SERIES 1100
KERBS, FOOTWAYS AND PAVED AREAS

Contents

NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATIONS OF SCOTLAND, WALES AND NORTHERN IRELAND

# denotes a Clause or Sample Appendix which has a substitute National Clause or Sample Appendix for one or more of the Overseeing Organisations of Scotland, Wales or Northern Ireland.

KERBS, FOOTWAYS AND PAVED AREAS

1100 (02/17) General

1 (02/17) This Series is part of the Specification for Highway Works. Whilst this Series is particularly relevant to the subject matter in its title it must be read in conjunction with the general requirements in Series 000 and 100 and with all other Series relevant to the specification for the particular works to be undertaken.

#1101 Precast Concrete Kerbs, Channels, Edgings and Quadrants

1 (05/06) Except where otherwise specified in this Clause, precast concrete kerbs, channels, edgings and quadrants shall conform to BS EN 1340 and their dimensions, type designations and performances and classes shall be as described in this Clause and Appendix 11/1. They shall be laid and bedded in accordance with BS 7533-6 on a mortar bed on a concrete pavement slab, a base or a C6/8 or ST1 in accordance with BS 8500-2 concrete foundation. The mortar bed may be omitted if units are bedded onto a concrete slab or foundation that is still plastic. All precast units laid on a mortar bed or bedded onto plastic concrete shall be backed with a strength class C6/8 or ST1 concrete in accordance with BS 8500-2.

2 (11/06) Precast concrete kerbs, which are to be bonded to the pavement surface, shall conform to BS EN 1340. The bonding materials and methods of bonding shall be to the manufacturer's recommendations for this specific application. Bonded kerbs shall not be less than 100 mm in width at the base, their height shall not exceed their width and they shall be bonded over their full width. Kerbs shall be precast to the dimensions described in Appendix 11/1. The clear distance between unsupported pavement edge and back of kerb shall be not less than 100 mm. The bending strength of units shall be established by testing in accordance with BS EN 1340 and shall not be less than class 2 in Table 3 of BS EN 1340. Units shall be installed in accordance with the manufacturer's instructions. They shall be bonded to the pavement surface with a resilient adhesive compatible with the pavement materials and be capable of withstanding a static push-off load of 10 kN/m applied parallel to the pavement surface at right angles to the kerb.

3 Joints shall be provided in kerbs, channels, edgings and backing, which are laid on or adjacent to a concrete pavement to coincide with the pavement transverse contraction, warping and expansion joints. The joints shall be the same width as the joint sealing grooves of the pavement and shall be caulked and sealed as described in Clauses 1016 and 1017. Concrete foundations to kerbs, channels and edgings laid adjacent to a concrete pavement shall be provided with joint filler board complying with Clause 1015 placed vertically through the full extent of the concrete foundation at positions coinciding with the pavement joints. At expansion joints in bridge decks, the kerb joints shall be as described in Appendix 11/1. Where the details of bridge expansion joints are proposed by the Contractor, such details shall include the intended treatment at kerbs and footways.

4 (11/04) For curves of radius 12 m or less, kerbs of appropriate radius shall be used as per BS EN 1340.

5 The surface level of units of kerb, channel, edging and quadrant shall not deviate from the design level ± 6 mm, nor shall the longitudinal surface regularity deviate more than 3 mm in 3 m when checked with a 3 m straight edge. Horizontal alignment shall comply with Clause 702.

1102 (11/04) In-Situ Asphalt Kerbs

1 (11/04) The materials for, and making and placing of in-situ asphalt kerbs shall comply with the recommendations of BS 5931. In addition, a tack coat shall be used and they shall be laid by a machine capable of producing a dense, smooth-surfaced kerb to true line and level.

2 Kerbs shall be constructed to the dimensions described in Appendix 11/1.

3 Vertical expansion and contraction joints shall be formed in kerbs laid on unreinforced concrete slabs and jointed reinforced concrete slabs to coincide with the pavement transverse expansion and contraction joints. All joints shall be sealed in compliance with Clauses 1016 and 1017.

1103 (11/04) Freestanding In-Situ Concrete Kerbs, Channels and Edge Details

1 (11/04) Freestanding in-situ concrete kerbs, channels and edge details shall comply with the recommendations of BS 5931 except where otherwise specified in this Clause. They shall be laid by a machine capable of forming dense kerbs or surface water channels or edge details with regular sides, arrises and chamfers, finished to a fine surface free from blow holes and dragging and constructed to the dimensions described in Appendix 11/1.

For kerbs, channels and edge details:

(i) Constructed before the adjacent road pavement surface, the surface level adjacent to the future road surface shall not deviate from the design level by more than ±5 mm.

(ii) Constructed after the adjacent road pavement surface, the surface level shall not deviate from the finished level of the adjacent pavement surface by more than +0-10 mm.

The longitudinal surface regularity shall not deviate by more than 5 mm in 3 m when measured with a 3 m straight edge.

2 (11/04) The concrete shall be a strength class C28/35 to BS 8500-2 and air-entrained in accordance with BS 5931. Coarse aggregate used in kerbs and channels shall be partially crushed or crushed materials.

3 The concrete shall be cured by one of the methods specified in Clause 1027 unless otherwise described in Appendix 11/1.

4 (11/04) Kerbs, channels and edge details shall be firmly secured to the surface on which they are laid. Vertical expansion and contraction joints shall be formed in kerbs, channels and edge details laid on, integral with or adjacent to unreinforced concrete slabs and jointed reinforced concrete slabs to coincide with the pavement transverse expansion, warping and contraction joints. Joints may be omitted from channels cast integral with a CRCP concrete pavement. Vertical expansion joints at 40 m spacings and intermediate contraction joints at 5 m spacings shall be formed in kerbs, channels and edge details laid on or adjacent to other types of concrete and flexible pavement. Expansion joints may be replaced by contraction joints and installed in accordance with the manufacturer's instructions during the summer period from 1 April until 31 October. All joints in kerbs, channels and edge details shall be sealed in compliance with Clauses 1016 and 1017.

1104 (05/01) Footways and Paved Areas (Precast Concrete Flags and Natural Stone Slabs)

1 (11/04) Precast concrete flags shall conform to BS EN 1339. Natural stone slabs shall conform to BS EN 1341. Type designations, thicknesses and performances and classes shall be as described in Appendix 11/1.

2 (11/04) Precast concrete flags and natural stone slabs shall be laid in accordance with BS 7533-4, 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 10 mm and not more than 40 mm thick. Where permitted in Appendix 11/1, flags and natural stone slabs 450 mm x 450 mm and smaller may be laid on a layer of sand comforming to BS EN 12620 designation 0/4 mm, 25 mm ± 5 mm thick. Joints to be filled with sand conforming to BS EN 12620 designation 0/2.

3 (05/01) On circular work where the radius is 12 m or less all flags and natural stone slabs shall be radially cut on both edges to the required line.

4 (11/04) The laying course shall be laid on subbase composed of one of the materials complying with Clause 803, 804, 805, 806, 821, 822 or 823, laid and compacted to Clause 802 or 813 as appropriate and to the thickness described in Appendix 11/1.

1105 (11/04) Footways and Paved Areas (Flexible Surfacing)

1 (08/08) Flexible surfacing and subbase for footways and paved areas shall be constructed using the materials and layer thicknesses described in Appendix 11/1.

2 (08/08) Bituminous mixtures used in flexible surfacing shall be made in accordance with BS EN 13108, the detailed requirements from the example specifications in BS PD6691 and Clause 901.

3 (08/08) Flexible surfacing shall be laid and compacted in accordance with BS 594987. Subbase shall be composed of an unbound mixture conforming to Clause 803, 804, 805, 806, or 807 or a cement bound granular mixture conforming to Clause 821, 822 or 823. Subbase shall be laid and compacted to Clause 802 or 813, as appropriate.

1106 (11/04) Footways and Paved Areas (In-Situ Concrete)

1 (11/04) In-situ concrete for footways and paved areas shall be made, laid and cured as described in Appendix 11/1. The grade of concrete and surface finish shall be as described in Appendix 11/1.

2 (11/04) In-situ concrete shall be laid to true levels and crossfalls, and be of the thickness described in Appendix 11/1.

3 (11/04) In-situ concrete shall be laid on a subbase composed of one of the materials conforming to Clause 803, 804, 805, 806, 821, 822 or 823, laid and compacted in compliance with Clause 802 or 813 as appropriate, and to the thickness described in Appendix 11/1.

1107 Footways and Paved Areas (Concrete Block Paving)

1 (11/04) Precast concrete paving blocks shall be chamfered and shall comform to BS EN 1338 and the shapes, dimensions, colours and performances and classess described in Appendix 11/1.

2 (11/04) Precast paving blocks shall be laid in accordance with BS 7533-3, except that the subbase shall be one of the materials permitted in sub-Clause 1104.4.

3 The layout of blocks and details at edges, chamber covers, gullies and other openings shall be as described in Appendix 11/1.

1108 Footways and Paved Areas (Clay Pavers)

1 (11/04) Clay pavers shall conform to BS EN 1344 with chamfers. The shapes, dimensions, colours and performances and other required classes of clay pavers shall be as described in Appendix 11/1.

2 (11/04) Clay pavers shall be laid in accordance with BS 7533-3, except that the subbase shall be one of the materials permitted in subClause 1104.4.

3 The layout of pavers and details at edges, chamber covers, gullies and other openings shall be as described in Appendix 11/1.

1109 (11/04) **Grass Concrete Paving**

1 (11/04) Grass concrete paving shall consist of a reinforced perforated in-situ concrete slab or a precast panel system as specified in Appendix 11/1 and in the locations shown on the Drawings.

2 (11/04) In-situ grass concrete paving shall be cast and cured as described in Appendix 11/1. The strength class of concrete and surface finish shall be as described in Appendix 11/1.

3 (11/04) Perforations shall be formed in in-situ grass concrete paving as described in Appendix 11/1.

4 Concrete panels shall conform to the shape, dimensions and colour described in Appendix 11/1.

5 (11/04) Concrete used shall have compressive strength class of 28/35 and panels when tested in accordance with BS EN 1339, the characteristic bending strength shall be class 3 to Table 5 of BS EN 1339. The water absorption when tested in accordance with BS EN 1339 shall be class 2 of Table 4.1.

6 The layout of panels and details at edges, chamber covers, gullies and other openings shall be as described in Appendix 11/1.

7 (11/04) Grass concrete paving shall be laid to true levels and crossfalls, and be of the thickness described in Appendix 11/1.

8 (11/04) Grass concrete paving shall be laid on a bed of Type 1 unbound mixtures conforming to Clause 803 laid and compacted in accordance with Clause 802 and to the thickness described in Appendix 11/1. In addition panels shall be bedded on a layer of sand conforming to BS EN 12620 to the thickness specified in Appendix 11/1.

9 Perforations shall be filled with friable soil free from deleterious matter or with other material as described in Appendix 11/1, levelled off 30 mm below the top surface, sown with grass seed as described in Appendix 11/1, covered with a layer of fine soil and levelled. The seed shall be sown while soil is still loose after filling.

1110 (02/17) **Access Steps**

1 (02/17) The Contractor shall provide the access steps identified in contract specific Appendix 11/2 and where identified in contract specific Appendix 1/10 shall undertake the design of the access steps or elements thereof.

The access steps shall comply with the requirements of BS EN ISO 14122-1 and BS EN ISO 14122-3, contract specific Appendix 11/2 and the performance requirements described hereafter. Where required in contract specific Appendix 11/2 the steps shall be installed in accordance with HCD drawing MCX 0138 sheet numbers 1 and 2.

For the purpose of this Clause:

(i) The term ‘access steps’ shall mean access steps provided for highway maintenance purposes to communication cabinets and other roadside items and shall include landings and guardrails.

(ii) The term ‘Machinery’ referred to under BS EN ISO 14122-1 and BS EN ISO 14122-3 shall mean communication cabinets and other roadside items.

2 (02/17) Where required by contract specific Appendix 1/4, working and fabrication drawings indicating material and fabrication of components and fittings shall be submitted to the Overseeing Organisation for approval.

3 (02/17) The alignment and location for access steps shall enable the safe access to and egress from any communication cabinet and other roadside items. The steps shall be located, where possible, such that they will not require removal for access to services or supplies including motorway communication systems.

(02/17) **Durability**

4 (02/17) The access steps must achieve, as a minimum, a serviceable life as detailed in contract specific Appendix 11/2. The serviceable life shall be obtained without the requirement for any maintenance other than that resulting from accidental damage and routine maintenance.

(02/17) **Materials**

5 (02/17) Material for access steps shall conform to BS EN ISO 14122-3 section 4, requirements stated in contract specific 11/2 and the following:

(i) All components of the steps shall be resistant to theft, tampering and fire.

(ii) Where two or more materials are used they shall be compatible and include measures to avoid galvanic action and avoid differential movement. Materials shall be able to resist corrosion provoked by the surrounding atmosphere and ground conditions to achieve its serviceable life.

(iii) Unless otherwise stated in contract specific Appendix 11/2 materials listed in Table 11/1 shall conform to the requirements listed in Table 11/1 and shall comply with the standards and/or Clauses listed. Where materials are covered by the Construction Products Regulation the Declaration of Performance and CE marking shall demonstrate that the product meets or exceeds the performance requirements of the specification.

Table 11/1 (02/17) **Access Step Materials**

Material	Requirements General	Detailed
Paving slabs or flags	BS EN 1339 or BS EN 1341 Laid in accordance with BS 7533-4	Concrete flags shall be Class 2 or Class 3 as detailed in Annex NA of BS EN 1339, and shall have a minimum breaking strength of 3.2 MPa. Natural stone slabs shall have a minimum Class of 2 and minimum breaking load of 3.5 kN Flags or slabs to be bedded on a layer of mortar of 10 mm to 40 mm thick, or sand 25mm ± 5 mm.
Engineering bricks	BS EN 771-1	Class B Compressive strength ≥ 75 N/mm2 Water absorption (% by mass) ≤ 7.0 Freeze/thaw resistance category F2 Active soluble salts content category S2
Mortar	BS EN 1996-2 BS EN 998-2	Durability designation M or S
Bedding sand	BS EN 12620	Designation 0/4 mm
Precast concrete edgings	BS EN 1340	–
Concrete Landings	Series 1700 BS EN 8500	Exposure class: reinforced – XC3 or XC4, XD3, XF2 unreinforced – XF2 Minimum strength class C25/30 or greater Maximum aggregate size – 20mm
Ancillary concrete	BS 8500	Bedding and backing to precast concrete edgings ST2 Backing to steps ST2
Fill material	Series 600, Table 6/1	Class 1 General Fill
Galvanised steel guardrails	BS EN 10255	–

(02/17) **Particular Access Step Criteria**

6 (02/17) Unless otherwise stated in contract specific Appendix 11/2 the design of access steps shall conform to the following:

(i) The steps shall have a minimum clear width of 800mm.

(ii) Subject to the requirements of paragraph (vi) below, no part of the steps, excluding guardrails, shall protrude more than the step rise height plus 50mm above or below the adjacent finished ground level, measured along a line at right angles to the embankment or cutting slope except where necessary to accommodate a landing.

(iii) In accordance with BS EN ISO 14122-3 the steps shall have at least one guardrail unless the width of the steps is greater or equal to 1200mm when two guardrails are required. Where one guardrail is to be used it shall be located on the right hand side going up the steps.

(iv) The steps shall have a rise and going which achieves the safety requirements formulae of BS EN ISO 14122-3 Steps with an angle of pitch greater than 45 degrees are not permitted.

(v) The step going shall maintain the as-constructed finished level for the serviceable life of the steps.

(vi) Steps with solid edging shall have edging laid at the slope of batter with the top edge set slightly above but not more than 50mm above adjacent ground level measured perpendicular to the slope. The top edge shall also be 50mm minimum above the leading edge of the step going measured perpendicular to the slope.

(vii) There shall be a change in horizontal direction of not less than 30 degrees after not more than 16 steps or a climbing height of 6m, whichever is the lesser, by means of a landing.

(viii) Steps shall have adequate drainage for their safe use. There shall be no areas of standing water on the steps.

(ix) Open steps where a solid riser is not provided are not acceptable. The step going and landings shall also be solid.

(x) Kneerails are required on landings and steps.

(02/17) **Environment**

7 (02/17) The access steps shall conform to the environmental requirements stated in contract specific Appendix 11/2. The access steps shall be visually acceptable, have a non-intrusive appearance and be suitable for the location. The alignment of the steps shall minimise the impact on the environmental assets in the soft estate.

(02/17) **Geotechnical Requirements**

8 (02/17) Where required in contract specific Appendix 11/2 the Contractor shall determine the geotechnical classification of the works in accordance with HD 22 Managing Geotechnical Risk (DMRB 4.1.2) and agree the classification with the Overseeing Organisation in accordance with HD 22.

(02/17) **Records**

9 (02/17) The Contractor shall provide as-built drawings of the access steps to the Overseeing Organisation. These shall include details of materials, fabrication components and fittings.

NATIONAL ALTERATIONS OF THE OVERSEEING ORGANISATION OF NORTHERN IRELAND

1101NI Precast Concrete Kerbs, Channels, Edgings and Quadrants

1 (05/06) Except where otherwise specified in this Clause, precast concrete kerbs, channels, edgings and quadrants shall conform to BS EN 1340 and their dimensions, type designations and performances and classes shall be as described in this Clause and Appendix 11/1. They shall be laid and bedded in accordance with BS 7533-6 on a mortar bed on a concrete pavement slab, a base or a strength class C6/8 or ST1 in accordance with BS 8500-2 concrete foundation. The mortar bed may be omitted if units are bedded onto a concrete slab or foundation that is still plastic. All precast units laid on a mortar bed or bedded onto plastic concrete shall be backed with a strength class C6/8 or ST1 concrete in accordance with BS 8500-2.

2 (11/06) Precast concrete kerbs which are to be bonded to the pavement surface shall conform to BS EN 1340. The bonding materials and methods of bonding shall be to the manufacturer's recommendations for this specific application. Bonded kerbs shall not be less than 100 mm in width at the base, their height shall not exceed their width and they shall be bonded over their full width. Kerbs shall be precast to the dimensions described in Appendix 11/1. The clear distance between unsupported pavement edge and back of kerb shall be not less than 100 mm. The bending strength of units shall be established by testing in accordance with BS EN 1340 and shall not be less than class 2 in Table 3 of BS EN 1340. Units shall be installed in accordance with the manufacturer's instructions. They shall be bonded to the pavement surface with a resilient adhesive compatible with the pavement materials and be capable of withstanding a static push-off load of 10 kN/m applied parallel to the pavement surface at right angles to the kerb.

3 Joints shall be provided in kerbs, channels, edgings and backing, which are laid on or adjacent to a concrete pavement to coincide with the pavement transverse contraction, warping and expansion joints. The joints shall be the same width as the joint sealing grooves of the pavement and shall be caulked and sealed as described in Clauses 1016 and 1017. Concrete foundations to kerbs, channels and edgings laid adjacent to a concrete pavement shall be provided with joint filler board complying with Clause 1015 placed vertically through the full extent of the concrete foundation at positions coinciding with the pavement joints. At expansion joints in bridge decks, the kerb joints shall be as described in Appendix 11/1. Where the details of bridge expansion joints are proposed by the Contractor, such details shall include the intended treatment at kerbs and footways.

4 (11/04) For radii of 12 m or less kerbs of appropriate radius shall be used as per BS EN 1340. Where radii kerbs are not available, straight kerbs shall be used. For radii of 3 m to 12 m, kerbs with a maximum length of 450 mm shall be used and for radii less than 3 m, kerbs with a maximum length of 300 mm shall be used. The ends of straight kerbs shall be splayed where necessary to form the required radius.

5 The surface level of units of kerb, channel, edging and quadrant shall not deviate from the design level ± 6 mm, nor shall the longitudinal surface regularity deviate more than 3 mm in 3 m when checked with a 3 m straight edge. Horizontal alignment shall comply with Clause 702.