

Health & Life Sciences External Works NBS Specification

University of Reading

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Q10 – Kerbs/ edgings/ channels/ paving accessories

TO BE READ WITH PRELIMINARIES/ GENERAL CONDITIONS.

TYPES OF KERBS/EDGINGS AND CHANNELS

110 PROPRIETARY PRECAST CONCRETE - KERBS

- Standard: To BS EN 1340.
- Manufacturer: Contractor's choice.
- - Product reference: Contractor's choice.
- Recycled content: As supplied.
- Designations: HB2 Kerb, half battered.
- Size (width x height x length): 255 x 125 x 915 mm.
- Special shapes:
 - Dropper kerbs DL1 and DR1 to footway crossings;
 - Internal radius kerbs as shown on drawings;
 - External radius kerbs as shown on drawings;
 - Internal angle HBIA; and
 - External angle HBXA.
- Finish: As cast.
- Colour: Natural.
- Bedding: Fresh concrete races.
- Joints generally: Dry, 2-3 mm gap.
- Sealant movement joints: Not required.
- Accessories: None.

111A PROPRIETARY PRECAST CONCRETE - CHANNELS

- Standard: To BS EN 1340.
- Manufacturer: Contractor's choice.
- - Product reference: Contractor's choice.
- Recycled content: As supplied.
- Designations: CS1 Channel, square.
- Size (width x height x length): 255 x 125 x 915 mm.
- Special shapes: None.
- Finish: As cast.
- Colour: Natural.
- Bedding: Fresh concrete races.
- Joints generally: Dry, 2-3 mm gap.
- Sealant movement joints: Not required.
- Accessories: None.

112A PROPRIETARY PRECAST CONCRETE - EDGINGS

- Standard: To BS EN 1340.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Recycled content: As supplied.
- Designations: EF Edging, flat top.
- Size (width x height x length): 50 x 150 x 915 mm.
- Special shapes: None.
- Finish: As cast.
- Colour: Natural.
- Bedding: Fresh concrete races.
- Joints generally: Dry, 2-3 mm gap.
- Sealant movement joints: Not required.
- Accessories: None.

170 LINEAR SLOT DRAINAGE CHANNEL SYSTEMS

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Bore: 100 mm.
- Finish: As cast.
- Colour: Natural.
- Accessories:
 - Endcaps - closing pieces;
 - Inspection unit channels; and
 - Sump units.
- Bedding: Fresh concrete races.
- Joints generally: 1-2 mm open joints.

180 DRAINAGE CHANNEL SYSTEMS WITH GRATINGS

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Size: Nominal bore 150 mm.
- Type of fall: Integral continuous fall.
- Finish: Standard.
- Colour: Natural.
- Accessories: Endcaps - closing pieces and Sump units.
- Bedding: Fresh concrete races.
- Joints generally: Drain unions as required.
- Cover gratings: Ductile iron, slotted.
 - Fixings: Hexagon head bolts with black moulded polypropylene protective cover caps.
 - Loading grade to BS EN 124: C250.
 - Finish/ Colour: Black.

ROADS/PAVING ACCESSORIES/ MARKING/ DEMARCATION**390 ROAD MARKING (LIGHT DUTY)**

- Manufacturer: Contractor's choice .
 - Product reference: Contractor's choice .
- Colour: Refer to Landscape Architect's drawings .
- Surfaces to receive markings: Clean and dry, loose material removed.
- Application: Uniform, with no streaks or ragged edges.

LAYING

510 LAYING KERBS, EDGINGS AND CHANNELS

- Cutting: Neat, accurate and without spalling. Form neat junctions.
 - Long units (450 mm and over) minimum length after cutting: 300 mm.
 - Short units minimum length after cutting: The lower of one third of their original length or 50 mm.
- Bedding of units: Positioned true to line and levelled along top and front faces, in a mortar bed on accurately cast foundations or on a race of fresh concrete.
- Securing of units: After bedding has set, secured with a continuous haunching of concrete or on a race of fresh concrete with backing concrete cast monolithically.

520 ADVERSE WEATHER

- Conditions: Do not construct if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer. Adequately protect foundations, bedding and haunching against frost and rapid drying by sun and wind.

530 CONCRETE FOR FOUNDATIONS, RACES AND HAUNCHING

- Standard: To BS 8500-2.
- Designated mix: Not less than GEN0 or Standard mix ST1.
- Workability: Very low.

531A CONCRETE FOR FOUNDATIONS, RACES AND HAUNCHING TO LINEAR CHANNELS

- Standard: To BS EN 206-1.
- Designated mix: Not less than C20/ 25.
- Workability: Very low.

547 BEDDING/BACKING OF UNITS ON FRESH CONCRETE RACES

- Standard: To BS 7533-6.

570 CHANNELS

- Installation: To an even gradient, without ponding or backfall.
- Lowest points of channels: 6 mm above drainage outlets.

580 DRAINAGE CHANNEL SYSTEMS

- Installation: To an even gradient, without ponding or backfall. Commence laying from outlets.
- Silt and debris: Removed from entire system immediately before handover.
- Washing and detritus: Safely disposed without discharging into sewers or watercourses.

590 DRAINAGE CHANNEL SYSTEMS WITH BUILT IN FALL

- Installation: Top of channels level, installed in correct sequence to form an even gradient without ponding or backfall. Commence laying from outlets.
- Silt and debris: Removed from entire system immediately before handover.
- Washings and detritus: Safely disposed without discharging into sewers or watercourses.

600 RADIUS KERBS/ CHANNELS

- Usage: Radii of 15 m or less.

610 ANGLE KERBS

- Usage: Internal and external 90° changes of direction.
- Cutting of mitres: Not permitted.

620 ACCURACY

- Deviations (maximum):
- Level: ± 6 mm.
- Horizontal and vertical alignment: 3 mm in 3 m.

625 REGULARITY OF PAVED SURFACES

- Maximum undulation of (non-tactile) paving surface: 3 mm.
 - Method of measurement: Under a 1 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface).
- Difference in level between adjacent units (maximum):
 - Joints flush with the surface: Twice the joint width (with 5 mm max difference in level).
 - Recessed, filled joints: 2 mm.
 - Recess depth (maximum): 5 mm.
 - Unfilled joints: 2 mm.
- Sudden irregularities: Not permitted.

Q20 – Granular Sub-bases to Roads/ Pavings

To be read with Preliminaries/ General conditions.

110 THICKNESSES OF SUB-BASE/ SUBGRADE IMPROVEMENT LAYERS

- Thicknesses: See sections:
 - Q22 Coated macadam/asphalt roads/pavings;
 - Q24 Interlocking brick/block roads/pavings; and
 - Q25 Slab/brick/sett/cobble pavings.

130 HERBICIDES

- Type: Non-residual, non-selective.
- Application: To subgrade of footpath.

140 EXCAVATION OF SUBGRADES

- Final excavation to formation or subformation level: Carry out immediately before compaction of subgrade.
- Soft spots and voids: Give notice.
- Old drainage and service trenches: Excavate to remove soft or damaged material, then backfill with specified granular sub-base material and compact..
- Wet conditions: Do not excavate or compact when the subgrade may be damaged or destabilized.

145 PREPARATION AND COMPACTION OF SUBGRADES

- Timing: Immediately before placing sub-base.
- Soft or damaged areas: Excavate and replace with sub-base material, compacted in layers 300 mm (maximum) thick.
- Compaction: Thoroughly, by roller or other suitable means, adequate to resist subsidence or deformation of the subgrade during construction and of the completed roads/ pavings when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.

150 SUBGRADES FOR VEHICULAR AREAS

- Preparation and treatment: To Highways Agency 'Specification for highway works', clauses 616 and 617.

170A GEOTEXTILE FILTER/ SEPARATOR MEMBRANE

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Jointing: 300 mm overlap.
- Type: Non-woven
- Characteristics:
 - Tensile Strength: 8.0 kN/m
 - Puncture resistance: 1500 N
 - Permeability: 90 l/s/sq.m
- Protect from:
 - Exposure to light, except during laying (maximum five hours).
 - Contaminants.
 - Materials listed as potentially deleterious by geotextile manufacturer.
 - Damage, until fully covered by fill.
 - Wind uplift, by laying not more than 15 m before covering with fill.
- Preparation: Remove humps and sharp projections and fill hollows before laying.

175A IMPERMEABLE MEMBRANE TO ATTENUATION TANK

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Jointing: 300 mm overlap with double sided tape positioned 50mm into overlap.
- Characteristics:
- Resistance to water pressure: 24 hours @ 60 kPa
2 hours @ 240 kPa
 - Puncture resistance: 300 N
- Protect from:
- Exposure to light, except during laying (maximum five hours).
 - Contaminants.
 - Materials listed as potentially deleterious by geotextile manufacturer.
 - Damage, until fully covered by fill.
 - Wind uplift, by laying not more than 15 m before covering with fill.
- Preparation: Remove humps and sharp projections and fill hollows before laying.
- Other requirements: Blinding as clause 213 .

200 SUBGRADE IMPROVEMENT LAYER (CAPPING)

- Material: To Highways Agency 'Specification for highway works', table 6/1, Class 6F4 or 6F5.
- Standard: Placed and compacted to Highways Agency 'Specification for highway works', table 6/1, clauses 612 and 613.3, 613.8, 613.9, 613.10 and 613.13.

210 HIGHWAYS AGENCY TYPE 1 UNBOUND MIXTURE FOR SUB-BASE

- Material: Type 1 unbound mixture to Highways Agency 'Specification for highway works', clauses 801 and 803.
 - Recycled aggregate: Permitted.

211 GRANULAR MATERIAL

- Quality: Of a known suitability for use in sub-bases, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111 or a resistance to fragmentation of LA50 for the Los Angeles test to BS EN 1097-2, and in any one layer only one of the following:
 - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
 - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
 - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
 - Natural gravel.
 - Natural sand.
- Filling: Spread and levelled in 150 mm maximum layers, each layer thoroughly compacted.

213 BLINDING PROTECTION FOR MEMBRANES

- Location: On subgrade to receive impermeable membrane.
- Material: Fine material approved by the membrane manufacturer.
- Thickness (minimum): Sufficient to fill interstices and cover all stones.
- Compaction: Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
- Permissible deviations on surface level: ± 20 mm.

215 COARSE GRADED AGGREGATE FOR PERMEABLE PAVING- UNBOUND.

- Material: Hard crushed rock.
 - Standard: To BS EN 13242 and paving manufacturers recommendations.
 - Aggregate size: 4/40.
 - Grading: Category Gc 85-15 + GTc 20/17.5.
 - Other properties: As Interpave 'Guide to the design, construction and maintenance of concrete block permeable pavements edition 6', table 13.
- Testing:
 - Materials: Provide suppliers' certificates for grading and specified properties.
 - Sub-base: Not required.
- Laying: Lay in 150 mm thick layers and lightly compact to ensure maximum density and aggregate interlock without crushing individual particles or unacceptably reducing the void ratio.
- Protection: Prevent damage by traffic and contamination by mud and soil.

220 FROST SUSCEPTIBLE GRANULAR MATERIAL

- Definition (non frost susceptible material): To Highways Agency 'Specification for highway works' clause 801.8.
- Depth of frost susceptible material below final surface of paving (minimum): 450 mm.
- Testing: Test materials used if required and supply certificates.

225 PLACING OF MATERIAL WITH HIGH SULFATE CONTENT

- Standard: To Highways Agency 'Specification for highway works', clauses 801.2 and 801.3.
 - Separation distance (minimum): 500 mm.

230 PLACING GRANULAR MATERIAL GENERALLY

- Preparation: Loose soil, rubbish and standing water removed.
- Structures, membranes and buried services: Ensure stability and avoid damage.

240 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS

- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
- Standard: To Highways Agency 'Specification for highway works' clause 802.
- At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.

250 LAYING GRANULAR SUB-BASES FOR PEDESTRIAN AREAS

- General: Spread and levelled.
- Compaction:
 - Timing: As soon as possible after laying.
 - Method: By roller or other suitable means, adequate to resist subsidence or deformation of the sub-base during construction and of the completed paving when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.

310 ACCURACY

- Permissible deviation from required levels, falls and cambers (maximum):
 - Subgrades:
 - Roads and parking areas: +20 -30 mm.
 - Footways and recreation areas: $\pm$ 20 mm.
 - Sub-bases:
 - Roads and parking areas: $\pm$ 20 mm.
 - Footways and recreation areas: $\pm$ 12 mm .

320 SURFACES TO RECEIVE SAND BEDDING FOR PAVING TO SECTIONS Q24 and Q25.

- Blind surface: As necessary before compaction to ensure that surface is tight and dense enough to prevent laying course sand being lost into it during construction or use.
- Material: Sand.

330 COLD WEATHER WORKING

- Frozen materials: Do not use.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.

340 PROTECTION

- Sub-bases: As soon as practicable, cover with subsequent layers, specified elsewhere.
- Subgrades and sub-bases: Prevent degradation by construction traffic, construction operations and inclement weather.

Q22 Asphalt roads/ pavings

To be read with Preliminaries/ General conditions.

TYPES OF PAVING

110 ASPHALT CONCRETE PAVING TO SERVICE YARD

- Standard: To BS EN 13108-1.
- Subgrade improvement layer: As section Q20.
 - Compacted thickness: 250 mm.
- Geotextile: Not required.
 - Manufacturer: Not applicable.
 - Product reference: Not applicable.
- Granular sub-base: As section Q20.
 - Compacted thickness: 150 mm.
- Base: AC 32 dense base.
 - Paving grade: 50/70.
 - Compacted thickness: 150 mm, nominal.
- Binder course: AC 20 dense bin.
 - Paving grade: 70/100.
 - Compacted thickness: 60 mm, nominal .
- Surface course: AC 14 close surf.
 - Paving grade: 70/100.
 - Slip/ Skid resistance: No requirement.
 - Compacted thickness: 40 mm, nominal.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): Contractor's choice.
- Surface treatment: Not required.
- Other requirements: None.

115 ASPHALT CONCRETE PAVING TO FOOTWAYS

- Standard: To BS EN 13108-1.
- Subgrade improvement layer: Not required.
 - Compacted thickness: Not applicable.
- Geotextile: Not required.
 - Manufacturer: Not applicable.
 - Product reference: Not applicable.
- Granular sub-base: Highways Agency Type 1 unbound mixture, as section Q20.
 - Compacted thickness: 150 mm.
- Binder course: AC 20 dense bin.
 - Paving grade: 100/150.
 - Compacted thickness: 50 mm.
- Surface course: AC 6 dense surf.
 - Paving grade: 100/150.
 - Slip/ Skid resistance: No requirement.
 - Compacted thickness: 20 mm.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): Contractor's choice.
- Surface treatment: Not required.
- Other requirements: None.

127A POROUS ASPHALT CONCRETE PAVING TO PARKING BAYS

- Standard: To BS EN 13108-7.
- Geomembrane: Geotextile membranes.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Granular sub-base: As section Q20.
 - Compacted thickness: 500 mm.
- Water collection: Not required .
- Base: Not required.
 - Compacted thickness: Not applicable.
- Binder course: AC 20 open bin.
 - Paving grade: 100/150.
 - Compacted thickness: 70 mm.
- Surface course: AC 10 open surf.
 - Paving grade: 100/150.
 - Slip/ Skid resistance: No requirement.
 - Compacted thickness: 30 mm.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): Contractor's choice.

PREPARATORY WORK/ REQUIREMENTS**220 BITUMINOUS MATERIALS GENERALLY**

- Suppliers names: Submit.
 - Timing (minimum): Two weeks before starting work.
- Test certificates: At the time of delivery for each manufacturing batch submit certificate:
 - Confirming compliance with this specification and the relevant standard.
 - Stating full details of composition of mix.

240 ACCEPTANCE OF SURFACES

- Surface: Sound, clean and suitably close textured.
- Level tolerances: To BS 594987.
- Kerbs and edgings: Complete, adequately bedded and haunched and to the required levels.

250 ABUTMENTS

- Vertical edges of manholes, gullies, kerbs and other abutments: Clean and paint with a thin uniform coating of cold applied thixotropic bitumen emulsion.
- Finishing: Tamp surface around projections.
 - Level: Flush or not more than 3 mm above projections.

LAYING**310 LAYING GENERALLY**

- Preparation: Remove all loose material, rubbish and standing water.
 - Adjacent work: Form neat junctions. Do not damage.
 - Channels, kerbs, inspection covers etc: Keep clean.
 - New paving:
 - Keep traffic free until it has cooled to prevailing atmospheric temperature.
 - Do not allow rollers to stand at any time.
 - Prevent damage.
 - Lines and levels: With regular falls to prevent ponding.
 - Overall texture: Smooth, even and free from dragging, tearing or segregation.
- State on completion: Clean.

320 ADVERSE WEATHER

- Frozen materials: Do not use.
- Suspend laying:
 - During freezing conditions
 - If the air temperature reaches 0°C, or in calm dry conditions -3°C, on a falling thermometer.
 - Hot rolled asphalt: During periods of continuous or heavy rain or if there is standing water on the base.

330 LEVELS

- Permissible deviation from the required levels, falls and cambers (maximum): In accordance with BS 594987, clause 5.2.

340 FLATNESS/ SURFACE REGULARITY

- Deviation of surface: Where appropriate in relation to the geometry of the surface, the variation in gap under a 3 m straightedge placed anywhere on the surface to be not more than:
 - Base: Hand laid, 25 mm.
 - Binder course: Hand laid, 13 mm and Machine laid, 13 mm.
 - Surface course: Hand laid, 10 mm and Machine laid, 7 mm.
 - Where a straightedge cannot be used the surface must be of a comparable standard of accuracy when judged by eye.

351 CONTRACTOR'S USE OF PAVEMENTS

- Preparation for final surfacing:
 - Timing: Defer laying until as late as practicable.
 - Immediately before laying final surfacing: Clean and make good the base/ binder course. Allow to dry.
 - Adhesion: Tack coat to BS 434-1 or BS EN 13808.
 - Application rate: 0.15-0.25 kg/m².
 - Accuracy: Uniform, without puddles.
 - Finishing: Allow emulsion to break completely before applying surface.

COMPLETION**390 DOCUMENTATION**

- Standard: BS EN 13108-1.
 - Declaration of conformity: Submit.
- Number of copies: 1.
- Submission: Two weeks prior to date when Contractor expects work to be complete.

Q24 Interlocking brick/ block roads/ pavings

To be read with Preliminaries/ General conditions

TYPES OF PAVING

110 CONVENTIONAL CONCRETE BLOCK PAVING TO FOOTPATHS

- Subgrade improvement layer: Not required.
 - Compacted thickness: Not applicable.
- Geotextile: Not required.
 - Manufacturer: Not applicable.
 - Product reference: Not applicable.
- Granular sub-base: Highways Agency Type 1 unbound mixture, as section Q20.
 - Compacted thickness: 150 mm.
- Laying course:
 - Material: In accordance with BS 7533-3.
 - Category: III.
 - Method of screeding, in accordance with BS 7533-3: Contractor's choice of compaction or uncompacted.
 - Nominal thickness after compaction: 50 mm.
- Blocks: To BS EN 1338.
 - Manufacturer: Refer to Landscape Architect's drawings.
 - Product reference: Refer to Landscape Architect's drawings.
 - Sizes: Refer to Landscape Architect's drawings.
 - Special blocks: Refer to Landscape Architect's drawings.
 - Arrises: Refer to Landscape Architect's drawings.
 - Colour/ Finish: Refer to Landscape Architect's drawings.
 - Recycled content: As supplied.
 - Requirements: .
 - Freeze/ thaw resistance: Refer to Landscape Architect's drawings.
 - Abrasion resistance: Refer to Landscape Architect's drawings.
 - Slip/ Skid resistance: Refer to Landscape Architect's drawings.
- Jointing:
 - Material: In accordance with BS 7533-3.
 - Joint width: 2-5 mm.
- Sealer/ Stabilizer: Not required.
- Setting out:
 - Bond: Refer to Landscape Architect's drawings.
 - Features: Refer to Landscape Architect's drawings.
- Accessories: None.

EXECUTION

200 EXECUTION GENERALLY - CONCRETE BLOCK AND CLAY PAVER PAVING

- Standard: In accordance with BS 7533-3.

211 COLOUR BANDING

- General: Unless premixed by manufacturer, select blocks/ pavers/ setts from at least 3-5 separate packs in rotation, to avoid colour banding.

240 ADVERSE WEATHER

- General: Do not use frozen materials or lay bedding on frozen or frost covered sub-bases.

485 LAYING BLOCKS/ PAVERS/ SETTS

- Setting out: Start from an edge restraint.
- Cutting: Cleanly, accurately and vertically, without spalling. Do not mark or damage visible surfaces.
- Cut edges: Turn inwards where possible; do not position against edge restraints or other features.
- In situ mortar or concrete infill: Do not use.
- Compaction: Vibrate to produce thoroughly interlocked paving of even overall appearance with regular joints and accurate to line, level and profile. Do not mark or damage paving units, kerbs and adjacent work.
 - Concrete blocks and clay pavers: In accordance with BS 7533-3, Annex F, to site category required for laying course material.

500 REGULARITY OF PAVED SURFACES

- Maximum variation in gap under a 3 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface):
 - Precast concrete paving blocks and clay pavers for flexible pavements: 10 mm.
- Difference in level between adjacent paving units (maximum): 2 mm.
- Sudden irregularities: Not permitted.

COMPLETION**615 COMPLETION OF PAVING**

- Final compaction of the surface course: In accordance with BS 7533-3.
- Vacuum cleaning machines: Not allowed.

Q25 Slab/ brick/ sett/ cobble pavings

To be read with Preliminaries/ General conditions.

GENERAL

120 CONCRETE FLAG PAVING SYSTEM TO FOOTPATHS

- Subgrade improvement layer: Not required.
 - Compacted thickness: Not applicable.
- Granular sub-base: Highways Agency Type 1 unbound mixture, as section Q20.
 - Compacted thickness: 150 mm.
- Base: Not required.
 - Thickness: Not required.
- Laying course: Sand.
 - Accessories: None.
- Paving units: Concrete flags.
- Jointing: Sand.
 - Bond: Refer to Landscape Architect's drawings.
- Accessories: None.

121A CONCRETE FLAG PAVING SYSTEM HAZARD WARNING PAVING

- Subgrade improvement layer: Not required.
 - Compacted thickness: Not applicable.
- Granular sub-base: Highways Agency Type 1 unbound mixture, as section Q20.
 - Compacted thickness: 150 mm.
- Base: Not required.
 - Thickness: Not required.
- Laying course: Sand.
 - Accessories: None.
- Paving units: Tactile concrete flags.
- Jointing: Sand.
 - Bond: Straight line.
- Accessories: None.

150 CONCRETE SETT PAVING SYSTEM TO FOOTPATHS

- Subgrade improvement layer: Not required.
 - Compacted thickness: Not applicable.
- Granular sub-base: Highways Agency Type 1 unbound mixture, as section Q20.
 - Compacted thickness: 150 mm.
- Base: Not required.
 - Thickness: Not required.
- Laying course: Site mixed mortar.
 - Accessories: None.
- Paving units: Concrete setts.
- Jointing: Site mixed mortar.
 - Bond: Refer to Landscape Architect's drawings.
- Accessories: None.

PRODUCTS

315 CONCRETE FLAGS TO FOOTPATHS

- Standard: To BS EN 1339.
 - Manufacturer: Refer to Landscape Architect's drawings.
Product reference: Refer to Landscape Architect's drawings.
- Recycled content: As supplied.
- Colour: Refer to Landscape Architect's drawings.
 - Finish: Refer to Landscape Architect's drawings.
 - Nominal sizes: Refer to Landscape Architect's drawings, minimum 80 mm thickness.
- Arrises: Refer to Landscape Architect's drawings.
- Water absorption and freeze/ thaw resistance class: Refer to Landscape Architect's drawings.
- Bending strength class: Refer to Landscape Architect's drawings.
- Abrasion resistance class: Refer to Landscape Architect's drawings.
- Slip/ Skid resistance: Refer to Landscape Architect's drawings.
- Breaking load class: Refer to Landscape Architect's drawings.

320 TACTILE FLAGS AND SLABS TO ROAD CROSSINGS

- Standard: To DD CEN/TS 15209.
- Material: Precast concrete.
 - Manufacturer: Contractor's choice.
Product reference: Contractor's choice.
- Recycled content: As supplied.
- Nominal sizes: 400 x 400 mm.
- Colour: Refer to Landscape Architect's drawings.
- Type of surface: Blister.

321A TACTILE FLAGS AND SLABS TO STEPS

- Standard: To DD CEN/TS 15209.
- Material: Precast concrete.
 - Manufacturer: Contractor's choice.
Product reference: Contractor's choice.
- Recycled content: As supplied.
- Nominal sizes: 400 x 400 mm.
- Colour: Refer to Landscape Architect's drawings.
- Type of surface: Ribbed/ Corduroy.

335 CONCRETE SETTS FOR FOOTPATH EDGING

- Manufacturer: Refer to Landscape Architect's drawings.
 - Product reference: Refer to Landscape Architect's drawings.
- Recycled content: As supplied.
- Colour: Refer to Landscape Architect's drawings.
- Finish: Refer to Landscape Architect's drawings.
- Sizes: Refer to Landscape Architect's drawings.
- Slip/ Skid resistance: Refer to Landscape Architect's drawings.
- Integral accessories: Refer to Landscape Architect's drawings.

390 SAND FOR FLEXIBLE LAYING COURSE AND JOINTING OF CONCRETE FLAG PAVING

- Standard: To BS 7533-4, unbound construction laying course and jointing material.
- Purity: Free from deleterious salts, contaminants, lime and cement.
- Procurement: Obtain from one source and ensure consistent grading.

EXECUTION

620 ADVERSE WEATHER

- General:
 - Temperature: Do not lay or joint paving if the temperature is below 3°C on a falling thermometer or below 1°C on a rising thermometer.
 - Frozen materials: Do not use. Do not lay bedding on frozen or frost covered bases.
- Paving with mortar joints and/ or bedding:
 - Protect from frost damage, rapid drying out and saturation until mortar has hardened.
- Paving laid and jointed in sand:
 - Stockpiled bedding sand: Protect from saturation.
 - Exposed areas of sand bedding and uncompacted areas of sand bedded paving: Protect from heavy rainfall.
 - Saturated sand bedding: Remove and replace, or allow to dry before proceeding.
 - Laying dry-sand jointed paving in damp conditions: Brush in as much jointing sand as possible. Minimize site traffic over paving. As soon as paving is dry, top up joints and complete compaction.

625 LAYING PAVINGS - GENERAL

- Appearance: Smooth and even with regular joints and accurate to line, level and profile.
- Falls: To prevent ponding.
- Bedding of paving units: Firm so that rocking or subsidence does not occur or develop.
 - Bedding/ Laying course: Consistently and accurately graded, spread and compacted to produce uniform thickness and support for paving units.
- Slopes: Lay paving units upwards from the bottom of slopes.
- Paving units: Free of mortar and sand stains.
- Cutting: Cut units cleanly and accurately, without spalling, to give neat junctions with edgings and adjoining finishes.

630 LEVELS OF PAVING

- Permissible deviation from specified levels:
 - Generally: ± 6 mm.
- Height of finished paving above features:
 - At gullies: +6 to +10 mm.
 - At drainage channels and kerbs: +3 to +6 mm.

635 REGULARITY OF PAVED SURFACES

- Maximum variation in gap under a 3 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface):
 - Precast concrete paving blocks and clay pavers for flexible pavements: 10 mm.
 - Precast concrete flags or natural stone slabs: 3 mm.
- Difference in level between adjacent paving units (maximum): 2 mm.
- Sudden irregularities: Not permitted.

640 COLOUR BANDING

- General: Unless premixed by manufacturer, select from at least 3-5 separate packs in rotation to avoid colour banding.

645 PROTECTION

- Cleanliness: Keep paving clean and free from mortar droppings, oil and other materials likely to cause staining.
- Materials storage: Do not overload pavings with stacks of materials.
- Handling: Do not damage paving unit corners, arrises, or previously laid paving.
- Mortar bedded pavings: Keep free from traffic after laying:
 - Pedestrian traffic (minimum): 24 hours.
 - Vehicular traffic (minimum): 7 days.
- Access: Restrict access to paved areas to prevent damage from site traffic and plant.

655 CONDITION OF SUB-BASES/ BASES BEFORE SPREADING LAYING COURSE

- Trenches and excavation of soft or loose spots in subgrade: Fill and thoroughly compact.
- Granular surfaces: Lay and compact so as to be sound, clean, smooth and close-textured enough to prevent migration of bedding/ laying course materials into the sub-base during compaction and use, free from movement under compaction plant and free from compaction ridges, cracks and loose material.
- Prepared existing and new bound bases (roadbases): Sound, clean, free from rutting or major cracking. Remove sharp stones, projections and debris.
- Sub-base/ Roadbase level tolerances: To BS 7533-7, Annex A.
- Levels and falls: Accurate and within the specified tolerances.
- Drainage outlets: Within 0-10 mm of the required finished level.
- Features in sand bedded paving (including mortar bedded restraints and drainage ironwork): Complete to required levels; adequately bed and haunch in mortar.
- Sub-bases containing cement/ hydraulic binder: Cure for minimum times specified in BS 7533-4.

695 SITE MIXED MORTAR - LAYING COURSE FOR CONCRETE SETT PAVING

- Mix: 1:3 cement:sand.
- Consistency: Stiff plastic.
- Admixtures: None.

710 LAYING FLAG AND SLAB PAVING - SAND LAYING COURSE AND JOINTING

- Standard: In accordance with BS 7533-4.
- Flag installation and cutting: To Interpave 'Concrete flag paving'.
- Laying course:
 - Nominal thickness after compaction: 50 mm.
- Joint width: 2-5 mm.

735 LAYING CONCRETE SETT PAVING - MORTAR BEDDED

- Laying: Spread and level a bed of mortar. Individually lay and hammer down the setts so that tops are level, leaving joints open.
- Laying course:
 - Nominal thickness after compaction: 25 mm.
- Jointing: Fill joints and finish neatly. Clean mortar from face of setts before it sets.
- Joint width (nominal): 10 mm.
Recess mortar joints below sett surface by: 2 mm.

COMPLETION**915 COMPLETION OF PAVING WITH DRY SAND OR FINE AGGREGATE FILLED JOINTS**

- Sand dressing: Leave a thin layer of dry jointing sand over the paving, sweep clean before practical completion.
- Final compaction of the surface course: In accordance with BS 7533-3.
- Vacuum cleaning machines: Not allowed.

