be followed, at an interval approved by the Overseeing Organisation, by dry blast cleaning in accordance with Clause 5003SR.3ia of all the previously wet blast cleaned areas.

(ii) Other requirements: All blast cleaning methods

When surface preparation is to be carried out by blast cleaning and, on adjacent surfaces by or wet cleaning down and or abrading, then unless otherwise agreed or specified by the Overseeing Organisation, the wet cleaning down and any wet abrading shall be carried out first.

When surface preparation is to be carried out by wet blast cleaning, any wet cleaning down and or wet abrading or adjacent surfaces may be carried out after the wet blast cleaning. In such cases areas to be blast cleaned and or abraded shall be cleaned down in accordance with Clause 5003SR.1i, and thoroughly rinsed using the blast cleaning equipment before any final preparation by dry blast cleaning or dry abrading is carried out.

Any prepared steel surfaces shall be protected from the effects of any further wet method of surface preparation by the application of a minimum 75 microns dry film thickness of paint.

(iii) Other requirements. Wet blast cleaning and combined wet/dry blast cleaning

- a. Within 1 hour of wet blast cleaning, the whole of the cleaned surfaces shall be thoroughly washed down with clean cold water. Any further deposits of abrasive on already rinsed surfaces shall be removed also within 1 hour of being deposited. Any accumulated deposits of abrasive and debris on other parts of the structure shall be removed before the end of the working day. After washing down, the surfaces shall be free of all particles of dust and debris. Tests shall be carried out after washing down to check that prepared surfaces are free from detrimental contamination.

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- b. The specified standard of surface preparation shall have been achieved in full initially by wet blast cleaning and rinsing, notwithstanding further treatment of the same area by dry blast cleaning.

4. **Grinding**

(i) Methods

- a. Grinding wheels and discs shall be of the size, shape and grade of coarseness appropriate to the particular operation.
- b. The speed of revolution shall be that recommended by the manufacturer and agreed by the Overseeing Organisation.

(ii) Other requirements

- a. Unless otherwise agreed by the Overseeing Organisation grinding shall be carried out after surface preparation by other methods, including cleaning down, has been completed.
- b. Surfaces prepared by grinding to bright steel shall be protected by the application of the primer and by the next two coats, including any stripe coats, before cleaning down or other preparation of adjacent surfaces specified in Clause 5016AR is undertaken.

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5004SR SURFACE PREPARATION – WORKMANSHIP STANDARDS

1. Surface Preparation Standards

The following standards of surface preparation shall be achieved:

- (i) Areas containing existing sound finishing paint shall be freed of:
 - a. all visible gloss in order to provide a satisfactory key for the first coat of paint.
 - b. detrimental contamination.
- (ii) Areas of existing unsound paint coating(s) over a steel substrate shall be freed of:
 - a. any unsound paint down to sound paint
 - b. any unsound paint down to clean steel
 - c. any unsound paint down to bare steel
 - d. any unsound paint down to bright steel
 - e. all paint down to bare steel
 - f. all paint down to clean steel
 - g. detrimental contamination.
- (iii) Areas of existing unsound paint coating(s) over a metal coated steel substrate shall be freed of:
 - a. any unsound paint down to sound paint or to sound metal coating
 - b. any unsound metal coating down to bright metal coating
 - c. any unsound metal coating down to clean steel
 - d. any unsound metal coating down to bright steel
 - e. all paint and unsound metal coating down to sound metal coating or clean steel
 - f. all paint and metal coating down to clean steel
 - g. detrimental contamination.
- (iv) Areas of sound galvanizing exposed through a paint system during surface preparation shall be abraded to an extent necessary, as agreed by the Overseeing Organisation, to ensure effectiveness of "T" wash and adhesion of the primer.
- (v) Areas containing unsound metal coating over a steel substrate shall be freed of:
 - a. any unsound metal coating down to bright metal coating
 - b. any unsound metal coating down to sound metal coating
 - c. any unsound metal coating down to clean steel
 - d. any unsound metal coating down to bright steel
 - e. all metal coating down to clean steel
 - f. detrimental contamination.

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- (vi) When either 'clean steel', 'bare steel' or 'bright steel' is exposed through a metal coating during surface preparation, the standard shall be as defined in Clause 5004SR.2v as appropriate, excepting that in the case of aluminium and zinc metal spray, and subject to the agreement of the Overseeing Organisation, remnants of soundly adhering and clean aluminium or zinc may be retained in the profile of previously blast cleaned steel surfaces.

2. Definitions Of Terms In Clause 5004SR.1 Describing Coatings, The Extent Of Surface Preparation And Chemical Cleanliness Of Surfaces

- (i) 'Unsound paint'. Paint showing signs of disruption, rusting through, having inadequate adhesion or covering rust scale, loose rust, loose mill scale or other detrimental products.
- (ii) 'Sound Paint'. Paint which is sound down to a metal substrate.
- (iii) 'Unsound metal coating'. A metal coating showing signs of disruption, inadequate adhesion or penetration by rust or other corrosion products.
- (iv) 'Sound metal coating'. A metal coating which complies with Clause 5005SR, 'Metal Coatings', or a metal coating restored to these requirements by blast cleaning, but with a reduced thickness.
- (v) Visual cleanliness of a steel substrate prepared to:
- a. 'Clean steel' by blast cleaning
Appearance:
There shall be a blast cleaning pattern overall. The surface profile shall be free from mill scale, rust and foreign matter when viewed by normal vision.
 - b. Sa2 to 'BS EN ISO 8501-1, BS 7079-A1' and 'BS EN ISO 8501-2, BS 7079-A2' by blast cleaning
Appearance:
The surface shall be free from all rust scale, loose rust and loose mill scale.
 - c. 'Bright steel', by abrading
Appearance:
The surface shall be free from all surface rust, mill scale and defects and shall have an overall bright appearance.
 - d. St3 to 'BS EN ISO 8501-1, BS 7079-A1' and 'BS EN ISO 8501-2, BS 7079-A2' by abrading
Appearance:
The surface shall be free from all rust scale, loose rust and loose mill scale.
 - e. 'Bright steel', by grinding
Appearance:
The surface shall be free of weld spatter, shelling, laminations and other surface defects as required by the Overseeing Organisation, leaving an overall bright appearance. Rounding of sharp edges shall be to a radius of about 1mm.

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(vi) Visual cleanliness of a metal coating restored or prepared to:

- a. 'Sound metal coating' by blast cleaning

Appearance:

The surface shall be free from corrosion products and embedded abrasive particles and shall have a bright appearance overall.

- b. 'Bright metal coating' by abrading.

Appearance:

The surface shall be free from surface corrosion and corrosion products and shall have a bright appearance overall.

(vii) 'Freedom from harmful residues or contamination': Surfaces shall only be deemed to be free of 'harmful residues or contamination' when their chemical cleanliness has been approved by the Overseeing Organisation.

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5005SR METAL COATINGS

1. Galvanized Coatings

Galvanized coatings shall, unless otherwise described in the Contract, comply with BS EN ISO 1461 and with the following:

- (i) Inhibited hydrochloric acid with a strength not exceeding 18% and within a temperature range of 15°C to 25°C or inhibited sulphuric acid with a strength not exceeding 18% and within a temperature range of 60°C to 80°C shall be used for pickling.
- (ii) Components shall not be immersed in the pickling acid longer than is necessary for cleaning the surfaces prior to galvanizing.
- (iii) The surfaces of components to be galvanized shall be dried before immersion in the molten zinc.
- (iv) When an aqueous flux is to be used, all traces of acid shall be washed off immediately after pickling.
- (v) Galvanized coatings shall be virtually free from imperfections, including porosity, to the satisfaction of the Overseeing Organisation.
- (vi) Detrimental surface contamination of galvanized coatings which are to be painted shall be removed by wet cleaning in compliance with Clause 5003SR.1ia. The surfaces shall not receive chromate passivation treatment.
- (vii) Vent holes drilled in hollow sections prior to galvanizing shall be plugged to the satisfaction of the Overseeing Organisation.

2. Sprayed Metal Coatings:

Sprayed metal coatings shall, unless otherwise described in the Contract, comply with BS EN 22063 and with the following:

- (i) Aluminium coating shall be material with a minimum quality in accordance with Type A1 99.5 (1050A) of ISO 209-1, zinc coating shall have a composition in accordance with Type Zn99.99 of ISO 752.
- (ii) The thickness of either coating shall not be less than 100 µm.
- (iii) The strength of adhesion of metal spray coatings shall not be less than the following:

Aluminium	50 kgf/cm ²
Zinc	50 kgf/cm ²
- (iv) Metal spray coatings shall be applied continuously over each 0.5m² per gun or the area of the component whichever is the lesser until the specified thickness has been achieved.
- (v) The application of metal spray in separate coats is not permitted.
- (vi) All surfaces to be metal sprayed, including that of the reference panel having equivalent hardness to that of the parent material, shall be blast cleaned and the standard shall be Sa3 quality to 'BS EN ISO 8501-1, BS 7079-A1', medium profile.

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3. Sheradized coatings shall, unless otherwise described in the Contract, comply with Class 1, Table 1 of BS 4921.

4. **Electroplated Coatings**

Electroplated coatings shall, unless otherwise specified in the Contract, comply with BS 3382: Part 2. 'Electroplated Coatings on Threaded Components (Cadmium on Steel Components and Zinc on Steel Components)' (Ref 10), additionally BS 3382 shall be deemed to cover the zinc electroplating of components up to and including 36mm in diameter.

5. **Other Requirements**

Before proceeding with the metal coating process the *Contractor* shall provide full details of the surface preparation and coating methods proposed and shall not put the work in hand until the Overseeing Organisation's permission has been received. Such permission shall not relieve the *Contractor* of its responsibilities under the Contract. Metal coated surfaces which are to be painted shall not receive chromate passivation treatment.

When a metal coating is required on only part of a component it shall be applied before the rest of the component receives paint.

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5006SR TESTING OF METAL SPRAY COATINGS

1. At the start of the Contract, and later at intervals specified by the Overseeing Organisation, (with the exception of coatings on steel in bearings, curved surfaces, repairs to mechanical damage, local failure or metal spray at site joints or areas restored on site) the *Contractor* shall demonstrate by means of a pull off test, of a type approved by the Overseeing Organisation, that the minimum adhesion requirement is being attained. In the excepted areas, the *Contractor* shall demonstrate to the satisfaction of the Overseeing Organisation that the adhesion is satisfactory when tested in accordance with BS EN 22063. Areas affected by the tests shall be restored.
2. The pull off tests shall be carried out initially on 150mm x 150mm x 6mm panels which shall simulate the surface condition of the parent material before and after blast cleaning. The panels shall be blast cleaned and metal sprayed together with the parent material to the same standard and using the same technique.
3. The *Contractor* shall make arrangements for the Overseeing Organisation to witness the preparation of the panels and all testing.

When instructed by the Overseeing Organisation, the *Contractor* shall carry out further tests on similarly prepared and metal sprayed panels.
4. If the adhesion requirement on any test panel is not met, the *Contractor* shall carry out a further test on the parent material adjacent to the test panel position.

In the case of adhesion failure on the steel work itself, by either method of test on sound metal spray coating shall be restored and the tests repeated.
5. If more than two local areas of faulty adhesion occur on any one component, the whole of the metal spray coating on the component shall be considered as having failed, and it shall be restored.

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5007SR PAINT AND SIMILAR PROTECTIVE COATINGS

1. The term paint in this specification shall be deemed to refer also to similar protective coatings, including specialist coatings such as sealers.
2. Paint suppliers shall be approved the Overseeing Organisation.
3. All paints shall have a current BBA HAPAS Roads and Bridges Certificate or equivalent. Details of the quality assurance scheme for paints and similar protective coatings are given in BD 35 which also includes the Manual of Paints for Structural Steelwork.
4. Unless otherwise agreed by the Overseeing Organisation, all paints shall be supplied in sealed containers of not more than 25 litres capacity and these shall be used in order of delivery. Each container shall be of the completely removable lid type and be clearly marked on the side. The marking shall include the name of the manufacturer, registered description of the material (including purpose e.g. whether primer, undercoat or finish and also the colour), Item Number, manufacturer's reference number, batch number and date of manufacture. Where date of manufacture is coded, the *Contractor* shall provide the Overseeing Organisation with the code key.
5. The *Contractor* shall ensure that the properties of the paints selected are compatible with the existing system and suitable for the atmospheric conditions on site, including temperature and humidity, and that the paints can be applied satisfactorily to all parts of the structure in these conditions.
6. Form HA/P1 (Maintenance) Paint System Sheet

Form HA/P2 Paint Data Sheet.
 - (i) Sample forms are included in Appendix 50/1. The Overseeing Organisation will issue a partially completed Form HA/P1 (Maintenance) Painting System Sheet with each Task Order for maintenance painting which the *Contractor* shall complete and return to the Overseeing Organisation for approval. At the same time the *Contractor* shall forward to the Overseeing Organisation for its information, a copy of the paint manufacturer's Data Sheet (Form HA/P2 Paint Data Sheet) for each of the paints.
 - (ii) Following the Overseeing Organisation's written instructions, the approved Form(s) HA/P1 (Maintenance) Paint System Sheet shall be adopted for the *service*.
 - (iii) On receipt of the Overseeing Organisation's approval the *Contractor* shall forward duplicate copies of the approved Form(s) HA/P1, together with a further two copies of the Data Sheets to the Overseeing Organisation. The Data Sheets shall not form part of the Contract.
7. Unless otherwise directed by the Overseeing Organisation all paints forming any one protective system shall be obtained from the manufacturer named in the Form(s) HA/P1 (Maintenance) Paint System Sheet submitted by the Contractor and, unless there are reasons agreed by the Overseeing Organisation to be exceptional, the source(s) of supply shall not be changed during the course of the work under any Task Order.

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5009SR TESTING OF PAINTS

1. Provision of Samples

Unless otherwise described in the Contract, the *Contractor* shall provide unopened samples, known as 'A' samples, for quality assurance purposes, of each type of paint to be used for the *service*. In addition the *Contractor* shall supply 500ml samples, known as 'B' samples, for application control purposes.

2. 'A' Samples

Unless otherwise instructed by the Overseeing Organisation, 'A' samples are required where:-

(i) More than 1000 litres of paint for any one coat are supplied to a single contract designated as having 'Difficult Access' in accordance with Clause 5016AR.2.

or

(ii) More than 2000 litres of paint for any one coat are supplied to a single contract designated as having 'Ready Access' in accordance with Clause 5016AR.2.

3. The first 'A' samples shall be taken from the first batch for each coat of paint delivered to site and accepted by the Overseeing Organisation as being representative for use in the *service*. First batches of paint of less than 10 tins shall be discarded as not being representative and shall not be used.

4. Unless otherwise instructed by the Overseeing Organisation, additional 'A' samples of paints subject to testing under sub-clause 3 of this Clause shall be provided by the *Contractor* depending on the volume of paint for each coat to be used in the Contract. Additional samples shall be provided in accordance with the following:

(i) For 'Ready or Difficult Access' steelwork

Over 1000 litres: a further set of samples for each part or whole 1000 litres.

Unless otherwise instructed by the Overseeing Organisation, the *Contractor* shall also provide an 'A' sample:

(ii) of any replacement batch of paint subject to testing under sub-clause 3 of this Clause.

(iii) of any returned paint described in Clause 5010SR.4.

(iv) for any contract when the paint, in the opinion of the Overseeing Organisation, is showing unsatisfactory application characteristics under Clause 5012SR.

5. Immediately after selection by the Overseeing Organisation, the 'A' samples shall be despatched by the Contractor to the testing authority in accordance with the Overseeing Organisation's instructions.

6. Paint shall be supplied in sufficient time to allow for sampling, delivery to the testing authority and testing before the start of application.

7. Unless permitted by the Overseeing Organisation, painting, except for procedure trials, shall not start until the Overseeing Organisation confirms that the first 'A' samples are satisfactory.

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8. 'B' samples

The *Contractor* shall take 'B' samples when instructed by the Overseeing Organisation, and only under its supervision. The samples shall be taken from painters' kettles or from nozzles or airless spray guns directly into clean, new 500ml tins which shall be filled and then sealed and handed to the Overseeing Organisation for recording in the Form HA/P3. On return of the samples to the *Contractor*, it shall despatch them immediately to the testing authority in accordance with the Overseeing Organisation's instruction.

9. Provision of 500ml Tins, Packing and Transport of 'A' and 'B' samples

The *Contractor* shall provide 500ml tins with lids and lid clips, for 'B' samples at the start of painting or before any procedure trials required by Clause 5011SR. The quantity of tins supplied shall be sufficient to avoid any delay in taking 'B' samples throughout the work.

10. The *Contractor* shall ensure that the lids of all tins of sample paint are securely clipped down when they are despatched for testing.

11. The *Contractor* shall be responsible for handling, packing as necessary, prompt despatch and transit of 'A' and 'B' samples.

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5010SR STORAGE REQUIREMENTS AND KEEPING PERIODS FOR PAINTS

1. On delivery to site, paint shall be unloaded directly into one or more secure paint stores. Unless otherwise agreed by the Overseeing Organisation, paint shall be stored within 100 metres of the painting area. Insulation and means of heating and ventilation shall be provided as necessary to maintain the temperature of paint stores between 5°C and 27°C.

If at any one time or place paint in tins, painters' kettles or airless spray containers is allowed to reach temperatures outside the 5°C and 27°C limits, the paint shall be discarded and not used for the *service*. The *Contractor* shall also implement any additional storage restrictions recommended by the paint manufacturer.
2. Unless excepted in sub-clause 4 of this Clause, paint which has not been used within the shelf life recommended by the manufacturer or within 18 months of the date of manufacture, whichever is the lesser, shall be discarded and not used in the *service*.
3. Chemically cured or moisture cured paints shall not be used after the expiry of the pot life stipulated by the paint manufacturer. They shall be discarded on expiry of the pot life and at the end of each working day/night. All other paints in opened tins or open containers including painters' kettles shall be returned to store and kept in sealed containers with not more than 10% ullage.
4. Exceptionally, and subject to agreement by the Overseeing Organisation, components of two-pack Epoxy paints may have their keeping period extended to 24 months from the date of manufacturer provided that the *Contractor* returns the paints to the paint manufacturer and ascertains that the manufacturer examines the contents of each tin and reconstitutes the paints as necessary so that such paints are equal in all respects to the paints described in the Contract. The *Contractor* shall provide the Overseeing Organisation with a Certificate of Conformity confirming that such paints have been inspected and where necessary reconstituted and conform in all respects to the Contract.
5. Each tin of reconstituted paint returned to site by the manufacturer shall have an additional label affixed stating 'Extended Keeping Period to (date)'. The previous date marking shall remain and not be obscured. Agreement by the Overseeing Organisation to extended keeping periods of 24 months for certain paints does not relieve the *Contractor* of its responsibilities as described in Clause 5007SR. Testing in compliance with Clause 5009SR shall apply to reconstituted paints.

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501 ISR PROCEDURE TRIALS

Surface preparation procedure trials

1. At the start of the *service period* the *Contractor* shall carry out procedure trials on areas totalling between 2m² and 10m² as designated by the Overseeing Organisation, employing the labour and equipment to be used in the *service*. The *Contractor* shall demonstrate the ability to carry out the specified methods of surface preparation to the standard required. The remaining surface preparation shall not be started until the first stage of the procedure trials specified in sub-clause 2 have been passed as satisfactory by the Overseeing Organisation.

Painting procedure trials

2. Immediately following the satisfactory completion of the first stage of the procedure trials the *Contractor* shall carry out the second and third stages employing the labour and equipment to be used in the *service*. The *Contractor* shall demonstrate its ability to apply the paints selected in accordance with the specification, and shall supply sufficient paint for the trials as agreed by the Overseeing Organisation.

In order to avoid delay the trials may be carried out in 3 stages:

- (i) surface preparation and primer
- (ii) undercoat(s)
- (iii) finish

The stripe coat(s) may be applied in stage (i) or stage (ii). Paint application of the various coats on the remaining parts of the structure shall not be started until the relevant stage of the procedure trials has been passed by the Overseeing Organisation.

3. Surface preparation and painting procedure trials shall be completed within a 7 day period unless otherwise agreed by the Overseeing Organisation.
4. Any adjustment to the registered paint formulations shown to be required by the trials, other than an adjustment to the solvent shall be agreed by the Overseeing Organisation and the adjustments made at the paint manufacturer's works.
5. Unless otherwise agreed by the Overseeing Organisation, the *Contractor* shall carry out further procedure trials whenever replacement skilled labour is employed or use of equipment of a different type is proposed.

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5012SR APPLICATION OF PAINT

1. The *Contractor* shall ensure that the properties of the paints selected cover the conditions at site, including temperature and humidity, and that it is possible to apply the paints satisfactorily to all parts of the structure in these conditions.
2. Paint shall be supplied from the *Contractor's* paint store to the painters ready for application, the only adjustment of formulation being as described in Clause 5011SR.4. In exceptional circumstances any addition of solvent necessary to improve application shall be advised and if possible carried out by the paint manufacturer, preferably in the paint process plant with adequate equipment and controlled measurements.
3. Paint shall be applied only to surfaces which have been prepared and cleaned as described in this Series. Areas of adjacent surfaces which are not to be painted, shall be masked before application of paints to the prepared and cleaned surfaces. Overspray on adjacent unpainted surfaces shall be removed immediately to the satisfaction of the Overseeing Organisation.
4. Unless otherwise described in the Contract, a coat of paint in a system shall be applied by one of the following methods:
 - (i) Brush (B)
 - (ii) Airless spray (AS)
 - (iii) Air pressure spray (S).
5. Paint shall not be applied under the following conditions:
 - (i) When the ambient temperature falls below 5°C or the relative humidity rises above 90% or, for types of paints in Clause 5012SR.14, outside the temperatures and humidities recommended by the paint manufacturer.
 - (ii) During rain, snow, fog, mist or in a dust laden atmosphere.
 - (iii) When the amount of moisture likely to be deposited on the surface by condensation or rain before or after painting, may have a harmful effect on the paint.
 - (iv) When windborne dust may have a harmful effect on the paint.
6. Before starting the procedure trials described in Clause 5011SR and as required by the Overseeing Organisation, the *Contractor* shall provide the Overseeing Organisation with details of the overall wet film thickness proposed for each coat. The *Contractor* shall also provide information as to the total amount of paint expected to be used for each coat of each system during any contract for which procedure trials are required. The calculation of the amount of paint to be used shall be based on the volume solids plus an allowance for waste.
7. The following requirements on paint film thicknesses shall apply:
 - (i) Wet film thickness gauges shall be used where practicable to check that the wet film thickness is not less than:

$$\frac{\text{min dry film thickness (mdft)} \times 100}{\text{volume solids \%}}$$

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- (ii) During the application of a paint system the *Contractor* shall ensure that the progressive total thickness of the applied coats will allow the specified minimum total dft of the system to be attained without exceeding, overall, the proposed wet film thickness referred to in sub-clause 6 of this Clause by more than 20%.
 - (iii) In no case shall the total dry film thickness of a paint system or the mdft of the last undercoat and finish be less than that specified in Form HA/P2 (Maintenance) Paint System Sheet.
 - (iv) The local dry film thickness for any primer shall not exceed the specified mdft by more than 30% and for other paints by more than 75%.
- 8. Each coat of paint of a specified system shall have satisfactory adhesion before the next coat in the system is applied.
- 9. The first coat of paint in Oleo-resinous or Acrylated Rubber paint applied over an existing Oleo-resinous paint, shall be brushed.
- 10. Each coat of paint of a specified system at whatever thickness applied shall be virtually free from surface defects, particularly cratering, pinholing, blistering, rivelling, sagging, bittiness, dry spray and cissing etc. The presence of any of these defects shall be determined by unaided visual assessment. The finished system shall have an even and uniform appearance, with no defects and the finishing paint in visually sensitive areas shall be from the same batch.
- 11. When required by the Overseeing Organisation, the degree of gloss of a finishing coat shall be agreed before the procedure trials. A painted tinplate reference panel, 150mm x 100mm, shall be provided by the *Contractor* for this purpose.
- 12. Unless otherwise specified, patch painting described in Clause 5016AR shall only be applied over areas of an existing system which have been prepared to sound paint.
- 13. All coats in a system including the stripe coat(s) (see Clause 5012SR.15), but excepting repeat coats of the same patch paint, shall be in contrasting colours to aid identification. Before starting the procedure trials described in Clause 5011SR, and as required by the Overseeing Organisation, the *Contractor* shall provide the Overseeing Organisation with a reference panel, coated with the stepped back paint system to indicate the contrast between each coat of paint.
- 14. Two pack chemically cured and moisture cured paints shall not be applied when the steel temperature falls below 3oC above dew point and/or 0oC or when the steel or ambient temperatures are below those advised by the paint manufacturer, nor shall such paints be applied when the temperature is likely to fall below the advised temperatures during the curing period.
- 15. Stripe Coats
 - (i) The stripe coat(s) specified in Clause 5016AR shall be applied over welds and all fasteners including washers and to all external corners excepting those of RHS members.
 - (ii) In areas prepared down to the substrate or to a metal coating, the first stripe coat shall be applied over the primer or the first undercoat; when a second stripe coat is specified it shall be separated from the first by an undercoat.

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CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND CANCELLED CLAUSES AND TABLES INCLUDED IN THE CONTRACT

- (iii) In areas prepared down to sound paint, the stripe coats shall be applied before the priming coat.
 - (iv) Stripe coats applied on existing paint coats other than on Chlorinated Rubber or Acrylated Rubber shall be applied by brush. Stripe coats applied on existing Chlorinated Rubber or Acrylated Rubber paint coats or on new paint may be applied by airless spray or by brush as appropriate.
 - (v) The first stripe coat on "T" Washed fasteners shall be applied by brush.
 - (vi) Square solid infill bars shall, after the second undercoat has been applied, be given an extra coat of the thickest undercoat specified in lieu of a stripe coat or coats.
16. Exposure Times for Prepared Steel or Metal Coated Surfaces
- (i) Clean steel prepared by dry blast cleaning or bright steel prepared by abrading or grinding shall be primed within 4 hours.
 - (ii) Clean steel prepared by wet blast cleaning only, shall be primed within 4 hours of being dry enough for painting.
 - (iii) Clean steel prepared by combined wet/dry blast cleaning shall be primed within 4 hours of dry blast cleaning.
 - (iv) Sa2 or St3 steel prepared by dry blast cleaning or abrading shall be overcoated within 48 hours.
 - (v) Sa2 steel prepared by wet blast cleaning or combined wet/dry blast cleaning shall be primed within 24 hours of being dry enough for painting or within 48 hours of dry blast cleaning.
 - (vi) Steelwork which has been metal sprayed at site shall be etch primed or sealed within 4 hours and in any case before the surfaces have been affected by moisture.
 - (vii) Areas prepared down to bright or sound metal spray coating shall be sealed or primed within 4 hours of preparation by dry blast cleaning or abrading and in any case before the surfaces have been affected by moisture.
 - (viii) Galvanizing which has been abraded to bright metal prior to painting shall be etch primed within 4 hours, or within 4 hours of being dry enough for treatment if wet abraded, and overcoated within 48 hours of etch priming.
17. Gaps at joints or plies shall be sealed in accordance with Clause 5002SR.2xi either before or after the application of the primer as appropriate.
18. Paint Overcoating Times
- Unless otherwise specified or agreed by the Overseeing Organisation, overcoating times shall be as follows:
- (i) Primers on steel or sealed metal sprayed coatings or first coats on "T" Washed or etch primed galvanizing shall be overcoated within 72 hours and the next coat applied within 14 days.
 - (ii) Surfaces of existing paint coats which have been prepared to sound paint, cleaned down only or abraded only to remove gloss shall be overcoated within 7 days.

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**CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND
CANCELLED CLAUSES AND TABLES INCLUDED IN THE
CONTRACT**

- (iii) Coats following those referred to in i and ii above, excepting for the last two coats of the remedial system, shall be applied within 14 days of each coat or as recommended by the paint's manufacturer.

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**CONTRACT-SPECIFIC ADDITIONAL , SUBSTITUTE AND
CANCELLED CLAUSES AND TABLES INCLUDED IN THE
CONTRACT**

5014SR ACCESS, CONTAINMENT AND LIGHTING

1. Without prejudice to the Conditions of Contract, access for inspection by the Overseeing Organisation shall be provided and erected by the *Contractor*. The access shall be agreed with the Overseeing Organisation as being adequate in all respects for inspection purposes.
2. Further to the Conditions of Contract, details of all elevated access and containment including drawings and calculations shall be submitted to the Overseeing Organisation at least 28 days prior to the commencement of work on site.
3. Manual surface preparation and coating application work shall not be carried out when natural light intensity at the workface is less than 500lux. When the light intensity falls below this level, the *Contractor* shall install and maintain temporary lighting which shall provide a minimum light intensity of 500lux over at least 1.0m² at the workface during the work and also for inspection when required by the Overseeing Organisation.

APPENDIX 0/2 CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES AND
TABLES INCLUDED IN THE CONTRACT

Clause No. Alterations to be made

**Clause 602 CLASSIFICATIONS, DEFINITIONS AND USES OF EARTHWORKS
MATERIALS**

GENERAL REQUIREMENTS

8th line, after "Appendix 6/1" insert:-

Topsoil shall not be stripped when it is raining or where there has been rain within the previous 24 hours such that the Overseeing Organisation considers that handling is likely to damage the soil structure. No stripped topsoil shall be removed from the Site unless agreed in writing by the Overseeing Organisation. Topsoil shall be kept free of contamination by subsoil or any other material.

**Clause 702 HORIZONTAL ALIGNMENTS, SURFACE LEVELS AND SURFACE
REGULARITY OF PAVEMENT COURSES**

702.7 After "... shall be taken on 75m lengths." Add the following additional text:-

When checking compliance with Table 7/2, Class A roads shall be regarded as Category A roads and all other roads as Category B roads unless stated otherwise in Appendix 7/1.

Additionally, the riding quality of Category A roads shall be tested within 28 days of completion of laying using a single wheel bump integrator towed at a nominal speed of 32km/h in accordance with TRL SR 26UC. The values obtained shall not be greater than the limits specified below for any 50m length:

Irregularity Index "r"

Surface Course 200cm/km

Binder Course 230cm/km

Where the existing riding quality is very poor and the *Contractor* considers that they will be unable to comply with the above tolerances, the *Contractor* shall give adequate notice in writing to the Overseeing Organisation so that the irregularity of the existing surface can be checked and, if necessary, additional regulating agreed. In the case of two or more courses required it shall be expected that the final layer will comply with the above limits.

Clause 901 BITUMINOUS BASE, BINDER COURSE AND SURFACING MATERIALS

Aggregates for Bituminous Materials

901.3 Aggregates for Bituminous Mixtures

After BS EN 13043, add

The coarse aggregate shall be crushed rock or slag – flint gravel is not acceptable. If more than one type of stone or slag is used in any mixture, then approval must be obtained for each of the types proposed and the proportions to be used. In carriageway Surface Course materials, limestone shall not be permitted as the coarse aggregate in any material nor the fine aggregate in any 6mm Dense Surface Course, Stone Mastic Asphalt or Thin Surface Course materials.

901.15 This sub-clause to be numbered (i)

APPENDIX 0/2	CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES AND TABLES INCLUDED IN THE CONTRACT
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Clause No.	Alterations to be made
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Add the following sub clauses:

- (ii) No fluxing or volatile oils shall be used in the manufacture of any permanent bituminous material unless specified by the Overseeing Organisation in writing,
- (iii) For all Surface Course materials except Hot Rolled Asphalt where the coarse aggregate is quartzite, basalt, or any other igneous rock, the binder shall include an adhesion agent.

Clause 903 PLACING AND COMPACTING OF BITUMINOUS MIXTURES

DENSE ASPHALT CONCRETE BINDER COURSE AS A SURFACE COURSE

903.27 In sub clause (i) delete reference to PSV50 and replace with PSV55.

903.27 Delete sub clause (ii) and add:-

- (ii) Where approved by the Overseeing Organisation AC 20 dense bin material may be used as a temporary (less than 3 weeks) surface on low speed lightly trafficked 'C' or Unclassified roads if the aggregate is crushed rock (other than limestone) with a PSV of not less than 55.

Add the following sub-clauses after 903.28.

903.29

- (i) At the end of the carpet and across side roads, transverse joints shall be made by letting into the surface. The change in gradient in the finished transition length shall not exceed 1 in 50 unless by so doing a smoother transition can be achieved.
- (ii) The *Contractor* shall make provision for making safe in suitable material, the run-on and run-off and any raised longitudinal joint or projecting ironwork at the end of each day's work and shall remove such material prior to continuing the surface operations unless otherwise agreed by the Overseeing Organisation. Signing shall be in accordance with the requirements of Appendix 1/17.
- (iii) Where trafficking of the binder course is anticipated to extend beyond 3 weeks a suitable HSC asphalt, as detailed in Appendix 7/1, shall be substituted. Any variation in thickness will be compensated by additional thickness of the base material. A temporary speed limit of 30 mph shall apply if necessary.

Clause 909 DENSE ASPHALT CONCRETE SURFACE COURSE

The following sub-clause to be added:-

909.3 Where the coarse aggregate used is quartzite, basalt or any other igneous rock, the binder shall include an adhesion agent.

Clause 912 CLOSE GRADED ASPHALT CONCRETE SURFACE COURSE

The following sub-clauses 4 & 5 to be added:-

- 912.4 With 10mm and 14mm materials, natural sand or a blend of crushed rock and natural sand fines is to be used. No fluxing oils are permitted in manufacture as in 901.15
- 912.5 Where the course aggregate used is quartzite, basalt or any other igneous rock the binder shall include an adhesion agent.

APPENDIX 0/2 **CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES AND TABLES INCLUDED IN THE CONTRACT**

Clause No. Alterations to be made

Clause 915 COATED CHIPPINGS FOR APPLICATION TO HOT ROLLED ASPHALT SURFACINGS

915.2 After Appendix 7/1, add the following:-

The Polished Stone Value shall be determined in accordance with BS EN 1097-8.

The aggregate shall be deemed to comply if the mean of the 6 most recent consecutive results from tests relating to the material to be supplied, carried out within the previous 12 months by at least 3 independent testing laboratories with the relevant UKAS accreditation within 6 weeks of sampling, is greater than or equal to the value specified in Appendix 7/1. Additionally, no individual result shall be more than 2 PSV units below the value specified in Appendix 7/1 and the most recent result (no more than 2 months old) shall not be below the value specified in Appendix 7/1 also.

Clause 916 OPEN GRADED ASPHALT CONCRETE SURFACE COURSE

The following sub-clauses 3 & 4 to be added:-

916.3 With 10mm and 14mm materials, natural sand or a blend of crushed rock and natural sand fines are to be used. No fluxing oils are permitted in manufacture as in 901.15.

916.4 Where the course aggregate used is quartzite, basalt or any other igneous rock the binder shall include an adhesion agent.

Clause 921 SURFACE MACROTEXTURE OF BITUMINOUS SURFACE COURSES

921.2 Insert after 'shown in Table 9/2' the following:-

'a surface having a value greater than 2.2 mm will not be accepted in the works'

Add sub-clauses 3 and 4:-

- 3 For screening purposes only, on Hot Rolled Asphalt works the texture depth may be measured using a Mini Texture Meter where compliant values shall be as follows:-
 - (i) On roads where the 85 percentile speed is in excess of 90km/hour a mean Sensor Measured Texture Depth (SMTD) shall not be less than 1.03 and no 50m section reading shall be less than 0.9.
 - (ii) On all other sites a mean SMTD shall not be less than 0.9 and no 50m section reading shall be less than 0.8. Unless otherwise stated in Appendix 7/1.
- 4 The Mini Texture Meter may be used for screening purposes to measure the surface texture of other materials providing a correlation exercise has been undertaken.

Clause 929 DENSE BASE AND BINDER COURSE ASPHALT CONCRETE (DESIGN MIXTURES)

929.12 Insert after "clause 9.5.1.3" the following amendment:-

If the core represents a single bituminous layer and has been cut in half, the density of the core is the average of the value obtained from each half of the core.

If the core represents more than one bituminous course and has been split into layers then the density shall be determined separately for each layer.

APPENDIX 0/2 **CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES AND TABLES INCLUDED IN THE CONTRACT**

Clause No. Alterations to be made

NOTE 1: A 'layer' is defined as a thickness of material spread by a single operation.

Clause 937 STONE MASTIC ASPHALT (SMA) BINDER COURSE AND REGULATING COURSE

After 'SMA 20 bin PMB' in sub-clause 1 add the following:

- 1.1. Fine aggregate shall comply with Clause 901 and shall comprise crushed rock or crushed slag which may be blended with not more than 50% of natural sand. Crushed gravel shall not be permitted.

Clause 942 THIN SURFACE COURSE

942. Add an additional sub-clause 6.1:-

- 6.1. Fine aggregate shall comply with Clause 901 and shall comprise crushed rock or crushed slag which may be blended with not more than 50% of natural sand. Crushed gravel shall not be permitted.

942.15 In the first sentence replace 'trunk' with 'county' and delete 'including motorway'.

Clause 943 HOT ROLLED ASPHALT SURFACE COURSE AND BINDER COURSE (PERFORMANCE-RELATED DESIGN MIX)

943.4 After 'modified binders' in line 2 add :-

' Only pre-blended modified binders shall be used.'

Delete 'whether the modifier into the asphalt mixer'

943.5 Delete 'PSV₄₄' and replace with 'PSV₅₀'

Clause 1104 FOOTWAYS AND PAVED AREAS (PRECAST CONCRETE FLAGS)

Add the following to "after BS EN 12620 designation 0/2"

The joints shall be close joints (2-4mm).

Clause 1107 FOOTWAYS AND PAVED AREAS (CONCRETE BLOCK PAVING)

Add the following sub-clauses 4, 5, 6, 7, 8, 9 and 10:-

- 1107.4 The layout of blocks and details of edges, manholes, gullies and other openings shall be agreed with the Overseeing Organisation prior to laying.
- 1107.5 The blocks shall be laid by workmen experienced in the laying of concrete blocks and the Overseeing Organisation will require references in support of this requirement.
- 1107.6 Blocks shall be cut to fit all edges using a water lubricated disc cutter. The bond of any edge shall be adjusted such that insert pieces are of a size not less than one half of a full block.
- 1107.7 For the purposes of the Contract Table B1 in BS 7533 Part 3 applies.
The level of any two adjacent blocks shall not differ by more than 2mm.

APPENDIX 0/2 **CONTRACT-SPECIFIC MINOR ALTERATIONS TO EXISTING CLAUSES AND TABLES INCLUDED IN THE CONTRACT**

Clause No.	Alterations to be made
	The maximum deviation of the finished surface shall not exceed 10mm below the 3m straight edge.
1107.8	The paving shall be treated with an approved colourless sealant before the pavement is trafficked.
1107.9	Blocks shall have a Polished Pendulum Test Value (PPTV) of 45 minimum or 55 minimum (when tested in accordance with BS 7932) as specified by the Overseeing Organisation. Any sealant used shall not reduce the slip / skid resistance of the blocks surface.
1107.10	Bedding Sand shall comply with Category 1B : Tables D2 and D3 : BS 7533-3.

Clause 1108 FOOTWAYS AND PAVED AREAS (CLAY PAVERS)

Add the following sub-clauses 4, 5, 6, 7, 8, 9 and 10:-

- 1108.4 The layout of blocks and details of edges, manholes, gullies and other openings shall be agreed with the Overseeing Organisation prior to laying.
- 1108.5 The blocks shall be laid by workmen experienced in the laying of concrete blocks and the Overseeing Organisation will require references in support of this requirement.
- 1108.6 Blocks shall be cut to fit all edges using a water lubricated disc cutter. The bond of any edge shall be adjusted such that insert pieces are of a size not less than one half of a full block.
- 1108.7 For the purposes of the Contract Table B1 in BS 7533 Part 3 applies.
The level of any two adjacent blocks shall not differ by more than 2mm.
The maximum deviation of the finished surface shall not exceed 10mm below the 3m straight edge.
- 1108.8 The paving shall be treated with an approved colourless sealant before the pavement is trafficked.
- 1108.9 Clay pavers shall have a minimum Polished Pendulum Test Value (PPTV) of 45 or 55 minimum (when tested in accordance with BS 7932) as specified by the Engineer. Any sealant used shall not reduce the slip / skid resistance of the blocks surface.
- 1108.10 Bedding Sand shall comply with Category 1B : Tables D2 and D3 : BS 7533-3.

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

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.

List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

Appendix No	Appendix Title
INTRODUCTION	
(	0/1 Contract-specific Additional, Substitute and Cancelled Clauses and Tables Included in the Contract
(	0/2 Contract-specific Minor Alterations to Existing Clauses and Tables Included in the Contract
(E) (	0/3 List of Numbered Appendices Referred to in the Specification and Included in the Contract
(	0/4 List of Drawings Included in the Contract
(	0/5 Special National Alterations of the Overseeing Organisations of Scotland/Wales/Northern Ireland – (Not used)
PRELIMINARIES	
(	1/1 Temporary Accommodation and Equipment for the Overseeing Organisation
(	1/2 Vehicles for the Overseeing Organisation
(	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 <i>Contractor</i>
(	1/6 Supply and Delivery of Samples to the Overseeing Organisation
(	1/7 Site Extents & Limitations on Use
(	1/8 Operatives for the Overseeing Organisation
(	1/9 Control of Noise and Vibration
(	1/10 Structures to be Designed by the <i>Contractor</i>
(E) (	1/11 Structural Elements and Other Features to be Designed by the <i>Contractor</i>
(	1/12 Setting Out and Existing Ground Levels
(	1/13 Programme of Works
(	1/14 Payment Applications
(	1/15 Accommodation Works
(	1/16 Privately and Publicly Owned Services and Supplies
(	1/17 Traffic Safety and Management
(	1/18 Temporary Diversions for Traffic
(	1/19 Routeing of Vehicles
(	1/20 Recovery Vehicles for Breakdowns – (Not used)
(	1/21 Information Boards
(	1/22 Progress Photographs – (Not used)
(	1/23 Risks to Health & Safety from Materials or Substances
(	1/24 Quality Management System – (Not used)
(	1/25 Temporary Closed Circuit Television (CCTV) System for the Monitoring of Traffic – (Not used)

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

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

	Appendix No	Appendix Title
(	1/26	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR) – (Not used)
(	1/27	Temporary Automatic Speed Camera System for the Enforcement of Mandatory Speed Limits at Road Works (TASCAR) – Particular Requirements – (Not used)
		SITE CLEARANCE
(	2/1	List of Buildings etc. to be Demolished or Partially Demolished
(	2/2	Filling of Trenches and Pipes
(E) (	2/3	Retention of Material arising from Site Clearance
(	2/4	Explosives & Blasting
(	2/5	Hazardous Materials
		FENCING AND ENVIRONMENTAL BARRIERS
(E) (	3/1	Fencing, Gates and Stiles
		ROAD RESTRAINT SYSTEMS (VEHICLE & PEDESTRIAN)
(E) (	4/1	Road Restraint Systems (Vehicle & 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
		DRAINAGE AND SERVICE DUCTS
(	5/1	Drainage Requirements
(	5/2	Service Duct Requirements
(E) (	5/3	Surface Water Channels and Drainage Channel Blocks
(	5/4	Fin Drains and Narrow Filter Drains
(	5/5	Combined Drainage and Kerb Systems
(	5/6	Linear Drainage Channel Systems
(	5/7	Thermoplastics Structural Wall Pipes and Fittings – (Not used)
		EARTHWORKS
(	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)
(	6/4	Requirements for Class 3 Material
(E) (	6/5	Geotextiles Used to Separate Earthworks Materials

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

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

	Appendix No	Appendix Title
(	6/6	Fill to Structures and Fill Above Structural Foundations
(	6/7	Sub-formation & Capping & Preparation & Surface Treatment of Formation
(	6/8	Topsoiling
(	6/9	Earthwork Environmental Bunds, Landscape Areas, Strengthened Embankments
(	6/10	Ground Anchorages, Crib Walling & Gabions
(	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 – (Not used)
(	6/14	Limiting Values for Pollution of Controlled Waters – (Not used)
(	6/15	Limiting Values for Harm to Human Health and the Environment – (Not used)
ROAD PAVEMENTS - GENERAL		
(	7/1	Permitted Pavement Options - (Schedules 1, 2, 3, 4 and 5)
(	7/2	Excavation, Trimming and Reinstatement of Existing Surfaces
(E) (	7/3	Surface Dressing – Performance Specification – (Not used)
(	7/4	Bond Coats, Tack Coats and Other Bituminous Sprays
(	7/5	In Situ Recycling – The Remix and Repave Process – (Not used)
(	7/6	Breaking Up or Perforation of Existing Pavement
(E)(C)(T)(P) (	7/7	Slurry Surfacing Incorporating Microsurfacing – (Not used)
(	7/8	NOT USED
(	7/9	Cold Milling (Planing) of Bituminous Bound Flexible Pavement
(C) (	7/10	NOT USED
(	7/11	Overband and Inlaid Crack Sealing Systems – (Not used)
(	7/12	Arrester Beds – (Not used)
(C) (	7/13	Saw-Cut Crack and Seal Bituminous Overlays on Existing Jointed Concrete Pavements – (Not used)
(	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 Seal Existing Jointed Reinforced Concrete Pavements – (Not used)
(	7/16	Cracking and Sealing of Existing Jointed Unreinforced Concrete Pavements and CBM Bases – (Not used)
(C) (	7/17	Cracking Plant and Equipment Progress Record – (Not used)
(E) (	7/18	Site Specific Details and Requirements for Cold Recycled Bitumen Bound Material
(	7/19	Site Specific Details and Requirements for Recycled Cement Bound Material – (Not used)

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

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

	Appendix No	Appendix Title
(E)(C)(T)	7/20	NOT USED
(E)(C)(T)	7/21	Surface Dressing – Recipe Specification – (Not used)
(E)(C)(T)	7/22	Repairs to Potholes – (Not used)
(E)(C)(T)	7/70	Modified Binder and Mixture Data Requirements
(E)(C)(T)	7/71	Patching
ROAD PAVEMENTS – CONCRETE AND CEMENT BOUND MATERIALS		
(T)	10/1	Plant and Equipment for the Construction of Exposed Aggregate Concrete Surface – (Not used)
KERBS, FOOTWAYS AND PAVED AREAS		
(E)	11/1	Kerbs, Footways & Paved Areas
(E)	11/2	Access Steps – (Not used)
TRAFFIC SIGNS		
(E)	12/1	Traffic Signs: General
(E)	12/2	Traffic Signs: Marker Posts
(E)	12/3	Traffic Signs: Road Markings & Studs
(E)	12/4	Traffic Signs: Cones, Cylinders, FTDs & Other Traffic Delineators
(E)	12/5	Traffic Signs: Traffic Signals
(E)	12/6	Traffic Signs: Special Sign Requirements on Gantries – (Not used)
ROAD LIGHTING COLUMNS AND BRACKETS, CCTV MASTS AND CANTILEVER MASTS		
(E)	13/1	Information to be Provided when Specifying Lighting Columns and Brackets
(C)(P)(E)	13/2	(Specification for Highway Works) Typical Lighting Column & Bracket Data Sheets 1 & 2
(P)	13/3	Instructions for Completion of Lighting Column & Bracket Data Sheets
(E)	13/4	Information to be Provided When Specifying CCTV Masts – (Not used)
(C)(P)(E)	13/5	(Specification for Highway Works) Typical CCTV Mast Data Sheet – (Not used)
(P)	13/6	Instructions for Completion of CCTV Mast Sheets – (Not used)
(E)(T)	13/7	Information to be Provided when Specifying Cantilever Masts Sheets – (Not used)
(C)(P)(E)	13/8	(Specification for Highway Works) Typical Cantilever Masts Data Sheets 1 and 2 – (Not used)

APPENDIX 0/3

LIST OF NUMBERED APPENDICES REFERRED TO IN THE SPECIFICATION AND INCLUDED IN THE CONTRACT

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

	Appendix No	Appendix Title
(P) (	13/9	Instructions for Completion of Cantilever Masts Data Sheets – (Not used)
		ELECTRICAL WORK FOR ROAD LIGHTING AND TRAFFIC SIGNS
(	14/1	Site Records
(	14/2	Location of Lighting Units and Feeder Pillars
(	14/3	Temporary Lighting
(	14/4	Electrical Equipment for Road Lighting
(	14/5	Electrical Equipment for Traffic Signs
		MOTORWAY COMMUNICATIONS
	15/1	Motorway Communications – (Not used)
	15/2	Cable Duct Requirements – (Not used)
		PILING AND EMBEDDED RETAINING WALLS
(	16/1	General Requirements for Piling and Embedded Retaining Walls
(	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 – (Not used)
		STRUCTURAL CONCRETE
(	17/1	Schedule For The Specification Of Designed Concrete

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

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

	Appendix No	Appendix Title
(	17/2	Concrete - Impregnation Schedule
(	17/3	Concrete - Surface Finishes
(	17/4	Concrete - General
(	17/5	Buried Concrete
(	17/6	Grouting and Duct Systems for Post-Tensioned Tendons
		STRUCTURAL STEELWORK
(	18/1	Requirements for Structural Steelwork
		PROTECTION OF STEELWORK AGAINST CORROSION
(	19/1	(Specification for Highway Works) Form HA/P1 (New Works) Paint System Sheet
(	19/2	Requirements for Other Work
(	19/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
(	19/4	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
(	19/5	General Requirements
		WATERPROOFING FOR CONCRETE STRUCTURES
(C)(P)(	20/1	Waterproofing for Concrete Structures
		BRIDGE BEARINGS
(	21/1	Bridge Bearings Schedule
		PARAPETS
(	22/1	NOT USED
		BRIDGE EXPANSION JOINTS AND SEALING OF GAPS
(	23/1	Bridge Deck Expansion Joint Schedule
(	23/2	Sealing of Gaps Schedule (Other than in Bridge Deck Expansion Joints)
		BRICKWORK, BLOCKWORK AND STONEWORK
(	24/1	Brickwork, Blockwork and Stonework
		SPECIAL STRUCTURES
(	25/1	Requirements for Corrugated Steel Buried Structures – (Not used)
(	25/2	Requirements for Reinforced Soil and Anchored Earth Structures – (Not used)

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

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

	Appendix No	Appendix Title
(	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 – (Not used)
		MISCELLANEOUS
(	26/1	Ancillary Concrete
(	26/2	Bedding Mortar
(	26/3	Cored Thermoplastic Node Markers
		LANDSCAPE AND ECOLOGY
(	30/1	General, sheets 1, 2 and 3
(	30/2	Weed Control
(	30/3	Control of Rabbits and Deer – (Not used)
(	30/4	Ground Preparation
(	30/5	Grass Seeding, Wildflower Seeding and Turfing
(	30/6	Planting, sheets 1 and 2 – (Not used)
(	30/7	Grass, Bulbs and Wildflower Maintenance – (Not used)
(	30/8	Watering – (Not used)
(	30/9	Establishment Maintenance for Planting – (Not used)
(	30/10	Maintenance of Established Trees and Shrubs – (Not used)
(	30/11	Management of Waterbodies – (Not used)
(	30/12	Special Ecological Measures – (Not used)
		MAINTENANCE PAINTING OF STEELWORK
(C)(P) (	50/1	(Specification for Highway Works) Form HA/P1 (Maintenance) Paint System Sheet
(C)(P) (	50/2	Requirements for Other Work
(C)(P) (	50/3	(Specification for Highway Works) Form HA/P2 Paint Data Sheet
(C)(P) (	50/4	(Specification for Highway Works) Form HA/P3 Paint Sample Despatch List: Sheets 1 and 2
(Co) (	50/5	General Requirements

Guide to types of Numbered Appendices - who compiles/completes

Symbol

(E) Overseeing Organisation compiles.

APPENDIX 0/3

**LIST OF NUMBERED APPENDICES REFERRED TO IN THE
SPECIFICATION AND INCLUDED IN THE CONTRACT**

List 'A': List of numbered Appendices referred to in the Specification for Highways Works.
List 'B' gives the list of Contract-specific Numbered Appendices devised for the Contract.

Appendix No	Appendix Title
(E/C)	Overseeing Organisation partially compiles and <i>Contractor</i> completes and returns to Overseeing Organisation.
(E/T)	Overseeing Organisation partially compiles and Tenderer completes and returns with Tender.
(C)	<i>Contractor</i> completes and returns to Overseeing Organisation.
(I)	For <i>Contractor's</i> information only.
(P)	This indicates the Appendix is a national proforma and format must not be altered.

APPENDIX 0/4 LIST OF DRAWINGS INCLUDED IN THE CONTRACT

Contract Specific Drawings

(Rev A, 04/01/13)

Mayer Brown Drawings and Documents

<u>Drawing number</u>	<u>Title</u>
ZSSLWVILLE2.2/08	Topographic Survey Drawing
ZSSLWVILLE2.2/09	Site Clearance Drawing
ZSSLWVILLE2.2/10	General Arrangement Drawing
ZSSLWVILLE2.2/11	Construction Treatments Drawing
ZSSLWVILLE2.2/12	Drainage and Ducting Drawing
ZSSLWVILLE2.2/13	Aston Road – Traffic Signals Drawing
ZSSLWVILLE2.2/14	Maurepas Way – Traffic Signals Drawing
ZSSLWVILLE2.2/15	Street Lighting Drawing
ZSSLWVILLE2.2/20	String Labels and Setting Out Drawing
ZSSLWVILLE2.2/21	Aston Road (New) Proposed Roundabout Stockdale Crown Line Design
ZSSLWVILLE2.2/22	Aston Road (New) Roundabout – Proposed Cross Sections along Roundabout Crowns MCR1, MCR2 & MCR3
ZSSLWVILLE2.2/23	Aston Road (New) – Proposed Longitudinal and Cross Sections along MCL0 and MCL1
ZSSLWVILLE2.2/24	Hambledon Road – Proposed Longitudinal and Cross Sections along MCL2
ZSSLWVILLE2.2/25	Customer Entrance & Aston Road (New) – Proposed Longitudinal and Cross Sections along MCL3 and MCL4
ZSSLWVILLE2.2/26	Aston Road (New) – Proposed Longitudinal Sections along Channel Lines MC00, MC01, MC07 and MC08
ZSSLWVILLE2.2/27	Longitudinal Sections Along Proposed Drainage Networks 1 & 2 on a 1 in 2 Year Event & 1 in 30 Year Event
ZSSLWVILLE2.2/28	Maurepas Way – Proposed Longitudinal and Cross Sections along MC0A
ZSSLWVILLE2.2/STATS02	Existing Services Drawing
ZSSLWVILLE2.2/STATS03	Proposed Services Drawing
ZSSLWVILLE2.2/BT01	Proposed BT Protection / Diversion Works
ZSSLWVILLE2.2/SSE01	Proposed Scottish & Southern Energy Protection / Diversion Works

APPENDIX 0/4 LIST OF DRAWINGS INCLUDED IN THE CONTRACT

ZSSLWVILLE2.2/SGN01	Proposed Southern Gas Networks Protection / Diversion Works
ZSSLWVILLE2.2/VM01	Proposed Virgin Media Protection / Diversion Works
ZSSLWVILLE2.2/PW01	Proposed Portsmouth Water Protection / Diversion Works
ZSSLWVILLE2.2/S278	Land to be dedicated as Public Highway

APPENDIX 0/4 LIST OF DRAWINGS INCLUDED IN THE CONTRACT

Kirk Saunders Associates Drawings and Documents

<u>Drawing number</u>	<u>Title</u>
4483.0003-AIP	Pedestrian / Cycle Ramp Structure Approval in Principle
4483.0006-AIP	Subway Infill Approval in Principle
4483-004	Pedestrian Ramp Plans & Details – General Arrangements
4483-005	Pile Cap & RC Ramp Details – General Arrangements
4483-006	Concrete Ramp Details – General Arrangements
4483-007	Steelwork Details – General Arrangements
4483-008	Enlarged Plan Details – General Arrangements
4483-009	Steelwork Details – General Arrangements
4483-010	Ramp Elevations – General Arrangements
4483-011	Pile & Pilecap Layout – General Arrangements
4483-020	Existing Ramp Infill – Plans & Details GA

Arthur Amos Associates Drawings and Documents

<u>Drawing number</u>	<u>Title</u>
779B-03	Landscape Proposals
779B-04	Landscape Proposals, Pedestrian Ramp, Maurepas Way
779B-08	Landscape Proposals, Pedestrian Crossing, Maurepas Way
779B-11	Maurepas Way Pedestrian Access Ramp Tree Removal, Retention & Protection Plan
779B-12	PFS Tree Removal, Retention & Protection Plan
779B-13	Aston Road Tree Removal, Retention & Protection Plan
779B-22	Detailed Hard Landscaping Proposals Public Realm – Store Front
779B-23	Detailed Soft Landscaping Proposals
779B-27	Maurepas Way Crossing, Root Barrier Details
779	Landscape Management Plan

APPENDIX 0/4 LIST OF DRAWINGS INCLUDED IN THE CONTRACT

HCC Standard Details

<u>Drawing number</u>	<u>Title</u>
HCC9/C/010 Rev A	Precast Concrete Kerb
HCC9/C/045 Rev C	Footways Type 1A, 1B, 2 and 3
HCC9/C/055 Rev C	Footway Type 5, Type 6A and Type 6B – Strengthened
HCC9/C/060 Rev B	Uncontrolled Pedestrian Crossing In New Works
HCC9/C/065 Rev B	Uncontrolled Pedestrian Crossing In Existing Footway
HCC9/C/070 Rev B	Uncontrolled Pedestrian Crossing Installed Within Footway Type 2
HCC9/C/075 Rev B	Pedestrian Refuge Island Types 1A to 8A With Non-illuminated Bollards
HCC9/C/090 Rev B	Reinstatement Of Drain And Duct Trenches In Existing Carriageways
HCC9/C/095 Rev B	Reinstatement of Drain and Duct Trenches in Existing Footway
HCC9/C/135	High Visibility Pedestrian Guard Rail
HCC9/C/140 Rev B	Traffic Signing Post Foundations
HCC9/C/145 Rev A	HCC Scheme Sign Boards Types 1 and 2
HCC9/D/015 Rev B	Gully Type 1
HCC9/D/045 Rev B	Manhole Types M1A, M1B & M1C (Precast Concrete depth exceeding 1.5m But Not 3.0m)
HCC9/L/015 Rev B	Column Types 2A Tubular Steel Planted Columns
HCC9/L/020 Rev B	Column Types 2B Tubular Steel Planted Columns
HCC9/L/025 Rev B	Planted Column Erection Details for Locations in Paved Areas
HCC9/L/026 Rev B	Planted Column Erection Details for Locations in Un-paved Areas
HCC9/L/045 Rev B	Column Type 3 Tubular Steel Planted Columns for Residential Roads
HCC9/L/050 Rev B	Externally Illuminated Sign Mounted on Steel Post and Foundation Details
HCC9/L/060 Rev A	Internally Illuminated Bollard Details
HCC9/L/065 Rev B	Termination of (S.W.A). Cables in Columns or Posts for a Private Network

APPENDIX 0/4 LIST OF DRAWINGS INCLUDED IN THE CONTRACT

<u>Drawing number</u>	<u>Title</u>
HCC9/L/070 Rev A	Underground Cabling For Private Cable Networks
HCC9/L/075	Street Lighting Drawpit Type 2
HCC9/L/080 Rev A	Typical Base Compartment Arrangement for Columns or Posts With Scottish and Southern Energy PLC Service
HCC9/L/085 Rev A	Steel Wire Armour Cable Method of Termination for Private Networks
HCC9/L/090 Rev A	General Feeder Pillar Details
HCC9/L/160 Rev A	Numbering Specification for Illuminated Furniture Mounted in Footways
HCC9/L/170	Areas to be Kept Clear of Trees and Shrubs
HCC9/M/005 Rev A	Kerb Replacement (On New Base)
HCC9/M/010 Rev A	Kerb Replacement (On Existing Base)
HCC9/M/020 Rev C	Carriageway Haunch Repair Detail
HCC9/M/025 Rev C	Carriageway Repair Details
HCC9/M/035 Rev C	Typical Vehicle Crossing In Existing Footway
HCC9/T/005 Rev C	Traffic Signal Drawpit Type 1A & 1B
HCC9/T/010 Rev C	Traffic Signal Drawpit Type 2
HCC9/T/020 Rev A	Details of Traffic Signal Controller Chambers Types A and B
HCC/T/025 Rev B	Details of Traffic Signal Pole Connection
HCC9/T/030	Details of Connection of Vehicle Detector Loop
HCC/T/035 Rev C	Traffic Signal Retention Pole Sockets
HCC/T/040 Rev B	Puffin/Pelican/Toucan Crossing Layout Details
HCC/T/045	Power Supply Pillar
HCC/T/055 Rev A	Traffic Signal Duct Details

Mayer Brown Site Specific Standard Details

<u>Drawing number</u>	<u>Title</u>
MB/C/01	Site Specific Construction Details

APPENDIX I/I TEMPORARY ACCOMMODATION AND EQUIPMENT FOR THE OVERSEEING ORGANISATION

1 Accommodation Required

An adequate desk, chair and filing cabinet(s) and associated space within a secure section of the Contractor's Site offices will be required for one Engineer throughout the course of the works. Suitable power supply for a computer and internet access will be required. Adequate parking shall be made available on site for visiting Engineers as may be required during the course of the works.

APPENDIX I/4 WORKING AND FABRICATION DRAWINGS

The following will require working/fabrication drawings/details and/or manufacturer's current instructions and explanatory brochures.

Series	Description of Work	Minimum Period for Submission of Drawings
100	Traffic Management	6 weeks
300	Temporary fencing	6 weeks
1200	Traffic Signs	6 weeks
1300/1400	Road Lighting and Cabling	6 weeks

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

GENERAL NOTES:

- 1 The Tables which follow show the minimum frequency of testing to be carried out by the *Contractor* to demonstrate compliance with the Specification. The actual frequency of testing to be carried out by the *Contractor* will be expected to be increased, in the event of materials failing to comply, until it can be demonstrated to the Overseeing Organisation, that those materials are again reliably compliant.
- 2 Unless otherwise shown in this Appendix, tests or certificates for work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the *works*.
- 3 Tests equivalent to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the *Contractor* (See sub-Clause 105.5).
- 4 The *Contractor* shall be responsible for carrying out tests in conjunction with Structures designed by the *Contractor* after agreeing testing requirements with the Overseeing Organisation.
- 5 Cube strengths are not required routinely for concrete complying with Clause 2602 / 2602SR.
- 6 The *Contractor* shall be responsible for cutting all cores for air voids testing, wheel tracking, stiffness and deformation resistance determinations at locations directed by the Overseeing Organisation in accordance with Clauses 903, 929, 937, 942, 943, 1003 and 1030. Cores will be required from each layer. A layer is defined as that thickness of material laid in one single operation. The *Contractor* shall also carry out the reinstatement and sealing of core holes using appropriate bituminous or cementitious materials as instructed by the Overseeing Organisation. Any core hole that settles by more than 8mm within 3 months of reinstatement shall, at the direction of the Overseeing Organisation, be retreated at no extra cost.
- 7 Where the *Contractor* is responsible for sampling and or testing the cores they shall ensure all cores are protected, stored and transported in accordance with the relevant clause.
- 8 In the cases of 6 and 7 the *Contractor* is responsible for ensuring the cores taken are of the correct dimensions and straightness and are clearly marked as required by the relevant clause. Cores shall be contained in such a way that their individual identities and locations are preserved and traceable.
- 9 Where tests are required at the rate of 1 per source, the *Contractor* shall either supply recent (i.e. not older than 12 months) appropriate test results or conduct testing specifically at the material approval stage.
- 10 (N) indicates that the test in question shall be carried out to UKAS standards and a UKAS accredited test report or Certificate is required.
- 11 Test Certificates. Where a requirement for test certificates is shown in any particular segment of the table, this requirement shall apply to all items adjacent to that segment.
- 12 Copies of all test certificates specified for the 900 Series shall be automatically sent to the Overseeing Organisation.

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 300					
306	Permanent fencing				Quality management scheme applies
	Concrete components	Cover to reinforcement	1 per consignment (max 1 per 100 components) (BS1722-2:2006)	Required	
308	Gates and Stiles				Quality management scheme applies
	Reinforced Concrete Posts	Cover to reinforcement	1 per consignment (max 1 per 100 components) (BS3470:1975)	Required	
308 & 311	Preservation of timber	Full sapwood penetration	As required in sub-Clause 311.2(v)	Required for each batch	Quality management scheme applies

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 400					
402	Welding	Welding procedures (Manufacturer's tests)	(Every seven years)	Required	Quality management scheme applies
		Welder qualification (Manufacturer's tests)	As required in Sub Clause 402.6(iii)		
		Production testing (Manufacturer's tests)	As required in Sub Clause 402.6(iv)		
	Welded joints	Destructive testing (Manufacturer's tests) (N)	(See sub-Clause 402.6 (v) and 402.6(vi))	Required	++ [See NG402(N)]
403	Anchorage and attachment systems for use in drilled holes	Ultimate tensile load (Manufacturer's tests)		Required	To provide well attested and documented evidence [See NG 403.15]
404	Anchorage in drilled holes	Loading test on site	1 per site or as required in Appendix 4/1	Required	
	Post foundations		1 per 100 linear m or per section, whichever is greater		Contractor to provide equipment and carry out test [See NG404.3 and 4]
406	Vehicle parapets			Required (BS 6779-1 1998 (Amd. No. 14290 21 March 2003))	Check Manufacturer's Test Certificate
407	Anchorage and attachment systems for use in drilled holes	Ultimate tensile load (Manufacturer's tests)		Required	To provide well attested and documented evidence [See NG 407.2]
409	Vehicle parapet posts	Production testing as specified in BS 6779-1 1998 (Amd No 14290. 21 March 2003) (Manufacturer's tests)		Required	Certification in accordance with Clause 409 is required.
410	Anchorage in drilled holes	Loading test on site	As required on Appendix 4/1	Required	[See NG410.1]

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500					
501	Pipes for drainage and service ducts				
		Vitrified clay	[See Note 1] Evidence of CE Marking or BBA Agreement Cert.	Required [See Note 2]	Product certification scheme applies. [Note 1. Additional manufacturer's tests are provided for in the relevant BS but should not normally be required.]
		Concrete-PC/S RC			
		Concrete Pre-stressed			
		Not exceeding 900mm diameter			
		Iron-cast			
		Iron-ductile			
		PVC-U			
		GRP			
		Plastics, see Table 5/1			
		Corrugated steel	(Manufacturer's tests)	Required (AASHTO)	[Note 2 Certificates are provided for in the relevant BS but should not normally be required except for pipes which are not quality marked by a UKAS or equivalent accredited body listed in Appendix B]
		Corrugated steel bitumen protection			
		Not exceeding 900mm diameter			
		Other materials		Required	BBA certification (or equivalent) applies
503	Pipe bedding	Grading and fines content (N)	1 per week (min of 3)	Required	Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242.
		For a recycled content see Clause 710 (N)			
		Water-soluble sulphate (WS) content (N)	5 per source at approval	Required	[Minimum to allow for natural variability of sulphur compounds.]
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source at approval	Required	
		Resistance to fragmentation (N)	1 per source* at approval		[LA category]

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 500					
505	Filter medium backfill	Plastic index (N)	1 per source at approval	Required	[Results of routine control tests from the factory production control system operated by the producer to be provided – see annex C of BS EN 13242 and Annex D of BS EN 13285.]
		Resistance to fragmentation (N)	1 per source at approval	Required	
		Water soluble sulphate (WS) content (N)	5 per source at approval	Required	[Minimum to allow for natural variability of sulphur compounds.]
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source at approval	Required	
		Grading and fines content (N)	1 per source at approval	Required	[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242 and Annex D of BS EN 13285.]
		For a recycled content see Clause 710		Required	
		Permeability (N)	1 per source at approval	Required	If required by App 5/1
506	Sealing existing drains		Site specific compiler to specify		
	Concrete				
	Grout				
507	Chambers	Evidence of CE Mark or BBA Agreement Cert. (Manufacturer's tests)	Each type and source	Required	Product certification scheme applies
	Pre-cast concrete				
	Corrugated galvanized steel			Required	Product certification scheme applies
	Chamber steps	BS EN 124 Tests	1 per type and source	Required	Product certification scheme applies
	Steel fitments				Quality Management scheme applies
	Covers, grates and frames				As App 5/1
	Cover bolts				
	Watertightness				
508	Gullies and pipe junctions	Evidence of CE Mark or BBA Agreement Cert	1 per type and source	Required	Product certification scheme applies
	Pre-cast concrete				
	Clay				
	Plastic				BBA certification applies

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Series 500					
509	Watertightness of joints	Air test	All pipelines with watertight joints <i>[As required in Appendix 5/1 for partly watertight joints]</i>	Required	To be observed by the Overseeing Organisation
512	Backfill to pipe bays	Grading and fines content (N) For a recycled content see Clause 710	1 per 50 tonnes (minimum of 3)*	Required	<i>[Appropriate tests/ samples for the resistance to freezing and thawing (magnesium sulphate soundness) should be scheduled where required. NG 803.4]</i>
		Water-soluble sulphate (WS) content	5 per source		Minimum to allow for natural variability of sulphur compounds
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source	Required	
513	Permeable backing to earth retaining structures	Plastic index (N)	1 per source	Required	<i>[Appropriate tests/ samples for the resistance to freezing and thawing (magnesium sulphate soundness) should be scheduled where required. NG 803.4]</i>
		Water-soluble (WS) content	5 per source	Required	<i>[Minimum to allow for natural variability of sulphur compounds]</i>
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per source	Required	<i>[Minimum to allow for natural variability of sulphur compounds]</i>
	Permeable backing to earth retaining structures	Resistance to fragmentation (N)	1 per source *	Required	<i>[LA category]</i>
		Grading and fines content (N) For a recycled content see Clause 710	1 per 200 tonnes (min of 3)*	Required	
		Permeability	1 per source *	Required	
		Pre-cast hollow concrete blocks	(Manufacturer's tests)	1 set per source *	Required
514	Fin drains	(Manufacturer's tests) BBA Agreement Cert		Required	BBA certificates (or equivalent) applies

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Series 500					
515	Narrow filter drains				
		Geotextile, pipes and fittings	(Manufacturer's tests) BBA Agreement Cert	Required	BAA certification (or equivalent) applies
		Granular fill	Plastic index (N)		[Minimum to allow for natural variability of sulphur compounds]
			Resistance to fragmentation (N)		
			Water-soluble sulphate (WS) content (N)		
			Oxidisable sulphides (OS) content and total potential sulphate (TPS) content (N)		
			Grading and fines content (N) For a recycled content see Clause 710		[Results of routine control tests from the factory production and control system operated by the producer to be provided – see Annex C of BS EN 13242]
			Permeability (N)		
516	Combined drainage and kerb systems	Load test (Manufacturer's test)	A minimum of 1 test and not less than 1 test per 1000m for each type and source	Required	Certification that the systems comply with Clause 516 is required
517	Linear drainage systems	Load test	A minimum of 1 test and not less than 1 test per 1000m for each type and source	Required	Certification that the systems comply with Clause 517 is required
518	Thermoplastic structured wall pipes and fittings	(Manufacturer's tests) BBA Agreement certificate		Required	BBA certification (or equivalent) applies

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 600						
601 631 to 637 640	Acceptable material					<i>[For recycled aggregate, see sub-Clauses 601.12, 601.18 and Clause 710]</i>
	Class	General Description				
	1	General granular fill	Grading/ uniformity coefficient (N)	Twice a week*	Required	
			mc/MCV (N) OMC Max. dry density	2 per 1000m ³ up to max of 5 per day*		
			SMC of chalk (N)	Twice a week*		
		IC only	Resistance to fragmentation (N)	Weekly*		<i>[LA Category]</i>
	2	General cohesive fill	Grading (N)	Twice a week*	Required	<i>[Cross-references should be made to any requirements in Appendix 6/1]</i>
			mc/MCV/PL Undrained shear strength (N)	2 per 1000m ³ up to max of 5 per day*		
			SMC of chalk (N)	Twice a week*		
			Bulk density (pfa) (N)	2 per 1000m ³ up to max of 5 per day*		
	3	General chalk fill	mc (N)	2 per 1000m ³ up to max of 5 per day*	Required	
			SMC (N)	Daily*		
	4	Landscape fill	Grading/mc/MCV (N)	Daily*	Required	
	5A	Topsoil	Grading (N)	Daily*	Required	
5B	Topsoil (imported)	Grading (N)	Daily*	Required		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			Full analysis to BS 3882 - determination of nitrogen content - extractable phosphate content - extractable potassium content - extractable calcium content - extractable magnesium content - extractable sodium content - extraction of exchangeable cations - calculation of exchangeable sodium percentage -determination of loss of mass on ignition - determination of mineral carbonate content - soil texture recommendation for handling and use	1 full suite of tests at approval and 1 per source or per 400 tonnes thereafter.		
Series 600						
601 631 to 637 640 cont'd	Acceptable material					
	Class	General Description				
	6	Selected granular fill	PI/LL (N)	Daily*	Required	
			Resistance to fragmentation (N)	Weekly for on-site material*		<i>LA category. Only 1 per source for Class 6F4 and 6F5</i>
			SMC (N)	Weekly*		
			omc/mc, mc or MCV (N)	1 per 400 tonnes*		1 per source for Class 6F4 and 6F5
			Organic matter/water soluble sulphate (WS) (N)	Weekly*		<i>[At least 5 tests per source for sulphur compounds over the course of the contract in accordance with TRL Report 447, tests 1- 5]</i>
			Oxidisable sulfides (OS) and total potential sulphate (TPS) content (N)	Weekly*		
			pH/chloride ion content (N)	Weekly*		
			Resistivity (N)	<i>[As Required]</i>		
			Undrained and drained shear parameters (N)	<i>[As Required]</i>		<i>[Cross reference should be added to any requirements in App 6/1]</i>
	6F3		Bitumen content	Daily	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
	6F4 and 6F5		Size designation and overall grading category (N)	1 per week*	Required	[Results of routine control tests from the factory production control system operated by the producer to be provided for Class 6F4 ad Class 6F5 – see Annex C of BS EN 13242 and Annex D of BS EN 13285]
			Maximum fines and oversize categories (N)	1 per week*		
			Volume stability of blast furnace slag	6 monthly		
			Volume stability of steel (BOF and EAF) slag	6 monthly		
			Other aggregate requirements	Annex C of BS EN 13242		
			Laboratory dry density and optimum water content (N)	Weekly		[Declared values from the factory production control system operated by the producer to be provided for Class 6F4 and Class 6F5 – see Annex D of BS EN 13285]
			Water content (N)	Daily		
Series 600						
	Acceptable material					
	Class	General Description				
601 631 to 637 640 cont'd	6H, I, J		Redox potential, microbial activity index	[As required]		As required in Table 6/3
	6K and 6LL		Sulphides and hydrogen sulphide	[As Required]		Standard textbook hydrogen sulfide qualitative inorganic analysis
	6N and 6P		Permeability	[As Required]		
			Slope stability effective angle of internal friction (ϕ') and effective cohesion (c')			
	7	Selected cohesive fill	Grading/mc/ MCV/bulk density (N)	1 per 400 tonnes*	Required	
			SMC of chalk (N)	Twice a week*		
			PI/LL (N)	Daily*		
			Organic matter/ water soluble (WS) sulphate content (N)	Twice a week* or daily where sulphates are expected		[At least 5 tests per source for sulphur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5]
			Oxidisable sulfides (OS) and total potential sulphate (TPS) content (N)	Twice a week* or daily where sulphates are expected		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
			pH/chloride ion content (N)	Weekly*	Required	
			Resistivity (N)	[As Required]	Required	
			Undrained and drained shear parameters (N)	[As Required]	Required	[Cross reference should be made to any requirements in Appendix 6/1]
			Permeability (N)	[As Required]	Required	
	7A		Effective angle of internal friction and cohesion Clause 636	[As Required]	Required	
	7B		Coefficient of friction and adhesion Clause 639 Slope Stability Clause 610	[As Required]	Required	
	7C		Redox potential	[As Required]		
	8	Miscellaneous	mc/MCV (N)	Daily*		
	9	Stabilised materials	Pulverisation	1 per lane width per 200m in length*	Required	
			mc/MCV (N)			
Target compacted density						
Bearing ratio (N)						
Series 600						
601 631 to 637 640 cont'd	Pulverised fuel ash		Chemical analysis	1 per consignment*	Required	[As appropriate to properties stated in Table 6/1 or Appendix 6/1]
	Incinerator bottom ash aggregate		Grading (N)	1 per 300 tonnes*		
	Fill adjacent to cementitious material or metallic items		Water-soluble sulphate (WS) content, oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N)	5 per 400 tonnes or per location if less than 400 tonnes*		[At least 5 tests per source for sulphur compounds over the course of the contract in accordance with TRL Report 447, tests 1-5]
602	Earthworks material beneath surface of a road or paved central reserve		Frost heave (N)		Required	
	Off site source			1 every four months*		
	On site source			As Required		
609 621	Geotextiles		Tensile load	1 per source and type	Required	Manufacturer's certification required to demonstrate compliance with Appendices 6/5 or 6/9
			Permeability			
			Pore size			
612	Compaction of fills				Required	
	Method compaction	Field dry density (N)	[As Required]			
		End product compaction	Optimum mc (2.5kg rammer/vibrating hammer method) (N)	Each class or sub-class of material*		
			Field dry density (N)	1 per 400 tonnes*		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
614	Cement stabilisation to form capping	Rate of spread of cement	1 per 500 square metres of cement spread*	Required	
615 641 643	Lime stabilisation to form capping	Rate of spread of lime	1 per 500 square metres of lime spread*	Required	
		Available lime content	Each source of lime weekly during stabilisation operation*		
622 638 639	Earthworks for reinforced soil and anchored earth structures	Redox potential	5 locations within the affected area*	Required	
	Drainage layers	Grading (N) Chemical analysis	1 per 400 tonnes*		
	Reinforcing elements	Coeff. of friction	Each type of element with each type of fill*		
	Anchor elements	Adhesion			
Series 600					
624	Ground anchorages	Proof loading	As required in Appendix 6/10	Required	
626	Gabions			Required	
	Fill	Grading (N) 10% fines values (N) Soundness test (N)	1 per 400 tonnes*		
	Geomesh	<i>[As appropriate to properties stated in Appendix 6/10]</i>	1 per 400 square metres*	Required	
	PVC coated wire			Required (ASTM G23)	
642	Earthworks materials for corrugated steel buried structures	Constrained soil modulus (M*)	3 on each side of each structure*	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 700					
702	Longitudinal and transverse surface regularity	Rolling straight edge or 3m straight edge	As required in Clause 702	Required	<i>Overseeing Organisation notified in advance to enable observation of the testing</i>
	Texture depth (N)	BS598-105 or BS EN 13036-1	Min 1, 50m section or as required in Annex B of BS 598-105	Required	As per Clause 921
	Bump integrator	As TRL SR 26 UC	As required on any lengths of 250m or more	Required	<i>To be called up by the Overseeing Organisation in accordance with Clause 702/942SR or Appendix 7/1 as appropriate</i>
710	Constituent materials in recycled aggregate	Quality control (N)	Checks are to be carried out by the Contractor in accordance with the procedure set down in 'Quality Control - Production of Recycled Aggregates' and with those in this Clause	Required	<i>The quality control procedure should be in accordance with the 'Quality Control - Production of Recycled Aggregates' published by Waste and Resources Action programme is available from WRAP website http://www.wrap.org.uk.</i> <i>The suppliers results of all quality control checks shall be accepted by the Overseeing Organisation in lieu of Contractor testing.</i>
		Constituents (N)	1 for approval (<i>see comments</i>) and 1 per week during works for each material supplied		
770AR	Overband sealing of cracks in bituminous pavement				BBA certification (or equivalent) applies
	Skid resistance	Pendulum test as described in 770.9AR	Random 5% of sites treated, to be tested after 12 months	Required	
771AR	Infrared Patching	BS598-105 or BS EN 13036-1	Minimum 1 per patch or 1 per 10 linear metre per patch, whichever is greater		
	Texture Depth (N)				

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments			
Series 800								
801 803 891AR 892AR 893AR	General requirements for unbound mixtures for adjacent to cement bound materials, concrete pavements, structures or products	Water soluble sulphate (WS) content(N) (Not required for IBAA)	1 per 400 tonnes or per location if less than 400 tonnes*	Required	[Minimum to allow for natural variability of sulphur compound] Supplier results			
		Oxidisable sulfides (OS) content and total potential sulphate (TPS) content (N) (Not required for IBAA)						
	Unbound mixtures beneath surface of a road or paved central reserve	Frost heave (N)	1 per source*					
		Grading and fines content (N)	1 per week*			[Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13242]		
		For recycled content see Clause 710						
		Crushed, broken or rounded test						
		Plastic index (N)						
		pH of IBAA (N) BS 1377-3	Daily*				[LA category]	
		Water Content (N)						
		Organic Content (N)						
		Resistance to fragmentation (N)	6 monthly*					[Where required - See NG 801.9] [Where required - see NG 803.4] [See NG 801.10] [See sub-Clause 801.6] [Declared values from the factory production control system operated by the producer to be provided – see Annex C of BS EN 13285]
		Resistance to wear – micro-Deval test						
		Resistance to freezing and thawing (magnesium sulphate soundness (N)	1 per source *					
		Water absorption (N)	[As Required]					
		Volume stability of blast furnace slags	6 monthly					
		Volume stability of steel (BOF and EAF) slags	6 monthly					
		CBR (N)	1 per source and then monthly*					
		OMC/mc (N)	[As required]					
		Density (N)	[As required]					
		Dynamic Stiffness of Compacted Material	6 per day’s production					

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 800					
870	Testing of hydraulically bound mixtures for sub-bases	In-situ density		Required	For soil/ aggregates on mixing and at compaction
		Depth of mixing	1/50m per lane, min 4/day		
		Water content BS 1924-1 clause 7.1 (N)	1/50m per lane, min 4/day		
		Mechanical performance	1/200m, per lane, min. 2/day		
		Grading (N)			
		PI (N)			<i>Cohesive materials only, if required as an acceptance method.</i>
		Batch records	Continuous		
		Rate of spread	1/200 m per lane, min 2/day		
		MCV	1/200m per lane, min 2/day		<i>Only if used as a control method</i>
		Pulverisation	1/200m per lane, min 2/day		
		Soaked CBR BS 1924-2	2 per day		Max. compacted Density no more than insitu value

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
901 902 925 937 938 942 943	Aggregates for bituminous materials			Required at approval stage	National quality management sector schemes apply
	Resistance to fragmentation (hardness)	Resistance to fragmentation (N)	Monthly*		
	Resistance to freezing and thawing (durability)	Soundness (N)	1 per source*		
		Water absorption (N)	<i>[As required]</i>		
	Cleanliness	Sieve test (mass passing 0.063mm sieve) (N)	Monthly*		Washing and sieving method to be used
	Shape	Flakiness index (N)	Monthly*		
	Blastfurnace slag	Bulk density (N)	1 per 500 tonnes*		[BS EN 1097-3]
		Soundness	Once every 4 months	Required	
		Dicalcium silicate disintegration (N)	1 per 500 tonnes*		<i>[These are for air-cooled blastfurnace slag]</i>
		Iron disintegration (N)			
	Steel slag	Bulk density (N)	1 per 500 tonnes*		
		Volume stability (N)	1 per 500 tonnes*		
	Coarse aggregate for surface courses	Resistance to polishing (PSV) (N)	6 per source at approval as Cl. 915.2	Required	As required in Cl. 915.2 SR
		Resistance to surface abrasion (AAV) (N)	1 per source at approval		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
901 902 925 937 938 942 943 cont'd	Binders for bituminous materials	Penetration (N)	1 per source*	Required	National quality management sector schemes apply. Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, then in the interim only modified binders undergoing BBA assessment should be considered for approval by the Overseeing Organisation. <i>[More frequent tests/samples should be scheduled for modified binders.]</i>
		Softening point (N)	1 per source*		
		<i>[Other BS EN tests]</i>	<i>[As required]</i>		
903 to 907 909 to 912 914 916 925 926 929 937 938 943 946 to 948	Bituminous mixtures	Laying records including rolling temperature	Each load	Required	National quality management sector schemes apply
		Grading (N)	1 per 100 tonnes (min 1 per material per day)		
		Binder Content (N)			
929	Base and Binder Course Asphalt Concrete	Refusal air void content (N)	<i>[As required]</i>		If the Job Mixture Approval Trial has been carried out off site then the results shall be supplied at least 10 working days before use on site. Otherwise JMA trial will be required on site
		Binder volume (N)			
		Grading (N)			
		Binder content (N)			
		In situ air void content (N)	Min 1 per set and 1 per 500m lane m	Required	<i>Contractor</i> to arrange coring. Cores must be taken perpendicular to the road surface.

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
911	Rolled asphalt wearing course (design mix)	Stability value (N) Flow value (N) Density (N) with combinations and sources of constituents	1 per source	Required	National quality management sector schemes apply. Provide results, at least 10 working days before use, with all graphs. The design shall be less than 12 months old. This information must be for exactly the same mixture as that proposed for the works
915	Coated chippings	Grading (N)	1 per stockpile*	Required	
		Binder content (N)	1 per stockpile*		
		Flakiness index (N)	1 per source*		Update every 2 months for approved sources
		Resistance to polishing (PSV) (N)	6 per source* As Cl. 915.2		
		Resistance to surface abrasion (AAV) (N)	1 per source* at approval		From 3 test houses and less than 12 months old
		Hot sand test (N)	1 per stockpile*		Not required for coated chippings for surface dressing
		Rate of spread (N)	Min 1 per day [As required]		
921	Surface macrotexture	BS EN 13036-1 Volumetric Patch Technique (N) or SMTD BS 598-105 Sand patch test	50m sections including a minimum one third of the scheme	Required	Where surface texture is required in Appendix 7/1
924SR	High friction and Gateway surfaces	Quality control checks	As required in BBA approved method statement or as required by Clause 924SR		BBA HAPAS Roads and Bridges certification (or equivalent) applies
		System coverage	As required by Clause 924SR		
		Tensile testing on thermosetting binder BS 2782-3 method 320A (N)	2 samples per shift		
		Aggregate	Resistance to polishing (PSV) (N)		Only 1 per source per year for calcined bauxite
			6 per source* and as required for coated chippings in Clause 915.2		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
937	Stone mastic asphalt (SMA) binder course and regulating course	Job mixture approval trial As required in Clause 937 for the <i>works</i>	1 per source*	Required	National quality management sector schemes apply
		Binder drainage test in accordance with DD 232:1996	1 per mixture	Required	To be < 12 months old
942	Thin Surface Course	Aggregate grading (N)	1 per source and mixture	Required	BBA/HAPAS scheme applies. Certificate to be supplied
		Binder Content (N)			
		Binder volume (N)			
		Bulk density (N)			
		Laboratory air voids content (set of 6)	1 per mixture at approval	Required	Information required by CI942.3-5 to be supplied
		In-situ wheel-tracking rate, rut depth, densities & air voids (N)			
		In situ wheel-tracking rate, rut depths, densities and air voids for the works	1 set per source and mixture per scheme*	Required	
		Binder drainage	1 per mixture at approval	Required	Not more than 12 months old
		PSV (N)	6 per source per year	Required	As per 942 SR
		AAV (N)	1 per source per year	Required	Coarse aggregates only less than 12 months old
		AIV (N)	1 per source per year		
		Flakiness Index (N)	1 per source per year		
		LA	1 per source per year		
		Indirect tensile stiffness modulus (N)	1 per source per year		
		Calibration of bond coat distributor (N)	Certificate less than 6 months old	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
942 cont'd	Thin Surface Course	Vialit pendulum cohesion of bond coat (N)	1 per bond coat per year	Required	
		Rate of spread of bond coat	1 per scheme	Required	Records of <i>Contractors</i> Tests to be provided
		Surface texture sand patch	As required in Annex B of BS598 Part 105		
943	Rolled asphalt wearing course (performance related design mix)	Stability value (N)	1 per source at approval	Required	National quality management sector schemes apply. See NFG 943.3 to 7 (Tendering) JMA trial information to be supplied at least 10 working days before use with details of components and properties. Results of wheel tracking, air voids, binder volume and design information with graphs shall be less than 12 months old. This information must be for exactly the same mixture as that proposed for the works.
		Flow value (N)			
		Density (N) with combinations and sources of constituents			
		Grading (N)			
		Binder content (N)			
		Density (N)			
		Wheel-tracking rate (N)			
		Wheel-tracking rut depth (N)			
		Air voids content (N)			
		In situ density, Air Voids and wheel-tracking rate and rut depth for the works (N)	1 per mixture per scheme	Required	
920	Bond coats, tack coats and other bituminous sprays				
	Binder	Product identification	At approval	Required	Tests are expected to be repeated every two years
		Vialit cohesion	At approval	Required	Tests are expected to be repeated every two years
		Penetration at 25°C and 5°C (N)	At approval	Required	Manufacturer's QA test results may be submitted
		Accuracy of spread calibration of binder distributor (N)	Certificate to be less than 6 months old	Required	Not more than 6 weeks prior to start of work and one per month
		Rate of spread Carpet tile test	1 set per site*	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 900						
918SR	Slurry surfacing incorporating microsurfacing – for footways					
		Binder				Modified binders should have a BBA HAPAS Roads and Bridges Certificate. In the event that no such Certificates have been issued, then in the interim, modified binders shall only be used if the binder is undergoing BBA assessment and with the approval of the Overseeing Organisation
			Product Identification	Per product per source at approval	Required	< 12 months old
			Vialit cohesion	Per product per source at approval	Required	< 12 months old
			Rate of Spread	For each machine	Required	Not more than 6 weeks prior to start of work
			Penetration at 25°C and 5°C (N)	Every manufactured batch	Required	Manufacturer’s QA test results may be submitted
		Aggregates	Flakiness index (N)	1 per source at approval	Required	
			Resistance to polishing PSV(N)	6 per source at approval as Clause 915.2	Required	To be updated every 2 months for approved source
			Resistance to surface abrasion AAV(N)	1 per source at approval	Required	
			Grading (N)	1 per 200 tonnes	Required	
		System	TAIT or BBA/HAPAS		Required	
			Rate of spread mass per square metre (binder and aggregate separately)	Daily per gang	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
918	Microasphalt for carriageways			Required	Modified binders should have a BBA/HAPAS Roads and Bridges Certificate. In the event that no such certificates have been issued then in the interim only modified binders undergoing BBA assessment may be used with the approval of the Overseeing Organisation
		Binder and Bond Coat			
		Product identification	Per product per source at approval	Required	
		Vialit Cohesion	Per product per source at approval	Required	
		Penetration at 25°C and 5°C (N)	Every manufactured batch	Required	Manufacturer's QC test results will be acceptable
		Aggregates (Coarse Aggregate only)	Flakiness Index (N)	1 per source at approval	
			Resistance to Polishing PSV(N)	6 per source at approval as Clause 915.2	
			Resistance to Abrasion AAV (N)	1 per source at approval	
		Application	Los Angeles abrasion value	1 per source at approval	
			Thickness	At least twice per site	
			Surface Macrotexture untrafficked sand patch or SMTD	50m sections including a minimum one third of a scheme	
			Surface Macrotexture at age 2 years sand patch or SMTD	50m sections including a minimum one third of a scheme	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments		
Series 900							
948SR	Cold recycled bitumen bound material (ex-situ process only)			Required			
		Mixture Design	Optimum Moisture Content (N)	At approval	Required	Information to be supplied at least 10 working days before use with details of properties and components. Design information shall be less than 12 months old. This information must be for exactly the same mixture as that proposed for the works.	
			Maximum Bulk Density (N)				
			Air voids content at Maximum Bulk Density (N)				
			Target Added Binder Content				
			Target Grading				
			Target in-situ density				
			ITSM (dry) (N) *				* At target in-situ density cured for 72 hours @ 60°C
			ITSM (soaked) (N) *				
		The <i>works</i>	Insitu Density (Sand Replacement) (N)	1 per 50 m per lane	Required	Density may be determined using the nuclear density gauge using a Calibration determined in accordance with BS 1377-9	
			Layer thickness				
			On final compaction Dynamic Stiffness (GDP)				
			After 24 hours Dynamic Stiffness (GDP)				
		Process Control	Added binder content	Every 1000 tonnes of production			
			In-situ density Calibration to BS 1377-9 (N)				
			Moisture content (N)				
			ITSM both dry and soaked (N)			At in-situ density cured for 72hours at 60°C	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 900					
951SR	Patching	Type and compacted thickness of materials as Cl. 951SR	2 cores per 250* sq. m	Required	Contractor to arrange coring. 150mm nominal diameter cores which must be taken perpendicular to road surfaces
		In situ bulk density (N)			BS 598 : Part 104
		Maximum density (N)			DD 228
		In situ air voids (N)			
	Surface macrotexture	BS EN 13036-1 Volumetric Patch Technique (N) or BS 598-105 Sand patch test	1 reading per patch or 10 sq. m	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000					
1001 1030 1044 1050AR	Cement			Required (BS EN 197)	Quality management and product certification schemes apply
				Required (BS 6610) (BS EN 197)	Tests and test certificates are required
	Pulverised-fuel ash			Required	BBA Roads and Bridges Certificate required for microsilica
					Tests and test certificates are required. Product certification schemes apply to pfa and slag.
	Ground granulated blast furnace slag	Sulfate content (N)	Monthly		
	Admixtures				
	Mixing water				
	Aggregates	Resistance to freezing and thawing - magnesium sulphate soundness (N)	1 per source*	Required	<i>[Where required - See NG 1001.20. Results of routine control tests from the factory production control system operated by the producer to be provided - see Annex C of BS EN 13242]</i>
		Water absorption (N)	<i>[As Required]</i>		
		Flakiness index (N)	Monthly*		
		Shell content (N)	1 per source*		
		Resistance to fragmentation (N)	6 monthly		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000					
1001 1030 1044 1050AR cont'd	Aggregates	Resistance to polishing (PSV) (N)	6 per source*		From 3 test houses and less than 12 months old. If not for carriageway surface course then 1 result only
		Resistance to abrasion (AAV) (N)	1 per source*		
		Grading and fines content (N)	1 per week per source*		
		Constituents of recycled aggregate (N) Clause 710	1 per week per source *		
		Chloride content (N)	Weekly or as otherwise agreed (1 per source for CBM Aggregate)		[At least 5 per source for sulphur compounds]
		Total sulphur (TS) and acid-soluble sulphate (AS) content (N)	Every 6 months		
	Flint course aggregate containing white flints Sand (i.e. fine aggregate) Blastfurnace slag	Water absorption (N)	3 per source thereafter weekly	Required	
		Acid-soluble material (N)	Monthly*		Not required for CBM Aggregate [See BS EN 12620. Clause 4.7 and Annex D]
		Bulk density (N)	Every 6 months		[These are for air-cooled blastfurnace slag] [at least 5 per source for compounds]
		Dicalcium silicate disintegration (N)	Every 6 months		
		Iron disintegration (N)	Every 6 months		
		Total sulphur (TS) and acid-soluble sulphate (AS) content (N)	Every 6 months		
	Pulverised-fuel ash			Required (BS 3892-2)	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000					
1002 1003 1004 1044 1050AR	Pavement Concrete	Air content test (N)	As required in Table 10/9	Required	Product certification scheme applies 1 cube tested at 7 days 2 at 28 days
		In-situ density (N)	As required in Table 10/9		
		Strength (N)	As required in Table 10/9		
1005	Consistence (Workability)	Degree of Compactability (Compaction Index) (N)	As required in Table 10/9	Required	[See also sub-Clause 1005.2]
		Vebe (N)			
		Slump (N)			
1011 1012	Dowel bars Tie Bars			Required (BS 4449)	Product certification scheme applies [See also sub-Clauses 1011.5-7]
	Dowel bars and supporting cradles	Load test	1 per arrangement*		
	Sheathed dowel bars	Bond stress	4 bars		
	Cranked tie bars (coated)	Bend test	4 bars*		
		Salt fog cabinet	4 bars*		
1015	Joint filler board	Weathering test	3 per type and source at approval	Required	Normally undertaken by manufacturer
		Compression and recovery	4 per type and source at approval		
		Extrusion	1 per type and source at approval		
	Cork filler board	Immersion in water	2 per source at approval		
		Immersion in acid	2 per source at approval		
1016 1017	Applied sealants	Initial Penetration	1 per 1000m or 1 per day	Required BSEN 14188-1 BS 2499-2 BS 5212-1 and 2 BS EN 13880-2 and 3 and BS 4254	
		Resilience	1 per 1000m or 1 per day		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1000					
1016 1017 cont'd	Compression seals			Required (ASTM D2628) (BS 2752) (BS 4443: Part 4 Method 10 and BS EN ISO 2440) (BS EN ISO 1856) BS 903: Part A 16 or BS ISO 1817)	
		Compression set	1 per type of seal* at approval		
		Immersion in oil	1 per type of seal* at approval		
	Self expanding cork seal	Tests specified in Clause 1017	1 per type of seal* at approval		
1026 1044	Surface macrotexture	BS EN 13036-1 Volumetric Patch Technique (N) or BS 598-105 Sand patch	1 (set of 10)* per 50m section including a min 1/3 of the scheme	Required	
1027	Aluminised curing compound	Efficiency index	1 per source* at approval	Required	
1030	Wet lean concrete	Density	2 cubes/30m ³ Minimum 2 cubes per day		Where early trafficking is proposed by the <i>Contractor</i> and approved by the Overseeing Organisation, additional site cured cubes will be required to demonstrate that the required strength has been achieved prior to trafficking
		Cube strength (N)			
1036 1037 1038	Cement bound material	Aggregate grading and fines content (N)	1 per source at approval and annually		
		Los Angeles abrasion (N)			Only required for Clause 1037
		Soundness value (N)			Only required for Clause 1038
		Compressive strength (N)	2 samples per 200 m ²		
		Cube density (N)			
		In situ wet density	2 readings from 2 locations per 200 m ²		
1043	Foamed concrete	Cube strength (N)	2 cubes per 12 m ³		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 1100						
1101	Pre-cast concrete kerbs, channels, edgings and quadrants		Bending strength (N)	Minimum of 8 per 1000 units of each product at approval (BSEN 1340)	Required	Test certificates less than 12 months old to be supplied
			Skid resistance (PPTV Test) BS 7932 (N)	Duplicate tests at approval		
			Water absorption and or freeze/thaw resistance (N)	At approval		
1104	Pre-cast concrete flags		Bending strength (N)	Minimum of 8 per 1000 m ² of each product BS EN 1339)	Required	Test certificates less than 12 months old to be supplied
			PPTV (N)	At approval	Required	
			Water absorption and or freeze/thaw resistance (N)	At approval		
	Bedding/ jointing	Granular material	Grading and Fines content (N)	1 per 50 tonnes or part of.		
		Mortar	Compressive strength (N)	1 set of 2 cubes per day		
1107	Concrete block paving		Compressive strength (N)	Minimum of 8 per 1000 m ² of each product (BS EN 1338) at approval	Required	
			Shape and dimensions (N)	[As required]		
			Abrasion resistance (N)	1 per source at approval		
			PPTV (N)	2 per source at approval		
			Water absorption and or freeze/thaw resistance (N)	1 per source at approval		
1108	Clay Pavers		Transverse Breaking Load	Minimum of 8 per 1000 m ² of each product (BS EN 1338) at approval	Required	Not recommended for use on HCC works
			Shape and dimensions (N)	[As required]		
			Abrasion resistance (N)	1 per source at approval		
			Water absorption and or freeze/thaw resistance (N)	1 per source at approval		
			Skid resistance PPTV (N)	2 per source at approval		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material		Test	Frequency of Testing	Test Certificate	Comments
Series 1100						
1170AR	Natural stone		Bending strength BS EN 12372	Minimum of 10 per 1000 m² of each product (BS EN 1338) at approval	Required	
			Shape and dimensions (N)	<i>[As required]</i>		
			Abrasion resistance (N)	1 per source at approval		
			Water absorption and or freeze/thaw resistance (N) BS EN 12371	1 per source at approval		
			Skid resistance PPTV (N)	2 per source at approval		
1107 1108 1170		Bedding sand	Grading (N)	1 per source at approval and 1 per 50 tonnes	Required	No more than 3 months old
		Jointing sand				No more than 2 months old
1172AR	Granite setts		Compressive strength BS EN 1926	Minimum of 8 per 1000m² of each product	Required	Suppliers tests less than 12 months old
			Shape and dimensions (N)	<i>[As required]</i>		
			Abrasion resistance (N)	1 per source at approval		
			Water absorption BS EN 13755 and freeze/thaw resistance (N) BS EN 12371	1 per source at approval		
			Skid resistance PPTV (N)	2 per source at approval		
1173AR 1174AR	Footpath gravel Type E and Self binding path gravel system		Grading, PI, m/c, (N)	1 per week or part of	Required	
			Plasticity Index (N)	1 per source		
			Optimum m/c (N)	1 per source		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1200					
1202	Permanent traffic signs		1 per type and source	Required	Quality management scheme applies; Certification that the traffic sign is passing the tests in BS 873: Part 1 is required
1207	Anchorage in drilled holes to supports of traffic signs	Loading test on site	<i>[As required]</i>		
1210	Holding down bolts and anchorages to bases of permanent bollards		1 per type and source at approval	Required <i>[where considered appropriate]</i>	Certification that the holding down bolts and anchorages are capable of complying with the performance requirements of BS 873: Part 3 is required
1212 SR	Road markings		10% of road markings at opening and repeated 8 - 11 months after opening	Required	Quality management scheme applies
		Approval	1 per material per source at approval	Required	Copy of BS EN 1824 road trial certificate
		'A' Roads & 'B' Road Junctions and Other roads	10% of road markings at opening and repeated 8 - 11 months after opening	Required	White material only
	Pavement marking paints	Tests specified in BS EN 1871	1 set per source at approval	Required	Quality management and product certification schemes apply

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1200					
1214	Permanent traffic cones and traffic cylinders			Required	Certification that permanent traffic cones and cylinders have been tested and comply with BS 873: Part 8 is required
		Tests specified in BS 873: Part 8	2 of each size and category/ type		<i>[Where required]</i>
	Flat traffic delineators			Required	Certification that FTDs have been tested and comply with Clause 1214 is required
		Tests specified in Clause 1214	<i>[As required]</i>		<i>[Where required]</i>
	Other traffic delineators			Required	Certification that the delineators have been tested and comply with Clause 1214 is required
			<i>[As required]</i>		<i>[Where required]</i>
	Temporary cones, cylinders, FTDs and other delineators			Required	Certification that at least 1 in 500 of any batch of cones, cylinders, FTDs and other delineators to be used in the Temporary Works have passed the tests in Clause 1214 as appropriate is required

APPENDIX 1/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1300					
1305	Anchorage for use in drilled holes	Tensile load (Manufacturer's tests)		Required	To provide well attested and documented evidence
1306	Anchorage in drilled holes to columns and masts with flange plates	Loading test on site	<i>[As required]</i>		□
1310	Welding	Welding procedures (Manufacturer's tests)	(Every seven years)		Quality management scheme applies.
		Welding qualification (Manufacturer's tests)	(Sub-Clauses 1310.1 and 1310.2 (7.1.3))		
		Production testing (Manufacturer's tests)	(Sub-Clauses 1310.1 and 1310.2 (7.1.4))		
	Welded joints	Destructive testing	<i>[See sub-Clauses 1310.1 and 1310.2 (7.1.5)]</i>		□□ <i>[(N) See NG 1310]</i>
1313	GFRP laminates	Loss on ignition	1 per 50 production		<i>[See sub-Clauses 1313.10-17]</i>
		Colour fastness	1 per batch		
		Electric strength			
		Water absorption			
		Impact strength			
1314	Brackets for laminated GFRP lighting columns			Required	
	Polyurethane foam	Bulk density	1 per batch		
		Surface hardness			
		Apparent bulk density	2 per batch		
		Impact strength			
		Flexural stress			

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1400					
1421	Cable				<i>[Special sample tests to BS 6346 or BS 5467, according to the cable used, should be scheduled where appropriate]</i> Product certification scheme applies
1424	Lighting Units	Tests specified in Clause 1424	Each unit	Required	☐ Product certification scheme applies Certification that the installation complies with BS 7671 (the IEE Wiring Regulations) is required
	Networks	Tests specified in Clause 1424	Each network	Required	☐ Certification that the installation complies with BS 7671 (the IEE Wiring Regulations) is required.

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1500					
1506	Copper communications cable			Required	☐ Certification that each completed cable complies with specification TR 2150 or TR 2158, as appropriate, is required
	Optical fibre communications cable			Required	☐ Certification that each completed cable complies with specification TR 2151 or TR 2159, as appropriate, is required
	Coaxial communications			Required	☐ Certification that each completed cable complies with specification TR 2152 or TR 2160, as appropriate, is required
	Energy cable			Required	☐ Certification that each completed cable complies with specification TR 2153 or TR 2161, as appropriate, is required
1513	Cable Joint Enclosures	Test specified in Clause 1513.12	Each CJE	Required	☐ Certification that CJE satisfies the air pressure test is required
1518	Coaxial and copper communications and power cable	Tests specified in specification MCG 1022 or MCG 1099, as appropriate	Each cable (Stage 1) As required in Appendix 15/1 (Stage 2)		☐ Results to be reported in accordance with MCG 1022 or MCG 1099, as appropriate
	Optical fibre communications cable	Tests specified in specification MCG 1055 or MCG 1099, as appropriate	Each cable (Stage 1) As required in Appendix 15/1 (Stage 2)		+Results to be reported in accordance with MCG 1055 or MCG 1099, as appropriate
1522	Motorwarn System				
	Steel posts			Required (BS 6323)	
1526	Electrical Installations	Tests specified in BS7671	Each installation		☐ Certification that the installation complies with BS 7671 (the IEE Wiring Regulations) is required

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1500					
1530	Cable ducts	Test specified in BS EN 50086-1 and BS EN 50086-2-4	Each supplier	Required	Current British Board of Agrément Certificate is required
1533	Cable ducts				
	Mandrel test	Test specified in Clause 1533	Each duct	Required	☐ Certificate that each length of duct between chambers satisfies the mandrel test is required
	Air Test	Test specified in Clause 1533	Each duct	Required	☐ Certificate that each length of duct between chambers satisfies the air test is required.

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1600					
1601	Soil samples In situ soil tests			Required	<i>[Appropriate soil tests should be scheduled where required]</i>
1602 to 1606 1610 to 1615	Concrete Grout Reinforcement Prestressing Steelwork Welding Protection against corrosion			Required	<i>[Appropriate tests/ samples should be scheduled where not included under other Clauses/ Series]</i>
1606	Coatings for protection against corrosion	Adhesion	As required in Appendix 16/6		
1607	Reduction of friction on piles				<i>[Particular requirements detailed in Appendix 16/7 should be scheduled]</i>
1608 1616	Integrity testing Dynamic testing				<i>[Particular requirements detailed in Appendix 16/8 or 16/16 should be scheduled]</i>
1609	Static load testing of piles			Required	
1612	Self hardening slurry mixes				<i>[Particular requirements detailed in Appendix 16/12 should be scheduled]</i>
1617	Instrumentation				<i>[Particular requirements detailed in Appendix 16/17 should be scheduled]</i>
1618	Support fluids	To be proposed by the Contractor			<i>[Particular requirements detailed in Appendix 16/18 should be scheduled]</i>

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700					
1702 1703 1704	Cement types as stated in sub-Clause 1702.1			Required	Quality management and product certification schemes apply
	Cements (all types)	Chloride content	Monthly	Required	Tests to be carried out by the manufacturer and results included on the test certificates required above. Quality management and product certification schemes apply
	Portland-blastfurnace			Required (BS EN 197-4)	
	Sulphate-resisting Portland			Required (BS 4027)	
	Portland pulverised-fuel ash			Required (BS EN 197-4)	
	Low heat Portland			Required (BS 1370)	
	High slag blastfurnace			Required (BS EN 197-4)	
	Pulverised-fuel ash	Colour index		Required (BS 3892: Part 1)	Product certification scheme applies
	Ground granulated blastfurnace slag	Acid-soluble alkali content		Required (BS 6699)	Product certification scheme applies
	Aggregates	Grading and fines content (N)	1 per week (per source)	Required	Results of routine control tests from the factory production control system operated by the producer to be provided – see Annex H of BS EN 12620
		Shell content (N)	Monthly*	Required at approval stage	Product certification scheme applies unless otherwise stated. Structural concrete must be supplied by QSRMC accredited organisation. Non structural rely on Contractor's Quality system.
		Flakiness index (N)	Monthly*		
		10% fines value (N)	Monthly*		
		Drying shrinkage(N)	1 per 5 years		
		Chloride content(N)	1 per week or as otherwise agreed		
		Sulphate content(N)	Yearly*		
		Blastfurnace slag	Bulk density (N)	Required	
			Stability (N)	Required	
			Sulphur content (N)	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Series 1700					
1702 1703 1704 cont'd	Water (Applicable only in the absence of a potable water supply)	Tests specified in BS EN 1008	<i>[As required]</i>	*As Required	Results of routine control tests from the factory production control system operated by the producer to be provided.
		Chloride content	Monthly*		Results of routine control tests from the factory production control system operated by the producer to be provided.
		Sulphate content	Monthly*		
		Acid-soluble alkali content	Monthly*		
	Admixtures	Chloride content	1 per consignment	Required (BS EN 934-2)	Results of routine control tests from the factory production control system operated by the producer to be provided.
		Sulfate content	1 per consignment	Required	
		Acid-soluble alkali content	1 per consignment		

APPENDIX 1/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700					
1707	Concrete	Cube strength (N)		Required	Concrete other than ST (standard prescribed mixes)
			Prestressed concrete – two cubes from 12 m ³ or 2 batches whichever represents the lesser volume		Contractor to cast and test sufficient additional cubes to demonstrate cube strength before transfer +
			Reinforced concrete – two cubes from 24 m ³ or 4 batches whichever represents the lesser volume		
			Mass concrete – two cubes from 50 m ³ or 50 batches whichever represents the lesser amount		[See also Table NG 17/1]
			Additional Cubes for special purposes		Tests/samples should be scheduled as required See NG 1707.6]
		Hardened Density	Each Cube tested	Required	
		Cube strength-identity testing as described in Appendix 17/4 (N)	2 Cubes from each of two samples of each batch		[Requirements should be given in Appendix 17/4 as appropriate] [See sub-Clause 1707.2 and Appendix 1/6]
		Density	[As required]		[Requirements should be given in Appendix 17/1 as appropriate]
		Modulus of elasticity			
	Fresh Concrete	Consistence (slump or degree of compactability or Vebe) (N)	Each batch		[See sub-Clause 1707.2]
		Air content	Each batch		
		Cement content	[As required]		
		Water/cement ratio			

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700					
1709	Silane			Required for each delivery	Certification that the silane complies with Clause 1709 is required
		Refractive Index	Three samples		[See sub-Clause 1709.2]
		Trial panels, where required in the Contract			[See sub-Clause 1709.8]
1710	Concrete packing, Mortar packing, Epoxy resin bonding agent	Compressive / tensile / adhesive strengths as appropriate	Each batch	Required	
	Pre-cast concrete manufactured off-site	Cube strength (Manufacturer's tests)		Required	Contractor to make available records of tests by the manufacturer
1711	Grout				
	Grouting and Duct Systems for Post-tensioned tendons			Required	CARES Scheme for Supply and Installation of Post-tensioned Systems In Concrete Structures or an equivalent scheme is reqd. Quality management and product certification schemes for cement apply
		Full scale trials, where required in the Contract		Required	See sub-Clause 1711.1 and Appendix 17/6
		Air pressure tests			See sub-Clause 1711.3 and Appendix 17/6
		Duct assembly verification tests			See sub-Clause 1711.3 and Appendix 17/6
		Wall thickness of ducts after tensioning			See sub-Clause 1711.3 and Appendix 17/6
		Fluidity	See Table 17/5		See sub-Clauses 1711.8 and 1711.9 and Table 17/4
		Bleeding			
		Volume change			
		Cube strength			
		Sieve			
		Sedimentation			

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700					
1711 cont'd	Grouting and Duct Systems for Post-tensioned tendons				
	Admixtures			Required	Quality management and product certification schemes apply Data on their suitability, including previous experience should be made available, See sub-Clause 1711.10
1712	Reinforcement				
	Steel bars			Required (BS 4449)	Product certification scheme applies
	Steel wire			Required (BS 4482)	
	Steel fabric			Required (BS 4483)	
	Stainless steel			Required (BS 6744)	
1713	Fabrication reinforcement			Required	Certification that fabricated reinforcement complies with the routine inspection/testing requirements of BS 4466 is required if the fabrication is not covered by a product certification scheme listed in Appendix B
1716	Reinforcement jointing systems	Permanent elongation Characteristic strength (Manufacturer's tests)	1 per source per scheme	Required for each type of connection	BBA Roads and Bridges or CARES Certificate of product assessment or fully equivalent scheme applies

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1700					
1717	Reinforcement metal arc welding	Welding procedure approval (BS 7123)	As required in BS 7123		Tests should be carried out by an independent testing body specified in BS 8666
		Welder approval (BS 7123)	Each welder	Required	
1724	Post-tensioning anchorages	Tests in accordance with BS 4447 (Manufacturer's tests)		Required	<i>Contractor</i> to make available records of tests by the manufacturer
1726	Stainless steel bar			Required (BS 6744)	Certificates to be provided
1727	Inspection and testing of structures and components				<i>[Tests should be scheduled as appropriate and requirements given in Appendix 17/4]</i>
1770AR	Existing concrete in structures	Compression test on cores in accordance with BS 1881: Pt 120	<i>As required</i>	Required	
1771AR	Repair material (hand placed)	Compression test on mortar cubes (N)	3 per day	Required	<i>Only required where repair area is greater than 1m² per structure</i>
	Repair material (spray applied)	Compression test on cores cut from test panels (N) See 1771AR	2 panels per structure		
	Concrete repair	Pull off test to BS 1881 Pt 207	<i>As Required</i>		
		Compression test on core from repaired area to BS 1881 Pt 120 (N)			

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1800					
1801 1803	Structural steels to BS EN 10025-1 to - 4 and BS EN 10025-6, BS EN 10210			Required	[Give type of document required] [Options as appropriate should be listed in Appendix 18/1]
	Structural steels to BS 7668			Required (BS EN 7668)	[Options B26-B36 as appropriate should be listed in Appendix 18/1]
	Stainless steels to BS 970, BS EN 10084, BS EN 10087 and BS EN 10095			Required (BS 970 BS EN 10084, BS EN 10087 and BS EN 10095)	[Intercrystalline corrosion test should be scheduled where required]
	Stainless steel to BS EN 10048, BS EN 10029, BS EN 10051, BS EN 10258, BS EN 10259			Required BS EN 10029 BS EN 10048, BS EN 10051 BS EN 10258 and BS EN 10259	[State condition of material if not softened condition. Give information required for test certificate as BS EN 10029 BS EN 10048 BS EN 10051 BS EN 10258 BS EN 10259]
	Steel plate	Ultrasonic testing	[As required]		[See guidance clause 3.1.4 of BS 5400-6]
	Bolts, nuts and washers				Quality management scheme applies
	All types except high strength friction grip	Test specified in BS 4395-2	As required in BS 4395-2		
	High strength friction grip	Test specified in BS 4395-1 or 2	As required in BS 4395-1 or 2		[Tests/ samples for the optional tests provided for in BS 4395-1 and 2 should be scheduled where required]
	Tension Control Bolts	Test specified in JSS II-09-1996 or BS 4395	As required in JSS II-009-1996 or BS 4395		
	Welding electrodes				
	Covered steel			Required (BS EN 499)	
	Wire			Required (BS EN 756, BS EN 760)	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1800					
1801 1803 cont'd	Welding				
		Welding procedures	Tests specified in BS EN ISO 15614-1	As required in BS EN ISO 15614-1 and Appendix 18/1	Results to be reported in accordance with Annex A of BS EN ISO 15614-1
		Welder qualification	Tests specified in BS EN 287-1	As required in BS EN 287-1 for each welder	Required (BS EN 287-1) Certificate to be in accordance with Annex B of BS EN 287-1
		Butt weld 'run-off' plates	Destructive tests specified in BS 5400-6	As required in BS EN 5400-6	
		Butt welds and adjacent areas of steelwork	Non-destructive tests using methods to be agreed	As required in BS EN 5400-6 and the following... [As required]	[Full details should be scheduled. See clause 5.5.2 of BS 5400-6 and its guidance clauses]
		Fillet welds	Non-destructive tests	[As required]	[Full details should be scheduled]
		Flame cutting and shearing	Tests to demonstrate procedures comply with BS5400-6 and Appendix 18/1	As required in Appendix 18/1	
		Stud shear connectors	Fixing (BS 5400-6)	Each stud	
			Bending (BS 5400-6)	[As required]	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 1900					
1903	Abrasives	Grading	[As required]		☐ ☐ (See NG 1903)
		Hardness			
1909	Galvanised coatings	Tests specified in BS EN ISO 1461	[As required]		
	Aluminium and zinc spray coatings	Tests specified in BS EN 22063	[As required]		Areas to be tested to be in accordance with Clause 1910
	Aluminium coating material			Required (BS EN 1301)	
	Zinc coating material			Required (BS EN 1301)	
	Sherardized coatings	Tests specified in BS 4921	[As required]		[Sampling procedures and any special adhesion requirements including test method should be scheduled]
	Zinc electroplated coatings	Tests specified in BS 3382-2	[As required]		
	Plated to high strength friction grip and tension control bolts				[Special tests to detect hydrogen embrittlement should be scheduled where required]
1910	Metal spray coatings	Tensile test specified in BS EN 22063	[As required]		☐
		Grid test specified in BS EN 22063	[As required]		☐
1911SE	Paints				
		'A' and 'B' Samples	Specific gravity		☐ ☐ [See NG 1911] Samples will be selected in accordance with Clauses 1911 and 1911SE]
			Colour match		
			Composition		
			Application characteristics		
			[See Clauses #1911 and 1911SE]		[See Clauses #1912 and 1912SE]

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2000					
2003	Mastic asphalt	Test specified in BS 6925	1 per source	Required (BS 6925)	Sampling to comply with BS 6925
	Permitted waterproofing systems	(As required - see NFG 2007)		Required	Registration and BBA certification apply and Certificates to be provided.
		Pull off adhesion test	One per 20m ² or part of, at least 4 per bridge deck	Required	
	Additional bituminous protection	Tests specified in BS 598 : Part 102	1 per source	Required	Sampling to comply with BS 598 : Part 100
	Stability value	Tests specified in BS 598 : Part 107	1 per source	Required	
2004	Bitumen emulsions or proprietary systems	Manufacturers tests	1 per source per type	Required	Certificates to be provided to confirm fitness for purpose.

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2100					
2101	Bridge bearings	Elastomeric bearings	[As required]	Required (BS 5400: Section 9.2)	
	Complete bearings	Tests specified in Appendix 21/1	As required in Appendix 21/1		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2200					
2202	Metal parapets			Required (BS 6779 : Part 1	Quality management scheme applies
2204	Welding	Welding procedures (Manufacturer's tests)	(Every seven years)	Required	
		Welder qualification (Manufacturer's tests)	(Every two years)	Required	
		Production testing (Manufacturer's tests)	(Sub-Clause 2204 (19.2.4))	Required	
	Welded joints	Destructive testing	(See Sub-Clause 2204 (19.2.5))	Required	(N) See NG 2204
2207	Parapet posts	Production testing as specified in BS 6779 : Part I : 1991 (Manufacturer's tests)		Required	Certification in accordance with Clause 2207 is required
2208	Anchorage in drilled holes	Loading test on site	<i>[As required]</i>		Departmental registration applies

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400					
2401	Masonry cement Portland cement Sulphate resisting Portland cement			Required (BS EN 413-1) (BSEN 197) (BS 4027)	Quality management scheme applies
		Chloride content and Manufacturers Tests	Monthly*	Required	Test to be carried out by the manufacturer and results included on the test certificate
2402	Sand	Grading and fines content (N)		Required per consignment (BS EN 13139)	
		Chloride content	Monthly*		Test to be carried out by the manufacturer and results included on the test certificate
2403	Water	Tests specified in BS EN 1008	<i>[As required]</i>	Required	Only required if not from public mains supply
2404	Mortar admixtures			Required (BS EN 934-3)	Product certification scheme applies
2405	Lime			Required (BS EN 459-1)	
2406/2417	Bricks	Clay	1 set per type and source at approval	Required	
		Calcium silicate		Required	
		Concrete	BS 6073-1 / BS EN 771-3	Required	
2407	Blocks	Clay	1 set per type and source at approval	Required	
		Concrete	BS 6073-1 / BS EN 771-3	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2400					
2408	Reconstituted stone	As BS 6457	1 set per type and source at approval	Required	
2410	Reinforced brickwork/ blockwork		1 set per type and source		
2411	Stainless steel Wire/fabric	As BS EN10088-1		Required	Product certification scheme applies unless otherwise stated. Structural mortar must be supplied by QSRMC accredited organisation. Non structural rely on <i>Contractor's</i> Quality system.
	Stainless steel bars	As BS 6744		Required	
	Ready mixed mortars	Tests specified in Appendix A1 of BS EN 10521-1	1 set of tests per batch	Required	
	Mortars	Tests specified in Appendix A1 of BS EN 10521-1	1 set of tests per mix designation per day	Required	

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 2500					
2504	Environment barriers				Quality management scheme applies [Appropriate tests/ samples should be scheduled where not included under other Clauses]
	Timber				
	Concrete				
	Steel				
	Brickwork				
	Other materials				
	Barriers	Sound absorption	As required in Appendix 25/4		[See NG 2504 14-17]
		Sound insulation			
	Post foundations	Loading test on site	As required in Appendix 25/4		[See NG 2504.12]
2505, 2506	Drainage structures/buried rigid pipes for drainage structures Pipes for drains and culverts having diameters or clear span exceeding 900mm				
	Vitrified clay	[See Note 1]			Product certification scheme applies [Note 1. Additional manufacturer's tests are provided for in the relevant BS but should not normally be required]
	Concrete PC/SRC	(Manufacturer's test)			See sub-Clause 2506.28
	Iron	[see Note 2]			[Note 2. Certificates are provided for in the relevant BS but should not normally be required except for pipes which are not quality marked by a UKAS or equivalent accredited body listed in Appendix B of SHW]
	Corrugated steel	(Manufacturer's test)			Type Approval Certificate and BBA Roads and Bridges Certificate apply

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments	
Series 2600						
2601	Bedding mortar materials			Required for each batch	Certification in accordance with Clause 2601 is REQUIRED	
	Bedding mortar	Flow cone test	Each batch	Required	Laboratory tests see Clause 2601	
		Flow between glass plates				
		Compressive strength				
		Expansion test				
		Water absorption				
		Elastic stability	1 per source	Required		
	Flow cone test Compressive strength	Each load	Required	Site control tests		
2602 SR	Ancillary Concrete	Cement (all types)	Chloride content		Required	Tests to be carried out by the manufacturer and results included on the test certificates required above
			Sulphate content		Required	
			Acid-soluble alkali content		Required	
		Aggregates	Grading and Fines content Clause 710 for recycled material	1 per source at approval and monthly	Required	Results of routine control tests by the manufacturer/supplier to be provided.
			Shell content (N)	1 per source at approval	Required	
			Flakiness index (N)	1 per source at approval	Required	
			Los Angeles value (N)	1 per source at approval	Required	Product certification scheme applies
			Drying shrinkage (N)	1 per source at approval	Required	
			Chloride content (N)	1 per source at approval	Required	
			Sulphate content (N)	1 per source at approval and annually	Required	
			Water	Tests specified in BS EN 1008	(As required)	
		Chloride content		Required		
		Sulphate content		Required		
		Acid-soluble alkali content		Required		

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Series 2600					
2604	Plastic coating to fencing posts, gates and ancillaries	Impact test Adhesion Retention of adhesion Salt spray Accelerated weathering (Manufacturer's tests)		Required	Records of all tests to be available for inspection
Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 3000					
3001	General			Inspection Reports as required in Appendix 30/1	
3005	Grass seeding, Wildflower seeding and turfing	Rate of spread of fertiliser	1 per 1000 square metres*	Required	
		Chemical analysis of fertiliser	1 per source	Required	
		Grass seed germination and purity (Official Seeding Test Station tests)	1 per source and mix variety*	Required prior to sowing	□

APPENDIX I/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Clause	Works, Goods or Material	Test	Frequency of Testing	Test Certificate	Comments
Series 5000					
5003	Abrasives	Grading	[As required]		☐ [See # NG 5003]
		Hardness			
5005	Aluminium and zinc spray coatings	Tests specified in BS EN 22063	[As required]		Areas to be tested in accordance with Clause 5006
	Aluminium coating material			Required (BS EN 1301-1)	
	Zinc coating material				
	Sherardized coatings	Tests specified in BS 4921	[As required]		[Sampling procedure and any special adhesion requirements including test method should be scheduled]
	Zinc electroplated coatings	Tests specified in BS 3382-2	[As required]		
	Plating to high strength grip and tension control bolts				[Special tests to detect hydrogen embrittlement should be scheduled where required]
5006	Metal spray coatings	Tensile test specified in BS EN 22063	[As required]		☐
		Grid test specified in BS EN 22063	[As required]		☐
5007 5007SE	Paints				
		Specific Gravity	[see Clauses 5007 and 5007SE]		☐ [see NG 5007] Samples will be selected in accordance with Clauses 5007 and 5007SE [see Clauses 5009 and 5009SE]
		Colour match			
		Composition			
		Application characteristics			

APPENDIX 1/5 TESTING TO BE CARRIED OUT BY THE CONTRACTOR

Key

- indicates a requirement in SHW for the test to be carried out by the *Contractor*; such tests should therefore be scheduled in Appendix 1/5.

- indicates a statement in SHW that the test may/will be carried out under the direction of the
- Overseeing Organisation; samples for such tests should therefore be required in Appendix 1/6.

- * indicates that the frequency of testing is given for general guidance and is only indicative of the frequency that may be appropriate (ie no frequency is given in the SHW or reference documents). Where materials are known to be marginal or if initial test results show them to be such, the frequency of testing should be increased. Conversely where material properties are consistently in excess of specified minimum requirements or well below specified maximum limits, then the frequency of testing should be reduced.

- (N) indicates that a UKAS or equivalent accredited laboratory sampling and test report or certificate is required.

APPENDIX I/6 SUPPLY AND DELIVERY OF SAMPLES TO THE OVERSEEING ORGANISATION

GENERAL NOTES

- 1 The Tables which follow indicate the likely average requirements for samples for testing by the Overseeing Organisation but these requirements may increase or decrease depending on the perceived quality of the work, goods or material in question.
- 2 Sampling rates for low cost materials such as aggregates, fresh concrete and bituminous mixtures for testing by the Overseeing Organisation, to establish compliance with the following Clauses, are not defined but materials shall be supplied as the Overseeing Organisation may reasonably require:

 Clauses 503, 505, 512, 513, 515

 Series 600, (excluding 609, 624 and 626), 700, 800, 900, 1000, 1100, 1700

 Clauses 1102, 1174AR, 2003, 2004, 2600
- 3 Unless otherwise shown in this Appendix, samples of work, goods or materials as scheduled under any one Clause are required for all such work, goods or materials in the *works*.
- 4 Samples comparable to those specified in this Appendix will be necessary for any equivalent work, goods or materials proposed by the *Contractor* (see sub-Clause 105.5).
- 5 Unless otherwise stated in this Appendix, all sampling of materials shall be undertaken by the Overseeing Organisation.
- 6 Samples of concrete to Clause 2602SR are not required.
- 7 Where it is specified that sampling is to be undertaken by the *Contractor*, it is the *Contractor's* responsibility to ensure that:
 - i) sampling is carried out in accordance with the appropriate Standard, (including any requirements for UKAS accreditation)
 - ii) the samples are representative of work, goods or materials incorporated in the *works*
 - iii) a fully completed sampling certificate is provided
- 8 Wherever this Appendix specifies that samples shall be delivered to the Overseeing Organisation's laboratory, or some other location, it is the *Contractor's* responsibility to ensure that the samples are:
 - i) supplied in a suitable container and clearly labelled
 - ii) transported and delivered in such a way that upon delivery they are intact and representative of work, goods or materials incorporated into the *works*.

APPENDIX I/6 SUPPLY AND DELIVERY OF SAMPLES TO THE OVERSEEING ORGANISATION

- 9 The *Contractor* shall be responsible for cutting cores for the Percentage Refusal Density, air voids and wheel tracking tests at locations directed by the Overseeing Organisation in accordance with Clauses 903, 929, 937, 943, 1003 and 1030. Cores will be required from each layer. A layer is defined as that thickness of material laid in one single pass of the paver. The *Contractor* shall also carry out the sealing and reinstatement of coreholes using HRA or DBM for bituminous materials and cement bound material for Clause 1003 and 1030 materials, as instructed by the Overseeing Organisation.
- 10 (N) indicates that samples shall be taken by staff accredited under UKAS procedures for the sampling of the particular material/product specified.
- 11 Where samples or equipment is required to be delivered to the Hampshire County Highways Laboratory, the address is: Stockbridge Road Micheldever Station SO21 3BB Hampshire Phone 01962 774502 fax 01962 795042.

APPENDIX 1/6 SUPPLY AND DELIVERY OF SAMPLES TO THE OVERSEEING ORGANISATION

Clause	Sample Description	Frequency of Sampling	Delivery Location	Comments
Series 500				
507	Chambers		County Highways Laboratory	Testing by the Overseeing Organisation will not be required if the <i>Contractor</i> has undertaken this testing under Appendix 1/5 at the Materials approval stage
	Covers, grates and frames	1 per type and source		
	Cover bolts	1 per type and source		
Series 900				
929 942 943	Cores of compacted bituminous material	As required by the Clause No or BS 4987: Part 2 as appropriate	County Highways Laboratory	Cores to be taken perpendicular to the road surface

APPENDIX I/7 SITE EXTENT AND LIMITATIONS ON USE

1. Extent of the Site

- a) The extent of the S278 Works site is indicated on the general arrangement drawings.
- b) The site includes the following areas:

Parts of the carriageway, footway and verges of Hambledon Road, Aston Road and Maurepas Way

and Part of the development site.

2. Limitations on Use

- a) Work on the existing carriageways is to be restricted where possible to ensure that free flowing traffic conditions are maintained at all times.
- b) The use of temporary two-way traffic signals will only be permitted with the advance written permission of the Highway Authority.
- c) For the purposes of work on the existing carriageways, permitted hours of working are provided in Appendix 1/17.
- d) Due care must be taken for the diversion of pedestrian footpaths around the works.
- e) Access is to be maintained at all times to properties adjacent to the works, unless otherwise agreed with the owner and occupier of those properties.
- f) The Roadworks contractor is required to liaise and co-ordinate with the Principal Contractor prior to and during the construction of the works to achieve suitable phasing and working arrangements with particular attention to working at the interface of the site.
- g) The Roadworks Contractor will be required to facilitate access to and from the development site through the S278 works to the satisfaction of the Engineer.

APPENDIX 1/8 OPERATIVES FOR THE OVERSEEING ORGANISATION

Operative Required	Number	Period Required
Chainman/Surveyor	1	From time-to-time, as required by the Overseeing Organisation

APPENDIX I/9 CONTROL OF NOISE AND VIBRATION

- 1 Without in any way limiting the liabilities and obligations imposed upon the *Contractor* elsewhere in the Contract, the *Contractor* shall provide the Works in such a manner so as to minimise at all times the levels of site generated noise. Procedures for noise control and the assessment of site noise shall be in accordance with:
- BS5228-1:2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites: Part 1 – Noise, and
 - BS5228: 2009 Code of Practice for Noise and Vibration Control on Construction and Open Sites: – Part 2: Vibration..
- 2 The Enforcing Authority responsible for cases of noise nuisance/ investigation of complaints regarding noise from the Site for the *works* is:
- | | |
|--|--|
| <p>East Hampshire District Council
Penns Place
Durford Road
Petersfield
Hampshire
GU31 4EX

Tel: Petersfield (01730) 266551</p> | <p>Havant Borough Council
Civic Offices
Civic Centre Road
Havant
Hampshire
PO9 2AY

Tel: Havant (023) 9247 4174</p> |
|--|--|
- 3 The Local Authority has informally agreed that the following measures would be acceptable and these are given as a guide; however it is for the *Contractor* to decide whether to seek the Local Authority's formal consent to its proposed methods of work and to the steps he proposes in order to minimise noise:-
- i. The best practicable means, as described in Section 79 of the Environmental Protection Act 1990, to reduce noise to a minimum shall be employed at all times.
 - ii. All vehicles and mechanical plant used for the purpose of the works shall be "sound reduced" or muffled models fitted with effective exhaust silencers in accordance with the manufacturer's recommendation. Where acoustic covers are fitted or temporary screens used, they shall be kept closed whenever the machine is in use. Vehicles and plant shall be shut down or throttled down to a minimum in the intervening periods between work.
 - iii. The *Contractor* shall furnish such information as may be requested by the Overseeing Organisation in relation to noise levels emitted by all constructional plant installed on Site or which the *Contractor* intends to install on the Site and shall afford all reasonable facilities to enable the Overseeing Organisation to carry out such investigations as he may consider to be necessary.
 - iv. The date of Commencement of Works shall be notified in writing by the *Contractor* to the Local Authority at least 7 days prior to the commencement of any works. A telephone number for emergency use shall also be notified prior to the commencement of any works.
 - v. The name and address of any persons other than the *Contractor* who it is intended will carry out works on the Site shall be notified by the *Contractor* to the Local Authority before the commencement of any works.

- vi. Compliance with these conditions will not constitute protection from proceedings instituted under Sections 80 and 82 of the Environmental Protection Act, 1990 (whereby a Local Authority or any occupier of premises may institute summary proceedings).
- vii. Subject to the requirements of Appendix 1/17 paragraph 1 the normal working hours within the Site shall be restricted to:
 - Monday to Friday between 0730 hours and 1800 hours, and
 - Saturday between 0730 hours and 1400 hours, with
 - No working on Sundays or public holidays.
- viii. Exceptionally, consent for work outside of these hours may be given after the necessary consultation. Fourteen days' notice is required from the *Contractor* when seeking such consent.
- ix. The total sound level from all sources when measured 1 metre from the facade of any adjacent building shall either not exceed the appropriate level given in the schedule to this appendix, or not exceed by more than 3 dB(A) the ambient equivalent continuous sound level at the same point of the facade measured over the same period, whichever level is the greater.
- x. The following types of plant shall not be permitted to be used on the Site:
 - a) Vibrating rollers with a mass/metre width in excess of 2900kg
 - b) Dropping weight compactors
 - c) Unsilenced piling equipment (see 5iii below).

APPENDIX 1/9

CONTROL OF NOISE AND VIBRATION

4 SCHEDULE - TOTAL NOISE LEVELS AT ANY ADJACENT RESIDENTIAL FACADE

Period	Hours	Noise (L_{Aeq}) Measured at Nearby Dwelling (dB)	Period of Hours over which L_{Aeq} is applicable	Maximum Noise (L_{Amax}) measured at Nearby Dwelling (dB)
Monday to Friday	0730-0800	65	any 1 hour	74
	0800-1800	75	any 1 hour	88
Saturday	0730-0800	65	any 1 hour	74
	0800-1400	75	any 1 hour	88
Sunday				
Night				
All unattended plant outside normal working hours	-	50	any 1 hour	52

Notes

- The total sound level is the noise from all sources in the vicinity, including that from the construction operations, over the specified period, expressed as L_{Aeq}
- The existing ambient noise level is the total noise from all sources in the vicinity over the specified period excluding noise caused by Providing the Works, expressed as L_{Aeq}
- The maximum noise level is the highest indicated on a sound level meter which meets the requirements of BS EN 61672: 1 and 2, set to the slow response and frequency weighting A.

5 PILING OPERATIONS (Including the driving of trenching sheets)

- All piling operations shall be limited to between the times of 0830 hours and 1630 hours Monday to Friday only.
- For the installation of driven piles the *Contractor* shall utilise an appropriate silenced system based on the following alternative principles:
 - Impact driver with cushioned blow
 - Impact driver with enclosing sound reducing muffler
 - Hydraulic driver without impact
 - Vibratory driver
- Unless the *Contractor* demonstrates otherwise, by calculation or measurement, to the satisfaction of the Overseeing Organisation it shall be assumed that any piling equipment with an activity equivalent continuous sound pressure level at 10 metres distance over 1 cycle of operation in excess of 78 dB(A) will not satisfy the environmental noise requirements of the Contract.

6 VIBRATION

- i) The *Contractor* shall also normally limit vibration levels arising from site activities at any residential dwelling between 0800 & 1800 hours weekdays and 0800 to 1400 Saturdays, to a peak particle velocity of 1.5mm/second in the vertical direction. No perceptible vibration is permitted in such buildings at any other time.
- ii) Exceptionally, for short periods not exceeding 2 hours in any weekday, vibration levels of up to 2mm/second may be permitted at the discretion of the Environmental Health Officer.
- iii) Where vibration occurs, reference should be made to ISO 2631 – Guide for the evaluation of human exposure to whole body vibration and BS 6472 – Evaluation of human response to vibration in buildings.

APPENDIX I/I2 SETTING OUT AND EXISTING GROUND LEVELS

1. The method of setting-out shall be related to a system of co-ordinated survey markers. Existing survey stations are as indicated on the setting out drawings.
2. Details of existing levels are indicated on the existing survey drawings.
3. It is the Contractor's responsibility to check all existing levels and dimensions prior to commencing works. Any discrepancies shall be notified to the Engineer immediately.
4. All setting-out is to be verified with the Engineer prior to the commencement of any kerb or edging works.
5. Vertical profile of finished roads will be achieved by extension of existing long and crossfalls and additional level information provided on the setting out drawings and MX string report.
6. Specific requirements for setting out Survey and Geometrical Information:
 - a) As soon as practicable after taking possession of the Site, the Contractor shall check the accuracy of the Bench Marks and immediately notify the Engineer of any discrepancies.
 - b) The Contractor shall not disturb or remove any Bench Mark except with the prior approval of the Engineer, and shall take all necessary precautions to maintain the stability of Bench Marks until such time as they are no longer required.
 - c) The Contractor shall carefully establish additional setting-out stations and Works Bench Marks, at locations approved by the Engineer, as may be necessary from time to time for the proper setting out of the Works.
 - d) The Contractor shall set out parts of the Works at such times as he may be directed by the Engineer to enable Public Utilities Undertakers, Local Authorities or other Statutory Bodies to carry out temporary or permanent alterations to their mains, services or other apparatus.
 - e) Should any setting out mark, station, peg or other apparatus however established be disturbed during the course of the works the Contractor shall suspend the activity, operatives or machinery responsible until such time as it has been replaced to the satisfaction of the Engineer.

APPENDIX 1/13 PROGRAMME OF WORKS

- 1 **The Construction of the Section 278 Works shall be co-ordinated with the Highway Authority. The Contractor is advised that the lead-in time for the works is likely to be a minimum of 6 weeks (assuming S58 not required) and that it is the Contractor's responsibility to agree the a programme of works and road space booking with the Highway Authority in advance.**
- 2 The *Contractor* shall provide the Programme of Works in a form of a Gantt/Bar Chart and must abide by the constraints below. It shall show the level of detail appropriate to each stage of Providing the Works and all activities, restraints and resources, each of which shall be given a short title. All events shall be numbered and annotated with earliest and latest event dates, and the critical path operations highlighted.
- 3 At the time of presentation of the Programme the *Contractor* shall also provide a drawing showing its intended sequence of works.
- 4 SCHEDULE OF CONSTRAINTS
 - i. The extent of the site, and limitations on its use, as detailed in Appendix 1/7 and any additional information detailed on the specific scheme contract drawings.
 - ii. Restrictions on noise and vibration, as detailed in Appendix 1/9 and any additional information detailed on the specific scheme contract drawings.
 - iii. Accommodation works to properties fronting the site, as detailed on the specific scheme contract drawings (If applicable).
 - iv. Work to privately and publicly owned services and supplies, as outlined in Appendix 1/16 and any additional information detailed on the specific scheme contract drawings.
 - v. Traffic safety and management including notice requirements, as detailed in Appendix 1/17 and any additional information detailed on the specific scheme contract drawings.
 - vi. Restrictions arising from substances hazardous to health, as detailed in Appendix 1/23 and any additional information detailed on the specific scheme contract drawings.
 - vii. Possession and access
 - viii. Provision of environmental protection prior to the main construction operations (environmental barriers, etc.).
 - ix. Trials and demonstrations in advance of main construction.
 - x. Compliance with technical approval procedures in relation to structures designed by the *Contractor*, including awaiting approvals resubmissions and modifications.
 - xi. The *Contractor's* attention is drawn to Appendix 1/17 and that no lane closure will be permitted over Bank Holiday weekends, Bank Holidays and the day preceding these dates.
 - xii. Restrictions on the application of high friction surfacing, as details in Clause 924SR. (If applicable).
 - xiii. Work by street lighting, traffic signal and other contractors.
 - xiv. Access to the works through retail park land should be agreed with Sam Pilgrim of Savills T: 020 7409 8926, E:SPilgrim@savills.com.

APPENDIX 1/13 PROGRAMME OF WORKS

5 The level of detail should be not less than the following:-

Level 1

Within 4 weeks of the Contract Date and any subsequent revision(s):-

- i. Earthworks - each cutting and embankment.
- ii. Roadworks - in lengths not exceeding 150m for main route and for each side road.
- iii. Fencing
- iv. Setting up of Traffic Management
- v. Site Clearance
- vi. Drainage
- vii. Sub-base
- viii. Sub-grade improvement layer
- ix. Road base or concrete paving
- x. Kerbing and Footway works
- xi. Carriageway Surfacing
- xii. Application of anti-skid
- xiii. Road Markings & Signing
- xiv. Major privately and publicly owned services and supplies.
- xv. Traffic management measures including operation of site accesses, plant crossings and temporary diversions for traffic.

Level 2

Further breakdown of items and other details as may be required.

APPENDIX I/I5 ACCOMMODATION WORKS

- 1 Copies of Land Reference Plans and Schedules together with details of accommodation works already determined will be made available during the Tender period.

They will be supplied to the successful Tenderer before the commencement of the Works. Further information will be provided in respect of Accommodation Works when this has been agreed.

- 2 No specific accommodation works outside the highway boundaries are identified. However, the Contractor is required to make good any access or footway serving an adjacent property due to the alteration of kerblines, carriageway or footway.

- 3 Similarly, any damage caused by the actions of the Contractor to boundary fences/walls/hedges of properties adjacent to the works is to be made good.

- 4 RESTRICTIONS

The *Contractor* shall provide the Overseeing Organisation with 2 weeks notice of his intention to access non-highway land for the purpose of carrying out accommodation works, together with a programme outlining his proposed order and duration of the works.

The *Contractor* shall carry out the accommodation works expeditiously, in order to minimise disruption.

Any materials arising from the accommodation works should be offered, in the first instance, to the owner of the land. If they do not wish to retain the property, this shall be recorded and the *Contractor* shall make appropriate arrangements to dispose or recycle the material in accordance with the contract requirements. A record of this disposal/recycling shall be supplied to the Overseeing Organisation.

APPENDIX I/16**PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES**

- 1 Details of preliminary arrangements that have been made with Statutory Undertakers and others for the alteration of services affected by the *works* will be provided on the specific contract drawings.
- 2 The *Contractor* shall make arrangements with the Statutory Undertakers and others concerned, for the coordination of its work with all work which needs to be done by them or their contractors concurrently with the *works*. Compliance with the periods of notice given in this Appendix does not relieve the *Contractor* of its obligations.
- 3 Private Services to individual properties have not generally been listed or shown on the drawings. The *Contractor* shall make arrangements with the Statutory Undertakers and others concerned for the phasing of all necessary disconnections and diversions of private services affected by the *works*.
- 4 Disconnected apparatus shall be removed by the *Contractor* only with the prior consent of the Authority concerned.
- 5 The names, addresses and telephone numbers of the authorities serving in the locality are listed below:

Name	Address	Initial Contact Telephone Number
Electricity Supply		
Scottish and Southern Energy	PO Box 93 Portsmouth Hampshire PO6 2YP	Andrew Doe <i>Network Development Designer</i> T: 023 9262 4123 F: 023 9262 4548 E: andy.doe@sse.com Ref: DUP497
Gas supply		
Scotland Gas Networks	2 Leeson's Hill Orpington Kent BR5 2TN	Phil Chalmers <i>Network Planning</i> T: 01689 881533 E: phil.chalmers@sgn.co.uk Ref: DIV.7079 Steve Cooke Team Manager T: 02392 624412 M: 07775 820658
Telecommunications		
BT Openreach	PP 3004 Portsmouth Central Exchange King Henry 1 st Street Portsmouth PO1 2BZ SO16 0YU	Martin Ward <i>Roadwork's Project Manager</i> T: 020 3251 6574 M: 07918 071771 E: martin.r.ward@openreach.co.uk Ref: 37533/BVD46C/MW

APPENDIX 1/16 PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

Name	Address	Initial Contact Telephone Number
Virgin Media	Ocean House, West Quay Rd, Southampton, Hants. SO15 1EE	Becky Elliott <i>Access Planner</i> T: 023 8048 1645 M: 07811 262199 F: 023 8032 2181 Ref: VM.CIP.80533
Cable & Wireless and ENERGIS	Smale House 114 Great Suffolk Street London SE1 0SL	Samantha Wilkinson <i>Diversionary Works Cost Controller</i> <i>Fibre Services – Planning Service</i> <i>Delivery</i> T: 01614 232740 M: 07822 806559 E: samantha.wilkinson@cw.com Ref: NRSWA/544/731443
Easynet	Easynet Telecom Ltd 70 Buckingham Avenue Slough SL1 4PN	01753 714 176 / 177 0207 032 3160 (Fax) email: nrswa@uk.easynet.net
Fujitsu Telecommunication s Europe Ltd	Fujitsu Telecommunications Europe Ltd Fujitsu & Supported Networks Plant Enquiries Solihull Parkway Birmingham Business Park Birmingham B37 7YU	0121 717 6065 0845 8500115 (Fax)
Verizon Business	Verizon Attn. Onny Essien 2 – 6 St Pancras Way London NW1 1AQ	07899 980661 0129 355 3871 (Fax)
Global Crossing	Plant Enquiries Global Crossing Rosalind House Jays Close Viabes Basingstoke RG22 4BS	01256 858415 01256 858581 (Fax) stat.request@GlobalCrossing.com.co.uk

APPENDIX 1/16 PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

Name	Address	Initial Contact Telephone Number
Allcom	Alison Lloyd Operations Director Allcom UK Ltd 136 Hodges Street Spring Field WIGAN WN6 7JE	0871 566 1245 0777 624 0542 (Mobile) 01942 513 607 (Fax) Alison.lloyd@allcomltd.com
VSNL	McNicholas Construction Services Ltd VSNL Plant Protection Centre Lismirrane Industrial Park Elstree Road ELSTREE WD6 3EA Contact :- Paul Turberfield McN Works Control Centre	020 8236 6612 020 8236 6600 (Fax)
Water supply		
Portsmouth Water plc	PO Box 8 West Street Havant Hampshire PO9 1LG	Jim Hayler <i>Technical Assistant</i> T: 023 9224 9327 E: j.hayler@portsmouthwater.co.uk Ref: RCW5901
Sewerage		
Southern Water	Southern House Capstone Road Chatham Kent ME5 7QA	Land Search Department F: 01634 844514 Ref: 126704
Sewerage		
Others		
Pipelines (various companies)	Web based enquiry service available at: www.linesearch.org	

APPENDIX 1/16 PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

Name	Address	Initial Contact Telephone Number
National Grid	National Grid Asset Protection Team National Grid PO Box 3484 Warwick CV34 6TG	0800 731 2961 Opt 3 01926 656574 (Fax)
National Grid (Gas)	National Grid Gas Distribution Plant Protection Team Lakeside House The Lakes Bedford Road Northampton NN4 7HD	01604 815361
Street Lighting	SEC Unit 1 Royal London Park Flanders Road Hedge End SO30 2LG	Contact: Dave Burrows Tel: 01489771780
Post Office	PO7 Collection Office dave.seller@royalmail.com	Contact: Dave Seller Collection Manager Tel: 07889 035000
Havant Borough Council	Havant Borough Council Public Service Plaza Havant PO9 2AX	Tim Pointer Community Safety Team Leader Tel: 023 9244 6606

APPENDIX 1/16 PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES**SERVICES AND SUPPLIES AFFECTED BY THE WORKS**

Location	Description	Group *	Drawing No	Notice Required to commence	Time for Completion
Name of Authority					
BT Openreach	<u>Stopping Up</u> Existing apparatus to be relocated into the new Aston Road	C	C4 Estimate dated 07/09/12 & drawing numbered Appendix A (Contractor to excavate, lay ducting and construct chambers as indicated on drawing numbered Appendix A under a £1 contract with BT Openreach)	3 months	6 months
	<u>Pedestrian Ramp</u> Protection/ diversion works TBC post KSA investigation works	C	TBC	TBC	TBC
	Traffic Signal controller telemetry connection	E	ZSSLWVILLE.2/ 13 & 14 indicates locations of controllers. Contractor to obtain quotation and arrange for connection.	TBC	TBC
Scottish and Southern Energy	<u>Stopping Up</u> Existing apparatus to be relocated into the new Aston Road	C	C4 Estimate dated 06/09/12 & enclosed drawing (Contractor to excavate, obtain and lay ducting and reinstate trenches on behalf of SSE)	3 months	TBC
	<u>Pedestrian Ramp</u> Unaffected	-	-	-	-
Southern Electric Contracting (SEC)	Connection and disconnection to lighting columns and signs	E	Contractor to obtain	Phone Terry Edmonds on: 01489 771705 at least 28 days before required	TBC
	Provision of new power supply for Traffic signal controller				

APPENDIX 1/16 PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

Location	Description	Group *	Drawing No	Notice Required to commence	Time for Completion
Southern Gas Networks	<u>Stopping Up</u> Existing apparatus to be relocated into the new Aston Road.	C	C4 Estimate dated 03/09/12 & drawing numbered 56/3868 (Contractor to excavate and reinstate trenches on behalf of SGN)	3 months	TBC
	<u>Pedestrian Ramp</u> Protection works required outlined on drawing number MBSK120904A Rev A subject to revised AIP approval	C	MBSK120904A Rev A	-	TBC
Portsmouth Water	<u>Stopping Up</u> Existing apparatus to be relocated into the new Aston Road.	C	C4 Estimate dated 30/01/12 & enclosed drawing (Contractor to excavate and reinstate trenches on behalf of PW)	3 months	TBC
	<u>Pedestrian Ramp</u> PW to abandon their main that runs under the proposed pedestrian ramp		C4 Estimate dated 22 nd March 2012 & enclosed drawing	3 months	TBC
Cable and Wireless	<u>Pedestrian Ramp</u> Diversion of existing fibre cables situated in the verge in close proximity to the proposed pedestrian ramp	C	C3 Estimate dated 5 th December 2011	20 weeks	TBC
Virgin Media	<u>Stopping Up</u> Existing apparatus to be relocated into the new Aston Road.	C	C4 Estimate dated 04/09/12 & drawing numbered 80533 (Contractor to excavate and reinstate trenches on behalf of VM)	3 months	TBC

APPENDIX 1/16 PRIVATELY AND PUBLICLY OWNED SERVICES AND SUPPLIES

Location	Description	Group *	Drawing No	Notice Required to commence	Time for Completion
Post Office	Box to be sealed prior to contractor moving it to agreed relocated position indicated on drawing numbered MBSK120816A	C	MBSK120816A	72 hours	Contractor to move Post Box – 72 hours' notice required to seal the box prior to moving
Havant Borough Council	Agreed relocation of CCTV mast is not required based upon drawing numbered MBSK120828A	C	MBSK120828A	-	Contractor liable for damage to CCTV mast and / or service connection during construction works

*** Key to Group Letters Specified**

- A Work expected to be Completed before the Commencement of the *works*.
- B Work required after Commencement of the *works* which **does not** require Prior Work by the *Contractor*.
- C Work required after Commencement of the *works* which **does** require Prior Work by the *Contractor*.
- D Work Expected To Be in Progress at the Commencement of the *works*.
- E Work To Be Wholly Undertaken By The *Contractor*.

- 6 Refer to Clause 572AR Replacing, Raising or Lowering Covers and Frames on Existing Chambers, in Appendix 0/1.

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Notes to Compiler

When notices are required for road space bookings, the type and notice period shall be as set out in the Table 1/17_16 below:

Table 1/17_16 – Activity Types and Notice Periods for the Traffic Management Act

No.	Activity Type / Description	Notice Type	Notice Period / Served at
1	Minor Activities; Any planned activity that is to take 3 days or less. E.g.; Sign cleaning, gully emptying, Some lines, Studs, emergency potholes, rural grass cutting, footway patching, off highway repairs, surface dressing (all types).	S55	3 Days (min)
		S74 Wks closed	Within 24 hours of completion
2	Standard Activities; Any planned activity that is to last longer than three days, but less than, or equal to ten days. E.g., Vehicle crossings, small SM / RS Schemes, most safety / traffic calming schemes, significant c'way patching.	S55	10 Days (min)
		S74 In progress	Within 24 hours of works commencing
		S74 Wks closed	Within 24 hours of completion
3	Major Activities; Any planned activity that is to last 11 days or more or any planned activity that requires a temporary traffic order or any activity identified on an annual programme or normally planned at least six months in advance. E.g.; SM / RS schemes. Capital improvement schemes.	S54	3 Months (min)
		S55	10 Days (min)
		S74 In progress	Within 24 hours of works commencing
		S74 Wks closed	Within 24 hours of completion
4	Immediate Activities (Emergency); Unplanned activities undertaken to immediately resolve life threatening problems. E.g.; Safety fence repairs, major pothole repairs etc	S57	Within 2 Hours of works commencing
		S74 Wks closed	Within 24 hours of completion
	Immediate Activities (Urgent); Unplanned activities undertaken to put an end to unplanned interruption of service.	S55	Within 2 Hours of works commencing
		S74 Wks closed	Within 24 hours of completion

A notice shall be produced for each road on which works are taking place. If therefore works are taking place at a junction, a notice for each road on the junction will be required.

Cancellation/extension notices shall be managed as follows:

- **Cancellation:** All notices must be either closed with a registration notice or abandoned if the works are subsequently cancelled. Furthermore an existing notice must be abandoned if the works fail to start within the validity periods. If the works are cancelled or

APPENDIX 1/17 TRAFFIC SAFETY AND MANAGEMENT

postponed beyond the validity dates a registration notice must be sent confirming the status to be 'abandoned' and giving an abandoned date. Subsequent notices **MUST NOT** reuse the same unique reference number, even if they refer to the same works that were postponed.

- **Extending:** Once works have commenced if the duration of the works needs to be extended beyond the estimated end date then a further S74 'In Progress' notice, giving the revised end date, must be submitted **BEFORE** the existing end date expires.
- **Hampshire Coordination:** Co-ordination of all works and activities on the highway is the responsibility of the Highway Authority. In Hampshire this is carried out by local co-ordinators in the Highway Sub Units. Each co-ordinator has the authority to deny access to the highway, or give directions regarding the timing and duration of the works. They may also deny an extension. Furthermore a coordinator may direct the timing of works and may prescribe extended hours, weekend or night working. Such powers are exercised with respect to ensuring minimum disruption for highway traffic. Primarily these powers are exercised on traffic sensitive streets, but may be used on any street if the co-ordinator considers the circumstances warrant such restrictions. If a co-ordinator wishes to exercise these powers they will do so in response to a notice. Failure to comply with a direction from a co-ordinator will result in a non-compliance and possible removal from site.

Information Required for Noticing:

- Unique reference number, e.g. FF400 "Order No." A, B, C etc (A, B, C if more than one road on an order).
- Road Name (Street Gazetteer) – Available from system.
- Grid reference, 6 figure Eastings and Northings – Map books.
- Start / End date of works.
- Traffic Management details (from Works order).
- Description of works – In plain English. (Patching etc).
- Text Description of location of work.
- Street Unique Street Reference Number (USRN) – From system.

If a notice fails to have the required information in the required format, or submitted in the wrong sequence, then it may be invalid and may be rejected (usually within 1 working day). Upon receipt of the reject report the error shall be rectified and the notice resubmitted.

If a notice for proposed works is late then it may be invalid and be rejected at the discretion of the co-ordinator. Where a notice for proposed works will result in a notice period less than specified then the *works promoter* should contact the local co-ordinator to confirm whether this is acceptable.

Christmas Embargo

In the period between the end of November to 4th January (inc) avoid undertaking any planned works in town centres / shopping areas or main arterial routes to town centres / shopping areas. Also, from the 20th December to 4th January (inc) avoid any planned works anywhere on the network.

If you do need to go in for urgent works or consider there is greater benefit to minimising disruption elsewhere by working during these periods then contact the local coordinator first to discuss. Planned works already agreed by the local coordinators may continue as normal. Existing and additional works within an already established / agreed closure / TM, and that will cause no extra disruption,

APPENDIX 1/17 TRAFFIC SAFETY AND MANAGEMENT

may also continue during this period. Emergency works (threat to life or property) are unaffected by this request.

Contact the local coordinators if you need clarification of any specific roads covered by this restriction.

The *Contractor* shall be responsible for the traffic safety and management as described in Clause 117 and the following, unless otherwise instructed in writing by the Overseeing Organisation:

1 TRAFFIC CONTROL AND DIVERSIONS

- i. The *Contractor* shall note that to minimise disruption to traffic the optimum use must be made of traffic management instructed or provided in connection with this contract. The traffic management will not be measured where its use extends beyond the times instructed by the Overseeing Organisation unless the extension of use is for reasons outside the *Contractor's* control.
- ii. The *Contractor* shall provide traffic management in accordance with Chapter 8 of the Traffic Signs Manual (2009) and "Safety at Streetworks and Roadworks" a code of practice (2002), and the 'Guidance for safer temporary traffic management' published on behalf of the Highways Agency, Health and Safety Executive and CSS.
- iii. Single line traffic operation will be required when the undivided clear width of carriageway available is less than 5.5 metres. When single line traffic operation is required, the *Contractor* shall provide a width of at least 3 metres, or wider as necessary at curves and junctions, and the length of single line operation at any one time shall not exceed 200 metres unless otherwise directed by the Overseeing Organisation.
- iv. If required by the Overseeing Organisation traffic control for single line operation shall be carried out by the *Contractor* using manually operated "Stop/Go" signs or vehicle actuated portable traffic signals supplied by the *Contractor* and such signs shall conform with the requirements of Chapter 8 of the Traffic Signs Manual (2009) published by HMSO or any amendment thereof for the time being in force.
- v. The advice of the Police and the Overseeing Organisation shall be sought for works at junctions or roundabouts where more than two way traffic signals will operate and especially where Pelican Crossings or any signal operated site is involved. If sites have to be left unfinished overnight traffic control measures must be agreed with the Police and the Overseeing Organisation.
- vi. Where work is to be undertaken within 800 metres of a half barrier level crossing the *Contractor* shall comply with Chapter 8 of the Traffic Signs Manual or any amendment thereof for the time being in force and shall notify the Overseeing Organisation at least seven days before commencing work of its intention to do so.
- vii. At all times whilst Providing the Works a safe, through route shall be maintained for pedestrians in accordance with "Safety at Streetworks and Roadworks" a code of practice.
- viii. All proposals for traffic control, diversions, restricted carriageway or footway widths etc shall be agreed with the Overseeing Organisation and the Police prior to the starting date. Both reserve the right to require the works to be stopped and the removal or reduction of the traffic restriction where it is causing undue congestion.
- ix. The *Contractor* shall submit detailed proposals to the Overseeing Organisation not less than four weeks before the date on which it is intended to effect such diversions or arrangements.

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- x. Compliance with the requirements of this Appendix shall not relieve the *Contractor* of any other obligations imposed by this Contract or by Statute.

2 DEPARTMENT OF TRANSPORT PUBLICATIONS

- a) DoT publications relevant to this Clause are listed below and shall include subsequent amendments:-
 - i. Traffic Signs Manual, Chapter 8, 2009.

ALL CONTRACTORS SUPERVISORS ARE REQUIRED TO HAVE A COPY OF "SAFETY AT STREETWORKS AND ROADWORKS" a code of practice (2002) published by HMSO.

3 TRAFFIC SAFETY & CONTROL

- i. All traffic barriers used in the carriageway shall incorporate rigid rails to be continuous between supports and fixed so that they cannot be accidentally knocked over.
Lightweight barriers utilising road pins and traffic tape shall not be used.
- ii. Where the carriageway is not barriered off whilst Providing the Works care must be taken at all times to ensure that the surface is safe for all users. Any raised boxes or manhole covers etc must be temporarily ramped and trenches reinstated using bound materials to make them safe.
- iii. Where the circumstances of any particular case are not covered by the recommendations of Clause 117.1, the *Contractor* shall submit proposals for dealing with such situations to the Overseeing Organisation for approval at least one week before installation is due to commence. Compliance with this requirement shall not relieve the *Contractor* of any of its obligations and liabilities under the Contract and under the relevant provisions of the Highways Acts.

4 REQUIREMENTS FOR HIGHWAY TRAFFIC CONTROL

- i. The Traffic Control Area is defined as the area of highway affected by the *works* in any phase in each direction between:-
 - a) The first advance roadworks sign.
 - b) The roadworks "End" sign.
 - c) or between "Road Closed" signs, however, all diversion signs in conjunction with a road closure shall be defined as part of the traffic control area.
- ii. The *Contractor* shall appoint a responsible senior person to act as Traffic Safety Officer during the total contract period and shall notify the Overseeing Organisation accordingly before the *starting date*. The Traffic Safety Officer shall be available both during and out of working hours to direct:-
 - a) immediate replacement of damaged or displaced signs, cones, cylinders or white lines and full restoration of the traffic control layout;
 - b) assistance with the removal of crashed vehicles and debris from the trafficked lanes if so instructed;
 - c) The Traffic Safety Officer shall take instructions direct from the Overseeing Organisation or the Police if the Police have assumed control in an emergency.

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- iii. The *Contractor* shall be responsible for covering and uncovering, cleaning and maintaining any existing signs as specified or directed by the Overseeing Organisation within the Site. On no account will adhesives be stuck to existing sign faces. The *Contractor* shall not organise any other signing in connection with the works, except as specified or directed by the Overseeing Organisation.
- iv. The *Contractor* shall ensure that the traffic control layout of signs, cones, cylinders, barriers, lamps, temporary road studs and temporary road markings is inspected once per day. The traffic layout shall be maintained in accordance with the Contract drawings and in accordance with the recommendations of Chapter 8 of the Traffic Signs Manual 2009, and Signing for Traffic Management at certain Major Roadworks Sites (TD 14/83).
- v. The Overseeing Organisation may direct the *Contractor* to assist in the removal and replacement of signs, traffic cones etc, to facilitate the movement of abnormal indivisible loads. The *Contractor* shall submit to the Overseeing Organisation a full record of plant, labour and materials used in such an operation within 24 hours.
- vi. The *Contractor* shall sweep, patch, remove debris, restore road surface to its original condition and otherwise maintain the trafficked carriageway surfaces within the Traffic Control Area to allow traffic to pass safely within the speed restrictions on the Traffic Control Area.
- vii. The *Contractor* shall provide, maintain and remove suitable traffic management requested by the Overseeing Organisation to allow:
 - (a) Scottish and southern Electric to supply and service connections to illuminated signs and lighting columns,
 - (b) The traffic signal contractor to erect, cable and commission traffic signals,
 - (c) British Telecom to supply lines to the traffic signal installations.

5 REQUIREMENTS FOR INSTALLATION OF HIGHWAY TRAFFIC CONTROL

- i. The *Contractor* shall inform the Overseeing Organisation before the installation of signs, cones, cylinders etc is carried out, and the Overseeing Organisation will inform the Police if necessary. This work shall be carried out in "off peak" periods as agreed with the Overseeing Organisation. Traffic shall not be diverted until the approval of the Overseeing Organisation has been obtained. The *Contractor* shall not alter or adjust the traffic control without the approval of or unless directed by the Police or the Overseeing Organisation.
- ii. The following peak hours apply unless otherwise agreed by the Overseeing Organisation, or stated in Paragraph 14 below in respect of Traffic Sensitive Streets:-

DAY	MORNING PEAK	EVENING PEAK
Monday	0630 to 0930	1600 to 1830
Tuesday	0630 to 0930	1600 to 1830
Wednesday	0630 to 0930	1600 to 1830
Thursday	0630 to 0930	1600 to 1830
Friday	0630 to 0930	1600 to 1830
Saturday	-	-
Sunday	-	-

- iii. No work shall be undertaken on the trafficked lanes of the Site without the approval of the Overseeing Organisation.
- iv. The *Contractor* shall not open any area to traffic that has previously been closed until:-

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- a) appropriate road markings have been laid;
- b) the carriageway has been swept and cleared of all items of plant, personnel, material and debris to the satisfaction of the Overseeing Organisation;
- c) verge or central reserve works and bridge maintenance works have been completed to the satisfaction of the Overseeing Organisation.
- v. No lane closures shall be permitted over bank holiday weekends, bank holidays and the days preceding and following bank holiday weekends without prior written approval from the Overseeing Organisation.
- vi. The following roads are designated high speed dual carriageways (with a speed limit of 50mph or greater). All traffic management apparatus associated with works on these roads shall be planned and installed by operatives/sub-contractors accredited in accordance with Sector Scheme 12 A-D of the National Highway Quality Management Sector Scheme, as appropriate.

Road No.	Location	Length
B2150	Hulbert Road from A3(M) Junction 3 to Tempest roundabout	400m

6

ACCIDENTS AND EFFECT ON THE WORKS

- i. In the event of an accident occurring on the trafficked lanes within the Site the Police may direct operations, including instructions to the Traffic Safety Officer (defined in paragraph 4.(ii)). The Overseeing Organisation or the Police may direct the *Contractor* to remove broken down or damaged vehicles and debris which are capable of being removed by the vehicles and equipment on the Site. The Overseeing Organisation or the Police may call in specialist contractors to assist in the removal of large vehicles, dangerous chemicals etc. The *Contractor* shall, on the direction of the Overseeing Organisation, restore the road surface to its original condition to the satisfaction of the Overseeing Organisation and shall submit to the Overseeing Organisation within 24 hours a record of plant, materials and labour used for this purpose.

7

TRAFFIC ORDERS

- i. All temporary diversions and the use of three or four way signals proposed by the *Contractor* will require traffic orders to be processed by the Highway Authority and the *Contractor* shall allow for this procedure in its programme.
- ii. Where in addition to any closure instigated by the Overseeing Organisation the *Contractor* considers its works necessitate closing a road or amendment of existing traffic movements, or interference with waiting, loading or parking arrangements the *Contractor* shall notify the Overseeing Organisation in writing at least 6 weeks before the date when it is desired to Provide the Works so that the necessary advertising and posting of statutory notices may be put in hand in accordance with the provisions of the Road Traffic Regulations Act.
- iii. Where multi way including two way traffic signals are involved the details of the site, including position of traffic heads and all signs, shall be submitted to the Overseeing Organisation not less than three weeks before the intended date of use.
- iv. If owing to an emergency a road has to be closed without notice, due to danger to road users, the *Contractor* shall notify the Overseeing Organisation, Police, Fire Services,

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Ambulance Service and Public Transport Operators immediately in order that suitable diversions may be arranged.

v. Notice required by the Employer to arrange orders and licences are:

- | | |
|---|----------|
| ▪ Amending or making traffic orders (temporary) | 8 weeks |
| ▪ Authorising non-prescribed signs | 6 months |
| ▪ Authorising two-way temporary traffic lights | 7 day |
| ▪ Authorising three/four-way temporary traffic lights | 21 days |

vi. At all times vehicular and pedestrian access shall be maintained to all properties.

vii. Every endeavour must be made to accommodate disabled or handicapped persons requiring access through the site.

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8

ADVANCE INFORMATION SIGNS

1 Requirements for the Use of Driver Information Signs

a. General

- i. All temporary signs shall be of standard construction and reflectorised using materials having a photometric performance complying with the requirements set out in Table 1 of Annex C of TA 19/81.
- ii. All temporary signs (except free standing signs) shall be attached to existing lamp columns or traffic sign posts as directed by the Overseeing Organisation, unless otherwise stated below.
- iii. A minimum vertical clearance of 2.1m above footways (2.4m above cycleways), and a horizontal clearance of 0.5m from carriageways shall be maintained.
- iv. The *Contractor* shall provide all necessary fixtures and fittings.
- v. It should be noted that additional signs may be instructed following a request from either the Police or HCC Area Office, should circumstances dictate a change to the traffic management.

b. Special Temporary Signs

- i. For the period between completion of surfacing and the commencement of any areas of anti-skid surface treatments, the *Contractor* shall provide 2 No 600mm high temporary signs to Diag 557 of the Traffic Sign Regulation and General Directions 2002 (and subsequent amendments), on the approach.
- ii. One sign shall be positioned at the start of the area to be treated, with the second located between 75 and 125m in advance.
- iii. All signs shall be maintained throughout the period until the special surfacing has been completed.

c. Advanced Notification Signs

- i. Temporary advanced notification signs stating 'Roadworks on from <Contract Date> until <Completion Date + float > shall be erected on each side of the road for . . . weeks before the commencement of works at each of the following locations:
- ii. The signs shall be manufactured from appropriate materials and mounted on suitable posts, as agreed with the Overseeing Organisation. The exact locations of the signs shall be agreed on site.

d. Driver Information Signs during Construction

- i. Advance driver information signs shall be supplied and erected at each of the locations in Para 8.1. Legends shall be as detailed in Section 8.2 below.
- ii. Driver information signs shall also be provided for any lane closures left in place overnight, where works are not being carried out.

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2 Sign Legends

a. The permitted legends for these signs are:

- LANE CLOSED TO PROTECT WORKFORCE
- LANE CLOSED FOR SAFETY
- WORK SUSPENDED – UNSUITABLE WEATHER
- ROAD REPAIRS – MATERIALS HARDENING

b. Required Variations to Legends

i. Driver Information Signs during Construction

The legend for the advance driver information signs shall read:

- DELAYS POSSIBLE UNTIL

The date shall be changed as necessary.

9

PUBLIC HIGHWAYS AND PRIVATE ROADS AND OTHER WAYS AFFECTED BY THE WORKS

i. All highways and public rights of way are under the Authority of:-

The Economy Transport and Environment Department
The Castle, Winchester
SO23 8UD, Hampshire
Tel: 0845 603 5633

- ii. Where pedestrian access is required footways shall be maintained at least 1.5m wide. Pedestrian barriers must be rigid barriers to protect pedestrians from traffic, excavations, plant or material. Pedestrian barriers shall have hand rails between 1.0 and 1.2 metres above ground level and tapping rails fixed with the lower edge approximately 150mm above ground. All rails shall be solid, continuous between the supports and fixed so that they cannot be accidentally knocked over.
- iii. For excavations deeper than 1.2m the type of barriers required shall be agreed with the Overseeing Organisation.
- iv. Lightweight barriers utilising road pins and traffic tape shall not be used.
- v. Where the footway is not barriered off whilst Providing the Works care shall be taken at all times to ensure that the surface is safe for pedestrians. Any raised boxes or manhole covers etc shall be temporarily ramped and trenches reinstated using bound materials to make them safe.
- vi. Access to and from the existing highways by works vehicles shall be made only by means of clearly signed works accesses.

10

PUBLIC FOOTPATHS

- i) Safe pedestrian access to and from the public highway shall be maintained at all times as agreed with the Overseeing Organisation.

11

PRIVATE RIGHTS OF WAY

- i) Private rights of way shall be maintained at all times in a safe condition as agreed with the Overseeing Organisation.

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12 TRAFFIC SIGNAL SUB-SURFACE LOOP DETECTORS

- i) The *Contractor* shall ensure, when working in the vicinity of traffic signal facilities at junctions and controlled pedestrian crossings which utilise induction loops inlaid in the carriageway, that these cables are not damaged.
- ii) The Overseeing Organisation if requested will arrange for the position of such loops to be indicated on site subject to reasonable notice.
- iii) These cables if damaged require specialist facilities and any damage caused by the *Contractor* shall be repaired by the Employer at the *Contractor's* expense or deducted from any sum due or which may become due to the *Contractor*.

13 TEMPORARY DIVERSIONS FOR TRAFFIC SPECIFIED BY THE OVERSEEING ORGANISATION

- i) The *Contractor's* attention is drawn to the requirements of Clause 117 and Appendix 1/17 on traffic safety and management in implementing the Temporary Diversions of traffic listed below:
- ii) Requirements for temporary diversions of traffic will be shown on a drawing to be supplied by the Overseeing Organisation.
- iii) Implementing and maintenance of Temporary diversions of traffic shall be the responsibility of the *Contractor*.
- iv) Special legend signs may be required for specific schemes and wording of these will be instructed by the Overseeing Organisation. These signs are required to be Class 1 high intensity, black legend on yellow background with a 'x' height of 100mm. These signs shall be covered until effective, if erected in advance of the starting date.

14 DETAILS OF EVENTS THAT COULD IMPACT ON THE DELIVERY OF WORKS

- i) The *Contractor* shall be aware that other contractors will carry out works on the highway network from time to time. These works may include (although not exhaustively) statutory undertakers, developers, highway improvements, major maintenance schemes, specialist surfacing works, bridgeworks and inspections, technical and drainage surveys, traffic signal installation, commissioning and maintenance, and street lighting maintenance and installation.
- ii) The *Project Manager* shall endeavour to keep the *Contractor* informed of planned works on the highway network at all times, in line with the provisions of the Traffic Management Act.
- iii) The *Contractor* should also note that other events may have a bearing on works, and examples of a typical annual programme are provided below. Major planned events, such as the New Forest Show, Southampton Boat Show and Farnborough Air Show can place significant restrictions on access to the highway network and will be discussed in detail with the *Contractor* with a minimum of 3 months notice.

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Event name	Location	Typical date	Typical Duration
Chichester Priory 10k road race	Chichester - starting @ the Northgate Car Park	February	1 Day
Legoland - Big Opening Weekend	Windsor	March	1 Day
Agility Dog Show	Newbury Showground, Berkshire	March	Weekend
Hampshire Spring Craft & Garden Show	Broadlands, Romsey	April	Weekend
Guildford Lions Easter Show	Guildford	April	1 Day
British Superbikes	Thruxton Racing Circuit, Andover	April	1 Day
Winchester St Georges Day parade	Winchester city centre	April	1 Day
Gosport St Georges Day Parade	Gosport	April	1 Day
Aldershot Horse Show	Aldershot, Hants	May	Weekend
British Touring cars	Thruxton Racing Circuit, Andover	May	1 Day
Royal Windsor Horse Show	Windsor Castle, Windsor, Berks	May	Weekend
Sparsholt College Countryside Day	Sparsholt College, Winchester	May	1 Day
Watercress Festival	Alresford	May	1 Day
Wickham Horse Fair	Wickham	May	1 Day
HI:FI South (Homelands)	Matterley Bowl, nr Winchester	May	Weekend
Hampshire Country Show	Broadlands, Romsey	May	Weekend
Beggars Fair	Romsey, Hants	May	Weekend
Romsey Carnival	Romsey, Hants	May	Weekend
Highclere Country Fair (9am - 5.30pm)	Highclere Castle, Highclere Park, Newbury, Berks	May	Weekend
Surrey County Show - opens @ 9am	Stoke Park, Guildford	May	1 Day
Southern Counties Canine Association	Newbury Showground, Berkshire	June	Weekend
The Newbury Summer Show	Newbury Showground, Berkshire	June	Weekend
Goodwood Festival Of Speed - Gates open @ 7am	Goodwood House, Goodwood, Chichester	June	Weekend
Planning Sans Frontieres	Aldershot, Hants	July	1 Day
Hampshire Water Festival	Andover	July	1 Day
Salisbury Show	Salisbury	July	Weekend

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Event name	Location	Typical date	Typical Duration
Alton Agricultural Show	Froyle Park Showground, Alton	July	1 Day
Romsey Beggars Fair	Romsey, Hants	July	Weekend
The Aldershot Army Show	Queens Parade Playing Fields, Queens Avenue, Aldershot, Hampshire	July	Weekend
Netley Marsh Steam & Craft Show	Meadowmead Farm, Netley Marsh	July	Weekend
Bournemouth & Poole Show	Chapel Gate, nr. Bournemouth Airport	July	Weekend
New Forest & Hampshire County Show	The Showground, New Park, Brockenhurst	July	Weekend
Portsmouth & Southsea Show	Portsmouth, Hants	August	Weekend
Hampshire Summer Garden Show	Broadlands, Romsey	August	Weekend
Bournemouth Canine Association Show	Brockenhurst, Hants	August	Weekend
Reading Festival	Central Reading (Little John's Farm, Richfield Avenue)	August	Weekend
Hampshire Pageant of Motoring	Broadlands, Romsey	August	Weekend
Dorset County Show	Dorchester Showground, Dorchester	September	Weekend
Alresford Show - 9am - 6pm	Tichborne Park, Alresford, Hants	September	1 Day
Reading & Wokingham Show	Spencers Wood, Reading	September	1 Day
IOG Saltex	Windsor Racecourse, Maidenhead Road	September	Weekend
Emsworth Food Festival	Emsworth, Havant	September	4 Days
Beaulieu International Autojumble - 9am/10am - 5pm	The National Motor Museum, Beaulieu	September	Weekend
Romsey Show	Broadlands, Romsey	September	Weekend
Southampton Boat Show	Southampton, Hants	September	10 Days
Royal County of Berkshire Show	Newbury Showground, Berkshire	September	Weekend
Showman's Show - Newbury	Newbury Showground, Berkshire	October	Weekend
Legoland Fireworks	Windsor	October	Weekend
Beaulieu Firework Spectacular	The National Motor Museum, Beaulieu, Hants	October	1 Day
Fireworks	Thruxton Racing Circuit, Andover	November	1 Day

APPENDIX 1/17 TRAFFIC SAFETY AND MANAGEMENT

Event name	Location	Typical date	Typical Duration
Legoland Fireworks	Windsor	November	1 Day
Christmas Market	Winchester Cathedral	Nov/Dec	3 Weeks
Ice Rink	Winchester Cathedral	Nov/Jan	6 Weeks
Christmas Shopping	Town centres across Hampshire and critical transport links	End of November to 4 January **	
Farnborough Airshow	Farnborough	July in even numbered years	1 Week †

† Please note that the Farnborough Air Show is held every two years and involves significant restrictions to the highway network over approx. 6 weeks on the run up to and after the show itself.

** In the period between the end November to 4th January (inc) please could you avoid undertaking any planned works in town centres / shopping areas or main arterial routes to town centres / shopping areas. Also, from the 20th December to 4th January (inc) please avoid any planned works anywhere on the network.

Please contact the local coordinators if you need clarification of any specific roads covered by this restriction.

15

THE TRAFFIC MANAGEMENT ACT 2004

- i) Highway Authorities have a duty to coordinate all activities on the public highway and to minimise congestion. The NRSWA 1991 and the TMA 2004 prescribe powers to execute these duties. Although primarily aimed at utility works, the same principles shall be adopted for Hampshire's own works.
- ii) The *Contractor's* operations will affect traffic flow and accordingly the *Contractor* should organise the works to minimise the impact. Details of how this will be achieved will be agreed with the Overseeing Organisation prior to commencement of work.
- iii) The *Contractor* shall maintain programmes for all the Works. The Overseeing Organisation shall submit all required street works notices in accordance with the New Roads and Street Works Act, as amended by the Traffic Management Act.

Where a 3 month notice for proposed works is required, the Overseeing Organisation will serve this notice in advance of the actual scheme being issued to the *Contractor*. Where a notice is served by the Overseeing Organisation, a copy will be provided to the *Contractor*, to ensure details such as the unique reference number is correct on the remaining required notices that will be served by the *Contractor*.

APPENDIX I/I9 ROUTING OF VEHICLES

1 Permitted Access Routes To and From the Site

- i) The *Contractor* shall ensure that construction traffic uses only those permitted routes shown within the Works Information, if applicable.
- ii) The *Contractor* shall, at the Commencement of the Contract, erect appropriate signs clearly indicating this requirement. These signs shall be removed upon the completion date.
- iii) The legend, size and location of these signs shall be agreed with the Overseeing Organisation.

2 The Use of the Works by Construction Traffic

- i) The structures and finished pavement forming part of the works shall only be used to carry construction traffic when measures approved by the Overseeing Organisation have been taken to protect them from damage.
- ii) The *Contractor* shall not be permitted to use any of the structures or finished pavement forming part of the works to carry construction traffic outside the current Motor Vehicle (Construction and Use) Regulations.
- iii) The use by construction traffic of the works, over or adjacent to railway tracks or property, private property or public highways will only be permitted when suitable protective measures to the Overseeing Organisation's approval have been implemented. The cost of all such measures shall be borne by the *Contractor*.
- iv) The approval of the Overseeing Organisation to proposals to use structures or finished pavement forming part of the works for construction shall not relieve the *Contractor* of its responsibilities under the Contract.

3 Movement of Machinery and Plant Across Public Roads

4 Temporary Structures for Construction Traffic Spanning Areas Used by the Public

APPENDIX I/2I INFORMATION BOARDS

- i) Scheme Sign Boards shall be erected on temporary posts as directed and at locations agreed with the Overseeing Organisation.
- ii) When directed by the Overseeing Organisation, the *Contractor* shall carefully take down the Scheme Sign Boards and deliver them to the HCC offices at Micheldever.
- iii) The Scheme Sign Boards shall comply with HCC Standard Detail Drawing No HCC9/C/145 A.

APPENDIX I/22 PROGRESS PHOTOGRAPHS

1. The contractor shall arrange for a photographic record of the site to be made at the commencement of the works and fortnightly thereafter.
2. The photographs shall be taken with a digital camera by a competent photographer, who may be a member of the Contractor's staff. The photos shall be presented to the Engineer on a compact disk.
3. Photograph locations are to be agreed with the Engineer.
4. No aerial photographs are required.

APPENDIX I/23

RISKS TO HEALTH AND SAFETY FROM MATERIALS OR SUBSTANCES

1 Restrictions in relation to traffic management measures

- i) In addition to the requirements of Appendix 1/17 and any further requirements contained within the Works Information relating to Traffic Management, the *Contractor* shall be responsible for the provision of such measures as additional safety zones, signs, barriers etc where these are considered necessary for the protection of the public.

2 Restrictions in relation to working practices

- i) Attention is drawn to the safety precautions required when using resin based materials for bedding mortars. The *Contractor* shall comply with the manufacturer's instructions.
- ii) Fires or the burning of materials on Site shall not be permitted.

3 Measures to be taken to protect members of the public

- i) Members of the public are to be protected from activities within, and from gaining access to the working area by whatever means necessary, e.g. temporary fencing, appropriate signing etc, to prevent their interaction with any hazardous materials.
- ii) The *Contractor* shall use methods approved by the Overseeing Organisation which prevent nuisance and pollution due to dust, smoke or noise arising from the removal of carriageway materials and from cutting pavements, paving slabs and blocks, kerbs, pipes, etc.
- iii) Due consideration shall be given to wind speed and direction during operations to remove existing road markings.

4 Monitoring to be undertaken by Contractor

- i) The *Contractor* shall be responsible for monitoring operations required to Provide the Works to ensure that measures to limit risks to health and safety from materials and substances are being implemented as agreed with the Overseeing Organisation.

APPENDIX 2/I LIST OF BUILDINGS, ETC. TO BE DEMOLISHED OR PARTIALLY DEMOLISHED

1 General

- i) Items of requiring clearance from the site are indicated on the Site clearance, general arrangement drawing and traffic sign removal schedule ZSSLWVILLE.2/RSS.

2 Redundant Lighting Columns

- i) Where carriageway or footpaths remain open as public highway, no lighting may be disconnected without provision of an equivalent system of lighting. This may be achieved by the commissioning of the new lighting scheme or provision of a temporary lighting scheme, see Appendix 14/3.
- ii) Care must be taken in disposing of old lighting equipment, older lanterns could contain a small amount of asbestos. Lamps used in street lighting do contain small amounts of potentially hazardous substances such as metallic sodium and mercury. Danger can be avoided effectively by careful handling to prevent breakage and by following well established safety procedures for the disposal of used lamps. Where significant quantities may be involved, the local Waste Disposal Officer should be consulted.
- iii) As detailed on Street Lighting Drawing and scheduled in this Appendix, the *Contractor* shall liaise with the Distribution Network Operator and the Overseeing Organisation regarding programming the disconnection of columns which are to be removed. It is the Contractor's responsibility to place orders for the disconnection/connections of illuminated street furniture, unless otherwise agreed. The *Contractor* shall be aware of overhead power lines and comply with working clearances in G39/1 during the removal of lighting columns.
- iv) The safety requirements in relation to underground and overhead obstructions and column lifting, as outlined in ILE Code of Practice for Electrical Safety in Highway Electrical Operations, Clause 11, must be observed.
- v) Columns shall be removed strictly in accordance with the ILE document "Safety During The Installation And Removal Of Lighting Columns And Similar Street Furniture In Proximity To High Voltage Overhead Lines", published in 2004 as a supplement to the "Code Of Practice For Electrical Safety In Highway Operations" fifth edition.

3 Redundant Cables

- i) Existing underground cables for the circuits listed in section 2 below shall be safely disconnected, cut out and removed from Site and disposed of as part of the *Contractor's* obligations under Health and Safety requirements. Existing ground shall be reinstated after removal of cables.

4 Removal Or Alterations To Existing Signs

- i) Signs to be taken down are as detailed on the Site Clearance drawings and as scheduled in the Traffic Signing Removal Schedule located at the end of this specification document. The *Contractor* shall liaise with the Distribution Network Operator and the Overseeing Organisation regarding programming the disconnection of illuminated signs which are to be removed. It is the Contractor's responsibility to place orders for the disconnection/connections of illuminated street furniture, unless otherwise agreed.

APPENDIX 2/2

FILLING OF TRENCHES AND PIPES

1. For treatment of redundant gully pots refer to Appendix 5/1.
2. For treatment of disused soil and surface water drains refer to Appendix 5/1.
3. Disused cables and ducts together with any bed or haunch or surround within 1 m of formation level shall be removed and over 1 m below formation shall be left unless otherwise described in Appendix 2/2. The ends of existing drains and sewers no longer required because of alterations to the drainage layout shall be sealed in accordance with Clause 506. All trenches shall be backfilled in accordance with Clause 505
4. Any abandoned/redundant pipes and chambers more than 1.0m deep and greater than 375mm diameter that fall within the proposed adoptable highway shall be permanently filled with a grout of cement and pfa (or similar filler to the approval of the Engineer).
5. All redundant connections in existing manholes/chambers shall be sealed and the benching made good, all to the satisfaction of the Highway Inspector and utility company involved.

APPENDIX 2/3 RETENTION OF MATERIAL ARISING FROM SITE CLEARANCE

The Contractor shall provide new materials for the construction of the Permanent Works, except as detailed below:

1. Existing gully gratings and frames and manhole covers and frames to be raised/lowered/adjusted to suit new road or footway levels as required.
2. Existing traffic signs shall be taken down and stored on site for re-use as indicated on the 'Traffic Signs Removal Schedule ZSSLWVILLE2.2/RSS'. The new positions of these items are shown on the general arrangement drawings and the 'Traffic Signing Schedule ZSSLWVILLE2.2/TSS'.

APPENDIX 2/4 EXPLOSIVES AND BLASTING

Explosives shall not be used in any location.

APPENDIX 2/5 HAZARDOUS MATERIALS

Hazardous materials are not expected to be encountered.

APPENDIX 3/I FENCING, GATES AND STILES

Temporary fencing

1. The Contractor is to agree with the owners/occupiers and the highway authority the extent of any temporary fencing to be provided at the boundary of the Works with adjacent properties.
2. The Contractor is to provide hoarding and security fencing as necessary to protect the permanent works, temporary works, accommodation works, third party properties abutting the site, site offices and compounds.
3. The contractor should note the requirement for the protection of trees and vegetation along the perimeter of the development site and the need for protective fencing to be erected. Refer to Landscape Architect's drawings for further information. No works shall commence within the vicinity of existing vegetation until the protective fencing is in place to the satisfaction of the Engineer.
4. The Contractor shall submit to the highway authority details of the standard and location of temporary fencing to be provided during the course of the works. The Contractor should allow suitable time for the checking of his submissions by the highway authority.

Permanent fencing

5. Where permanent fencing is required it is indicated on the drawings.

APPENDIX 4/I ROAD RESTRAINT SYSTEMS (VEHICLE AND PEDESTRIAN)

Provision and/or modification to new or existing Road Restraint Systems (Vehicle and Pedestrian) to be undertaken and submitted to HCC separately by Kirk Saunders Associates.

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

Provision and/or modification to new or existing Road Restraint Systems (Vehicle and Pedestrian) to be undertaken and submitted to HCC separately by Kirk Saunders Associates.

APPENDIX 5/1 DRAINAGE REQUIREMENTS

GUIDANCE ON THE TREATMENT OF DISUSED EXISTING HIGHWAY DRAINS OR SEWERS

General

This guidance only applies to pipes owned by the Highway Authority. If pipes owned by Water Authorities or others are being diverted as part of a scheme and the redundant pipe is to be backfilled, the written agreement of the Water Authority or other owner should be sought before this is done.

1 Disused Existing Highway Drains or Sewers Under Carriageway or <1m from the Carriageway Edge

- i) Any existing gully or chamber covers and frames shall be removed and if suitable stored for re-use elsewhere.
- ii) In new construction any gullies, chambers or disused pipes shall be removed if above the sub-formation/formation level.
- iii) Below the sub-formation/formation level and in existing carriageway gullies and chambers shall be backfilled in accordance with Clause 508.6 of the Specification for Highway Works (SHW). For large chambers it may be preferable to use foamed concrete to Clause 1043 of the SHW. The backfill should be clearly stated on the scheme drawings or in Appendix 5/1.
- iv) Clause 506.3 of the SHW specifies the treatment of disused highway drains. It is recommended that if an existing disused pipe's invert level is within 0.5m of the sub-formation or formation level it shall be removed and backfilled with sub-base or appropriate general fill material. Deeper than 0.5m the pipe should be grouted with foamed concrete to Clause 1043 of the SHW. Where PFA mixes are readily available, it is practical to grout a drain as CL 506.3 of SHW. IT IS THE DESIGNER'S RESPONSIBILITY TO ENSURE THAT THE PIPE CAN BE CAPPED (SEALED) OR GROUTED BEFORE WORK STARTS ON SITE. If in doubt the pipe should only be capped as Clause 506.3. Usually pipes are generally only capped as it is often extremely difficult in all circumstances to establish that there are no unknown connections to pipe runs.
- v) Land drains should be treated as Clause 511.2. See also the accompanying Notes for Guidance to the SHW.

2 Disused Existing Highway Drains or Sewers Under Verge/Footway

If a projected line at 45° from the nearest edge of the base of a gully or chamber intersects the foundation of any structure, embankment etc or such feature is within the area between the projected line and the closest part of the gully or chamber, the treatment shall be as above.

If no structures etc fall within the above described area, the treatment shall be as follows:

- i) Any existing gully or chamber covers and frames shall be removed and if suitable stored for re-use elsewhere.
- ii) Any gullies, chambers or disused pipes shall be removed to the formation level of the footway or paved area or to below the level of the surrounding top soil. Below this level gullies or chambers shall be backfilled with granular material; in accordance with Clause 508.6. Pipes should be capped as Clause 506.3.
- iii) Drainage layouts shall be as stated in the Works Information.

3 Surface Water Drains

- i) Details of surface water chambers are detailed in the Schedule 1b of this Appendix.

APPENDIX 5/1 DRAINAGE REQUIREMENTS

- ii) For trench & bedding details see Specification for Highway Works Volume 3: Highway Construction Details, drawing F1.
- iii) Joints in surface water drains shall be watertight.
- iv) The locations of existing drains to be sealed, removed or filled in accordance with Clause 506.3 shall be as stated in the Works Information.

4 Filter Drains

- i) For trench, bedding and backfill details see HCC Standard Detail Drawing No. HCC9/D/010.

5 Chamber Covers & Frames

Chamber covers and frames shall conform to the following:

- i) All covers and frames shall be made of ductile iron and shall be both certified by a UKAS accredited body (e.g. BSI or equivalent) and to BS EN 124 (Class D400), unless otherwise stated by the Overseeing Organisation.
- ii) Minimum frame depth shall be 150mm, unless otherwise stated by the Overseeing Organisation.
- iii) All covers and frames shall incorporate a permanent non-rock feature. If the security of the chamber cover within the frame relies upon the depth of insertion only, the depth of insertion shall be increased to 80 mm.
- iv) Where a chamber cover incorporates couplings they shall be loose couplings of steel hexagon headed complying with BS 4190. They shall be no less than M16 size complete with a hexagon nut. Other type of loose coupling shall have a minimum cross-sectional area of 140mm².
- v) Pins and circlips used as part of the securing device shall be of equal cross-section or be sufficiently protected to give a life equal to the main components.
- vi) Chamber covers shall be provided with at least two keyways. Where a cover is divided into two or more sections, each section shall be provided with at least one keyway. Closed keyways shall be used at all times.
- vii) The cover shall be of suitable material, design and construction to achieve an in-service skid/slip resistance potential suitable for the condition of use. This shall be determined by the accelerated polish test method described in BS9124. The minimum PSRV shall be 60 in accordance with HA 104/09.
- viii) All chamber frames shall have a minimum bedding width of the frame of 75mm which shall be solid metal. If slots/holes are incorporated within the bedding area of the frame the overall width of the frame shall be increased to give a compensating area of solid flange. The external corners of the frame shall be solid and may be square, curved or chamfered but at no point less than the minimum bedding width.
- ix) Where the manufacture of the frame includes vertical frame webs/gussets, the tops of the web/gussets shall be at least 15mm below the top surface of the frame for triangular gussets and at a minimum of 25mm for rectangular gussets.
- x) Where the weight of any frame exceeds 15kg it shall be provided with suitable holes or hooking points. These shall be located to give a balanced lift.
- xi) All chambers fitted with BS EN 124 D400 to F900 manhole covers shall have the following features:
 - Frame-Flange features which promote sympathetic dispersal of applied vehicular loads, and which do not act as stress raisers to the bedding mortar. Acceptable features will include, but not be restricted to, circular section Frame-Flange perimeter beads and hole/aperture surrounds;

APPENDIX 5/I DRAINAGE REQUIREMENTS

- Frame features which indicate a non-crack inducing but gripping surface to the underside of the flange, in order to eliminate lateral frame movement. This gripping surface should be predominant in the regions coincident with the cover element seating positions;
- Frame features which incorporate an increase in the flange underside mortar contact area coincident with the cover element seating positions;
- These features are now available on several manufactures products. In all cases the manufacturer's recommended polyester resin bedding mortar shall be used.

6 Chambers

- i) Details of chambers are shown in Schedule 3b of this Appendix.
- ii) Chambers shall be inspected to ensure that they are watertight with no identifiable flow of water penetrating the Chamber.
- iii) The five manhole Standard Details within the HCC9/D/045 A to 065 A have been produced in accordance with the 6th edition of Sewers for Adoption (SfA) with the purpose of ensuring that all manholes are constructed to adoptable standards. The Clause numbers referred to are from the Specification for Highway Works, and are equivalent to those referred to in SfA. There are three water Authorities operating within the County of Hampshire; Southern Water, Thames Water and Wessex Water. Each of these Authorities and the County Council have different requirements in terms of chamber clear opening dimensions and the provision of step irons, ladders and safety chains. Table 5/1 provides details of each Authorities requirements, which should be entered in the relevant chamber schedule reflecting the requirements of the adopting Authority.

APPENDIX 5/I DRAINAGE REQUIREMENTS

Table 5/1

Adopting Authority	Standard Access Manhole Types M1A to M1C and M2A to M2C (Sewer Diameter (mm))			Manhole Fitting Requirements All manhole Types		
	150 - 874	875 - 1074	1074 or Greater	Step Irons (Type)	Safety Chains (Materials)	Ladders (Clearance from Wall to Ladder)
Southern Water	675 x 675	675 x 675	675 x 675	No	No	No
Hampshire County Council	675 x 675	675 x 675	675 x 675	No	450mm pipe dia. or greater (As HCD F10)	No

7 Gullies and Gully Connections

- i) Details of the treatment of existing and proposed gullies will be described in the Works Information.
- ii) Gullies shall be constructed as shown on HCC Standard Detail Drawing No. HCC9/D/015 A.
- iii) The joining of a gully connection to an existing pipe shall be made using a saddle, all to be constructed as described in Clause 508.7.
- iv) Gully Gratings and Frames shall conform to the following:
 - v) They shall be made from ductile iron and shall be to both BS EN 124 (Class D400) and certified by a UKAS accredited body (e.g. BSi or equivalent).
 - vi) They shall be supplied coated by dipping, or other equivalent means, using a hot applied coal tar based material complying with the requirements of BS 4164. Alternatively, at the option of the manufacturer a cold applied black bitumen material complying with the requirements of BS 3416 may be used. No coating shall be applied to any casting, unless the surfaces of the casting are clean, dry and free from rust.
 - vii) The upper surface of the gully grating shall be flat and slot orientation shall be between 45° and 135° relative to traffic as BS EN 124 Clause 7.9.
 - viii) Gratings shall be non-rocking and captive hinged, with the hinge at the on-coming traffic end of the frame.
 - ix) The minimum clear opening dimensions shall be 400mm x 350mm and the maximum clear opening dimensions 450mm x 410mm.
 - x) The minimum total waterway areas shall be 900cm².
 - xi) There shall be a minimum waterway area of 45cm² between the kerb face of the frame and a parallel line 50mm from the kerb face.
 - xii) There shall be a minimum waterway area of 65cm² between the kerb face of the frame and a parallel line 90mm from the kerb face.
 - xiii) The minimum frame depth shall be 100mm.

APPENDIX 5/I DRAINAGE REQUIREMENTS

- xiv) The minimum bedding width of the frame shall be 75mm, which shall be solid metal. If slots/holes are incorporated within the bedding area of the frame the overall width of the frame shall be increased to give a compensating area of solid flange. The external corners of the frame shall be solid and may be square, curved or chamfered, but at no point less than the minimum bedding width.
- xv) Where the manufacture of the gully frame includes vertical frame webs/gussets, the tops of the webs/gussets shall be at least 15mm below the top surface of the frame for triangular gussets and a minimum of 25mm for rectangular gussets.
- xvi) Where the weight of any frame exceeds 15kg it shall be provided with suitable holes or hooking points. These shall be located so as to give a balanced lift.

8 Raising Or Lowering Covers, Gratings & Frames on Existing Chambers and Gullies

- i) Existing manhole covers, gully gratings, covers to BT, Water Authority, Electricity, Gas apparatus or any other described in the Contract shall be carefully taken up and laid, in accordance with Clause 572AR, to the appropriate levels to suit the new carriageway, footway or verge surface levels.
- ii) All frames shall be bedded on a minimum thickness of 15mm of polyester resin mortar.
- iii) Adjustments are to be made to the following requirements:

<i>Level raised by:</i>	<i>Materials to be used:</i>
Not exceeding 25mm	Resin mortar and bedding only
Between 25mm and 75mm	Slate or tile 150mm wide bedded in 1:0.25:3 cement/lime/sand mortar fair faced internally and splayed externally (but see note below).
Between 75 and 150mm	225mm Class B solid engineering bricks bonded and bedded in 1:0.25:3 cement/lime/sand mortar pointed with flush joints (but see note below).

Note: Polyester resin mortar to be used for all carriageway locations.

9 Contractor's Alternatives For Specified Drain Materials

- i) Where the *Contractor* wishes to use pipe or drain materials or construction not specified in the Contract, it shall submit details of its proposed alternatives at least 14 days prior to the date when the alternative is to be installed, for the Overseeing Organisation's approval. The submitted details shall include the following:
 - a) Hydraulic roughness and flow capacity characteristics of the pipe.
 - b) Manufacturer's name, material properties and durability of the materials.
 - c) Strength characteristics and structural properties of the pipe and pipe bedding combination including calculations showing structural adequacy for the application.
- ii) Following receipt of these details the Overseeing Organisation may ask for further details and clarification as necessary.
- iii) In circumstances where Type Z bed and surround is to be used with plastic pipes at less than 1m depth, the individual lengths of plastic pipe used shall be no more than 3m in length.
- iv) The following pipes shall not be used:

APPENDIX 5/1 DRAINAGE REQUIREMENTS

- a) Flat invert corrugated UPVC pipes ("horseshoe profile")
- b) Glass Reinforced Plastic (GRP)
- c) Corrugated Steel
- d) Thermoplastic Solid Wall (including PVC-U, PP & PE)

10 Highway Drainage

- i) Ditches and piped drainage systems shall at all times be kept clear of deposits of silt and deleterious material from excavations and pumping operations. Adequate provision shall be made to prevent silt from entering the drainage system of the highway. The *Contractor* shall be responsible for all necessary clearing of gullies, pipes and ditches to the satisfaction of the Overseeing Organisation.
- ii) Any drains or culverts disturbed or damaged by the excavations shall be reinstated to the requirements of the Overseeing Organisation at the *Contractor's* expense or deducted from any sum due or which may become due to the *Contractor*.

APPENDIX 5/I DRAINAGE REQUIREMENTS**11 Schedule 1b: Surface Water Drains**

PIPE SCHEDULE									Sheet 1 of 1
Pipe Run				Size (mm)	Length (m)	Minimum Cover (m)	Drain Group No.	Number Of Gully Connections	Drawing No.
Location		Invert Level							
Upstream	Downstream	Upstream	Downstream						
Network 1									
MH01	MH02	36.673	35.992	225	22.809	1.2	PN 1.000	3	ZSSLWVILLE2.2/12
MH02	MH03	35.992	35.021	225	51.335	1.2	PN 1.001	7	ZSSLWVILLE2.2/12
MH03	Outfall 1	35.021	34.829	225	28.761	1.2	PN 1.002	6	ZSSLWVILLE2.2/12
Network 2									
MH04	MH05	35.003	34.630	225	32.003	1.2	PN 1.000	7	ZSSLWVILLE2.2/12
MH05	Outfall 2	34.630	34.040	225	41.720	1.2	PN 1.001	5	ZSSLWVILLE2.2/12

Prepared by Paul Davis

Date 10/08/12

Checked by Adrian Barnley

Approved by Adrian Barnley

APPENDIX 5/I DRAINAGE REQUIREMENTS

12 Schedule 3b: Chambers (Surface Water)

CHAMBER SCHEDULE									Sheet 1 of 1		
Chamber Ref.	Chamber Type	Lowest Pipe Invert Level (m)	Base Slab Level (m)	Proposed Cover Level (m)	Existing Cover Level (m)	Chamber Depth (m)	Cover Type & size (mm)	Proposed Connection Sizes (mm) In	Proposed Connection Sizes (mm) Out	Internal Chamber Size (mm)	Manhole Fitting Requirements (* see below)
Network 1											
MH01	M1A	36.673	36.673	38.099	-	1.426	D400 – 675 X 675 Clear opening	150	225	1200	S
MH02	M1A	35.992	35.992	37.508	-	1.516	D400 – 675 X 675 Clear opening	225 150	225	1200	S
MH03	M1A	35.021	35.021	36.825	-	1.804	D400 – 675 X 675 Clear opening	225 150 150	225	1200	S
Network 2											
MH04	M1A	35.003	35.003	36.563	-	1.560	D400 – 675 X 675 Clear opening	-	225	1200	S
MH05	M1A	34.630	34.630	36.220	-	1.590	D400 – 675 X 675 Clear opening	225 150 150	225	1200	S

Prepared by Paul Davis

Date 10/08/12

Checked by Adrian Barnley

Approved by Adrian Barnley

Details of access dimensions and manhole fitting requirements are given in Table 5/1, above.

* L = Access Ladder, S = Step Irons, SC = Safety Chain, H = Safety Chain hooks only.

No manholes or catchpits to be adopted by HCC shall be fitted with step irons or ladders.

APPENDIX 5/I DRAINAGE REQUIREMENTS

13 Schedule 4a: Gullies

Treatment of Existing Gullies				Sheet 1 of	
Gully Reference Number	Number Of Existing Gullies				
	LOWER 0-45mm	NO CHANGE	RAISE 0-45mm	RAISE 30-90mm	RAISE 90-225mm
EX G01	Gully to be removed and associated connection abandoned				
EX G02	Gully to be removed and associated connection abandoned				
EX G03	Gully to be removed and associated connection abandoned				
EX G04	Gully to be removed and associated connection abandoned				
EX G05	Gully to be removed and associated connection abandoned				
EX G06	Gully to be removed and associated connection abandoned				
EX G07	Gully to be removed and associated connection abandoned				
EX G08	Gully to be removed and associated connection abandoned				
EX G09	Gully to be removed and associated connection abandoned				
EX G10	Gully to be removed and associated connection abandoned				
EX G11	Gully to be removed and associated connection abandoned				
EX G12	Gully to be removed and associated connection abandoned				
EX G13	Gully to be removed and associated connection abandoned				
EX G14	Gully to be removed and associated connection abandoned				
EX G15	Gully to be removed and associated connection abandoned				
EX G16	Gully to be removed GY-68 to re-use connection				
EX G17	Gully to be removed and associated connection abandoned				
EX G18	Gully to be removed and associated connection abandoned				
EX G19	Gully to be removed and associated connection abandoned				
EX G20	Gully to be removed and associated connection abandoned				
EX G21	Gully to be removed and associated connection abandoned				
EX G22	Gully to be removed GY-69 to re-use connection				
EX G23	Gully to be removed GY-70 to re-use connection				

Prepared by Paul Davis Date 10/08/12

Checked by Adrian Barnley Approved by Adrian Barnley

APPENDIX 5/I DRAINAGE REQUIREMENTS**14 Schedule 4b: Gullies**

Proposed Gullies					Sheet 1 of 3	
Gully Reference No./Type	Grating Type	Connection To	Connection Invert Level (m)	Connection Length (m)	Connection Pipe Group	Comments
Network 1						
GY-04 Type 1	Type R	MH-2	35.992	8.46		
GY-05 Type 1	Type R	1.001	35.905	5.464		
GY-06 Type 1	Type R	1.001	35.792	4.54		
GY-07 Type 1	Type R	1.001	35.525	5.456		
GY-08 Type 1	Type R	1.001	35.279	8.407		
GY-09 Type 1	Type R	1.002	34.954	13.101		
GY-10 Type 1	Type R	GY-11 lead	-	4.462		
GY-11 Type 1	Type R	1.002	34.89	10.436		
GY-13 Type 1	Type R	1.002	34.843	11.357		
GY-22 Type 1	Type R	GY-23 lead	-	0.754		
GY-23 Type 1	Type R	1.002	34.838	1.076		
GY-24 Type 1	Type R	GY-25 lead	-	1.477		
GY-25 Type 1	Type R	1.002	34.858	9.343		
GY-42 Type 1	Type R	MH-3	35.021	12.138		
GY-43 Type 1	Type R	MH-3	35.021	8.995		
GY-44 Type 1	Type R	1.001	35.441	2.939		
GY-45 Type 1	Type R	1.001	35.698	3.587		
GY-46 Type 1	Type R	1.001	35.938	4.721		
GY-47 Type 1	Type R	1.000	36.275	9.989		
GY-48 Type 1	Type R	1.000	36.559	6.057		
GY-50 Type 1	Type R	MH-1	36.673	4.474		
GY-52 Type 1	Type R	1.000	36.132	8.011		
GY-53 Type 1	Type R	1.002	34.912	7.568		
GY-54 Type 1	Type R	GY-53 lead	-	2.436		
GY-55 Type 1	Type R	GY-09 lead	-	2.000		

APPENDIX 5/I DRAINAGE REQUIREMENTS

Proposed Gullies					Sheet 2 of 3	
Gully Reference No./Type	Grating Type	Connection To	Connection Invert Level (m)	Connection Length (m)	Connection Pipe Group	Comments
Network 2						
GY-12	Type R	1.001	34.508	3.667		
GY-26	Type R	1.000	34.902	11.517		
GY-27	Type R	1.000	34.826	11.826		
GY-28	Type R	1.000	34.732	12.822		
GY-29	Type R	GY-31 lead	-	8.131		
GY-30	Type R	GY-31 lead	-	4.515		
GY-31	Type R	MH-05	34.456	11.985		
GY-32	Type R	1.001	34.309	4.238		
GY-33	Type R	1.001	34.291	1.505		
GY-34	Type R	1.001	34.221	5.078		
GY-35	Type R	MH-5	34.630	12.559		
GY-36	Type R	GY-35 lead	-	4.763		
GY-37	Type R	GY-38 lead	-	1.728		
GY-38	Type R	1.000	34.749	5.489		
GY-39	Type R	1.000	34.803	5.006		
GY-40	Type R	1.000	34.884	5.789		
GY-41	Type R	1.000	34.976	6.917		
GY-51	Type R	1.001	34.372	15.000		

Connections to existing Southern Water Surface Water Sewer – Hambledon Road / Aston Road						
GY-57	Type R	600 Conc.	-	2.582		
GY-58	Type R	GY-57 lead	-	1.064		
GY-59	Type R	600 Conc.	-	7.844		
GY-60	Type R	375 Conc.	-	1.127		
GY-61	Type R	375 Conc.	-	2.18		
GY-62	Type R	375 Conc.	-	8.991		
GY-63	Type R	375 Conc.	-	3.619		
GY-64	Type R	GY-65 lead	-	0.605		
GY-65	Type R	300 Conc.	-	1.649		

APPENDIX 5/I DRAINAGE REQUIREMENTS

Proposed Gullies					Sheet 3 of 3	
Gully Reference No./Type	Grating Type	Connection To	Connection Invert Level (m)	Connection Length (m)	Connection Pipe Group	Comments
Connections to existing Southern Water Surface Water Sewer – Hambledon Road / Aston Road – Cont...						
GY-66	Type R	GY-67 lead	-	0.372		
GY-67	Type R	375 Conc.	-	0.771		
GY-68	Type R	Ex. GY-16	-	0.877		Gully to utilise existing connection

Connections to existing Gullies – Maurepas Way						
GY-69	Type R	Ex. GY-22	-	13.000		Gully to utilise existing connection
GY-70	Type R	Ex. GY-23	-	0.95		Gully to utilise existing connection

Prepared by Paul Davis Date 10/08/12

Checked by Adrian Barnley Approved by Adrian Barnley

ALL GULLY TYPE 1 SHALL BE TRAPPED, UNLESS STATED ABOVE.

APPENDIX 5/2 SERVICE DUCT REQUIREMENTS

- 1 The layout of service ducts shall be as provided as indicated below.
- 2 Drawpits for Street Lighting Ducts shall be constructed as HCC Standard Detail Drawing No. HCC9/L/075.
- 3 Drawpits for Traffic Signal Ducts shall be constructed as HCC Standard Detail Drawing No. HCC9/T/005 B or HCC9/T/010 B, as specified.

Location	Colour	Diameter	Length (each duct)	No. Of Ways
<u>All areas</u>				
Private HCC ducted electrical supply to detail HCC9/L/070	Black embossed 'STREET LIGHTING'	100mm	Refer to drawing numbered ZSSLWVILLE2.2/14	Refer to drawing numbered ZSSLWVILLE2.2/14
Traffic Signal ducting HCC9/T/055	Orange embossed 'TRAFFIC SIGNALS'	100mm	Refer to drawing numbered ZSSLWVILLE2.2/13	Refer to drawing numbered ZSSLWVILLE2.2/13
<u>Utility Services</u> <u>(exact requirements to be agreed with utility company as necessary)</u>				
Water Company	Blue	-	-	-
British Telecommunications	Grey	-	-	-
Gas	Yellow	-	-	-
Communication company	White	-	-	-
Electric LV	Black	-	-	-
Electric HV	Red	-	-	-

APPENDIX 6/I REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC. OF EARTHWORKS MATERIALS

1 GENERAL NOTES:

- i. The *Contractor* shall be responsible for the testing for classification and assessment of acceptability of earthworks materials prior to excavation or import, leading to his making of decisions regarding methods and manner of excavation, deposition and compaction and make the results available to the Overseeing Organisation as agreed.
- ii. The *Contractor* shall notify the Overseeing Organisation in advance of the trial pitting for the above testing, in order that the Overseeing Organisation may observe the trial pitting and/or carry out any such testing of their own that may be required.
- iii. The *Contractor* shall notify the Overseeing Organisation of its determination regarding the extent and classification of acceptable earthworks materials and of the intended methods of working prior to commencement of excavations.
- iv. The *Contractor's* assessment of acceptability/classification will be conditional on the earthworks materials remaining substantially unchanged. If in the opinion of the Overseeing Organisation the condition of the materials has changed significantly then repeat acceptability testing shall be undertaken.
- v. All disposal of material off-site shall be undertaken by the *Contractor* in accordance with the requirements of the Waste Management Licensing Regulations 2005.
- vi. Fill shall be as follows unless otherwise directed by the Overseeing Organisation:-

<u>Use</u>	<u>Class</u>
General Fill	1A-C, 2A-E or 3
Landscape Fill	4
Topsoil	5A or 5B
Selected Fill	6A-S or 7A-I
Capping Layer	6F1-5
Miscellaneous Fill	8
Stabilised Materials	9A-F

APPENDIX 6/I REQUIREMENTS FOR ACCEPTABILITY AND TESTING ETC. OF EARTHWORKS MATERIALS

2 REQUIREMENTS FOR EARTHWORKS MATERIALS

Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 and Appendix 6/1)	Material Properties Required for acceptability (In addition to requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (see exceptions in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
5B	Imported topsoil	Topsoiling	General purpose grade complying with BS 3882	-	-	-	-	-
6F1	Selected granular material (fine 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 that contain tar and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 6
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-	
				(iii) mc	BS 1377 : Part 2	Optimum mc -2%	Optimum mc	
				(iv) Los Angeles coefficient	Clause 635	-	60	
				(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 Clause 601 and Appendix 6/1)	Material Properties Required for acceptability (In addition to requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements
				Property (see exceptions in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
6F2	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 that contain tar and tar-bitumen binders, unburnt colliery spoil and argillaceous rock. Property (i) in the next column shall not apply to chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Table 6/4 Method 6
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-	
				(iii) mc	BS 1377 : Part 2	Optimum mc -2%	Optimum mc	
				(iv) Los Angeles coefficient	Clause 635	-	50	
				(v) Class Ra (asphalt) content	Clause 710	-	50%	
				(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%	

Footnotes to Table 6/1

1. App = Appendix
2. Tab = Table
3. Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. (05/04) Where BS 1377 : Part 2 is specified for mc, this shall mean BS 1377 : Part 2 or BS EN 1097-5 as appropriate.
5. Uniformity coefficient is defined as the ratio of the particle diameters D60 to D10 on the particle-size distribution curve, where:
D60 = particle diameter at which 60% of the soil by weight is finer
D10 = particle diameter at which 10% of the soil by weight is finer
6. (11/04) The limiting values for Class U1B material are given in Appendix 6/14 and Appendix 6/15

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

1. If such material is encountered during the execution of the Works the Overseeing Organisation shall contact the Environmental Health Officer and agree the appropriate measures to be taken.
2. The Contractor will be responsible for complying with all current regulations and requirements for dealing with Class U1B or U2 Unacceptable Material.

APPENDIX 6/7 SUB-FORMATION AND CAPPING AND PREPARATION AND SURFACE TREATMENT OF FORMATION

(Rev A, 04/01/13)

1. Requirements for earthworks are indicated on Drawing No ZSSLWVILLE2.2/10.
2. Requirements for cutting faces:-
 - i) Undercutting of cuttings or embankments shall not be undertaken.
 - ii) No special face stability measures are required as part of the Contract. However should an excavated face be such, that in the opinion of the Overseeing Organisation some form of protection is required, the measures to be taken shall be as directed by the Overseeing Organisation.
3. Requirements for embankment construction:-
 - a. Embankments shall not be oversteepened for any purpose. If the *Contractor* requests a temporary widening of an embankment to ensure adequate edge compaction, this shall not exceed 1m. Agreement shall be obtained from the Overseeing Organisation before such temporary widening is undertaken.
 - b. If following placement of embankment fill, adverse weather conditions render the upper layer of fill unacceptable, this material shall be removed. The underlying embankment fill shall be scarified to a depth not less than 150mm prior to placing further fill material.
4. The thickness of sub-base for weather protection of sub-formation or formation shall be a minimum of mm. No reduction in thickness shall be permitted. The *Contractor* shall ensure that the thickness of material laid for the purpose of protection of earthworks is adequate. If the sub-formation or formation is subsequently damaged requirement 5 (iv) shall apply.
5. Capping material or additional sub-base is to be provided in all locations beneath new carriageways where sub-grade formation CBR is 15% or less. It shall be the responsibility of the Contractor to verify CBR values.
6. Carriageway sub-base and capping layer thicknesses are to be determined in accordance with the **Figure 4.1 and 4.2 of IAN 73/06** and will be dependent upon sub-grade CBR value.
7. The Contractor shall carry out in-situ and **equilibrium** CBR testing of the sub-grade material in order to account for seasonal variations in ground water/water table levels. It is the lower CBR value that shall be used to determine the thickness of sub-base/capping to be provided. The CBR results determined by the Contractor shall be presented to and approved by the Engineer/Highway Authority to enable the thickness of sub-base/capping to be agreed prior to placing of such materials.
8. No material within 450mm of the carriageway surface shall be frost susceptible.
9. Class 6F1 or 6F2 Capping material shall comply with Table 6-1 of Appendix 6/1. Material may be crushed concrete arising from demolition or breakout works of the development site.

Draft HD 25
 4. Restricted Designs

Interim Advice Note 73/06
 Design Guidance For Road Pavement Foundations

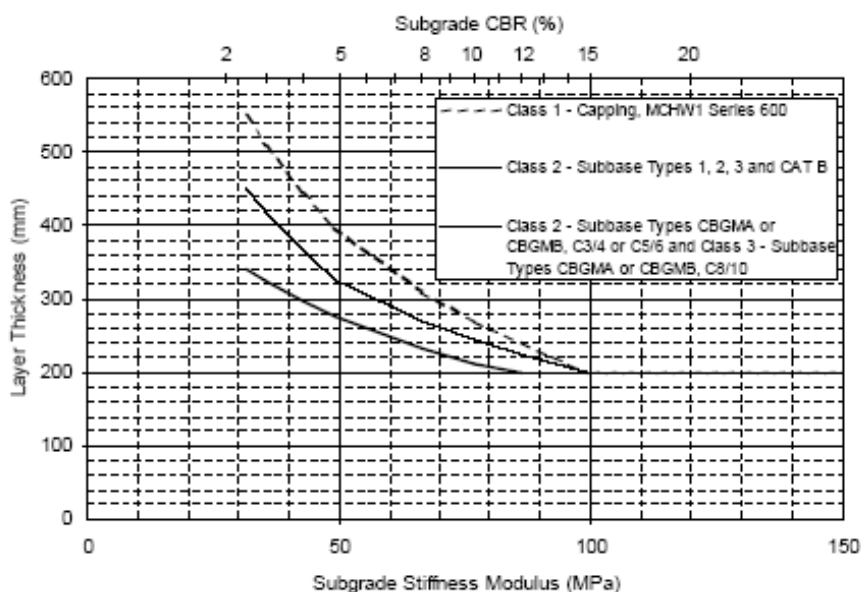


FIGURE 4.1 Restricted Design Options – Subbase or Capping only

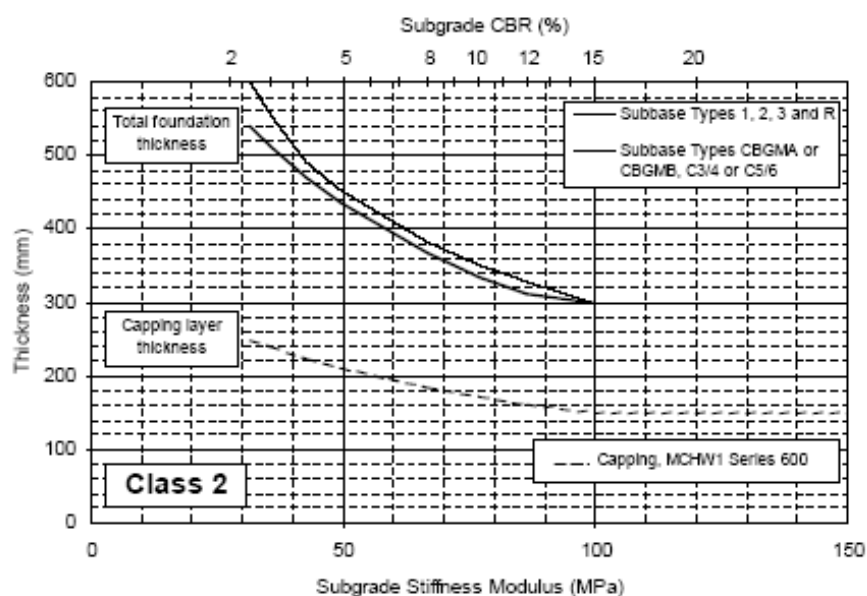


FIGURE 4.2 Restricted Design Options – Class 2 Subbase on Capping

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Figures 4.1 and 4.2 from IAN 73/06
 Sub-base only or Capping and Sub-base Thickness Design
Exact CBR Value to be agreed with HCC

APPENDIX 6/6 FILL TO STRUCTURES AND FILL ABOVE STRUCTURAL FOUNDATIONS

1. Fill to Structures and Fill above Structural Foundations is shown on the Structural Engineer Consultant Drawings

APPENDIX 6/8 TOPSOILING

1. The areas to be topsoiled are indicated on the Construction Treatments drawings.
2. Areas and depths of topsoil to be stripped will be detailed in the Works Information.
3. Topsoil shall be kept separate from other classes of deposited materials.
4. No work shall be carried out when rain is falling, when there has been heavy rain within the previous 24 hours or when in the opinion of the Overseeing Organisation the subsoil is likely to be damaged.
5. Topsoiling shall be in accordance with Clause 618 unless instructed otherwise by the Overseeing Organisation.
6. Topsoil shall be spread in layers not exceeding 150mm and shall be consolidated as work proceeds to the depths shown on the drawings.
7. During fallow periods prior to seeding, the ground shall be kept substantially weed free.
8. Imported topsoil class 5B shall be from a source approved by the Overseeing Organisation.
 - i) It shall comply with BS 3882, be of general purpose grade and unless agreed in advance with the Overseeing Organisation, shall not be screened.
 - ii) In addition, the texture and pH should match existing topsoils on site as far as is reasonable, or as agreed with the Overseeing Organisation.
 - iii) If fertility, organic content, texture or pH is not readily obvious from inspection of the source, or a sample submitted for approval, or a test certificate is not available, ameliorants may be required to be supplied and incorporated to attain a quality to support healthy growth of planting in the first season of planting available after topsoil is spread on site.
 - iv) Ameliorants are to be supplied and incorporated as agreed by the Overseeing Organisation in advance of delivery to site.
 - v) Generally, topsoils with a high clay or stone content or poor structure are not acceptable for areas to receive planting, or for areas where frequent grass mowing will be required.
9. Topsoil ameliorants shall be:
 - a) Organic Materials:
 - Peat shall not be used
 - Composted green waste in the form 'Progrow' or equivalent approved by the Overseeing Organisation
 - Well rotted stable manure, free of weed roots
 - Well composted mushroom compost
 - Composted leaf mould, free of weed roots
 - Composted bark chippings, free of fungi, diseases and contaminants.

APPENDIX 6/8 TOPSOILING

- b) Drainage improvers:
 - Graded horticultural grit
 - Clean washed sharp sand
 - Clean washed angular gravel 0-3 mm diameter grade
 - Composted for a minimum of 16 weeks wood chippings
 - 25-75mm, maximum 15% fines.
- c) Fertilizers:
 - Organic fertilizer in the form of sterilized bonemeal, shall be supplied and spread at a rate to be agreed with the Overseeing Organisation.

10. For manufactured imported topsoil a laboratory test certificate shall be provided in advance, to accompany each sample submitted for inspection and approval and shall include the following:
- a) Source
 - b) Texture to BS 3882, figure K1
 - c) Reaction, to BS 1377-3: pH
 - d) Organic matter
 - e) Nutrient content: Minimum index values for nitrogen, phosphorus, potassium and magnesium to be as for general purpose grade of BS 3882
 - f) Crumb structure: Made up of discernible crumbs, typically 2-7 mm diameter, each comprising an aggregation of soil particles attracted around a sticky humus centre
 - g) Size of stones in any dimension (maximum)
 - h) Foreign matter: On visual inspection, free of fragments and roots of aggressive weeds, sticks, straw, subsoil, pieces of brick, concrete, glass, wire, large lumps of clay or vegetation and the like.

APPENDIX 6/9 EARTHWORK ENVIRONMENTAL BUNDS, LANDSCAPE AREAS, STRENGTHENED EMBANKMENTS

1. Landscape Areas
 - i) The locations of landscape areas are shown on the Construction Treatment drawings. The details of the Landscape Consultant Drawings.

APPENDIX 7/I PERMITTED PAVEMENT OPTIONS

(Rev A, 04/01/13)

1 PERMITTED PAVEMENT OPTIONS – SCHEDULE 1

Drawing Reference	General Requirements	Permitted Pavement Options
Aston Road / Hambledon Road (SGL) ZSSLWVILLE2.2/11	Schedule 2	1
Hambledon Road (D2B) ZSSLWVILLE2.2/11	Schedule 2	2
Aston Road / Hambledon Road (SGL) ZSSLWVILLE2.2/11 (Widening < 1m)	Schedule 2	3
Hambledon Road (D2B) ZSSLWVILLE2.2/11 (Widening < 1m)	Schedule 2	4

2 GENERAL REQUIREMENTS – SCHEDULE 2

Schedule 2: General Requirements – Pavement Treatment Options 1 and 3		
Grid for checking surface levels of pavement courses [702.4]	Longitudinal dimension:	10m max
	Transverse dimension:	2m max
Surface regularity [702.5, Table 7/2]	Category of Road:	A
Interval for measurement of longitudinal regularity [702.7]		Continuous
Interval for measurement of transverse regularity [702.8]		20m
Whether measurement of surface texture is required [921.2] Average: 1.2 mm with a maximum of 2.2mm and a minimum of 0.9mm		Yes

Schedule 2: General Requirements – Pavement Treatment Options 2 and 4		
Grid for checking surface levels of pavement courses [702.4]	Longitudinal dimension:	10m max
	Transverse dimension:	2m max
Surface regularity [702.5, Table 7/2]	Category of Road:	A
Interval for measurement of longitudinal regularity [702.7]		Continuous
Interval for measurement of transverse regularity [702.8]		20m
Whether measurement of surface texture is required [921.2] Average: 1.5 mm with a maximum of 2.2mm and a minimum of 1.2mm		Yes

APPENDIX 7/1 PERMITTED PAVEMENT OPTIONS

3 PERMITTED CONSTRUCTION MATERIALS – SCHEDULE 3

	Pavement Option 1 Aston Road / Hambledon Road (SGL)		Pavement Option 2 Hambledon Road (D2B)	
Pavement Layer	Material Ref.	Thickness (mm)	Material Ref.	Thickness (mm)
Surface Course	SC1	45	SC2	45
Binder Course	BC1	55	BC1	55
Base	RB1	180	RB1	250
Sub-base	SB1/2	200 min*	SB1/2	200 min*
[Other – e.g. regulating]	-	Subject to CBR	-	Subject to CBR
Total Thickness	-	480 min*	-	550 min*
Capping subject to CBR refer to Appendix 6/7	-	Subject to CBR*	-	Subject to CBR*

	Pavement Option 3 Aston Road / Hambledon Road (SGL) (Widening < 1m)		Pavement Option 4 Hambledon Road (D2B) (Widening < 1m)	
Pavement Layer	Material Ref.	Thickness (mm)	Material Ref.	Thickness (mm)
Surface Course	SC1/SC2	45	SC1/SC2	45
Binder Course	BC1 (laid in 2 layers)	85	BC1	135
Base	RB2	200	RB2	250
Sub-base	SB1/2	200 min*	SB1/2	200 min*
[Other – e.g. regulating]	-	Subject to CBR	-	Subject to CBR
Total Thickness	-	530 min*	-	630 min*
Capping subject to CBR refer to Appendix 6/7	-	Subject to CBR*	-	Subject to CBR*

APPENDIX 7/I PERMITTED PAVEMENT OPTIONS

4 GENERAL REQUIREMENTS FOR CONSTRUCTION MATERIALS – SCHEDULE 4

Schedule 4: General Requirements for Construction Materials	
Clause	Requirement
801.7	All sub-base material shall comply with sub-Clause 801.7
802.4	Material of compacted thickness greater than 225mm shall be laid in two or more layers.
903.27	A minimum PSV ₅₅ is required for a temporary running surface.
924SR	Surfaces to which non-thermoplastic Type 1 materials are to be applied shall be trafficked for at least 3 weeks and deemed suitable by the <i>Contractor</i> prior to application. 'Slippery Road Ahead' signs to TSRGD Diagram No. 557 shall be erected at each site until the Type 1 material has been applied.

5 REQUIREMENTS FOR CONSTRUCTION MATERIALS

Requirements for Regulating Course

The following table (Table 1) gives the permitted regulating materials and the range of thicknesses they can be laid over. Regulating thicknesses of less than 10mm/15mm (dependent upon the materials permitted within each surfacing appendix) shall be achieved within the thickness of the overlying bituminous material, unless otherwise agreed by the Overseeing Organisation.

All Regulating Course material shall be laid in accordance with BS 594987.

APPENDIX 7/I PERMITTED PAVEMENT OPTIONS

Table I – Permitted Regulating Materials

Ref No	Layer Thickness (mm)	Regulating Material		Grade of Binder	Requirements
1	0 – 20	HRA 0/2 F surf 40/60 des to –BS EN 13108-4		40/60 pen only	Wheel Tracking Level 1 to BS 598 part 110
2a	15 to 25	SMA 6 reg 40/60	Stone Mastic Asphalt to Clause 937	40/60 pen	Wheel-tracking criteria to match that specified for surface course specified in Table 2 of this Appendix..
2b	25 to 35	SMA 10 reg 40/60			
2c	35 to 45	SMA 14 reg 40/60			
2d	50 to 65	SMA 20 reg 40/60			
3	35 - 65	HRA 50/14 bin des 40/60 to –BS EN 13108-4		40/60 pen	Wheel-tracking criteria to match that specified for surface course specified in Table 2 of this Appendix.
4a	50-100	AC 20 dense bin 40/60 des to –BS EN 13108-1 & Clause 929		40/60 Pen	Coarse Aggregate to be crushed rock or slag.
4b		AC 20 dense bin 100/150 des to –BS EN 13108-1 & Clause 929		100/150 Pen	Fine aggregate to exclude natural sand fines
4c		AC 20 HDM bin 40/60 des to –BS EN 13108-11 & Clause 929		40/60 Pen	Wheel-tracking criteria to match that specified for surface course specified in Table 2 of this Appendix.. Where no requirement is stated these may be recipe mixes.
5a	70-150	AC 32 dense bin 40/60 des to – BS EN 13108-1 & Clause 929		40/60 Pen	Coarse Aggregate to be crushed rock or slag. Fine aggregate to exclude natural sand fines Wheel-tracking criteria to match that specified for surface course specified in Table 2 of this Appendix. Where no requirement is stated these may be recipe mixes.

APPENDIX 7/I PERMITTED PAVEMENT OPTIONS

Table 2 – Schedule of Surface Course Materials

Element	Material Ref.	Clause	Material	Requirements
Aston Road/ Hambledon Road (SGL) Surface Course	SC1	911	Hot Rolled Asphalt (Design Mix)	BS EN 13108-4, PD 6691, BS 594987 HRA 55/14 F surf 40/60 des Minimum Delivered Temperature: 165 °C Maximum Wind Speed km/hr: 40 km/hr Minimum Laying Air Temperature: 0 °C Course Aggregate Percentage: 55% Coarse Aggregate to be crushed rock or slag, excluding limestone. Minimum PSV = 60 Maximum AAV = 14 Aggregate Grading BS EN 13108-4 Table 4 Or PD 6691 Table C.2A Column No.: 55/14F Minimum target Binder Content $B_{act} = 6.0\%$ Minimum Stability of 7 KN (across the whole of the + or – 0.6% binder content tolerance) determined in accordance with Annex H of BS 594987. Maximum Flow: 5mm No chippings.
B2150 Hambledon Road Surface Course	SC2	943	Hot Rolled Asphalt (Performance Related Design Mix)	BS EN 13108-4, PD 6691, BS 594987 HRA 35/14 F surf 40/60 des + PCC's Minimum Delivered Temperature: 165 °C Maximum Wind Speed km/hr: 40 km/hr Minimum Laying Air Temperature: 0 °C Course Aggregate Percentage: 35% Coarse Aggregate to be crushed rock or slag, excluding limestone. Aggregate Grading [BS EN 13108-4 Table 4] Column No.:35/14F Test temperature for wheel-tracking: 60°C Wheel-tracking rate: 5mm/hr Wheel-tracking rut depth: 7mm Site classification: 2 Minimum target Binder Content $B_{act} = 7.0\%$ Coated Chippings Nominal Size: 14/20mm Minimum PSV: 68+ Maximum AAV: 12

APPENDIX 7/I PERMITTED PAVEMENT OPTIONS

Table 2 – Schedule of Surface Course Materials (Continued)

Element	Material Ref.	Clause	Material	Requirements
High Friction Surfaces				
Surface Treatments	HFS1	924	Colour – Dark Grey	Type Classification: HAPAS BBA Type 1 Minimum PSV: 70 (100% calcined bauxite) Guarantee Period: 3 years
	HFS2		Colour - Buff	Type Classification: HAPAS BBA Type 1 Minimum PSV: 70 (100% calcined bauxite) Guarantee Period: 3 years

Table 3 – Schedule of Binder Course Mixtures

Element	Material ref.	Clause	Material	Requirements
Binder Course	BC1	929	Dense Binder Course Asphalt Concrete (Design Mixes)	BS EN 13108-1, PD 6691, BS 594987 AC 20 dense bin 40/60 des Clause 945 applies Binder Grade: 40/60 Aggregate Size: 20mm 60 °C Wheel-tracking criteria applies: Max. wheel-tracking rate = 5mm/hr Max. Rut Depth = 7 mm Coarse Aggregate to be crushed rock or slag. Fine aggregate to exclude natural sand fines.

APPENDIX 7/I PERMITTED PAVEMENT OPTIONS

Table 4 – Schedule of Base and Sub-base Materials

Element	Material Ref.	Clause	Material	Special Requirements
Base	RB1	929	Asphalt Concrete (Design Mixes)	BS EN 13108-1, PD 6691, BS 594987 AC32 dense base 40/60 des Clause 945 applies Binder Grade: 40/60 Aggregate Size: 32 60 °C Wheel-tracking criteria applies: Max. wheel-tracking rate = 5mm/hr Max. Rut Depth = 7 mm Coarse Aggregate to be crushed rock or slag. Fine aggregate to exclude natural sand fines.
Base	RB2	1030	C8/10 Wet Lean Concrete ❶	BS 8500-1 To be fully compacted by internal vibration only. Crack inducers to be max 3m centres. Must achieve equivalent of 7 days strength before overlaying permitted. ST mixes not permitted.
Sub-base	SB1	891AR	Granular Sub-base Material Type CDD	
Sub-base	SB2	892AR	Granular Sub-base Material Type RP	Max. PAH (Tar) content 0.1% as defined in the Clause. Compact at M/C close to declared OMC. Total max course thickness 200 mm.

❶ For use in narrow(<1m) constructions.

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

- 1 Should the *Contractor* need to excavate trenches in existing paved surfaces typical reinstatement details are indicated below:-
- 2 Paved areas to be scarified, regulated and reinstated to achieve required finished levels at tie points between new and existing pavements are shown on the Construction Treatment Drawings.
- 3 Typical trench reinstatement details:-
 Carriageways HCC9/C/090 B
 Footways HCC9/C/095 B
- 4 Reinstatement materials to be in accordance with Appendix 7/1.
- 5 PVC coated glass fibre grid reinforcement shall be placed beneath the binder course unless the sub grade is Clay. In this case Tensar AR1 or equivalent should be placed beneath the binder course with at least 60 mm cover, overlapping the trench edges by a minimum 300 mm.

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

1. Clause 903.4 requires a tack-coat or bond coat to be applied prior to placing bituminous material on any bound substrate, it shall be applied at a uniform rate in accordance with Clause 920. There shall be no bare areas or areas of ponding. Bond coat can be substituted for tack coat at suitable application rates, but not vice versa.
2. Street Furniture, iron work and drop kerbs shall be masked using self adhesive masking materials before application starts and removed prior to the *completion date*.
3. In the case of thin overlays being applied, where a thickness of bituminous material of less than 40mm is to be applied, a proprietary polymer modified bond coat, with a minimum peak vialit cohesion value of 1.0 J/cm² shall be used.
4. If the bituminous material is a proprietary product, then the manufacturer's recommendations shall be followed.
5. Where it is necessary for the layer to be temporarily trafficked by pedestrians or vehicles a "non-tack" bond coat shall be used.
6. A bond coat shall be used where required to improve the relative impermeability of a lower layer.

APPENDIX 7/6 BREAKING UP OR PERFORATION OF EXISTING PAVEMENT

The areas of existing hard standing to be broken up are shown on Drawing Number ZSSLWVILLE2.2/11

Type 1 Treatment - where existing pavement lies directly below formation

- (i) The existing pavement, not including sub-base, shall be excavated.
- (ii) The material shall be processed to comply with the grading requirements of Class 6C acceptable materials.
- (iii) The material shall be deposited in its original location and compacted to comply with Clause 612.

Type 2 Treatment - other areas

- (i) The existing pavement, including sub-base, shall be broken up to a depth of 500mm with no pieces of material exceeding 200mm in any dimension.

Type 3 Treatment - perforation

- (i) Where perforation is specified, minimum 50mm diameter holes shall be made through the pavement at no greater than 300mm centres extending into the sub-grade.
- (ii) The perforated holes shall be completely filled with 4/10mm single-sized aggregate. If granular material is to be overlaid, the existing surface and holes shall be covered with Terram 1000 or similar to prevent migration of fine material.

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

1. Areas of proposed Pavement Construction Types are as indicated on the Construction Treatment Drawings.

Any weakly adhering material remaining must be removed and the surface swept prior to overlaying.
2. All arisings from the cold-milling areas above shall, in the first instance be utilised after processing if necessary as Type RP Sub-base beneath carriageways and footways. All remaining arisings shall be delivered to Tarmac's depot at Micheldever Station, as outlined in Appendix 2/3.
3. 48 hours prior to all cold-milling, the *Contractor* shall carry out a sweep of the areas to locate buried metalwork, all in accordance with Clause 709.11. Additionally, it shall be confirmed there are no overhead cables or obstructions.

APPENDIX 7/71 PATCHING

1. References

Details of typical patching and haunch repair of existing carriageways are shown in the following standard detail drawings:

Drawing Number	Drawing Title
HCC9/M/15 B	Haunch Details Employing Cold Recycled Bituminous Base Material (CRBBM)
HCC9/M/20 B	Carriageway Haunch Repair Details
HCC9/M/25 B	Carriageway Repair Detail

2. Schedule of Patching Types

Patching Type	Description	Repair Type (refer to HCC9/M/25 B)	Minimum Dimensions
1	Rolled asphalt surface course, 40mm thick with 14/20mm coated chippings to Appendix 7/1	B1	750mm x 750mm
2	Rolled asphalt surface course, 40mm thick with 14/20mm coated chippings to Appendix 7/1 on Dense Macadam binder course 0/20mm aggregate, 60mm thick to Appendix 7/1.	B2	1m x 1m
3	Rolled asphalt surface course, 40mm thick with 14/20mm coated chippings to Appendix 7/1 on Dense Macadam binder course 0/20mm Aggregate, 60mm thick to Appendix 7/1 on Dense Macadam base, 0/32mm aggregate 100mm thick to Appendix 7/1.	B3	1m x 1m
4	Dense Macadam surface course, 0/6mm aggregate, 25mm thick to Appendix 7/1 on Dense Macadam binder course, 0/20mm aggregate, 60mm thick to Appendix 7/1.	B1	750mm x 750mm
5	Close graded surface course, 0/10mm aggregate, 30mm thick to Appendix 7/1 on Dense Macadam binder course, 0/20mm aggregate, 70mm thick to Appendix 7/1.	B1	750mm x 750mm
6	Close graded Macadam surface course, 0/10mm aggregate (see note 1), 30mm thick to Appendix 7/1 on Dense Macadam binder course, 0/20mm aggregate, 70mm thick to Appendix 7/1 on Dense Macadam base, 0/32mm aggregate, 100mm thick to Appendix 7/1.	B3	1m x 1m
7 (Footway)	Dense surface course, 0/6mm aggregate, 20mm thick to BS 4987 Part 1 Clause 7.5 (190 Pen) on open graded Macadam binder course, 0/20mm aggregate, 45mm thick to BS 4987 Part 1 Clause 6.1 (190 Pen)	N/A	750mm x 750mm

APPENDIX 7/71 PATCHING

3. Restrictions on Open Trenches

The *Contractor* must ensure that openings in carriageways and footways are no wider or longer than they reasonably need be at any time as may be agreed by the Overseeing Organisation. In areas of high pedestrian movement or where otherwise reasonably required by the Overseeing Organisation all obstructions will be fenced or removed outside normal working hours.

4. Supporting of Trenches

The sides of trenches, pits and other excavations shall be adequately supported having regard to the recommendations of British Standard 6031 (1981) "Code of Practice for Earthworks". Battered sided trenches will not be permitted unless there is prior written agreement by the Overseeing Organisation.

5. Maintenance of Temporary Reinstatements

The *Contractor* shall maintain any temporary reinstatements in a safe condition with an even surface to the satisfaction of the Overseeing Organisation.

6. Typical trench reinstatement details

Carriageways HCC9/C/090 B

Footways HCC9/C/095 B

APPENDIX I I/I

KERBS, FOOTWAYS AND PAVED AREAS

1. Kerbs

Proposed kerbing, located as shown on the Construction Treatment Drawing, shall be constructed as detailed on HCC Standard Detail Drawing No. HCC9/C/010 A.

2. Footways and Paved Areas

Proposed footway construction and footway resurfacing located as shown on the Construction Treatment Drawing shall be constructed as detailed on HCC Standard Detail Drawing No. HCC9/C/045C and HCC9/C/055C.

Concrete pavers of thickness specified on the Construction Treatments Drawing shall have a minimum Polished Pendulum Test (PPTV) of 55, and an Abrasion Resistance in accordance with BS EN 1338.

Proposed Paved Area construction, located as shown on the Construction Treatment Drawing

Insitu concrete for Paved Areas shall be laid in accordance with the requirements of Series 1000 unless otherwise stated in this document.

Insitu concrete for Paved areas shall be cured in accordance with Clause 1027 unless an additional treatment is to be applied later. In this case the curing regime shall be agreed in advance with the Overseeing Organisation but a minimum period of 7 days curing shall be required at all times.

3. Uncontrolled Pedestrian Crossings

Uncontrolled pedestrian crossings, located as shown on the Construction Treatment Drawings shall be constructed as detailed on HCC Standard Detail Drawing No. HCC9/C/060 B & 065 B, as appropriate. In each case the width of the dropped kerb shall be 2m min and the blister tactile paving flags shall be buff coloured.

4. Controlled Pedestrian Crossings

Controlled pedestrian crossings, located as shown on the Construction Treatment Drawings shall be constructed as detailed on MB Detail MB/C/01. The width of the dropped kerb shall be as stated and the blister tactile paving flags shall be coloured red.

In general, cycle tracks shall be constructed to the same standard as flexible footways. However, when measured using the rolling straight-edge, the riding quality of the finished track shall comply with the following requirements;

5. Maximum Permitted Number of Surface Irregularities

Surfaces of cycle track incorporated as part of the carriageway

Irregularity	4mm	7mm	10mm
Length (m)	75	75	75
> 250 cvd	9	1	0
< 250 cvd	18	2	0

APPENDIX I I/I KERBS, FOOTWAYS AND PAVED AREAS

	Surfaces of cycle tracks laid separate from the carriageway (traffic category does not apply)			
Irregularity	4mm	7mm	10mm	12mm
Length (m)	75	75	75	75
	20	10	3	0

APPENDIX 12/I TRAFFIC SIGNS – GENERAL

1. Location Of Traffic Signs

The approximate locations of each traffic sign to be erected or replaced shall be as shown on the General Arrangement Drawings and as described in the notes on the Schedule of Signs contained at the back of this specification document. The exact locations shall be agreed on site with the Overseeing Organisation.

2. Signing Requirements

Proposed signs shall be as detailed on the Traffic Signing Schedule ref ZSSLWVILLE2.2/TSS and associated sign face details at the end of this specification.

3. Overall Size Of Sign Plates

The sizes of the signs together with the sign face details (for existing temporary and permanent signs) are included in the Traffic Signs Schedule or as specified in the Works Information.

4. Material Requirements

Each traffic sign or part thereof shall comply with BS EN 12899-1:2007.

Aluminium shall not be used for sign plates less than 1.1 square metres in area excluding double sided end mounted finger post signs unless otherwise directed by the Overseeing Organisation

Sign faces shall be manufactured from high intensity reflective material having a photometric performance complying with the requirements set out in National Annex NA of BS EN 12899-1, except where prohibited by Regulations or directed by the Overseeing Organisation.

The type of material used for pre-printed sign faces or in rolls or as individual letters, numbers and symbols shall be in accordance with BS EN 12899-1: 2007 or BS 8408: 2005. All pre-printed sign faces shall be to the colour, design and layout as set out in the latest DMRB drawings. All screen printing inks are to be of a type approved by the manufacturer of the sheet material. The sign faces shall also be rivet less.

All reflective materials supplied shall conform to National Annex NA of BS EN 12899-1 with respect to the minimum chromaticity, luminance and coefficients of retro-reflection. Table NA.1 states: "Note 5 No microprismatic material will be able to meet the recommended minimum performance indices for signs in all positions or for both vehicle types" BS 8408: 2005 details the process to be followed in order that the appropriate Performance Index can be stated for individual signs. The Performance Index is included in the Sign Schedule.

5. Foundations For Permanent Traffic Signs

The type and size of foundations required for each direction and other traffic signs shall be as detailed in HCC Standard Detail Drawing No. HCC9/C/140 A, and for those requiring illumination, Drawing Nos. HCC9/L/050 B.

Foundations for illuminated sign posts shall have a 50mm minimum diameter smooth bore duct for cable entry, as detailed in HCC9/L/050 B.

APPENDIX 12/I **TRAFFIC SIGNS – GENERAL**

Where a post foundation is contiguous with the filter material of a filter drain, formwork shall be used as required to prevent the ingress of concrete into the filter material unless otherwise agreed by the Overseeing Organisation.

6. **Posts For Permanent Traffic Signs**

All tubular sign posts for the support of signs shall be manufactured from steel complying with BS 4360-2, grade 43c.

Post wall thickness should be:

- Post 76mm = 3mm thick wall
- Post 89mm = 3mm thick wall
- Post 114mm = 3.2mm thick wall
- Post 140mm = 3.6mm thick wall
- Post 168mm = 3.6mm thick wall

All steel posts shall be protected against corrosion by hot dip galvanising to BS EN ISO 1461 with a minimum thickness of 65µm.

Wide base posts shall be used for illuminated signs. These shall be manufactured from steel complying with BS EN 10210. The shaft and base compartment shall be jointed by a tapered shoulder with welded joints. The base compartment shall have a minimum internal diameter of 150mm. A weatherproof door with minimum opening of 100mm x 400mm shall be fitted with a captive triangular head bolt (Drawing No's: HCC9/L/050 B). The lower edge of the door shall be positioned so that when the post is installed, it is not less than 300mm above ground level.

Where signs are fixed to any lighting column, then the column must be protected by the use of 3mm translucent EPDM 60° Shore A rubber sheeting as per Standard Detail Drawing HCC9/L/165.

The section, size and number of posts shall be shown in the Traffic Signs Schedule.

Each post shall have a base plate having a minimum area of 0.052 m² and a post top waterproofing cap. Both base plate and post cap shall be in accordance with BS EN 12899-1.

Where illuminated signs are erected on RSJ or UB posts, switch boxes shall be provided of steel not less than 5mm thick (complying with BS EN 10210, hot dipped galvanised to BS **EN ISO 1461** with a minimum thickness of 65µm). Where switch boxes are used as root boxes they shall be bolted to the posts so that their base is just within the ground. The opening to the box shall be not less than 100mm x 400mm and shall afford easy access to the equipment.

A weatherproof door shall be provided for the opening and this shall be fitted with a tamperproof lock. The distance from the face of the switchboard to the inside front shall be at least 100mm and a cable entry provided just below ground level.

The section, size and number of posts shall be shown in the Traffic Signs Schedule.

Where UB posts are required to carry an overhead lighting unit a 450mm length of 76mm tubular post shall be welded within the top of the post leaving a 75mm projection above the top of the post for fixing the lighting unit. Otherwise no part of any post shall show above the sign.

APPENDIX 12/I TRAFFIC SIGNS – GENERAL

Each post shall have a base plate having a minimum area of 0.052 square metres and a post top waterproofing cap. Both base plate and post cap shall be in accordance with BS EN 12899-1.

Base plates are not required for RSJs and UB posts.

In order to highlight their presence to visually impaired pedestrians (see DfT Inclusive Mobility para. 3.9) traffic sign posts to be erected in footway areas or within 0.5m of a footway or cycleway shall have a 150 deep self adhesive white band applied at between 1.4m and 1.6m above ground level. The band shall be in retroreflective material to BS 873 Class 1 or 2. The ends of the tape shall be secured to resist removal. The DfT document does not state that reflective bands are a requirement for all sign posts; therefore their use should be assessed and determined on a site by site basis.

Street Lighting columns (other than units incorporating Belisha beacons as shown on standard detail drawing HCC/L/155A) are usually exempt from the provision of reflective bands due to their painted finish which allows sufficient contrast and their typical location at the rear of the footway.

7. Compartments For Electrical Equipment

The compartment shall be fitted with a non hydroscopic and rot resistant back board of not less than 300mm x 100mm x 13mm and a substantial earth terminal complete with brass washers and locking nuts. The terminal may be screwed or butt welded onto the post inside the base compartment immediately adjacent to the door. The distance from the face of the back board to the inside of the housing shall be not less than 100mm.

8. Locks And Keys

All compartments for electrical equipment shall incorporate stainless steel M8 anti-vandal door bolts as manufactured by Pudsey Diamond Engineering Ltd quoting 'As part No. 6161 (30mm), 6162 (40mm), 6163 (50mm) (or equivalent) with hexagonal head complete with integral centre pin, capable for being operated only with special hexagonal key with centre hole to accept pin location. The Overseeing Organisation shall be provided with six keys for each type of lock.

9. Sign Face Material

The type of material used for pre-printed sign faces or in rolls or as individual letters, numbers and symbols shall be in accordance with BS EN 12899-1:2007 or BS 8408:2005. All pre-printed sign faces shall be to the colour, design and layout as set out in the latest DMRB drawings. All screen printing inks are to be of a type approved by the manufacturer of the sheet material.

All reflective materials supplied shall conform to National Annex NA of BS EN 12899-1 with respect to the minimum coefficients of retro-reflection. Where specified, 3M Scotchlite Diamond Grade VIP, or equivalent material, shall be used.

10. Illumination

Illumination of traffic signs shall only be via external overhead lighting, except in the case of bollards.

APPENDIX 12/I TRAFFIC SIGNS – GENERAL

Overhead lighting units shall comply with the requirements of BS EN 12899-1 and be minimum rated IP54 in accordance with BS 5490.

All new units shall be complete with lamps and integral control gear internally wired ready for use.

All screws and fasteners which are slackened during normal maintenance shall be captive and manufactured from stainless steel or UV stabilised plastic.

All GRP, polycarbonate and plastic canopies, together with lantern bowls shall be UV stabilised.

The glazing panels for use with the lanterns shall be polycarbonate. All lanterns shall be suitable for mounting as required by the specific project requirements.

The lantern shall be so fixed to the supporting bracket arm that it cannot rotate and shall be locked by a minimum of 3 No. hardened pinch screws of not less than 6mm diameter.

Wiring shall be of heat resisting material and capable of withstanding the temperature generated within the lantern. A suitable fused terminal block shall be provided for connection of mains supply along a marked earth terminal. All electrical components shall be earthed to the main lantern body.

All control gear shall be electronic and fully dimmable, using 'DALI' protocol. DynaVision DALI Xtreme.

A Mayflower Intelligent Management System (MIMS) remote monitoring Node shall be installed in each lantern fitted with 6 pin NEMA socket.

The lantern support bracket shall be:-

- Of the post top spigot mounting type, with a 300mm projection from the centre line of the shaft to the spigot shoulder.
- Provided with a single or double arm as shown in the Schedule.
- Of cast aluminium not less than 25mm outside diameter and of a wall thickness suitable for the conditions to be encountered in service.
- Fitted with a minimum of 4 No stainless steel hardened 'pinch' screws that when fixed to the post prevents removal and rotation.

Method Of Switching The Illumination

A Mayflower Intelligent Management System (MIMS) remote monitoring Node shall be installed in each lantern fitted with 6 pin NEMA socket.

Bollard Illumination

Solar Powered LED Bollards

For new installations, either the Signature Truflex or the TMP Heritage solar powered LED units shall be installed. All units shall be installed in accordance with standard detail drawing HCC9/L/061.

APPENDIX 12/I TRAFFIC SIGNS – GENERAL

Internally Illuminated Bollards

For locations where the speed limit is 50mph or greater and there is a requirement for an illuminated bollard, then a conventional 600mm internally illuminated bollard shall be installed/retained with the mains powered LED units.

All bollards shall comply with the requirements of BS EN 12899-2:2007. They shall incorporate sign faces of 270mm, 450mm or 600mm as required.

They shall be of the impact absorbing type which, after impact or overrun, return to their original shape and position.

All bollard shells shall be a single moulded item manufactured from medium density polythene and co-polymers, shall be UV stabilised and sign faces and panels shall be an integral part of the moulding to a depth of 40% of the wall thickness. The date of manufacture of the shell to be stamped onto the galvanised steel stiffener at the base of the shell.

The date of manufacture of the base shall be applied to the exterior of the base plinth. The base of the bollard shell shall be reinforced to withstand impact without tearing.

The shell base plinth shall incorporate a galvanised steel liner for rigidity which shall be capable of withstanding over-run by a light commercial vehicle.

The base box shall be manufactured from diecast LM6 Alloy with ground line clearly marked. External base flanges shall include holes at spacings conforming to BS EN 12899-2 to secure the base box.

Refer to HCC Standard Detail Drawing Nos. HCC9/L/060 A and 150.

The base box shall house the electrical gear, fused connections, earth terminal, the lamps and control gear. The base box shall be sufficiently deep enough to enable the largest Southern Electric cut-outs to be installed. The gear tray shall be removable by insulated straps and be self-disconnecting or disconnection must be achieved before the gear tray is removed.

The base box shall be sealed with a frame and clear polycarbonate cover which shall be removable for maintenance purpose. It shall also withstand over-run by light commercial vehicles.

The base box shall have a 50mm dia. knockout cable access hole provided in the base of the box adjacent to the cut-out mounting board and in such a position as to permit the termination of the supply cable.

Control Gear

All control gear shall be electronic and fully dimmable, using 'DALI' protocol. DynaVision DALI Xtreme.

A Mayflower Intelligent Management System (MIMS) remote monitoring Node shall be installed in each lantern fitted with 6 pin NEMA socket.

11. Non-illuminated Bollards

APPENDIX 12/I TRAFFIC SIGNS – GENERAL

The non-illuminated bollard shall be a minimum of 800mm high (measured from ground level) and wide enough to accommodate a 300mm diameter diagram 610 arrow to the Traffic Signs Regulations and General Directions 2002.

3M Scotchlite Diamond Grade VIP or equivalent fluorescent yellow retro-reflective material shall be used on the front, back and side panels of the non-illuminated bollard with Diamond Grade retro-reflective material being used for the diagram 610 sign.

The reflective bollard shall be installed in accordance with the manufacturers instructions. For new works the non-illuminated bollards the appropriate manufacturers cast-in reinforcement cage or anchorage system shall be concreted into an ST2 concrete foundation. All fixings shall be made from stainless steel. The bollard is to be installed centrally on the island unless otherwise stated. Where an existing illuminated bollard is to be replaced by a non-illuminated bollard, the existing bollard shall be disconnected and the redundant bollard base modified in accordance with the manufacturers recommendation, with the appropriate adaptor plate installed to accommodate the replacement non-illuminated bollard.

All reflective bollards shall have complied with the requirements of BS EN 12767 (Passive safety and Support Structures for Road Equipment).

The reflective bollard shall be manufactured from plastic (e.g. polypropylene, polyethylene, etc.) and should be able to withstand vehicular impact.

12. Sign Location Identifying Mark

All illuminated signs shall be identified by a painted number, supplied by the Overseeing Organisation. The style to be used shall be Helvetia Medium with the letter height 50mm. All numbers shall be painted white on a black background. Black backgrounds shall be 50mm wide with a minimum 12mm border surrounding the numerals.

The number shall be painted down the post. Paint shall be applied by brush only. The number shall not be painted until the white background is dry.

Numbers shall be located 2.5m above ground level facing the road and at 90° angle to on-coming traffic. At the time of installation a temporary number shall be marked on the post with indelible marker. The numbers shall be clear and plain to see at night.

13. Damage To Signs, Posts And Fittings

Signs, posts or fittings having damaged faces, backs, paintwork or plastic coating may be rejected by the Overseeing Organisation and shall then be replaced at the *Contractor's* expense. Slight damage may be rectified by touching in, at the *Contractor's* expense, but only with the approval, and in accordance with the instructions, of the Overseeing Organisation.

The *Contractor* shall be responsible for the protection of sign posts, sign fascias and fixings until such a time as this responsibility is discharged by the Overseeing Organisation.

14. Cleaning Of Signs

Upon completion and servicing of the signs, they shall be thoroughly cleaned immediately prior to being handed over.

APPENDIX 12/I TRAFFIC SIGNS – GENERAL

The cleaning shall be carried out in the manner described in Chapter 12(3) of the Traffic Signs Manual. The type of detergent used shall be to the approval of the Overseeing Organisation.

15. Manufacturer's Trade Marks

The manufacturer's name or trade mark will not be permitted on the sign face.

The following information shall be clearly and durably marked on the back of the sign, as required by BS EN 12899-1:

- i. The number and date of this European Standard
- ii. The relevant performance classification of the product
- iii. The month and the last two digits of the year of manufacture
- iv. The name, trademark, or other means of identification of the manufacturer, or supplier when not the manufacturer

The markings shall be in characters legible at the normal reading distance, such that the total area of the marking does not exceed 30cm², and shall be sufficiently durable to last the expected life of the sign.

APPENDIX 12/2 TRAFFIC SIGNS – MARKER POSTS

1. Verge Marker Posts

Verge marker posts shall conform to BS 873 Part 6 Clauses 4 and 5 and are to be of plastic or other approved material. The size, shape and colour of the posts shall conform to the Traffic Signs Regulations and General Directions 2002, diagram Nos. 560 and 561, with a minimum reflector size of 100 square cm in Class 1 reflective material.

The verge marker posts shall be 1000mm high above finished ground level.

The verge marker posts shall either be rigid in construction, or flexible and be able to spring back after vehicle impact. The type required shall be stated in the Works Information.

APPENDIX 12/3 TRAFFIC SIGNS - ROAD MARKINGS AND STUDS

1. **Permanent Road Markings**

The types and approximate locations of permanent road markings and studs are shown on General Arrangement Drawings. The drawings include the Road Markings Reference Schedule indicating details of Traffic Sign Regulation & General Direction (TSRGD) 2002 diagram numbers and road marking types and dimensions. The exact locations shall be in accordance with Traffic Signs Manual (Chapter 5) and agreed with the Overseeing Organisation prior to installation.

All permanent road markings shall comply fully with the specification and performance requirements of Clause 1212SR and be applied by an Organisation registered with the BS EN ISO 9001 Sector Scheme for the application of Road Marking Materials and Road Studs to Road Surfaces..

All yellow road markings shall be to BS 381C No. 310 (Primrose)

2. **Preparation Of Road Surfaces**

On concrete carriageways or where directed by the Overseeing Organisation a tack coat, compatible with the material, shall be applied. Prior to application of road marking material the pavement should have a minimum 48 hours of dry conditions in order to ensure minimum moisture content. Road marking material should not be laid before the concrete has cured for at least 28 days.

The *Contractor* shall be responsible for ensuring the road surface is sufficiently clean and dry to achieve the necessary level of adhesion with the road marking. Where the *Contractor* believes that mechanical sweeping is needed to remove extensive detritus, loose chippings, etc. or that warming/drying of the road surface is necessary, this shall be agreed with the Overseeing Organisation.

3. **Existing Markings**

Where a marking is laid on top of an existing marking the combined total thickness shall not exceed 6mm as detailed in current Traffic Signs Regulations and General Directions, and that any superseding marking is either permanently removed or totally and efficiently covered by the new marking.

When directed by the Overseeing Organisation, the *Contractor* shall carefully remove old markings by an approved method to ensure that the prepared surface is suitable to receive a new marking of regular thickness. Damage to the adjacent road surface caused by removal of road markings shall be avoided. Where damage occurs it shall be corrected using a method agreed by the Overseeing Organisation at no additional cost.

Where marking is required by Overseeing Organisation to be laid on top of an existing marking which exhibits significant signs of deterioration or contamination, then the *Contractor* shall not be responsible for the subsequent integrity of the overlaid material. Such instances shall be reported and agreed by the Overseeing Organisation prior to their installation. The sites will also be recorded for possible future reference. Notwithstanding this, the performance requirements of the road marking material itself shall comply with the relevant table in Clause 1212SR.

APPENDIX 12/3 TRAFFIC SIGNS - ROAD MARKINGS AND STUDS

4. Performance Monitoring

The *Contractor* is required to undertake monitoring of the Dry Retro-reflectivity and Wet Skid Resistance on a proportion of the road markings laid each year. Details of the proportion of road markings to be tested, the frequency of testing and the format/submission of results are included within Clauses 1212SR.

5. Quality Assurance

All materials and solid glass beads shall be obtained from manufacturers who operate Third Party QA schemes under ISO 9002, EN29002.

A copy of the Manufacturer's current Road Trial report to BS EN 1824 shall be submitted yearly and at least 10 days prior to any road markings being laid.

The *Contractor* shall operate a Quality System complying with Scheme No.7 of the Sector Schemes for Quality Management in Highway Construction – "Application of Road Marking Materials".

The *Contractor* shall hold and maintain a valid certificate of registration in the above scheme, issued by a UKAS accredited Certification Body. A copy of the current certificate shall be submitted yearly and at least 10 days prior to any road markings being laid.

6. Road Studs

- i. All retroreflecting road studs shall comply with BS EN 1463 parts 1 & 2 and the Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113) regulations 31, 32 and directions 57 and 58, the Traffic Signs (Amendment) General Directions 2003 (Statutory Instrument 2002 No. 393) and any subsequent amending Regulations and General Directions.
- ii. Retroreflecting road studs and components which are not within the scope of BS EN 1463-1, but which have statutory type approval by the Secretary of State under direction 58 of the Traffic Signs Regulations and General Directions 2002 (Statutory Instrument 2002 No. 3113), and any subsequent amending General Directions can be incorporated into the *works*.
- iii. The type, location and colour of all retroreflecting road studs shall be included in the Works Information.
- iv. All road studs shall be fixed using the manufacturer's instructions relating to high speed roads as used on the road trials.
- v. A copy of the official road test certificate for the product the *Contractor* proposes shall be supplied with the Tender together with details of the actual test results.

APPENDIX 12/3 TRAFFIC SIGNS - ROAD MARKINGS AND STUDS

7. Temporary Covering Of Road Studs And Road Markings

Temporary Covering of Road Studs shall be by one of the following means:

- (i) Retroreflecting road studs - depressible type - the rubber inserts shall be removed and set aside for re-fixing immediately. The studs once more become a part of the Road Marking system.
- (ii) Retroreflecting road studs - non-depressible type - shall be removed to be replaced with new immediately. The studs once more become a part of a Road Marking system.
- (iii) Where it is impracticable to completely remove redundant white lines during phases of the roadworks then, either a black paint meeting the requirements of BS 6044, or an approved temporary removable Road Marking tape shall be used.

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

1 PERMANENT TRAFFIC SIGNALS

i) GENERAL

- a) The installation of traffic signal equipment shall be undertaken by a signal installer appointed by Hampshire County Council under the County Council's Term Contract for the Installation of Traffic Signals. The traffic signal equipment shall be procured by the Overseeing Organisation. The *Contractor* shall be responsible for all civil engineering works and traffic management associated with traffic signal junctions and signal controlled pedestrian crossings.
- b) The *Contractor* shall give 8 weeks notice to the Overseeing Organisation, unless specified elsewhere in the Contract, for the delivery of the traffic signal equipment to the *Contractor's* compound by the traffic signal installer.
- c) The Works contained in this appendix shall refer to the installation of permanent traffic signals, Pelican crossings, Puffin crossings, Pegasus crossings, Toucan crossings and cycle facilities.

ii) Drawing numbered ZSSLWVILLE2.2/13 and ZSSLWVILLE2.2/14 indicates the locations of the following:

- a) Signal poles
- b) Controller
- c) Traffic signal ducting of carriageway
- d) Electricity power supply pillar
- e) Traffic signal draw pits and Ducting

iii) Drawing numbered ZSSLWVILLE2.2/10 indicate the location of the following:

- f) Road markings
- g) Tactile paving and flush dropped kerbs

iv) STANDARDS, SPECIFICATIONS AND REGULATIONS

All works shall be undertaken in accordance with the following:

- a) BS EN 12368
- b) IEE Regulations for Electrical Installations (current edition) BS 7671
- c) Current Department for Transport (DfT) Specifications relating to traffic signals and associated equipment
- d) Highways Agency Manual of Contract Documents for Highways Work Volume 1 Specification for Highways Works Series 1400. 'Electrical Work for Road Lighting and Traffic Signs'
- e) Current DfT Standards relating to traffic signals and associated equipment

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

- f) Current DfT Advice Notes relating to traffic signals and associated equipment
 - g) The Traffic Signs Regulations and General Directions 2002
 - h) The Zebra, Pelican and Puffin Pedestrian Crossings Regulations and General Directions 1997
 - i) DfT Local Transport Note 1/98 The Installation of Traffic Signals and Associated Equipment
 - j) DfT Specification TR 2500
 - k) The Traffic Signs Manual
 - l) Current health and safety legislation
 - m) TA 84/01 Code of Practice for Traffic Control and Information Systems
 - n) Hampshire County Council Standard Specification for traffic signals.
- v) **EQUIPMENT**
- a) **General**
 - 1. Traffic signal poles shall be installed either into pole retention sockets or directly into the subsurface as specified on the traffic signal drawing. Where pole retention sockets are shown, the *Contractor* shall supply and install these and the third party traffic signal contractor shall subsequently install the signal poles into these sockets. Where no pole retention socket is shown, the *Contractor* shall be responsible for the installation of the signal pole.
 - 2. Traffic signal equipment shall be delivered to the *Contractor's* compound by the third party traffic signal installer. The traffic signal poles (where applicable), controller root base and any associated equipment shall only be delivered when all equipment is ready for dispatch.

The Overseeing Organisation shall arrange for a single delivery to be made and any subsequent delivery of equipment shall be at the *Contractor's* expense. Any traffic signal poles to be installed into pole retention sockets shall be retained by the third party traffic signal contractor and installed directly by them.
 - 3. On delivery of the traffic signal poles, controller root base and any associated equipment the *Contractor* shall be responsible for the safe storage of this equipment. This equipment shall be kept free from damage during storage and construction and any damage or loss of the equipment shall be rectified at the *Contractor's* expense.
 - 4. All street furniture shall be installed at the positions shown on the drawings and in accordance with the Overseeing Organisation's siting instructions. The Overseeing Organisation's Intelligent Transport Systems (ITS) Group (01962 847 695) shall set out the position of all traffic signal pole retention sockets, traffic signal street furniture, traffic signal draw pits, traffic signal ducting, controller root base, power supply pillar and detection on site before the equipment is installed. Where engineering difficulties prevent the installation of the equipment in the specified position the *Contractor* shall inform the Overseeing Organisation. ITS Engineer to agree alternative measures.

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

5. Unless otherwise specified in the Specification, the construction of traffic signal ducts, traffic signal draw pits, and controller root base will be undertaken by the main civil engineering contractor for the Works.
6. The location and orientation of the controller root bases are to be set out by the Overseeing Organisation ITS Engineer. They shall be installed so that the front of the base does not face directly away from the carriageway and such that all normal maintenance and checking can be readily carried out without encroachment on the carriageway by equipment or personnel. The root base shall be installed so that sufficient clearance is provided above the finished ground level to ensure that the controller door can be fully opened.
7. The *Contractor* shall prove the vertical alignment of all pole retention sockets using a guide post. This shall be done under the supervision of the Overseeing Organisation ITS Engineer prior to the completion of the works or the installation of the traffic signal equipment. Where any pole retention socket is found to be out of alignment the *Contractor* shall be responsible for realigning the socket. Responsibility for checking the vertical alignment of signal poles installed directly into the subsurface rests with the *Contractor* who shall also ensure that there is adequate stability before the third party traffic signal installer attends the site to fit any signal heads. The *Contractor* shall notify the Overseeing Organisation immediately if any signal poles fail to satisfy the aforementioned requirements. All traffic signal poles installed directly into the subsurface shall have the cut out section directly abutting the adjacent traffic signal draw pit.
8. All traffic signal equipment shall be installed in accordance with the Overseeing Organisation's standard detail drawings.

The *Contractor* shall obtain confirmation from the Overseeing Organisation on the availability of the traffic signal equipment and the traffic signal installer for installation of the equipment. This information shall be obtained prior to submission of the programme of works. The time scales specified by the Overseeing Organisation for the delivery of the traffic signal equipment, the installation of the traffic signal equipment and its commissioning by the Overseeing Organisation shall be incorporated into the *Contractor's* programme of works.

The time scale specified for the installation of the traffic signal equipment shall not be altered; however, if by agreement the timescale for the installation of the traffic signal equipment is reduced or extended at the *Contractor's* request, they shall be liable for any additional costs incurred by the traffic signal contractor.

9. The *Contractor* shall ensure that all pole retention sockets, traffic signal ducting, including draw strings traffic signal draw pits, controller root base, power supply pillar (including mains power supply) and any traffic signal poles installed directly into the subsurface are installed prior to the Overseeing Organisation instructing the third party signal installer to commence the installation of the signal equipment. The traffic signal installation work shall only commence when all pole retention sockets, ducting, including draw strings, draw pits, power supply and any traffic signal poles planted directly into the subsurface are all installed.
10. The *Contractor* shall provide adequate working space and access around the site for the third party traffic signal contractor to install the signal equipment. This shall include but not be limited to activities including cabling pulling, erection of signal poles, installation of signal heads, controller installation and slot cutting.

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

11. Where the Contract involves work at, or within 80 metres of an existing traffic signal junction, Pelican crossing, Puffin crossing, Pegasus crossing or Toucan crossing, the *Contractor* shall ensure that all works affecting the installation are agreed at the commencement of the Contract with the Overseeing Organisation.
 12. Where the Contract will require the existing traffic signal equipment to be switched off, this shall be undertaken by agreement with the Overseeing Organisation by the third party traffic signal installer. The *Contractor* shall notify the Overseeing Organisation a minimum period of 5 working days in advance of the switch off date. The *Contractor* shall be responsible for providing and maintaining all traffic management for the duration that the permanent traffic signals are switched off. The *Contractor* shall notify the Overseeing Organisation a minimum period of 5 days in advance of the switching back on of permanent traffic signals. Any waiting time to the third party traffic signal installer caused by the delayed switching on or off the signals by the *Contractor* actions shall be recharged to the *Contractor*.
 13. Where the Contract includes working at existing traffic signal equipment the responsibility for maintaining the permanent traffic signals shall remain with the Overseeing Organisation. Where a fault occurs to the traffic signal equipment as a consequence of the *Contractor*'s work, the Overseeing Organisation shall arrange for the third party traffic signal installer to attend the site and to rectify the fault at the *Contractor*'s own expense.
- b) Controller
1. The *Contractor* shall provide wooden shuttering around the controller root base.
 2. The *Contractor* shall provide a separate 50mm diameter duct for a telemetry connection which shall terminate above the final base seal level, unless otherwise instructed by the Overseeing Organisation. The duct entry shall be sealed to prevent the ingress of moisture but the seal shall be removable to allow telemetry equipment to be installed subsequently by the Overseeing Organisation.
 3. The *Contractor* shall backfill any void between the shuttering around the root base and the surrounding ground level.
 4. A hard standing area shall be provided around the full extent of the controller cabinet to a minimum width of 600mm.
- c) Vehicular Signal Heads
1. The lowest part of any signal head assembly including brackets shall have a minimum clearance above the finished ground level of 2.1 metres.
 2. There shall be a minimum lateral clearance of 450mm between the outer surface of the traffic signal pole and the kerb face of the carriageway. Where the minimum clearance cannot be achieved the *Contractor* shall notify the Overseeing Organisation immediately.
 3. The *Contractor* shall be responsible for providing the means of access to enable the third party traffic signal contractor to install vehicular signal heads on overhead mast arms and tall signal poles (exceeding 4 metres length). This shall include the hiring of lifting equipment and traffic management. The provision of this activity shall be identified in the programme of works and agreed with the Overseeing Organisation.

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

4. Where two signal heads (twin) are positioned adjacent to each other and face in the same direction on the same signal pole the *Contractor* shall ensure the structural stability of signal pole and provide a base plate where necessary.
- d) Signal Heads for Cyclists
1. The lowest part of any cycle signal head assembly including brackets shall have a minimum clearance of 2.3 metres above the finished ground level.
- e) Additional Signs
1. The lowest part of the signal head assembly including any additional signs and brackets shall have a minimum clearance of 2.1 metres above the finished ground level.
 2. There shall be a minimum lateral clearance of 450mm between the outer edge of all additional signs including backing board and the kerb face of the carriageway.
- f) Slot cutting / Cabling
1. All slot cutting work shall be undertaken by the traffic signal installer. The *Contractor* shall work with the slot cutting operatives to provide Chapter 8 traffic management. The *Contractor* shall be responsible for erecting, maintaining and dismantling all Chapter 8 Traffic signing including traffic control required to complete the slot cutting. The method of traffic control is to be stated by the Overseeing Organisation and may include the use of temporary traffic signals at the *Contractor's* own expense.
 2. Where loop detection is required in areas of skid resistant surfacing, the *Contractor* shall ensure that slot cutting of the detector loops by the third party traffic signal contractor shall be completed prior to the application of skid resistant surfacing.
 3. The *Contractor* shall be responsible for installing draw strings in all traffic signal duct runs which shall be taken into the pole retention socket or top of traffic signal pole.
 4. Pulling of signal cables will be the responsibility of the third party traffic signal installer.
 5. The *Contractor* shall be responsible for removing any slurry produced by the slot cutting work from the carriageway prior to it being re-opened to traffic. The *Contractor* shall also ensure that no slurry reaches any part of the live carriageway during the slot cutting works.
- g) Mains Connection
1. The *Contractor* shall be responsible for placing an order with Southern Electric Contracting (SEC), who shall supply and install a power supply pillar with a 230V 50Hz (with a suitable power supply). The power supply shall be provided to the ongoing side of the Electricity Board fusible cut-out. Fuse rating shall be 60 amp cut-out 25 amp fuse for Traffic Signals and 60 amp cut-out 16 amp fuse for Pelican, Puffin and Toucan Crossings in accordance with BS 88-2.
 2. The *Contractor* shall install a 50mm diameter black duct between the power supply pillar and the controller root base to terminate above the finished base sea level unless otherwise directed by the Overseeing Organisations ITS Engineer.

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

2 TEMPORARY TRAFFIC SIGNALS

a) General

1. The *Contractor* is required under the Contract to submit, for the Overseeing Organisation's approval, details of the traffic management measures he proposes to adopt as part of the construction phasing. This submission shall include full details of any modifications to existing traffic signal installations and of any temporary traffic signal installations.
2. Temporary traffic signal equipment, inspection, testing, installation and servicing shall in all respects comply with the "Code of Practice for Portable Light Signals for the Control of Vehicular Traffic" published by the Association of Road Traffic Sign Makers.
3. The *Contractor* shall give the Overseeing Organisation six weeks notice prior to the use of temporary traffic signals.

b) Traffic Signal Layout

1. The *Contractor* shall provide drawings at 1:500 scale for each stage of the Works showing the following:-
 - (i) The proposed phasing/staging arrangement together with details of timings.
 - (ii) The type and location of all signal heads and the method of support.
 - (iii) The type and location of the controller.
 - (iv) The proposed method of vehicle detection. All temporary signal installations shall be capable of vehicle-actuated operation. Except where otherwise agreed with the Overseeing Organisation, temporary traffic signal installations shall include inductive loop vehicle detection. The *Contractor* shall indicate, on his Drawings, the proposed location of loops.
 - (v) The proposed cabling and ducting arrangement. Where cables are required to cross a trafficked carriageway, these shall be routed, wherever possible, via existing cable ducts or by new ducts provided under new (permanent or temporary) road construction. Only where absolutely necessary will the Overseeing Organisation permit a cable to be laid across the surface of a trafficked carriageway. The *Contractor* shall propose, for the Overseeing Organisation's approval, a suitable method of protecting the cable from damage by traffic.
 - (vi) Details of the proposed power supply. Where practicable power should be from a mains supply. Where agreed by the Overseeing Organisation a power supply may be a portable generator.
 - (vii) Full details of road markings and traffic signs associated with the traffic signal installation.

c) Testing

1. Temporary traffic signals shall not be brought into operation until the installation has been thoroughly tested on Site and the Overseeing Organisation's written approval is obtained.

d) Maintenance/Servicing

1. Maintenance, servicing and fault repair shall be the responsibility of the *Contractor* who shall submit his proposed methods for the approval of the Overseeing Organisation.

e) Training of Operatives

1. All personnel involved in controlling traffic using temporary traffic signals shall be trained in the use of the equipment. The *Contractor's* attention is drawn to the requirements of the Code of

APPENDIX 12/5 TRAFFIC SIGNS : TRAFFIC SIGNALS AND ASSOCIATED EQUIPMENT

Practice (see Clause 2.1 of this Appendix) and in addition, to the Department of Transport's publication "An Introduction to the Use of Vehicle Actuated Portable Traffic Signals".

APPENDIX 13/I INFORMATION TO BE PROVIDED WHEN SPECIFYING LIGHTING COLUMNS AND BRACKETS

(Rev A, 04/01/13)

1. GENERAL INFORMATION

- a) These notes and the Street Lighting Drawing No. ZSSLWVILLE2.2/15 are intended to complement information provided elsewhere in the documents, to enable the submission of a tender and completion of Data Sheets 1 and 2 given in Appendix 13/2.
- b) Lighting columns shall be designed in accordance with the requirements of Departmental Standard BD94/07, BSI PD 6547:2004 + A1:2009 and with HCC Standard Detail Drawing No. HCC9/L/015 Post top mounted Type 2A. Design provision for lighting columns to carry attachments shall be as specified in clauses 7.2, 7.3, and 7.5 of BD 94/07.
- c) Columns shall be manufactured from 50c type steel with a silicon content of greater than 3%. Column bases for 5/6m columns shall be manufactured from 5mm thick material whilst 8, 10, 12m columns and above shall use 6.3mm material.
- d) The requirements for lighting columns are given below:

Column Type	A	B	C	D (Relocated Existing LC83)	E
<i>Location</i>	B2150 Hambledon Road (D2B)	B2150 Hambledon Road (D2B)	Hambledon Road (SGL) Aston Road	Maurepas Way	Maurepas Way Ramp
Number of Columns	1	3	11	1	3
Nominal Height	12m	12m	8m	10m	8m
Bracket Projection	0.2m	Post top mounted	Post top mounted	0.5m	Post top mounted
Luminaire fixing; Size, Length & Angle	5 degrees tilt	5 degrees tilt	5 degrees tilt	5 degrees tilt	5 degrees tilt
Type of column base	Planted	Planted	Planted	Planted	Planted
Door opening	600x115	600x115	600x115	600x115	600x115
Position of door relative to the carriageway	Down stream from traffic	Down stream from traffic	Down stream from traffic	Down stream from traffic	Down stream from traffic

APPENDIX 13/I INFORMATION TO BE SUPPLIED WHEN SPECIFYING LIGHTING COLUMNS AND BRACKETS

Column Type	A	B	C	D	E
<i>Location</i>	B2150 Hambledon Road (D2B)	B2150 Hambledon Road (D2B)	Hambledon Road (SGL) Aston Road	Maurepas Way	Maurepas Way Ramp
Column Material	<i>Steel</i>	<i>Steel</i>	<i>Steel</i>	<i>Steel</i>	<i>Steel</i>
Corrosion Protection	<i>Polymer bonded thermoplastic coating or PSX700 over galvanise</i>	<i>Polymer bonded thermoplastic coating or PSX700 over galvanise</i>	<i>Polymer bonded thermoplastic coating or PSX700 over galvanise</i>	<i>Polymer bonded thermoplastic coating or PSX700 over galvanise</i>	<i>Polymer bonded thermoplastic coating or PSX700 over galvanise</i>
Number of Door keys to Be Provided	2	2	2	2	2
Identification Marks	Tbc by HCC	Tbc by HCC	Tbc by HCC	Tbc by HCC	Tbc by HCC
Earthing Requirements	See below	See below	See below	See below	See below
Lantern type to be mounted	Philips SGS254 FG TP P1 SON-TTP 250W		Philips SGS253 FG OR P1 SON-TTP 100W	Philips SGS253 FG TP P5X SON-TTP 150W	Philips SGS253 FG OR P3 SON-TTP 100W
Cable entry Dimension 'X'	75	75	75	75	75

PD6547:2009 V

Item to be specified	Recommendation	Requirement
Mean hourly wind speed - V_{ref}	Use Table A.1	22m/s
Site altitude above 250 m	Seek expert advice	n/a
Site altitude	Use Table A.1	132
Topography factor	1	Usually 1, see BSEN40-3-1
Terrain Category where installation is unknown	II for Group A columns III for Group B columns	see BSEN40-3-1
Rationalized wind loading region [Specify category]	Extra Heavy/Heavy/Medium/Light  /Extra Light 	EL
Partial safety factors on loads f	Class B	B
Deflection class	Class 3	3
Foundation data – it applicable – Soil type	Good/Average or Poor	Assume Poor
Road signs – only if required	Class A/B or C	A
Fatigue requirements- only if applicable	Use Highways Agency BD  94/07  [2]	BD 94/07

APPENDIX 13/I INFORMATION TO BE SUPPLIED WHEN SPECIFYING

LIGHTING COLUMNS AND BRACKETS

- e) All lighting columns shall incorporate stainless steel M8 anti-vandal door bolts as manufactured by Pudsey Diamond Engineering Ltd quoting “As part no 6161 (30mm), 6162 (40mm), 6163 (50mm) (or similar approved) with hexagonal head complete with integral centre pin, capable for being operated only with special hexagonal key with centre hole to accept pin location.
- f) Each column and post shall be earthed with an 8mm diameter brass earthing terminal with 2 no. brass plain washers and nuts. The earthing stud shall be in a readily accessible position. The Contractor shall submit the completed data sheets as required by HCC.
- g) The Contractor shall submit to the Overseeing Organisation a copy of the Design and Check Certificates as required by Departmental Standards BD 2: Part IV, for the design of each lighting column and luminaire, foundations for columns and their associated anchorage's and attachment systems.
- h) Typical column and foundation arrangements are shown on drawing numbers HCC9/L/025 B and 026 B.
- i) The Contractor shall provide columns of the style shown on the contract drawings. Approval of the style of column offered shall be obtained before the Contractor orders the columns.

2. ERECTION

- a) The *Contractor* shall be aware of overhead power lines and comply with working clearances in G39/1 (regional electricity company Scottish and Southern Energy recognised standard) during the erection of lighting columns. Warning notices regarding proximity to overhead power lines shall be provided where required.
- b) The safety requirements in relation to underground and overhead obstructions and column lifting, as outlined in ILE Code of Practice for Electrical Safety in Highway Electrical Operations, Clause 11, must be observed.
- c) Columns shall be erected strictly in accordance with the ILE document “Safety During The Installation And Removal Of Lighting Columns And Similar Street Furniture In Proximity To High Voltage Overhead Lines”, published in 2004 as a supplement to the “Code Of Practice For Electrical Safety In Highway Operations” fifth edition.
- d) Control gear, luminaires and attachments shall not be fitted until the column is in position and has been left for 48 hours or until the concrete has reached its design strength.
- e) The completed column shall be truly vertical and the luminaire shall be checked so that it is at 90 degrees to the carriageway.
- f) All locks, hinges and catches shall be re-greased prior to handover.
- g) *Hinged columns shall be of the base-hinged type with a planted root. The Contractor shall provide a suitable foundation and install the column as directed by the column manufacturer. Hinged columns shall be installed such that they can be safely and easily lowered without obstruction by safety fences and the like. They shall not lower towards or over a traffic lane. The Contractor shall provide details of the columns, foundations, fixings and lowered positions of all hinged columns for approval by the Overseeing Organisation.*

APPENDIX 13/1 INFORMATION TO BE SUPPLIED WHEN SPECIFYING LIGHTING COLUMNS AND BRACKETS

- b) Hinged columns adjacent to overhead lines shall carry two warning notices, they shall face across the carriageway, with one fixed immediately below the column location reference and the other one metre from the top of the column. Each notice shall consist of an aluminium plate attached to the column with a stainless steel bracket in accordance with HCC Standard Drawing HCC9/L/165.*
- i) Fixed columns adjacent to overhead lines shall carry two warning notices, they shall face across the carriageway, with one fixed immediately below the column location reference and the other one metre from the top of the column. Each notice shall consist of an aluminium plate attached to the column with a stainless steel bracket in accordance with HCC Standard Detail Drawing HCC9/L/165.*

3. NUMBERING OF COLUMNS AND ILLUMINATED SIGNS

- a) Each column shall be numbered as directed by the Overseeing Organisation with black numerals 50mm high on a white background. Backgrounds shall be 50mm wide with a minimum 12mm border surrounding the numerals. Two or three figure numbers shall run down the column. Labels shall be black vinyl polypropylene tape with high performance exterior grade adhesive in accordance with HCC standard detail HCC9/L/160 A. Numbers shall be a minimum of 2.5m from ground level and face the road perpendicular to the flow of traffic.
- b) The Contractor shall agree the exact numbering system with HCC prior to installation.*

APPENDIX I3/2

(SPECIFICATION FOR HIGHWAY WORKS) TYPICAL
LIGHTING COLUMN AND BRACKET DATA SHEETS

SHEET 1

Name of Manufacture:

Column Reference No

Revision No

Date

NAME OF CONTRACT:

PART A General

Column nominal height

(m)

Column material

Material design strength

(N/mm²)

No. of door openings

Door opening size - Height

(mm)

- Width

(mm)

Cross-section of base compartment

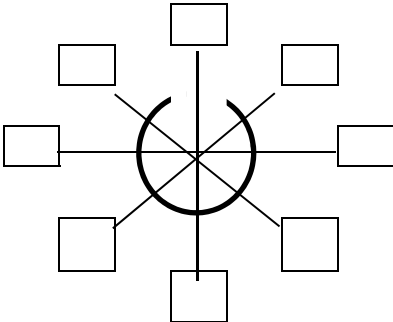
Height (mm)

Width (mm)

Depth (mm)

Acceptable positions of bracket arms relative to door position

Door Opening



Any

Manufacturers drawing ref. No.

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

Reference Wind Velocity V_{ref,o} as defined in BS EN 40-3-1

m/s

Details of the signs and attachments allowed for in the design Area (mm²), Eccentricity (mm), Height

- 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

(m)

Diameter of concrete surround (if any)

Standard Soil Type Factor G

630

390

230

Flange plate

Bolt hole centres

Hole diameter

Design load/bolt

(mm)

(mm)

(N)

Relevant forces and moments at Ground Level.

Line of action of max. moment relating to door opening

NOTE: For flange plates with slotted holes a diagram shall be included with this Data Sheet.

APPENDIX 13/2 (SPECIFICATION FOR HIGHWAY WORKS) TYPICAL COLUMN AND
BRACKET DATA SHEETS
SHEET 2

Luminaire: Maximum Characteristics

PART C Acceptable Luminaires

Post Top
Column

		Terrain Categories as defined in BS EN 40-3-1				
		I	II	III	IV	
Luminaire Connection		Maximum windage area (m²) for Terrain Categories as defined by BS EN 40-3-1				
Diameter	Length					

Single Arm
Bracket
Column:

Luminaire lever arm (mm)	
Due to wt. of luminaire	Due to Windage of luminaire

Bracket projection (m)	Ref No	Drawing No	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Maximum windage area (m²) for Terrain Categories as defined by BS EN 40-3-1				
			Grade	Design Strength (N/mm²)		Diameter (mm)	Length (mm)						

Double Arm
Bracket
Column:

Luminaire lever arm (mm)	
Due to wt. of luminaire	Due to Windage of luminaire

Bracket projection (m)	Ref No	Drawing No	Material		Luminaire Fixing Angle	Luminaire Connection		Luminaire Maximum Wt (kg)	Maximum windage area (m²) for Terrain Categories as defined by BS EN 40-3-1				
			Grade	Design Strength (N/mm²)		Diameter (mm)	Length (mm)						

PART D Certification

It is certified that the information given in the Data Sheet has been obtained in accordance with Departmental Standard BD26 (DMRB 2.2.1) and the Specifications.

Signed on Behalf of the Contractor:..... Date

APPENDIX 13/3

INSTRUCTIONS FOR COMPLETION OF LIGHTING COLUMN AND BRACKET DATA SHEETS

1. GENERAL

- a) When information is not required a dash shall be inserted in the appropriate boxes.
- b) Where a Data Sheet is amended it shall be given a new revision number with a date.
- c) The revision numbers shall be consecutive letters of the alphabet, commencing with "A".
- d) The date of the revision shall agree with the date of the *Contractor's* signature.
- e) The column, or bracket material shall be steel, aluminium, reinforced or pre-stressed concrete, glass fibre reinforced plastic or any other suitable material.
- f) 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.
- g) All relevant entries shall be made on the Data sheet before the document is certified by the *Contractor*.

2. COLUMN DATA

- a) The column nominal height shall be selected from Clause 2 or 3 of BS 5649: Part 2 as appropriate.
- b) The number of door openings shall agree with the manufacturer's drawing.
- c) The cross-section of the base compartment shall be indicated by a dimensioned diagram/sketch.
- d) 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.
- e) Where concrete is necessary around the planted base in accordance with sub-Clauses 1305.3 and 1305.4 the minimum diameter shall be entered.
- f) For flange bases all forces and moments used in the design of the foundations, anchorages and attachment systems shall be given.
- g) The corrosion protection system used on the column when new shall be recorded. Where additional steel is provided for sacrificial purposes the amount shall be recorded.
- h) The signs and attachments surface area, eccentricity from the centre line of the column to the centre of area of the sign and height above ground level to the centre of area of the sign and height above ground level to the centre of area of the sign shall be stated.

3. BRACKET DATA

- a) The luminaire lever arms, 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 are 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 14/I SITE RECORDS

- 1 As built drawings shall be produced by the Overseeing Organisation. The *Contractor* shall provide all necessary information to enable the drawings to accurately reflect the installation.
- 2 Scottish and Southern Energy PLC require a completed test and inspection certificate for all items before servicing can commence.

The address of Scottish and Southern Energy PLC office to send the certificates is given in Appendix 1/16.

- 3 Further to Cl.1426AR the documentation required for the Street Lighting PFI Service Provider to assume responsibility for the maintenance of street lighting and illuminated signs comprises:
 - a) Lighting Column and Bracket Data Sheets (Appendix 13/2)
 - b) Lighting Column compliance certification (Cl.1302)
 - c) Test and Inspection Certificates (Cl.1424)

Failure to provide this documentation may delay the issue of the Certificate of Completion. Where documentation is incomplete at the time of issuing the Certificate of Completion, the Overseeing Organisation will make arrangements for missing documentation to be assembled by others. The full cost of making these arrangements will be deducted from payments due under the contract. This cost is estimated to be £100 per unit.

APPENDIX 14/2 LOCATION OF LIGHTING UNITS AND FEEDER PILLARS

1. The locations of lighting units are shown on Drawing Number ZSSLWVILLE2.2/50.
2. Lighting columns shall installed at the rear of a footway where this is immediately adjacent to the highway and not more than 2m wide. In a verge, the following data taken from BS5489 shall be observed. Where neither of these locations is appropriate, the Overseeing Organisation's site representative shall be requested to give further instructions.

Table 1 – Recommended minimum clearance from edge of carriageway to face of lighting column

Design speed Km/h	Horizontal Clearance m
50	0.8
80	1.0
100	1.5
120	1.5

3. Electricity services to all lighting units/feeder pillars shall be provided by Scottish & Southern Energy Plc.

APPENDIX 14/3 TEMPORARY LIGHTING

1. Temporary lighting shall be provided where new sections of highway are opened to traffic before their permanent lighting systems are in operation.
2. The standard required for temporary lighting will be in accordance with the relevant Class of BS 5489-1:2003 : Part 1 (Code of Practice for the Design of Road Lighting) as specified by the contractor, the *Contractor* must demonstrate by calculation and/or measurement that his installation complies with these recommendations.

Road lighting lanterns shall be G* classification as defined in EN13201-2:2003 Annex A: and the *Contractor* shall ensure that any temporary lighting he provides does not cause glare to traffic using any highway nor annoyance to occupants of surrounding property.

Existing illuminated regulatory signs, where not part of a traffic signal installation, must be maintained either in their existing locations or temporary locations and the same standard of illumination maintained by either existing or temporary lighting. This lighting is to be maintained until the relevant regulation ceases to be appropriate and may not be removed without the prior approval of the Overseeing Organisation in writing.

3. The *Contractor* may if he wishes, propose the advance installation of fixed road lighting units in their final positions in order to fulfil the requirements of 1 and 2 above, but will be fully responsible for any damage which may occur to such equipment before final handover.

The *Contractor* shall ensure that all existing road lighting remains in operation for as long as that road is open to traffic. Where electrical supplies to existing units are disconnected during the execution of the Works the *Contractor* shall provide and install temporary supply cables as directed by the Overseeing Organisation.

APPENDIX 14/4 ELECTRICAL EQUIPMENT FOR ROAD LIGHTING

(Rev A, 04/01/13)

The *Contractor* shall insert below details of the equipment that he proposes to use in the Works and shall submit the information as soon as the Contract has been awarded.

1. Luminaires and Lamps

The luminaires shall be compatible with the columns and brackets offered in Appendix 13/2 and the information shall include the lamp type and wattage and luminaire circuit wattage.

1.1. Luminaires

The luminaire shall be designed for easy installation and maintenance and shall be supplied tested and ready for installation.

Lamps shall be new and permanently marked with the date of installation on the metal cap.

Column and Lantern Reference	Manufacturer	Model	Cat No.	Lamp type	Lamp position	Lamp design flux	Lantern bowl type	PECU Socket	IP Rating (min)
A & B	Phillips	SGS 254	TP	SON- TPP	P1 250W	33.20	flat glass	Fitted with 6 pin NEMA socket	65
C	Phillips	SGS 253	OR	SON-TTP	P1 100W	10.70	flat glass	Fitted with 6 pin NEMA socket	65
D	Phillips	SGS 253	TP	SON-TTP	P5X 150W	17.50	flat glass	Fitted with 6 pin NEMA socket	65
E	Phillips	SGS 253	TP	SON-TTP	P3 100W	10.70	flat glass	Fitted with 6 pin NEMA socket	65

2. Ancillary Equipment

2.1. Control Gear

All control gear shall be electronic and fully dimmable, using 'DALI' protocol. DynaVision DALI Xtreme.

One Mayflower Mobitex GPRS Sub-master unit shall be installed in a location to be confirmed with the Overseeing Organisation to control the nodes and link to the central control systems.

2.2. Photo-electric Control Units (PECUs)

A Mayflower Intelligent Management System (MIMS) remote monitoring Node shall be installed in each lantern fitted with 6 pin NEMA socket.

APPENDIX 14/4 ELECTRICAL EQUIPMENT FOR ROAD LIGHTING

2.3. Cut-outs, Fuses, Fuse Holders or MCBs

Columns and posts shall be equipped with an SSE fused cut-out. Fuse holders and carriers shall be complete with HRC fuses to BS EN 60269. Terminal shields shall be fitted to prevent accidental contact with live conductors. Protective devices shall be suitable for use at the prospective fault levels. Circuit protection shall be rated at 10A for 250W lamps and 6A for up to 150W lamps.

For private cable networks, columns shall have a fused cut-out/double pole isolator unit.

The fused cut-out/isolator shall have a moulded enclosure suitable for mounting on a wooden backboard, offering a minimum protection of IP 44 and capable of withstanding severe impact. The unit shall have a glanding plate and chamber for the incoming supply which is separate from the double pole switch and fuses. Separate terminals shall be provided for live, neutral and earth conductors complete with terminal shields to prevent accidental contact with all live conductors. Cut-outs shall be sized to accommodate the cables specified.

Cable armouring shall be bonded by the glanding plate fixed as an integral part of the cut-out, complete with cable gland and shrouds.

2.4. Wiring

The method of wiring is shown on Drawings No. HCC9/L/080 A.

Internal wiring of the lighting unit shall be copper stranded single core, PVC/PVC or multi core flex 1.5/2.5mm².

The insulation layer shall be brown for the phase conductor and blue for the neutral conductor.

The circuit protective conductor shall be 2.5mm² PVC insulated and coloured yellow/green.

2.5. Equipment Details

The *Contractor* shall insert below the details of the equipment which he proposes to use in the Works and shall submit the information with his tender.

Ancillary Equipment (to be completed by the *Contractor*)

Clause	Item	Manufacturer	Catalogue or Type No	Requirements (<i>compiler to complete</i>)
1409	Control Unit	Mayflower	MIMS	6 pin Node
1412	Electronic control gear			DynaVision DALI Xtreme
1419	Wiring			

3. Earthing (For Private Cable Networks)

Earthing shall be provided in accordance with the specification and BS 7430:1991 and as detailed on the drawings.

All cable gland earth tags within a box or cabinet shall be bonded together and to the earth point within the enclosure by insulated stranded copper conductor.

An earth electrode shall be located within 2 metres of each feeder pillar and adjacent to the last lighting column or illuminated sign post on each circuit.

APPENDIX I 4/4 ELECTRICAL EQUIPMENT FOR ROAD LIGHTING

The earth electrode shall be manufactured from high strength carbon steel rod with a uniform layer of copper over the entire length of the rod. The overall rod diameter shall be 16mm and the length of the rod shall be a minimum of 2.4 metres. Earth electrodes adjacent to feeder pillars shall be bonded to the main earthing terminal in the feeder pillar using a 25mm² copper conductor. Earth electrodes adjacent to columns or posts shall be bonded to the earthing terminal using a 16mm² insulated copper conductor.

An inspection chamber, to accommodate each earth rod and its connections, shall be provided and installed by the *Contractor*.

4. Cables and Cable Joints

Underground cables shall be installed as shown on the Drawing drainage and ducting drawings.

Where cables are pulled into ducts, sufficient rollers shall be used to guide the cables so as to prevent contact with the ducts ends.

The Contractor shall be mindful of the requirements in Series 1400 of the SHW, Inspection and Testing to be carried out by the Contractor. In particular, the criteria that the cable shall successfully pass a sheath test.

Each drum of cable shall be accompanied by duplicate copies of test certificates on delivery to site, bearing the cable description and name of manufacturer. Such certificates are to be handed to the Overseeing Organisation.

Cables shall be supplied on returnable drums with a minimum loan period of six months. Each drum must have an indication of the length, size of cable and number of cores it contains.

Cable drums shall be supported by suitable purpose made jack stands and axle while the cables are being drawn off. In no circumstances shall drums be rolled in a direction other than indicated on the side of the drum.

Jointing shall be carried out under adequate supervision and comply with BS 6910: Part 2.

Cable installation details are shown on drawing HCC9/L/070 A.

5. Procedures for Isolating Power

The isolation and re-energising of supplies shall be the responsibility of the *Contractor*.

The *Contractor* will be required to provide a 24 hour contact responsible for electrical work on Site.

Failure to re-energise circuits at the end of each working day will incur call-out charges from the Term Maintenance Contractor for which the *Contractor* will be liable.

24 hours' notice shall be given to the Overseeing Organisation prior to equipment being isolated on the network.

When private cables are to be isolated or energised, suitable weatherproof notices with the name of the person responsible must be displayed on the switchgear in the feeder pillar or any other control source. When more than one person requires a cable to be either isolated or energised, each person must display a notice. On completion of the Works and prior to dusk each day, the circuit should be tested and re-energised and the notices removed.

The isolation of individual circuits may be carried out using the fuse within a distribution board such that the empty fuse holder is replaced. *Isolation of circuits in this manner may only be carried out by an electrician NICEIC qualified in compliance with Health and Safety requirements.*

It is the *Contractor's* responsibility to identify and prove column supply sources prior to isolation and work commencing.

APPENDIX I4/4 ELECTRICAL EQUIPMENT FOR ROAD LIGHTING

6. Distribution Network Operator (DNO) Supplies

Where DNO supplies are required to be isolated above the cut-out, only competent and authorised persons in accordance with G39 Category 2 status may remove the fuse. The names of the competent and authorised persons must be submitted to the Overseeing Organisation prior to the commencement of any work.

Where electricity company supplies are required to be isolated below the cut-out, the Overseeing Organisation must be informed and the *Contractor* must then liaise with the DNO before work commences.

The Overseeing Organisation will place all orders with the DNO for the disconnection and connection of supplies. However, it is the *Contractor's* responsibility to liaise with and manage the DNO to ensure the disconnection/connection of supplies meets with the agreed programme of works.

7. Testing

The continuity test of protective conductors shall include the $R_1 + R_2$ values. The value of Z_s at the lantern shall be given on the test certificate.

APPENDIX I4/5

ELECTRICAL EQUIPMENT FOR TRAFFIC SIGNS

1. The *Contractor* shall carry out the installation of the signs and bring them into service.

Equipment for illuminated traffic signs and bollards shall be installed and wired as shown on HCC Standard Detail Drawings Numbers HCC9/L/050 B, 060 A and 150.

2. All illuminated traffic sign lanterns and bollards supplied by the *Contractor* shall be as follows:-

Type 'A' Sign Lanterns

Simmon Signs LUA LED or Signature LED lantern unit fitted with MIMS control gear.

Solar Powered LED Bollards

Signature Truflex or TMP Heritage units with solar powered LED lamps.

Illuminated Bollards

For locations where the speed limit is 50mph or greater and where there is a requirement for an illuminated bollard, then the conventional 600mm internally illuminated bollard shall be installed/retained with the mains powered LED units.

3. Electricity services to all mains powered illuminated signs will be provided by Scottish & Southern Energy Plc.

APPENDIX 19/I**(SPECIFICATION FOR HIGHWAY WORKS) FORM HA/P I
(NEW WORKS) PAINT SYSTEM SHEET**

Sheet No.

1. CONTRACT TITLE: STRUCTURE NO.: GRID REF.:				
2. DATE OF ISSUE OF DOCUMENT TO TENDERERS:				
3. ENVIRONMENT AND ACCESSIBILITY:				
4. REQUIRED DURABILITY OF SYSTEM: NO MAINTENANCE: 12 YEARS MINOR MAINTENANCE: 12 YEARS MAJOR MAINTENANCE: 30 YEARS			5. COLOUR OF FINISH: 12B21	
6. PAINT SYSTEM TO BE APPLIED OVER: AREA REF: AREA DESCRIPTION: PROTECTIVE SYSTEM TYPE: (i.e. I,II etc) POLYMER BONDED THERMOPLASTIC COATING OR PSX700				
7. DETAILS	1 st Coat	2 nd Coat	3 rd Coat	4 th Coat
Registered Description Item No. & Colour BBA HAPAS Roads and Bridges certificate Reference Brand Name and Manufacturer's Ref. No. Manufacturer's Data Sheet No. Where applied How applied Min dry film thickness (mdft) Max local dry film thickness (See Cl. 1914.7) Estimated total volume of paint likely to be used. (litres) 'A' type testing required? (YES/NO) (See Cl. 1912.3) 'B' type testing required? (YES/NO) (See Cl. 1912.10)				
8. STRIPE COAT DESCRIPTION (Including Item No And Colour) Workshop: Site:			9. PAINT MANUFACTURERS 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:	

**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	Surface dry				
	Hard dry				
Overcoating Times	Minimum				
	Maximum				

Cleaning Solvent:

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

Manufacturer's Application Restrictions:
eg for Temperatures or Humidity:

Manufacturer's General Recommendations:

APPENDIX 19/5 GENERAL REQUIREMENTS

Galvanising to street lighting columns and brackets to BS EN ISO 1461.

After galvanising the columns and brackets shall be coated with polymer bonded thermoplastic coating or PSX700.

APPENDIX 30/5 GRASS SEEDING, WILDFLOWER SEEDING AND TURFING

1. Seeding

The type of grass seed mixture which shall be used in the Works is as follows:-

	kg	%
Perennial Rye Grass	12.5	25
Strong Creeping Red Fescue	10.0	20
Hard Fescue	15.0	30
Smooth Stalked Meadow Grass	5.0	10
Highland Browntop Bent	5.0	10
Huia White Clover	2.5	5

(a) Seed Mixtures

i) Road verges mix, GRADE A18 consisting:-

- 30% Adinda (strong creeping Red Fescue)
- 25% Talgo (Perennial Ryegrass)
- 20% Mentor (Hard Fescue)
- 12.5% Balin (Smooth Stalked Meadow Grass)
- 10% Highland (Browntop Bent)
- 2.5% Aberace (Small Leaved White Clover)

Manufactured by British Seed House Limited or similar approved.

ii) New Forest Mix consisting:-

- 30% Festuca rubra subsp. rubra, (Red Fescue)
- 20% Agrostis tenuis (Brown Top Bent)
- 25% Poa pratensis (Smooth Meadow Grass)
- 25% Cynosurus cristatus (Crested Dogs Tail)

Traffic Signing Schedules and Sign Face Details

Traffic Signing Removal Schedule					Ref. No.: ZSSLWVILLE.2/RSS Rev A	
Client: Sainsbury's Supermarkets Limited					Date: October 2011	
Project: Hambledon Road, Waterloooville					Dwg. Ref.: ZSSLWVILLE.2/10	
Sign Reference	Diagram Number	Description	Post Details		Illumination	Comments
			Number	Type		
RS01	2103	Advance direction sign	2	CHS	None	Sign and posts to remain.
RS02	670	40mph repeater sign	Mounted on LC		None	Sign to remain.
RS03	2125	Direction sign	2	CHS	None	Sign and posts to be removed.
RS04	2140	Recycling centre direction sign	Same posts as RS3		None	Sign and posts to be removed.
RS05	670	30mph sign	1	CHS	None	Sign and post to be removed.
RS06	2103	Advance direction sign	2	CHS	None	Sign and posts to be removed.
RS07	611.1	Mini-roundabout sign	1	LBP	External	Sign and post to be removed.
RS08	965	End of cycle route sign	1	CHS	None	Sign and post to be removed.
RS09	957	Segregated cycle route sign	Mounted on reverse of RS8		None	Sign and post to be removed.
RS10	-	Road name plate	2	-	None	Sign and posts to be removed.
RS11	611.1	Mini-roundabout sign	1	LBP	External	Sign and post to be removed.
RS12	7014	'NEW ROAD LAYOUT AHEAD' sign	Mounted on LC		None	Sign to be removed.
RS13	510	Roundabout ahead warning sign	1	LBP	External	Sign and post to be removed.
RS14	-	Road name plate	2	-	None	Sign and posts to be taken down and set aside for re-use.
RS15	611.1	Mini-roundabout sign	1	LBP	External	Sign and post to be removed.
RS16	-	Road name plate	2	-	None	Sign and posts to be taken down and set aside for re-use.
RS17	-	'Please queue from opposite direction' sign	1	CHS	None	Sign and post to be removed.
RS18	957	Segregated cycle route sign	1	CHS	None	Sign to remain.
RS19	-	'Entry' sign	1	CHS	None	Sign to remain.
RS20	670	10mph sign	Mounted below RS19		None	Sign to remain.
RS21	-	'Entry' sign	1	CHS	None	Sign to remain.
RS22	-	'H.G.V.' sign	1	CHS	None	Sign to remain.
RS23	670	10mph sign	Mounted below RS22		None	Sign to remain.
RS24	-	Road name plate	2	-	None	Sign and posts to be taken down and set aside for re-use.
RS25	611.1	Mini-roundabout sign	1	LBP	External	Sign and post to be removed.
RS26	670	30mph sign	1	CHS	None	Sign and post to be removed.
RS27	957	Segregated cycle route sign	Mounted on LC		None	Sign to be removed.
RS28	957	Segregated cycle route sign	1	CHS	None	Sign and post to be removed.
RS29	670	40mph repeater sign	Mounted on LC		None	Sign to remain.
RS30	2103	Advance direction sign	2	CHS	None	Sign and posts to be removed.
RS31	670	40mph repeater sign	Mounted on LC		None	Sign to remain.
RS32	956	Shared use sign	1	CHS	None	Sign to remain
RS33	957	Segregated cycle route sign	1	CHS	None	Sign and post to be removed.
RS34	2103	Advance direction sign	2	CHS	None	Sign to remain.
RS35	877	Lane dedication sign	2	CHS	None	Sign to be taken down and set aside for re-use. Posts to be removed.
RS36	670	40mph repeater sign	Mounted on LC		None	Sign to be mounted on relocated LC83

Traffic Signing Removal Schedule					Ref. No.: ZSSLWVILLE.2/RSS Rev A	
Client: Sainsbury's Supermarkets Limited					Date: October 2011	
Project: Hambledon Road, Waterloooville					Dwg. Ref.: ZSSLWVILLE.2/10	
Sign Reference	Diagram Number	Description	Post Details		Illumination	Comments
			Number	Type		

Rev

	Prepared by		Date	Checked by	Revision Comment
0	PB		20/10/2011	AB	First Issue
A	OJN		31/07/2012	AB	RS36 amended

Traffic Signing Schedule												Ref No: ZSSLWVILLE.2/TSS				Rev.:	D		
Client: Sainsbury's Supermarkets Limited												Date: Oct-11							
Project: Hambledon Road, Waterloooville												Dwg. Ref: ZSSLWVILLE.2/10							
Sign Ref.	Diag No.	Description	Size		Grade	Traffic Sign Post Details						Foundation			Post Centres	Mounting Height	Lateral Clearance	Illumination Housing	
			(x)	(y)		Number	Type	Size	Length	Caps	Clips	Length	Width	Depth					
TS01	2114	Lane dedication advance direction sign (re-used RS35)	1630	x	1575	CR2	2	CHS	76.1	3475	2	12	300	300	900	906	1000	500	-
TS02	2125	Direction sign	2270	x	1175	CR2	2	CHS	114.3	4250	2	8	500	500	900	1354	2100	500	-
TS03	956	Shared use sign	450	x	450	CR2	1	CHS	60.3	3650	1	2	200	200	800	-	2400	500	-
TS04	965	End of cycle route sign	496	x	518	CR2	Mounted on below TS10					2	-	-	-	-	2400	500	-
TS05	956	Shared use sign	450	x	450	CR2	Mounted on reverse of TS04					2	-	-	-	-	2400	500	-
TS06A	670	30mph speed limit sign	600	x	600	CR2	1	CHS	76.1	3875	1	2	200	200	800	-	2400	500	-
TS06B	670	40mph speed limit sign	600	x	600	CR2	Mounted on reverse of TS06A					2	-	-	-	-	2400	500	
TS07	2103	Advance direction sign	2309	x	2637	CR2	2	CHS	139.7	6312	2	18	600	600	1200	1385	2400	500	-
TS08A	606	Proceed left sign	600	x	600	CR2	1	LBP	76.1	2525	0	2	300	300	600	-	1300	500	External
TS08B	515	Proceed left chevron	1200	x	400	CR2	2	CHS	60.3	1900	2	4	300	300	600	880	900	500	-
TS09	611.1	Mini roundabout sign	600	x	600	CR2	1	LBP	76.1	3500	0	2	200	200	800	-	2100	500	External
TS10	2024	Mini roundabout advanced direction sign	1408	x	820	CR2	1	CHS	76.1	4663	1	4	400	400	800	-	2968	500	-
TS11	611.1	Mini roundabout sign	600	x	600	CR2	1	LBP	76.1	3500	0	2	200	200	800	-	2100	500	External
TS12	611.1	Mini roundabout sign	600	x	600	CR2	1	LBP	76.1	3500	0	2	200	200	800	-	2100	500	External
TS13	510	Roundabout ahead warning sign	679	x	600	CR2	1	CHS	60.3	3875	1	2	200	200	800	-	2400	500	-
TS14A	606	Proceed left sign	600	x	600	CR2	1	LBP	76.1	2525	0	2	300	300	600	-	1300	500	External
TS14B	515	Proceed left chevron	1200	x	400	CR2	2	CHS	60.3	1900	2	4	300	300	600	880	900	500	-
TS15		Sign Not Used																	
TS16A	606	Proceed left sign	600	x	600	CR2	1	LBP	76.1	2525	0	2	300	300	600	-	1300	500	External
TS16B	515	Proceed left chevron	1200	x	400	CR2	2	CHS	60.3	1900	2	4	300	300	600	880	900	500	-
TS17A	670	30mph speed limit sign	600	x	600	CR2	Mounted on new lighting column LC2					2	-	-	-	-	2400	500	-
TS17B	670	40mph speed limit sign	600	x	600	CR2	Mounted on reverse of TS17A					2	-	-	-	-	2400	500	

Traffic Signing Schedule												Ref No: ZSSLWVILLE.2/TSS			Rev.:	D			
Client: Sainsbury's Supermarkets Limited												Date: Oct-11							
Project: Hambledon Road, Waterlooville												Dwg. Ref: ZSSLWVILLE.2/10							
Sign Ref.	Diag No.	Description	Size			Grade	Traffic Sign Post Details						Foundation			Post Centres	Mounting Height	Lateral Clearance	Illumination Housing
			(x)		(y)		Number	Type	Size	Length	Caps	Clips	Length	Width	Depth				
TS18	956	Shared use sign	450	x	450	CR2	Mounted on reverse of TS19					2	-	-	-	-	2400	500	-
TS19	965	End of cycle route sign	496	x	518	CR2	1	CHS	60.3	3793	1	2	200	200	800	-	2400	500	-
TS20	957	Segregated cycleway/footway	450	x	450	CR2	Mounted on new lighting column LC1B					2	-	-	-	-	2400	500	-
TS21	956	Shared use sign	450	x	450	CR2	Mounted on reverse of TS20					2	-	-	-	-	2400	500	-
TS22	2103	Advance direction sign	2049	x	1700	CR2	2	CHS	114.3	5125	2	12	600	600	950	1213	2400	500	-
TS23	957	Segregated cycleway/footway	450	x	450	CR2	1	CHS	60.3	3650	1	2	200	200	800	-	2400	500	-
TS24	956	Shared use sign	450	x	450	CR2	Mounted on reverse of TS23					2	-	-	-	-	2400	500	-
TS25	2114	Lane dedication advance direction sign	2022	x	1322	CR2	2	CHS	114.3	4697	2	10	500	500	900	1622	2400	500	-
TS26	610	Keep left sign	600	x	600	CR2	1	LBP	76.1	3575	0	2	200	200	800	-	2100	500	External
TS27	610	Keep left sign	600	x	600	CR2	Mounted on reverse of TS26					2	-	-	-	-	2100	500	External
TS28	610	Keep left sign	600	x	600	CR2	1	LBP	76.1	3575	0	2	200	200	800	-	2100	500	External
TS29	610	Keep left sign	600	x	600	CR2	Mounted on reverse of TS28					2	-	-	-	-	2100	500	External
TS30	956	Shared use sign	150	x	150	CR2	Mounted on bollard						400	400	450	-	-	-	-
TS31	956	Shared use sign	150	x	150	CR2	Mounted on reverse of TS30						400	400	450	-	-	-	-
TS32	956	Shared use sign	150	x	150	CR2	Mounted on bollard						400	400	450	-	-	-	-
TS33	957	Segregated cycleway/footway	150	x	150	CR2	Mounted on reverse of TS32						400	400	450	-	-	-	-
TS34		Sign Not Used																	
TS35	956	Shared use sign	450	x	450	CR2	1	CHS	60.3	3725	1	2	200	200	800	-	2400	500	-
TS36	956	Shared use sign	150	x	150	CR2	Mounted on bollard						TBA by KSA			-	-	-	-
TS37	956	Shared use sign	150	x	150	CR2	Mounted on reverse of TS36						TBA by KSA			-	-	-	-
TS38	956	Shared use sign	150	x	150	CR2	Mounted on bollard						TBA by KSA			-	-	-	-
TS39	956	Shared use sign	150	x	150	CR2	Mounted on reverse of TS38						TBA by KSA			-	-	-	-
TS40	965	End of cycle route sign	496	x	518	CR2	1	CHS	60.3	3793	1	2	200	200	800	-	2400	500	-
TS41	956	Shared use sign	450	x	450	CR2	Mounted on reverse of TS40					2	-	-	-	-	2400	500	-
TS42	965	End of cycle route sign	496	x	518	CR2	1	CHS	60.3	3793	1	2	200	200	800	-	2400	500	-
TS43	956	Shared use sign	450	x	450	CR2	Mounted on reverse of TS42					2	-	-	-	-	2400	500	-

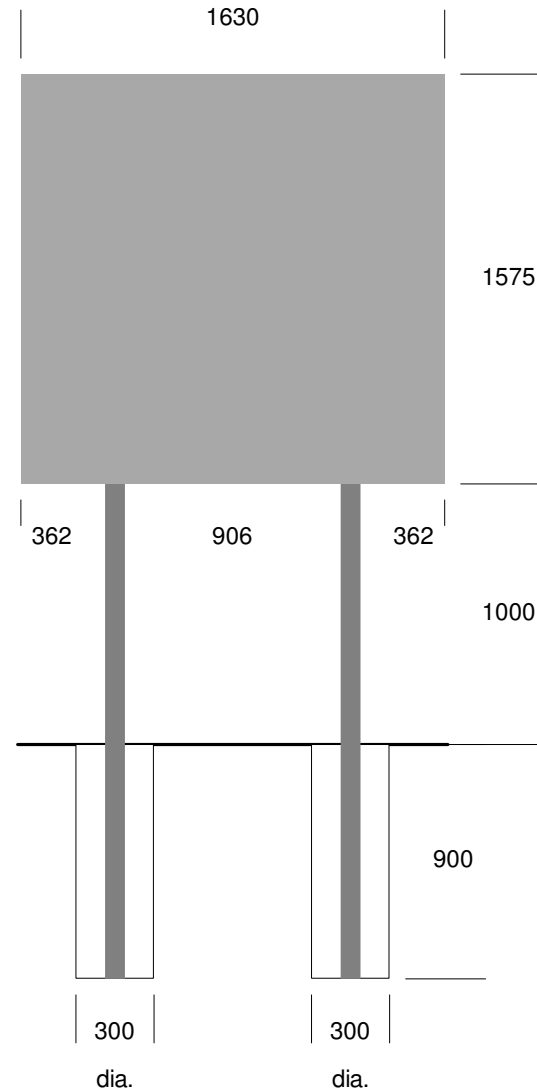
Traffic Signing Schedule											Ref No: ZSSLWVILLE.2/TSS			Rev.:	D				
Client: Sainsbury's Supermarkets Limited											Date: Oct-11								
Project: Hambledon Road, Waterloooville											Dwg. Ref: ZSSLWVILLE.2/10								
Sign Ref.	Diag No.	Description	Size			Grade	Traffic Sign Post Details						Foundation			Post	Mounting	Lateral	Illumination
			(x)	(y)			Number	Type	Size	Length	Caps	Clips	Length	Width	Depth	Centres	Height	Clearance	Housing
TMP01	7014	NEW ROAD LAYOUT AHEAD' Sign	492	x	488	CR2	Mount on convenient lighting column						-	-	-	-	2100	500	-
TMP02	7014	NEW ROAD LAYOUT AHEAD' Sign	492	x	488	CR2	Mount on convenient lighting column						-	-	-	-	2100	500	-
TMP03	7014	NEW ROUNDABOUT AHEAD' Sign	492	x	488	CR2	Mount on convenient lighting column						-	-	-	-	2100	500	-
TMP04	7014	NEW ROAD LAYOUT AHEAD' Sign	492	x	488	CR2	Mount on convenient lighting column						-	-	-	-	2100	500	-
TMP05	7014	NEW ROAD LAYOUT AHEAD' Sign	492	x	488	CR2	Mount on convenient lighting column						-	-	-	-	2100	500	-
TMP06	7014	NEW ROAD LAYOUT AHEAD' Sign	492	x	488	CR2	Mount on convenient lighting column						-	-	-	-	2100	500	-
RNP01	-	Road name plate (Re-used RS14)	Ex	-	Ex	-	As existing						300	300	300	Ex.	Ex.	500	
RNP02	-	Road name plate (Re-used RS16)	Ex	-	Ex	-	As existing						300	300	300	Ex.	Ex.	500	
RNP03	-	Road name plate (Re-used RS24)	Ex	-	Ex	-	As existing						300	300	300	Ex.	Ex.	500	-

Notes

- 1 It is the Contractors responsibility to check, on site, that the sign dimensions given in the signing schedule provide the required lateral and vertical clearances prior to the order and manufacture of the signs.
- 2 The Contractor must confirm with the Engineer that no further amendments are to be made to the sign face details before ordering the manufacture of signs.
- 3 The precise location of signs are to be confirmed on site by the Engineer prior to installation.
- 4 **Sign manufacturer must be a member of ARTSM.**
- 5 Materials NR1 = Non-reflective, CR1 = Class Ref 1, CR2 = Class Ref 2, MP= Microprismatic (eg 3m VIP), DG = Diamond Grade

Rev

	Prepared by	Date	Checked by	Revision Comment
0	PB	25/10/2011	AB	Initial issue.
A	PB	04/11/2011	AB	TS25 added.
B	OJN	24/07/2012	PSD	TS26 - 29 added
C	OJN	23/09/2012	PSD	TS30 - 43 added
D	OJN	08/01/2013	AB	Signs amended following comments from HCC dated 19/11/12



Job Ref: ZSSLWVILLE.2
Sign Ref: TS01
Scale 1:11
Dimensions (in mm):
Width: 1630, Height: 1575
x-Height: (100)
Area: 2.57 sq m

Colours:

Mounting height: 1m

BS EN 12899-1:2007 classes:
WL5, TDB5, PL3, PAF1
1000 N/m²

Structure Details:
2 no. Steel circular section S275:
76.1mm O.D. 4mm thick
Support length: 3475 mm

Planted foundations to BD 94/07:
Soil type: poor or unknown
Height of footing: 900 mm
Diameter of each footing: 300 mm

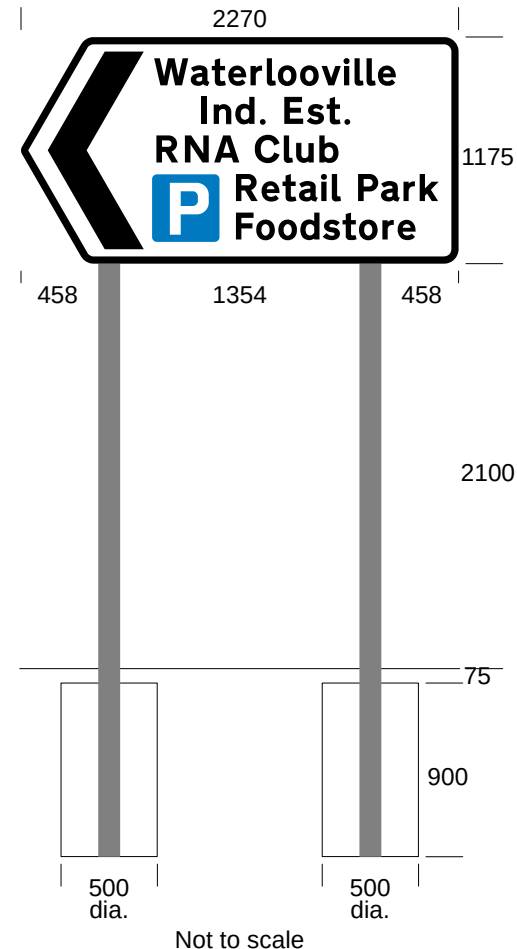
Passively safe to BS EN 12767:2007

MAYER BROWN LIMITED

TS25
ZSSLWV~1

SignPlot v2.60e

Not to scale



Job Ref: ZSSLWVILLE.2
 Sign Ref: TS02
 Scale 1:16
 Dimensions (mm):
 Width: 2270, Height: 1175
 x-Height: 100
 Area: 2.67 sq m

Colours:
☐ black on white

Mounting height: 2.1m

BS EN 12899-1:2007 classes:
 WL5, TDB4, PL3, PAF1
 1000 N/m²

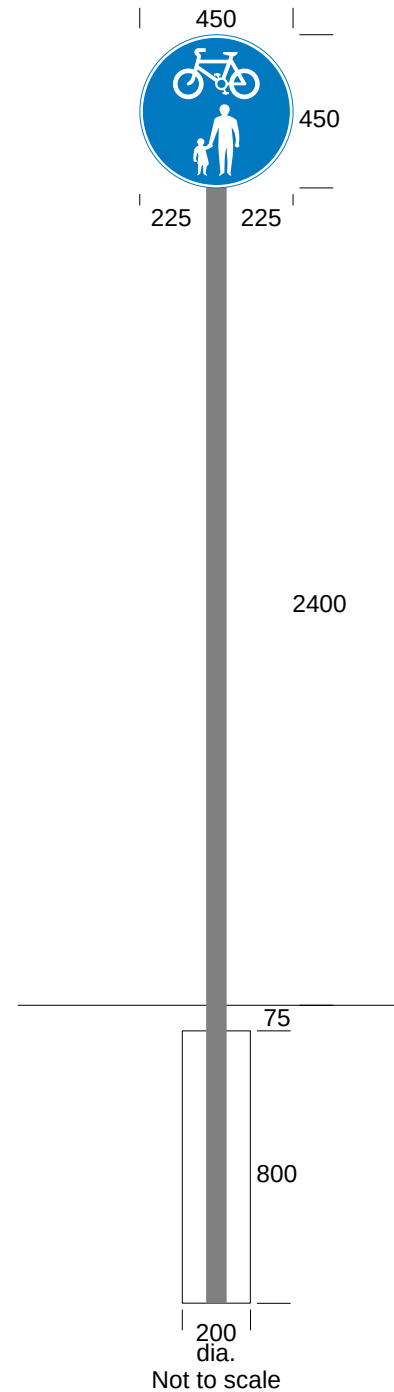
Structure Details:
 2 no. Steel circular section S275:
 114.3mm O.D. 3.2mm thick
 Support length: 4250 mm

Planted foundations to BD 94/07:
 Soil type: poor or unknown
 Depth of soft fill: 75 mm
 Height of footing: 900 mm
 Diameter of each footing: 500 mm

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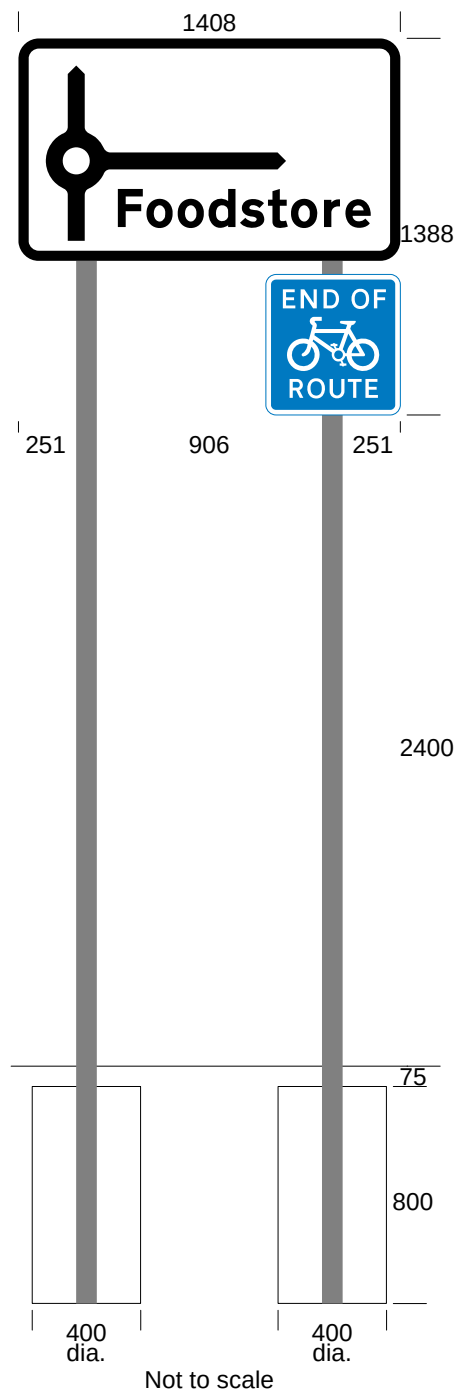
TS02A
 ZSSLWV-1

SignPlot v2.80a



SignPlot v2.80a

200
dia.
Not to scale



Job Ref: ZSSLWVILLE.2

Sign Ref: TS04 & TS10

Scale 1:10

Dimensions (mm):

Width: 1408, Height: 820

Width: 496, Height: 518

x-Heights: 100, 50

Area: 1.41 sq m

Colours:

black on white

white on blue

Mounting height: 2.4m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

2 no. Steel circular section S355:

76.1mm O.D. 4mm thick

Support length: 4663 mm

Planted foundations to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of each footing: 400 mm

Passively safe to BS EN 12767:2007

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ZSSLWVILLE

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2
Sign Ref: TS05, 18, 21 & 24
Scale 1:3
Dimensions (in mm):
Width: 450, Height: 450

Area: 0.16 sq m

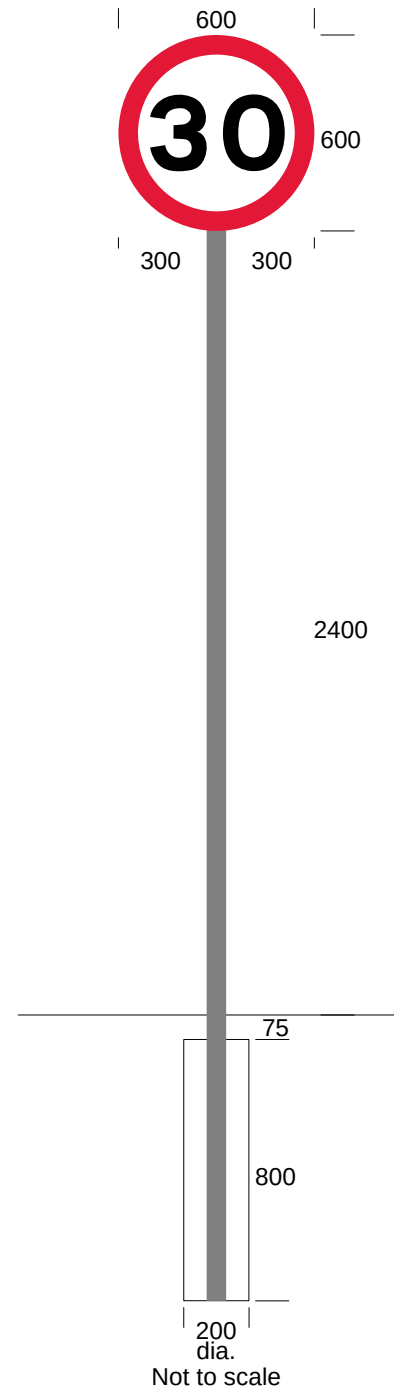
Colours:

Mounted on reverse of TS04,
TS19, TS20 & TS23

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TS05
ZSSLWV~1

SignPlot v2.60e



Job Ref: ZSSLWVILLE.2

Sign Ref: TS06A & 17A

Scale 1:5

Dimensions (mm):

Width: 600, Height: 600

Area: 0.28 sq m

Colours:

Mounting height: 2.4m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

1 no. Steel circular section S275:

60.3mm O.D. 3mm thick

Support length: 3875 mm

Planted foundation to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of footing: 200 mm

Passively safe to BS EN 12767:2007

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TS06

ZSSLWV-1

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2

Sign Ref: TS06B & 17B

Scale 1:5

Dimensions (mm):

Width: 600, Height: 600

Area: 0.28 sq m

Colours:

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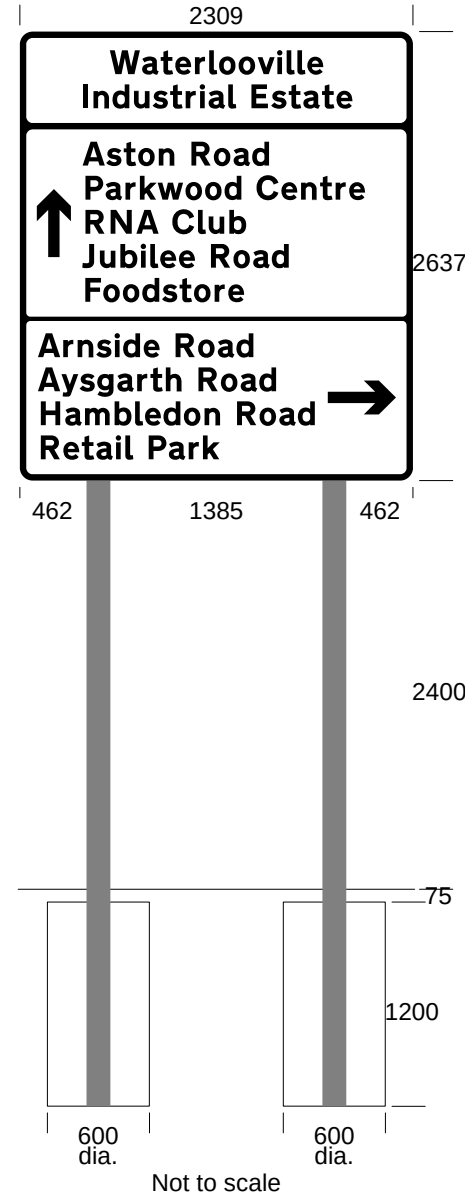
TS06B
ZSSLWV-1

SignPlot v2.80a

**Waterlooville
Industrial Estate**

**↑
Aston Road
Parkwood Centre
RNA Club
Jubilee Road
Foodstore**

**Arnside Road
Aysgarth Road
Hambledon Road
Retail Park →**



Job Ref: ZSSLWVILLE.2
Sign Ref: TS07
Scale 1:16
Dimensions (mm):
Width: 2309, Height: 2637
x-Height: 100
Area: 6.09 sq m

Colours:
☐ black on white

Mounting height: 2.4m

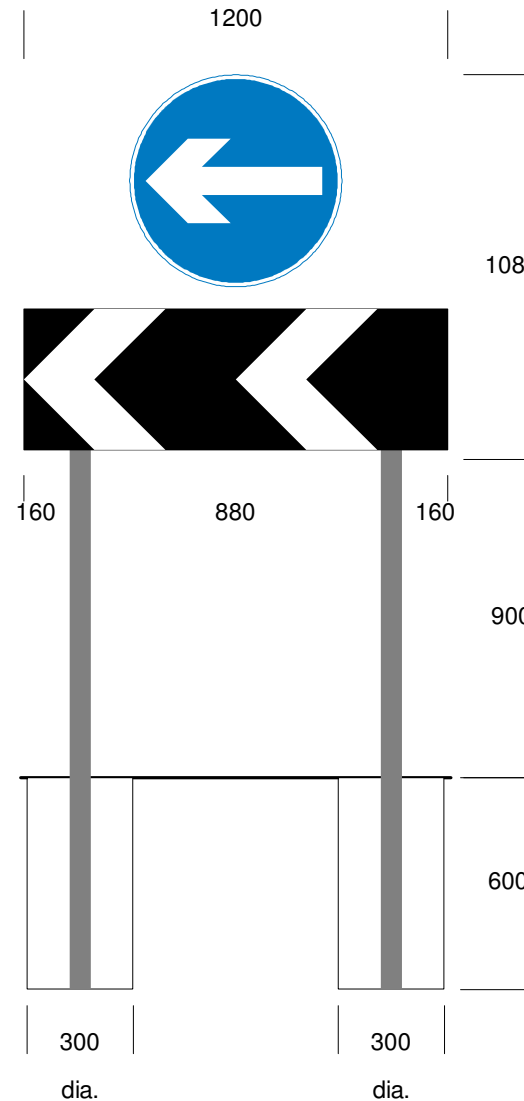
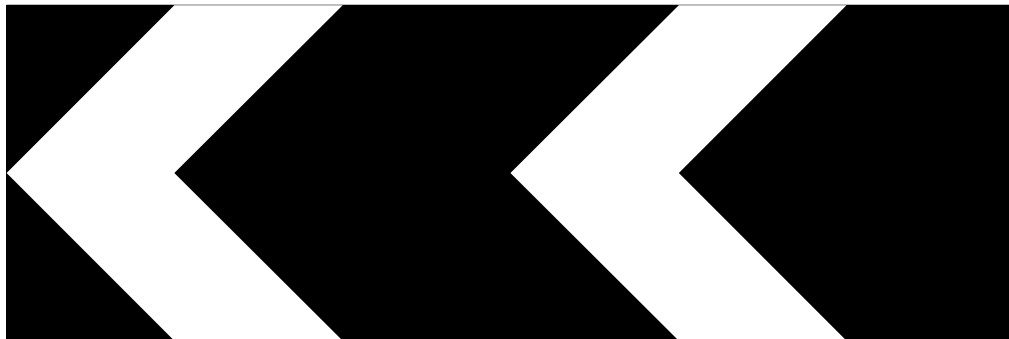
BS EN 12899-1:2007 classes:
WL5, TDB4, PL3, PAF1
1000 N/m²
Structure Details:
2 no. Steel circular section S275:
139.7mm O.D. 6.3mm thick
Support length: 6312 mm

Planted foundations to BD 94/07:
Soil type: poor or unknown
Depth of soft fill: 75 mm
Height of footing: 1200 mm
Diameter of each footing: 600 mm

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TS07-A
ZSSLWV-1

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2
Sign Ref: TS08A&B, 14A&B, 16A&B
Scale 1:9
Dimensions (in mm):
Width: 600, Height: 600
Width: 1200, Height: 400

Area: 0.76 sq m

Colours:

1087

Mounting height: .9m

BS EN 12899-1:2007 classes:
WL5, TDB5, PL3, PAF1
1000 N/m²

Structure Details:
2 no. Steel circular section S275:
60.3mm O.D. 3mm thick

900

Planted foundations to BD 94/07:
Soil type: poor or unknown
Height of footing: 600 mm
Diameter of each footing: 300 mm

Passively safe to BS EN 12767:2007

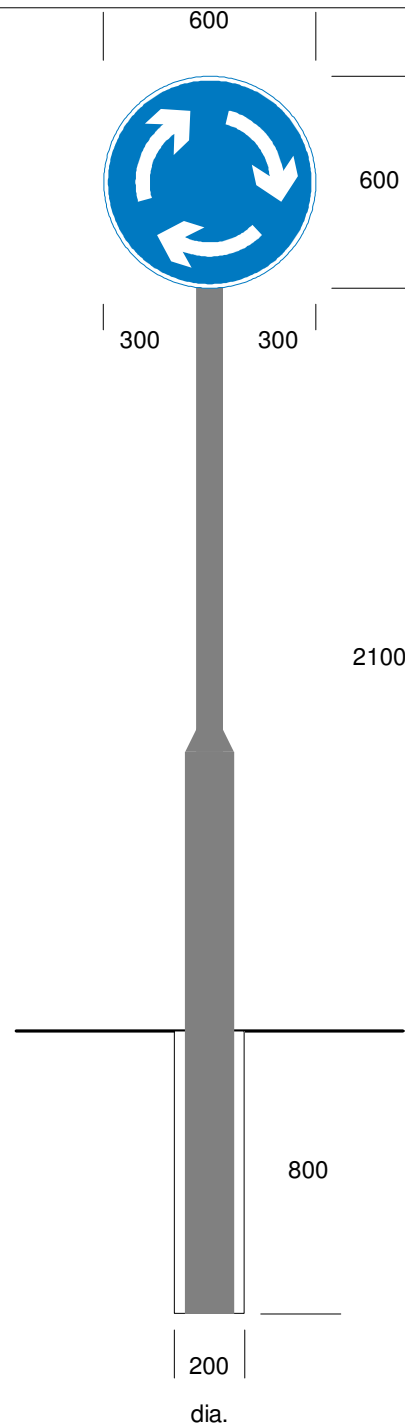
600

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ZSSLWV~1

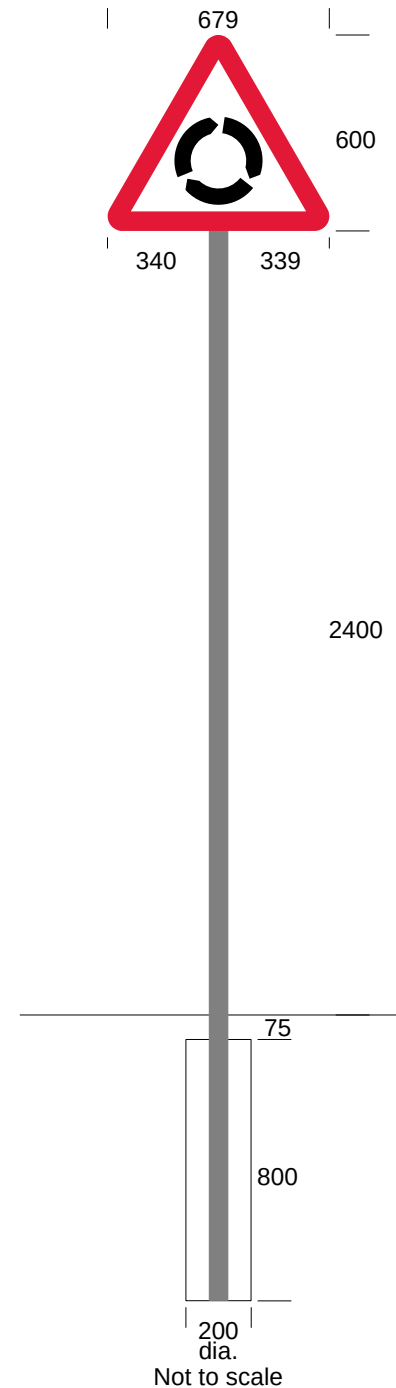
SignPlot v2.60e

Not to scale



SignPlot v2.60e

Not to scale



Job Ref: ZSSLWVILLE.2

Sign Ref: TS13

Scale 1:5

Dimensions (mm):

Width: 679, Height: 600

Area: 0.24 sq m

Colours:

Mounting height: 2.4m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

1 no. Steel circular section S275:

60.3mm O.D. 3mm thick

Support length: 3875 mm

Planted foundation to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of footing: 200 mm

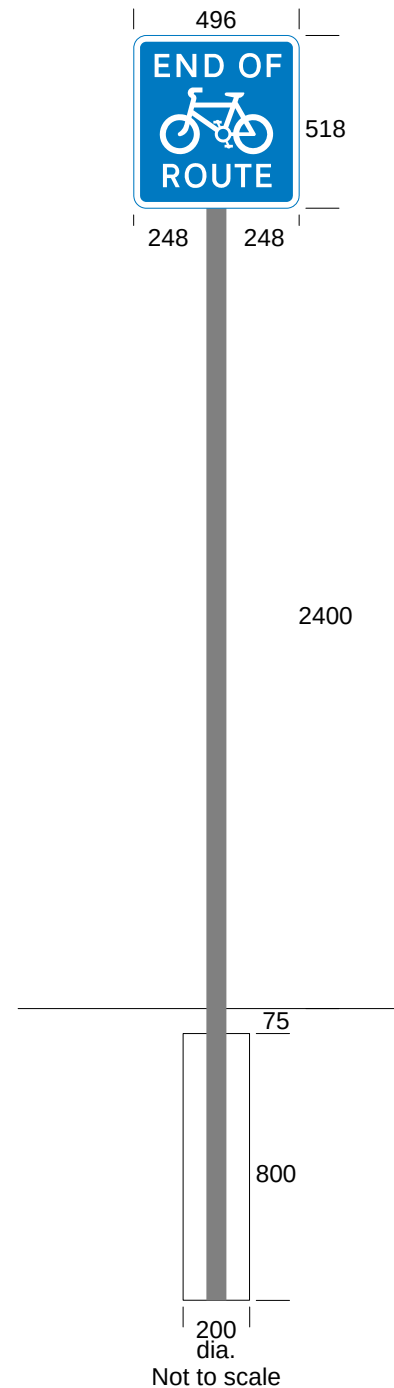
Passively safe to BS EN 12767:2007

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TS13

ZSSLWV-1

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2

Sign Ref: TS19, 40 & 42

Scale 1:5

Dimensions (mm):

Width: 496, Height: 518

x-Height: 50

Area: 0.26 sq m

Colours:

 white on blue

Mounting height: 2.4m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

1 no. Steel circular section S275:

60.3mm O.D. 3mm thick

Support length: 3793 mm

Planted foundation to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of footing: 200 mm

Passively safe to BS EN 12767:2007

MAYER BROWN LIMITED

TS19

ZSSLWVILLE

SignPlot v2.80a

Job Ref: ZSSLWVILLE.2

Sign Ref: TS20

Scale 1:5

Dimensions (mm):

Width: 600, Height: 600

Area: 0.28 sq m

Colours:

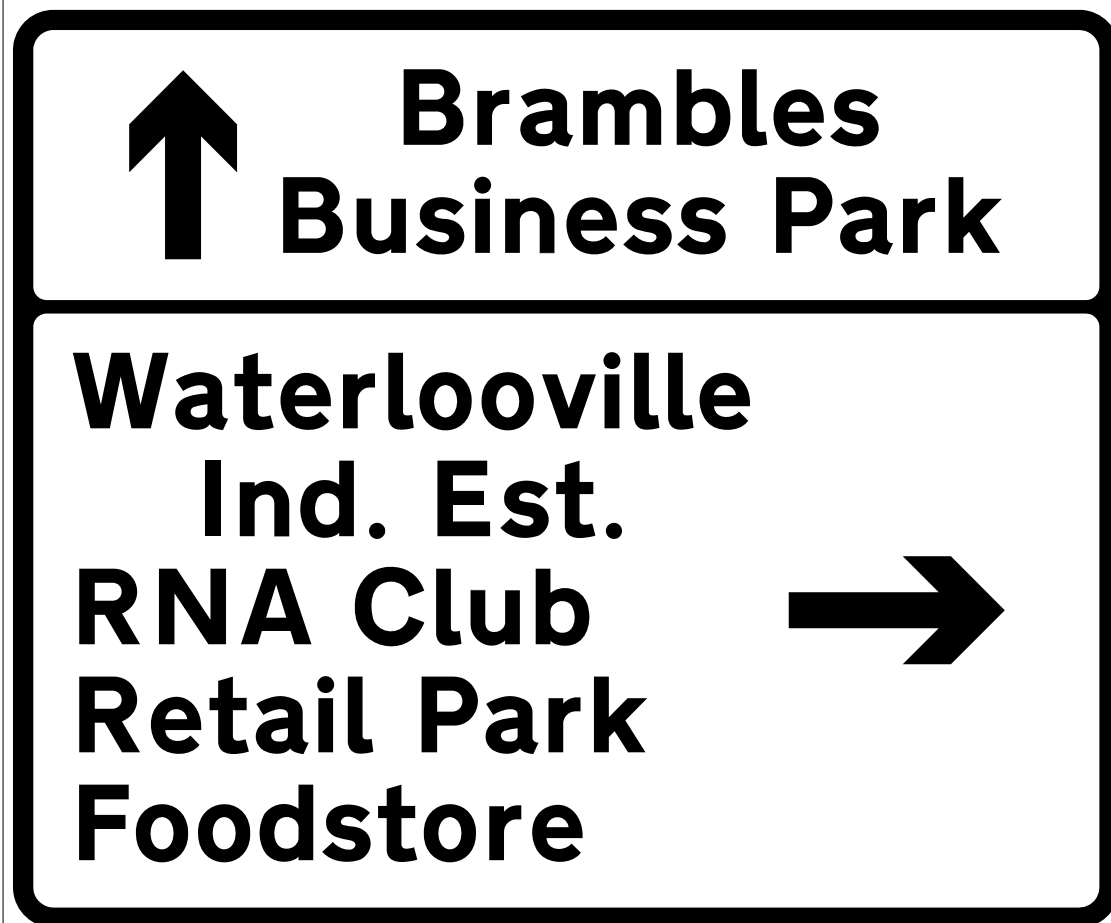
Mounted on new lamp column
LC1B

MAYER BROWN LIMITED

TS20
ZSSLWVILLE

SignPlot v2.80a





Job Ref: ZSSLWVILLE.2
 Sign Ref: TS22
 Scale 1:14
 Dimensions (mm):
 Width: 2049, Height: 1700
 x-Height: 100
 Area: 3.48 sq m

Colours:
☐ black on white

Mounting height: 2.4m

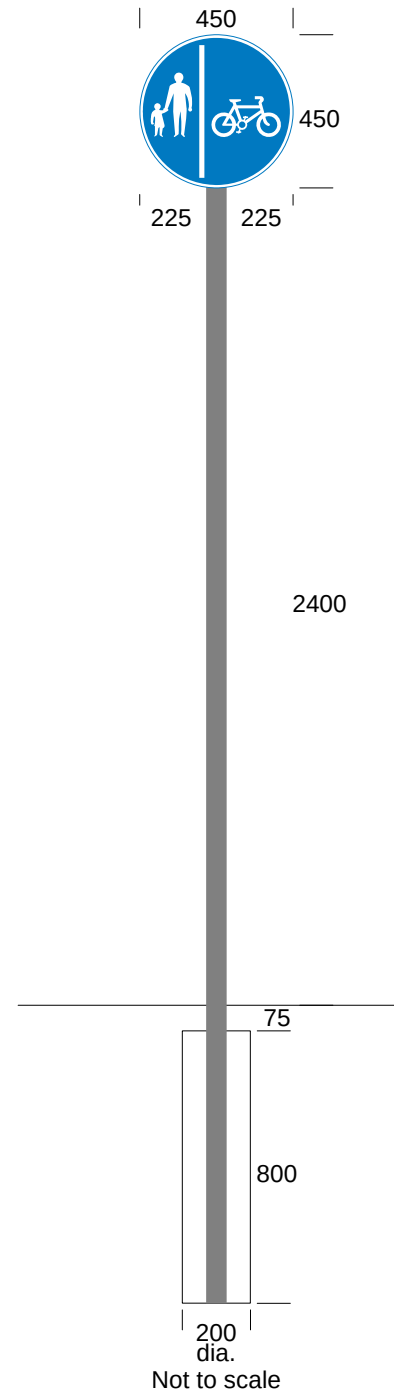
BS EN 12899-1:2007 classes:
 WL5, TDB4, PL3, PAF1
 1000 N/m²
 Structure Details:
 2 no. Steel circular section S275:
 114.3mm O.D. 5mm thick
 Support length: 5125 mm

Planted foundations to BD 94/07:
 Soil type: poor or unknown
 Depth of soft fill: 75 mm
 Height of footing: 950 mm
 Diameter of each footing: 600 mm

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TS22-
 ZSSLWV-1

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2

Sign Ref: TS23

Scale 1:4

Dimensions (mm):

Width: 450, Height: 450

Area: 0.16 sq m

Colours:

Mounting height: 2.4m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

1 no. Steel circular section S275:

60.3mm O.D. 3mm thick

Support length: 3725 mm

Planted foundation to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of footing: 200 mm

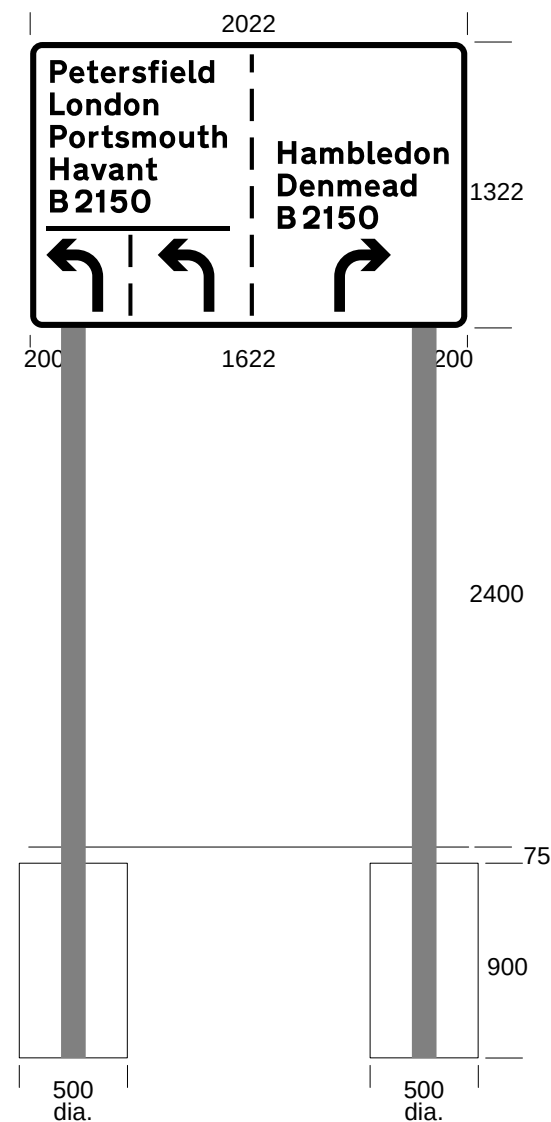
Passively safe to BS EN 12767:2007

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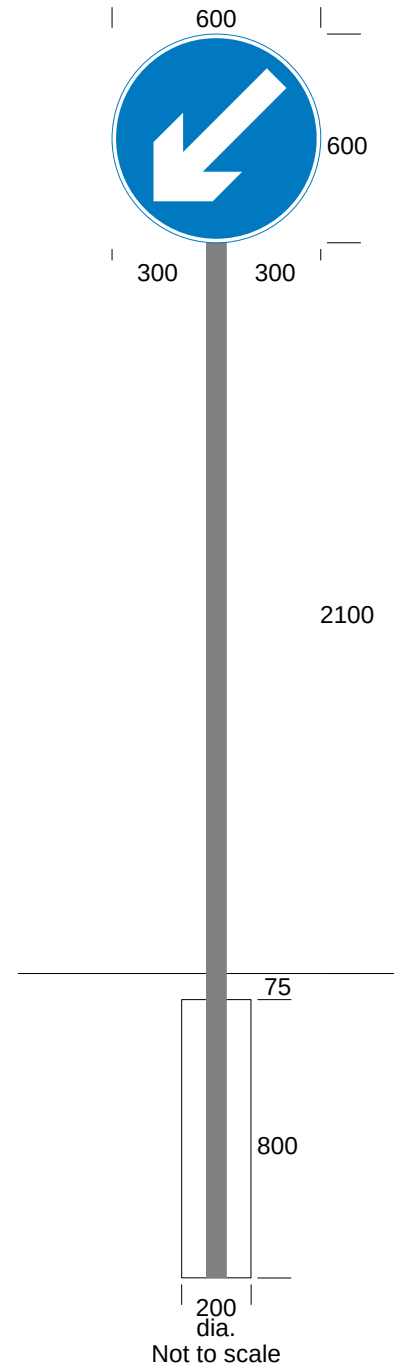
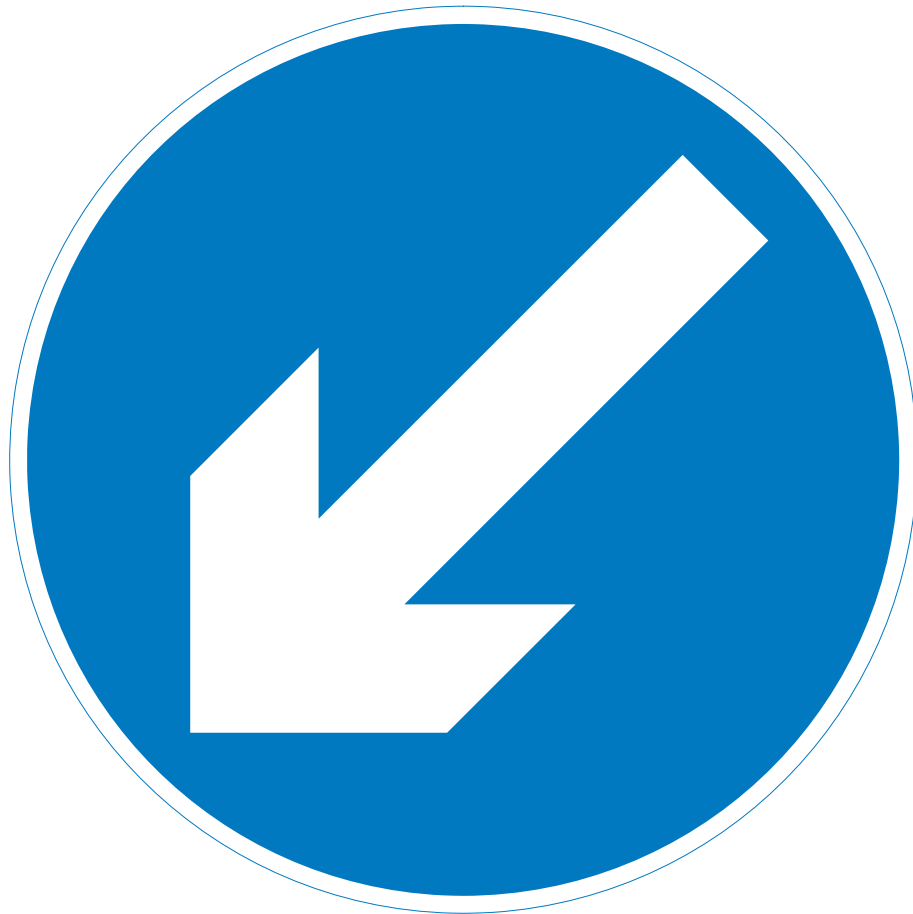
TS23

ZSSLWVILLE

SignPlot v2.80a



SignPlot v2.80



Job Ref: ZSSLWVILLE.2

Sign Ref: TS26 & 28

Scale 1:5

Dimensions (mm):

Width: 600, Height: 600

Area: 0.28 sq m

Colours:

Mounting height: 2.1m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

1 no. Steel circular section S275:

60.3mm O.D. 3mm thick

Support length: 3575 mm

Planted foundation to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of footing: 200 mm

Passively safe to BS EN 12767:2007

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TS26-29

ZSSLWVILLE

SignPlot v2.80a

Job Ref: ZSSLWVILLE.2

Sign Ref: TS27 & 29

Scale 1:5

Dimensions (mm):

Width: 600, Height: 600

Area: 0.28 sq m

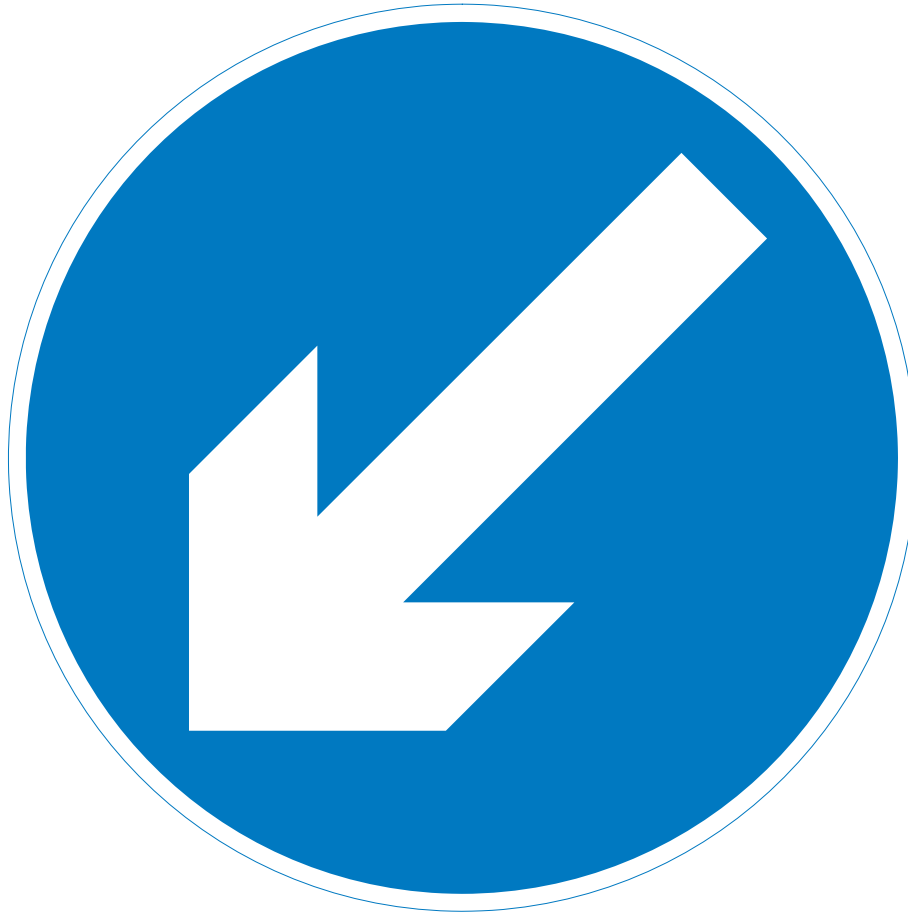
Colours:

Mounted on the back of
TS27 & TS28

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TS27
ZSSLWVILLE

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2
Sign Ref: TS30-32-36-38
Scale 1:2
Dimensions (mm):
Width: 150, Height: 150

Area: 0.02 sq m

Colours:



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TS30
ZSSLWVILLE

SignPlot v2.80a



Job Ref: ZSSLWVILLE.2

Sign Ref: TS31-37-39

Scale 1:1

Dimensions (mm):

Width: 150, Height: 150

Area: 0.02 sq m

Colours:

To be mounted on reverse of
TS30-36-38 respectively

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TS30
ZSSLWVILLE

SignPlot v2.80



Job Ref: ZSSLWVILLE.2

Sign Ref: TS33

Scale 1:1

Dimensions (mm):

Width: 150, Height: 150

Area: 0.02 sq m

Colours:

To be mounted on reverse of
TS32

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TS33
ZSSLWVILLE

SignPlot v2.80



Job Ref: ZSSLWVILLE.2

Sign Ref: TS35-41-43

Scale 1:3

Dimensions (mm):

Width: 450, Height: 450

Area: 0.16 sq m

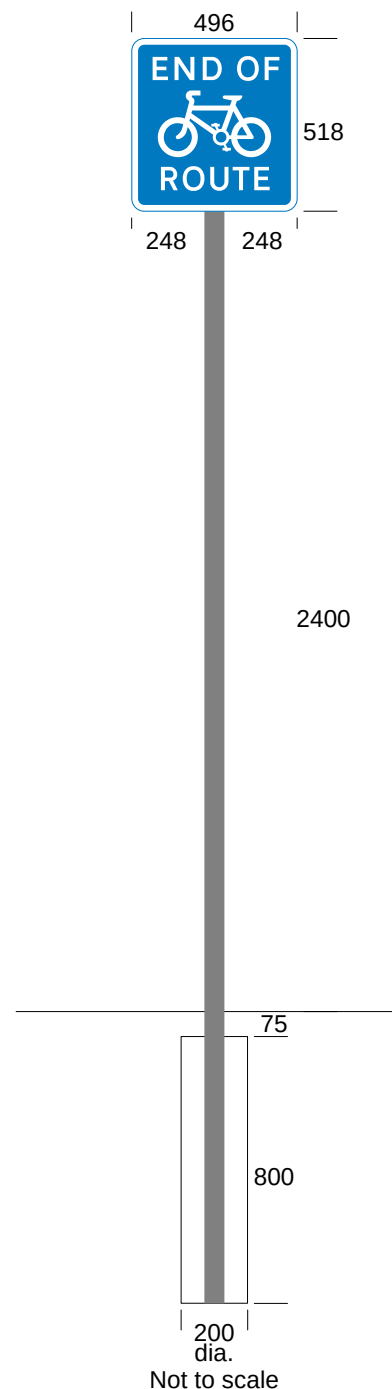
Colours:

Sign to be mounted on
reverse of TS34-41-43
respectively

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TS35
ZSSLWVILLE

SignPlot v2.80



Job Ref: ZSSLWVILLE.2

Sign Ref: TS40-42

Scale 1:4

Dimensions (mm):

Width: 496, Height: 518

x-Height: 50

Area: 0.26 sq m

Colours:

■ white on blue

Mounting height: 2.4m

BS EN 12899-1:2007 classes:

WL5, TDB5, PL3, PAF1

1000 N/m²

Structure Details:

1 no. Steel circular section S275:

60.3mm O.D. 3mm thick

Support length: 3793 mm

Planted foundation to BD 94/07:

Soil type: poor or unknown

Depth of soft fill: 75 mm

Height of footing: 800 mm

Diameter of footing: 200 mm

Passively safe to BS EN 12767:2007

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TS40

ZSSLWVILLE

SignPlot v2.80



Job Ref: ZSSLWVILLE.2
Sign Ref: TMP01, 02, 04, 05 & 06
Scale 1:3
Dimensions (in mm):
Width: 492, Height: 488
x-Height: 50
Area: 0.24 sq m

Colours:
 white on red

Mount on convenient
lighting column

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TMP01
ZSSLWV~1

SignPlot v2.60e

Job Ref: ZSSLWVILLE.2

Sign Ref: TMP03

Scale 1:4

Dimensions (in mm):

Width: 838, Height: 388

x-Height: 50

Area: 0.32 sq m

Colours:

■ white on red

Mount on convenient
lighting column

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TMP03
ZSSLWV~1

SignPlot v2.60e

**NEW
ROUNDAABOUT
AHEAD**