SECTION B

General Specifications

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STANDARD SPECIFICATION

FOR

INTER LOCKING

BRICK/BLOCK ROADS/PAVINGS

TYPE(S) OF PAVING

CONCRETE BLOCK PAVING TO ROADS/FOOTPATHS

Blocks: To BS 6717 Part 1
Manufacturer and reference: To be determined
Size: Common work sizes are 200 x 100mm (concrete and clay), and 215 x 102.5 or 210 x 105 (clay)
Typical thicknesses are as follows, but vary depending on the material and the manufacturer. It is advisable therefore to check with the manufacturer the recommended thickness for the particular traffic conditions
50mm-Pedestrain vehicular use.
60/65mm-Light vehicler use/occasional overrun by heavy vehicles
80/100mm-Heavy vehicles/heavy duty industrial applications
Special blocks: To be determined
Colour/pattern: To be determined. Chamfered edges should be used in paving subject to vehicular traffic. For pedestrain traffic, however, the chamfer of up to 7mm allowed by the BS can cause difficuities with stiletto heels and small-wheeled trolleys. Some
manufacturers offer a smaller chamfer, pencil round or unchamfered blocks.
Setting out:
Bond: If a shaped block/paver can be laid in only one way the item should be deleted.
Herringbone bond gives the maximum amount of restraint to individual blocks/pavers and should be used in areas subject to regular vehicular traffic. It is a good non directional general purpose pattern which will tend to increase the apparent size of the paved area.
Stretcher bond should be used only in pedestrian or lightly trafficked areas. If shaped locks/pavers are being used, stretcher bond may be acceptable for areas with light vehicular traffic. Laying the long axis at right angles to the traffic or line of view helps to disguise poor joint alignment
Basket weave and stack bonds are suitable for pedestrian areas only. There may be difficulties of fit with some brick pavers-check with manufacturer that the particular paver is suitable for this type of bond. A high standard of workmansip is needed to keep the joints aligned.
Shaped blocks allow the creation of different patterns , and are claimed to give superior interlock compared to standard to standard rectangular blocks. However it is harder to modify the bond pattern around features and at curved or raking perimeters, which can result in fiddly cutting. Also, repairing or maintaining the paving may be more difficult because of the variety of different or unusual blocks.
Features: See drawings
Granular sub-base as engineers specification taking into account the following:
The ability of the paving to support the loads imposed upon it will depend on the thickness of the block/paver, the design of the sub-base/roadbases and the type of subgrade.
Sub-bases and roadbases are covered in specification and can be designed using BS 7533, which provides a flow-chart for new roadbases and a method for evaluting existing highways which are to be overlaid. The roadbase type and thickness will depend on:
The bearing properties of the subgrade
Whether the roadbase will be used by construction traffic
The total numbers of standard (8,200 kg) axles that the paving will support during its design life.
The BS states that where traffic will be less than 0.5 million standard axles (msa) a roadbase is not required unless:
Speeds will be in excess of 50 km/h (30 miles/h)
Soils are frost-susceptible
Fill whose compaction is affected by water content is used
Traffic may be channelised or there is extensive concentrated turning or braking of heavy vehicles in a small area. These conditions occur for example in bus lanes,approaches to traffic signals and steep gradients.
As a guide a road with a 20 year design life, 2% per annum traffic growth and 30 average commercial vehicles per day will carry 0.3 msa.
For paving for heavy industrial use, including areas subject to severe surface stress from trailer jacks or small diameter solid wheels, storage rack supports or stored material such as heavy castings, designs based on BS 7533 may not be applicable and guidance should be sought from manufacturers and appropriate bodies such as Interpave, BDA and British Ports Association (for dockside paving)
Where roads are subject to adoption the requirements of the Local Highway Authority must be taken into account.
In practice, interlocking brick/block paving included in most building contracts will be laid direct onto a blinded granular sub-base and will rarely require a roadbase. If in doubt, however, seek specialist advice from the paving manufacturer or a civil engineer.
All interlocking pavings require edge restraint in order to support their design loads;

CLAY BRICK PAVING TO ROADS AND FOOTPATHS

Pavers: To BS 6677 Part 1
Manufacturer and reference: To be determined
Size: See concrete block paving
Special pavers: To be determined
Colour/pattern: To be determined
Setting out:
Bond: See concrete block paving
Features: See drawings
Granular sub-base: See concrete block paving

LAYING GENERALLY

Ensure that sub-bases are suitably accurate and to specified gradients before laying paving.
Cut blocks/pavers neatly and accurately without spalling to give neat junctions at edge restraints and changes in bond.
Select block/pavers vertically from at least 3 separate packs in rotation, or as recommended by manufacturer, to avoid colour banding.
Lay blocks/pavers on a well graded sand bed and vibrate to produce a thoroughly interlocked paving of even overall appearance with regular sand filled joints and accurate to line, level and profile. Cutting may be done with either an hydraulic splitter, bolster or by sawing. Some manufacturers prefer sawing only-see manufacturers details.
Alignment should be checked periodically during laying and adjustments made where necessary. Some products should be laid from 4-5 packs, whilst others may be pre-mixed by the manufacturer.

SAMPLES

Before placing orders submit for approval representive sample(s) of block/pavers which are inherently varible in appearance, e.g. clay pavers which are selected from different parts of the kiln and mixed before delivery. Insert reference to specific blocks/pavers or e.g. each type of paver.
Ensure that delivered materials match sample(s).

CONTROL SAMPLE(S)

Complete sample area(s) being part of the finished work, in approved location(s) as follows and obtain approval of appearance before proceeding
The specification of control samples should be related to the size and importance of the job. It may be difficult to justify control samples on small jobs under instruction from the Architects.

ADVERSE WEATHER

Do not use frozen materials or lay bedding on frozen or frost covered sub-bases.
Protect stockpiled bedding material to ensure it does not become saturated.
Protect exposed areas of sand bedding and uncompacted areas of paving from heavy rainfall.
Remove and replace any sand bedding which becomes saturated before laying paveing, or allow to dry before proceeding.
Sand should be stockpiled in covered heaps ahead of laying face.

ACCEPTANCE OF BASE

Before starting work ensure that the base is sound, clean and suitably close textured. The levels and falls of the base are as detailed, within the specified tolerance of +20mm
Drainage outlets are within +0 to -10 mm of the required finished level.
Edge restraints are complete, adequately bedded and hunched and to the required levels.
Hunching to gullies, manholes and the inside face of edge restraints is vertical so that pavings do not ‘ride up’ when compacted.
If the sub-base is used extensively by site traffic damage is bound to occur and this should be made good prior to spreading the sand bedding (laying) course. The surface of the sub-base should be blinded before laying the sand.
The DOT Specification for highway works (Table 7/1) specifies a tolerance of +15mm for roadbases. BS 6677 Part 3 specifies + 20mm for sub-bases.

GEOTEXTILE SHEET EDGING STRIP

Manfacturer and reference: To be determined
Lap and joint: To manufacturers details
Lay a strip of geotextile 1 m wide, between the base and the sand bedding layer, abutting perimeters, other types of paving, edge restraints and other features which interrupt the sand bedding layer, such as drainage fittings, channels, manholes, kerbs and the like. Turn sheet up to form an upstand against all such features.

GEOTEXTILE SHEET

Manufacturer and reference: To be determined
Lap and joint: To manufacturers details
Lay between the base and the sand bedding layer. Fit neatly at edge restraints and around other features which interrupt the sand bedding layer, such as drainage fittings, channels, manholes, kerbs and the like, turning sheet up to form an upstand against all such features

EDGE RESTRAINT

Edge restraints are vital to prevent spreading of the paving under load, which would allow the joints to open and cause rapid degradation of the paving. For vehicular use, edgings should be designed to withstand wheel impacts. This will require robustly dowelled and haunched kerbs for heavy vehicles.
Standard block/pavers can also be mortar bedded to form and edge restraint.
Bed specified units with mortar on....mm x ....mm concrete foundation, and secure with a continuous haunching of mortar. Keep exposed faces of units clean and free from mortar.
Jointing: Either dry, tightly butted. Tooled mortar. Tooled coloured.
Form movement joints: provided at 4.5 to 6m centres in clay paver edgings; joints are not usually required for concrete edging units unless mortar jointed.
Concrete for foundationd: To engineers details.
Mortar for bedding: Mix 1:3 Portland cement clause 42.5 Bs 882 sand, grading M or F
Bed thickness: 10mm minimum to 40mm maximum.

EDGE RESTRAINT-TOOLED MORTAR JOINTS

Butter ends of units with bedding mortar as work proceeds to completely fill joints. Mortar joints in clay edgings are usually 6-10mm (10mm may be required to align with joints in adjacent stretchers or rigid paving). Concrete block edgings are usually tightly butted dry.
Tool to a neat flush profile.

EDGE RESTRAINT-TOOLED COLOURED MORTAR JOINTS

Butter ends of units with bedding mortar as work proceeds to completely fill joints. Mortar joints in clay edgings are usually 6-10mm (10mm may be required to align with joints in adjacent stretchers or rigid paving). Concrete block edgings are usually tightly butted dry.
Rake out a depth of 10mm and point with 1:3 cement: sand mortar with pigment, colour to approval.

EDGE RESTRAINT-SEALANT MOVEMENT JOINT

Joint filler to be compressible cellular rubber or plastics compatible with the specified sealant. Build in as the work proceeds, extending through haunching and foundation. Position filler and barrier accurately to fully support sealant at the recommended distance from exposed faces of units.
Joint widths: 10mm
Barrier (joint breaker)
Sealant: See BS 6213
Colour: To match
Application of sealant:As manufacturers instructions

SAND FOR BEDDING

Naturally occurring clean sharp sand or crushed rock graded as for laying course sand to BS 6717 Part 3, Table 2.
Clay, silt and fine dust content not more than 3% by mass. Free from deleterious salts, contaminants and cement. Obtain from only one source and ensure that all sand supplied has consistent grading.
Maintain at an even moisture content which will give maximum compaction during any laying period.

SAND FOR BEDDING

Naturally-occurring silica sand
Graded as for laying course sand to BS 6717 Part 3, Table 2 and in addition no more than 0.1% to pass to a 75 mircometre BS sieve.
Free from deleterious salts, contaminants and cement.
Maintain at an even moisture content which will give maximum compaction during any laying period.
Obtain from only one source and ensure that all sand supplied has consistent grading.

SAND FOR JOINTING

Clean dry sand graded to BS 6717 Part 3 Table 2.
Do not use sand that will stain paving blocks.

JOINT SEALER/STABILISER

In some unusual circumstances, it is necessary to seal or stabilise the joints to prevent the loss of jointing sand, or for other reasons, for example:
Where industrial suction cleaners may be used internally.
Where suction from e.g. vacuum street cleaning machines or aircraft engines may occur.
Where pavings may be constantly wet, pressure hosed or flooded, e.g. vehicle washing areas, paving subject to tidal flooding, or where mould or moss growth may be severe.
Where rainwater pipes or gutterless roofs discharge directly onto paving.
To prevent spillages (e.g. oil, petrol or industrial chemicals) from entering the bedding sand and possibly polluting underlaying soil. Sealing is not usually considered necessary because of explosion risk on garage forecourts.
As an additional precaution to minimise saturation of the bedding sand and certain susceptible granular sub-bases of paving which may be subject to unusually heavy or channelised loading.
Consult manufacturers for a suitable product and insert details. Note that some sealers will give the paving a permanent ‘wet-look’.
Rigid paving with mortar base is an alternative solution in some cases.

LAYING BEDDING

In any one area of paving use only one of the following methods:
Precompaction laying method: Lay, level and compact a layer of bedding material to a thickness of approximately 35mm, then lay and screed to levels a further , uniformly loose layer with sufficient surcharge to give the required finished levels and an overall bedding thickness of not less than 50mm after compaction of paving.

PRECOMPACTION

The first layer evens out the variations in level of the bases (a tolerance of + 20mm would be quite normal) and allows the paving to be compacted into a loose second layer of constant thickness. The amount of surcharge (additional thickness to allow for compaction) will depend on the type and moisture content of the sand and should be determined by compacting a trial area

on site. This two layer approach is preferred by BS 6717 Part 3 and by several manufacturers, but is not suitable for beddings of less than 50mm compacted thickness. Over a bound roadbase, however, the thickness given may usually be reduced to 20-25mm after precompaction and 20-35mm overall.
Postcompaction laying method: Subject to approval of accuracy and regularity of the finished paving, the bedding may instead be laid instead in a single layer, thickness after compaction not less than 25mm at any point.
Maintain a prepared area of bedding not less than 1m and not more than 3m in advance of the laying face at all times, and not more than 1m at the conclusion of any working period.

POSTCOMPACTION

A single layer of significantly varying thickness tends to give a varying reduction in surface level when the same amount of compacting effort is applied over the whole surface, hence the proviso about tolerances and regularity. However, where the base is sufficiently accurate, there is a good supervision and a skilled workforce, a single layer of 30 to 40mm compacted thickness is likely to be cheaper and stronger than a 50mm precompacted bedding. This method is less suitable for clay pavers, which tend to be more irregular in shape and size. Check with the manufacturer and if necessary amend the clause to omit the choice of the postcompaction method.
Levels should be formed in the base and not by adjusting the bedding layer but screed rails will be needed in large areas to maintain an even depth. A cambered road will require a chambered screed board.
Do not leave areas of bedding exposed: proceed with laying blocks/pavers immediately.
Do not deliver bedding sand to working area over uncompacted paving. Prevent disturbance to the bedding course by pedestrain or wheeled traffic.
Fill, rescreed and recompact any parts of the bedding layer distrubed by removal of screed rails or trafficking.

LAYING BLOCK/PAVERS

Commencing from an edge restraint, lay block/pavers hand tight with a joint width of 2-5mm. Maintain an open working face and do not use mechnical force to obtain tight joints. Place blocks/pavers squarely with minimum disturbance to bedding.
Supply blocks/pavers to laying face over newly laid paving but stack at least 1m back from laying face. Do not allow plant to traverse areas of uncompacted paving. Continually check alignment of pavers with string lines as work proceeds to ensure maintenance of accurate bond. Infill at edge restraints as work proceeds. Whereever the type of bond and angle of edging permit, avoid very small infill pieces at edges by breaking bond on the next course in from the edge, using cut blocks/pavers not less than 1/3 full size.
In situ mortar infill 1.3 cement sand.

CUT BLOCKS/PAVERS

With a masonry saw only.

CUT EDGES OF CHAMFERED BLOCKS

Grind a chamfer on cut edges to match the manufactured chamfered edges.

VIBRATING PLATE COMPACTOR FOR CONCRETE BLOCK PAVING

Plate area: 0.35 to 0.5m2
Force range: 75 to 100 kN/m2
Frequency range: 75 to 100 Hz

VIBRATING PLATE COMPACTOR FOR CLAY PAVERS

Plate area: 0.2 to 0.4m2
Force range:50 to 75 kN/m2
Frequency range: 75 to 100 Hz
Compactor to be fitted with rubber sole plate.

CLAY PAVERS

Brush sand into joints and remove surplus before commencing any compaction.

COMPACTING AND JOINTING

Thoroughly compact blocks/pavers with vibrating plate compactor as laying proceeds but after infilling at edges. Apply the same compacting effort over the whole surface. Do not compact within 1m of the working face.
Do not leave uncompacted areas of paving at the end of working periods, expect within 1m of unrestrained edges. Check paving after compacting first few metres, then at frequent intervals to ensure that surface levels are as specified; if they are not, lift blocks/pavers and relay.
Brush sand into joints, revibrate surface and repeat as required to completely fill joints.
Avoid damaging kerbs and adjacent work during vibration. Do not begin vibration until kerbs have matured.

LEVELS OF PAVING

Permissible deviation from specified levels to be + 6mm generally. Paving at drainage outlets to be set 6mm above outlet.

REGULARITY

Sudden irregularities not permitted.
Where appropriate in relation to the geometry of the surface, the variation in gap under a 3m straight edge placed anywhere on the surface to be not more than 10mm.
The difference in level between adjacent blocks/pavers to be not more than 2mm.

AFTER COMPLETION OF PAVING

Do not use vacuum cleaning machines.
Spread a thin (1-2mm) layer of jointing sand over the paving.

REMEDIAL WORK

During the Contract and Defects Liability Period:

Any areas of paving which settle must be re-laid as specified.
Where early trafficking leads to settlement of the jointing sand, refill the joints as specified.

REFERENCE DOCUMENTS

Contractor to check the currency of documents cited in this section

BRITISH STANDARDS INSTITUTION (BSI)

BS 882 Specification for aggregates from natural sources for concrete
BS 5889 Specification for one-part gun grade silicone-based sealants
BS 6213 Guide to selection of constructional sealants
BS 6367 Code of practice for drainage of roofs and paved areas
BS 6677 Clay and calcium silcate pavers for flexible pavements
Part 1 Specification for pavers
Part 2 Code of practice for design of lightly trafficked pavements
Part 3 Method for construction of pavements
BS6717 Precast concrete paving blocks
Part 1 Specification for paving blocks
Part 3 Code of practice for laying
BS 7533 Guide for structural design of pavements constructed with clay or concrete block pavers
DD 155 Method for determination of polished paver value of pavers

BRICK DEVELOPMENT ASSOCIATION (BDA)

BDA Design Note 9

Flexible paving with clay and calcium silicate pavers R A Smith
Design of flexible clay pavements for ultra-heavy duty industrial applications J.Knapton
Code of practice for laying flexible pavements constructed in clay pavers
The construction of petrol filling stations in clay or concrete pavers (published jointly with Interlay and Interpave)

DEPARTMENT OF TRANSPORT (DOT)

Manual of contract documents for highway works

Volume 1 Specification for highway works
Volume 2 Notes for guidance on the specification of highway works

BRICK AND BLOCKWORK

MATERIAL/WORKMANSHIP SPECIFICATION

BRICKWORK AND BLOCKWORK

General

All materials and workmanship shall, in addition to this Specification, comply with CP.121: Part 1:1973. The facing brickwork, generally, and in particular the external brickwork, is to be of the highest quality and the Contractor's attention is drawn to this. The specific requirements of the Specification will be rigorously enforced and all defective material will be removed from site and sub-standard workmanship will be taken down and reconstructed to the satisfaction of the Architect.

MATERIALS

Common Bricks

Shall be 65mm bricks in accordance with BS:3921 with a minimum compressive strength of 27.5MN/m^2 obtained from an approved Manufacturer, machine made, sound, clean, square with well defined arises and free from all defects.

Facing Bricks

The type and manufacture of the facing bricks shall be as per the drawings taking into account the following:

Clay facing brickwork to BS3921
Modular clay facing brickwork to BS6649
Calcium silicate facing brickwork to BS187
Concrete facing brickwork to BS6073: Part 1

Second Hand Facing Brickwork:

Bricks: Second hand bricks free from deleterious matter such as mortar, plaster, paint, bituminous materials and organic growths. Bricks to be sound, clean and reasonably free from cracks and chipped areas.

Specific Requirements for Elevational Facing Bricks

The whole of facing brick requirement for the elevations shall be ordered at the same time.

In order to maintain colour uniformity of the bricks, the Manufacturer shall ensure:

a) The raw material for the manufacture of the bricks is obtained from the same location in the pit or quarry.

b) All bricks are fired in the same section of the kiln.
c) The bricks shall be delivered to site on pallets fully polythene wrapped and each pack of bricks shall be consecutively numbered.

Engineering Bricks

All Engineering Bricks shall comply with BS: 3921 and shall be Class A or B as specified and be from an approved Manufacturer.

Concrete Blocks

Shall be 450 x 225mm (co-ordinating sizes) in accordance with BS: 6073: Part 1 and have a compressive strength of 3.5N/mm^2 above dpc level and 7N/mm^2 below dpc level.

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Shall be 450 x 225mm (co-ordinating sizes) in accordance with BS: 6073:Part 1 and have a compressive strength of 3.5N/mm^2 above dpc level and 7N/mm^2 below dpc level.

Brick and Block Strengths

Where the brick or block strengths are specified in the specification, on the drawings or in the Bill of Quantities, the Contractor shall provide a Manufacture's certificate guaranteeing the strength of the material.

Sample bricks and blocks of each description shall be deposited with the Architect who may subject them to any tests, chemical or otherwise, which he may think necessary. All bricks and blocks brought on the site which are not up to the required standard will be rejected. The Contractor is to include for building sample panels of brickwork, facings and blockwork, each panel 900 x 1350mm, for the approval of the Architect, repeated if necessary, until final approval is given, and the approved panels are to be preserved until completion of the Contract.

Site Storage

Store bricks/blocks in stable stacks clear of the ground and clearly identified by type, strength, grade etc. Protect from adverse weather and keep clean and dry.

Conditioning of Bricks

Do not use clay bricks or calcium silicate bricks when still warm from the manufacturing process. In dry warm weather wet surfaces of very absorbent bricks slightly to reduce suction. Do not soak.

Conditioning of Concrete Bricks/Blocks

Do not use autoclaved concrete bricks/blocks when still warm from the manufacturing process.
Do not use non autoclaved concrete bricks/blocks until at least four weeks after casting.
Do not wet concrete bricks or blocks before laying; use an approved water retaining admixture in the mortar to counteract suction.

Cement

The cement, unless otherwise specified on the drawings, shall be Ordinary Portland cement as described under Concrete Works when used above damp proof course level whilst for masonry below ground level and up to damp proof course the cement shall be ordinary Portland Cement.

Water

The water shall be from the mains and free from all impurities.

Sand

Sand for mortar shall be naturally occurring sand or shall consist of crushed rock or gravel and shall comply with BS: 1200: 1976 and shall be in accordance with table 10 therein or Table 11 where specified for reinforced brickwork.

Lime

The lime shall be semi-hydraulic hydrated lime to comply with BS:890.

Cement Mortars (Plain)

Unless otherwise specified, the cement mortar shall be composed of one part ordinary Portland cement to three parts sand by volume.

All plain cement mortars shall be mixed at a central mixing plant using gauge boxes and mortar pans or ordinary mixers. Mortars shall be used while fresh.

Cement Lime Mortar (Plain)

Shall be composed of one part cement and one part lime and from five to six parts sand by volume and shall be in accordance with CP: 121: Part 1. Mortars below DPC level shall be composed of one part cement to one quarter part lime to three parts sand.

Coloured Mortars

All coloured mortars shall be supplied ready mixed by a suitable manufacturer at the discretion of the Architect to the mixes and colours specified and shall comply with BS: 4721.

Samples of each days deliveries will be required in the form of cubes to be checked by the Engineer/Architect for strength and colour. The colour will be checked against approved samples to be kept on site.

Any mortar not conforming to the Specification or the approved colour will be rejected and any work built incorporating sub-standard mortar shall be taken down and rebuilt.

Mortar Plasticisers

Shall comply with BS: 4887: 1973 and shall be used with the approval of the engineer/Architect in accordance with the Manufacturers instructions.

Wall Ties

Wall ties shall be stainless steel ties for cavity walls. The ties are to incorporate a restraining clip for holding the cavity wall insulation in position. All wall ties to comply with BS: 1243. 900mm centres longitudinally, 450mm centres vertically and 225mm centres around door and window openings.

Fixing Ties in Masonry Cavity Walls

Bed not less than 50mm into bed into bed joint of each leaf.
Slope slightly downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing.

Evenly space at 900mm horizontally, staggered in alternate courses, and at 450mm centres vertically, unless specified otherwise.
provide additional ties within 225mm of reveals of unbonded openings.

Fixing Ties in Masonry Cavity Walls with Full Fill Cavity Insulation

Bed not less than 50mm into bed joint of each leaf.
Slope downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing.
Evenly space at 900mm centres horizontally, staggered in alternate courses, and at 450mm centres vertically, unless specified otherwise.
Provide additional ties beneath the lowest row of insulation batts, and within 225mm of reveals of unbonded openings.

Fixing Ties in Masonry Cavity Walls with Partial Fill Cavity Insulation

Bed not less than 50mm into bed joint of each leaf.
Slope downwards towards outer leaf with drip centred in the cavity and pointing downwards. Do not bend ties to suit coursing.
Evenly space in horizontal and vertical rows (i.e. not staggered) at 900m centres horizontally, and 430mm centres vertically, unless specified otherwise.
Provide additional ties within 225mm of reveals of unbonded openings.

Damp Proof Courses

Materials for damp proof courses shall comply with BS:743. Generally damp proof courses are to be Hyload D.P.C.

Storage of Materials

Cement/Lime

Shall be stored off the ground, in a waterproof shed with a raised floor away from damp and in a manner so that it can be use in order of deliveries. Bags shall not be stored more than 1500mm in height.

Mortars

Store different sands and aggregates in different stockpiles on hard clean bases which allow free drainage.
store factory produced premixed lime: sand for mortars and ready to use retarded mortars in covered containers to prevent excessive drying out or wetting.

Store bags of cement and hydrated lime in dry conditions, raised off the ground and not touching damp surfaces. Do not use cement or hydrated lime affected by damp.
Avoid intermixing and contamination between stored materials and other building materials, debris or other deleterious matter.

Weather Protection of Stored Materials

All bricks and blocks shall be stores in fully wrapped packs on clean level hard standing and opened packs shall be fully sheeted down at the end of each days work and during periods of rain or frost.

All bricks and blocks lying around the works and on scaffolding shall be protected and no saturated bricks or blocks shall be incorporated in the Works.

All mortars shall be protected against rain until required.

WORKMANSHIP

Labour

The quality of the man employed for bricklaying is of prime importance and only know experienced bricklayers are to be used. Where new bricklayers are employed, a careful check on apprenticeships and previous work is to be made by the Contractor.

Laying Generally

Lay bricks/blocks on a full bed of mortar; do not furrow. Fill all cross joints and collar joints; do not tip and tail.
Build walls in stretching half lap bond when not specified otherwise.
Plumb perpends of facework very third or fifth cross joint along a course and even out the joint widths in-between

OVERHAND LAYING must not be used without approval.

ACCURACY keep courses level and true to line. Accurately plumb all wall faces and angles and features. Unless otherwise specified, build brickwork/blockwork within the following permissible deviations:

Dimension	Permissible deviation (mm)

Position in plan of any point or specified fair face in relation to the nearest building grid line at the same level.	+/- 10
Length (unless otherwise defined by adjacent construction):	
Up to 5m	+/- 15
5 to 10m	+/- 20
10 to 20m	+/- 25
Over 20m	+/- 30
Height:	
Up to 3m	+/- 15
3 to 6m	+/- 20
Over 6m	+/- 25
Level of bed joints:	
Up to 5m long	+/- 10
5 to 10m long	+/- 15
Over 10m long	+/- 25
Straightness in any 5m length	+/- 10
Vertically:	
In any 3m height	+/- 10
In o/a height of building exceeding 6m	+/- 20
Thickness:	
Overall thickness of walls or width of piers (subject to the following)	+/- 15
Difference in thickness of a wall or width of a pier at any two point 3m apart	+/- 10

Height of Lifts:

Rack back when raising quoins and other advance work.
Do not use toothing.
Raise no portion of the work more than 1.2m above another at any time.
In facework, compete each lift in one period of operation.
Do not carry up any one leaf more than 1.5m in one day unless permitted by the Main Contractor.

LEVELLING OF SEPARATE LEAVES: Bring both leaves of cavity walls to the same levels at:
Every course containing vertical twist type ties or other rigid ties.
Every third tie course for double triangle/butterfly ties.
Courses in which lintels are to be bedded.

COURSING: Gauge brick courses four to 300mm including joints.

FROGGED BRICKS: Lay single frogged bricks with frog uppermost; lay double frogged bricks with deeper frog uppermost. In either case completely fill frogs with mortar.

LINTEL BEARINGS Carefully predetermine setting out to ensure that full length masonry units occur below lintel ends.

SUPPORT OF EXISTING WORK: Where new lintels or walling are to support existing structure, completely fill top joint with semidry mortar, hard packed and well rammed to ensure full load transfer after removal of temporary supports.

JOINTING: When not specified otherwise, finish joints neatly to the specified profile as the work proceeds.

UNEXPOSED JOINTS: As the work proceeds, strike off joints that will not be exposed to view in the finished work.

JOINTS IN MASONRY TO BE PLASTERED OR RENDERED: Unless keyed units or metal lathing are used, rake out joints as work proceeds, to a depth of approximately 15mm.
POINTING: Where specified, rake out joints to a depth of 12-15mm as the work proceeds. Subsequently, remove loose debris from the joints using a dry brush, dampen the work, and neatly point to the specified profile in a continuous operation from the top of the wall downwards as the scaffolding is taken down.

FIRE STOPPING: Fill joints around joist ends built into cavity walls with mortar to seal cavities from interior of building. Ensure a tight fit between brickwork and cavity barriers to prevent fire and smoke penetration.

ADVERSE WEATHERS:
Do not use frozen materials.
Do not lay bricks/blocks when the air temperature is at or below 3 deg C unless mortar has a minimum temperature of 4 deg C when laid and walling is protected. Do not lay mortar on frozen surfaces.

Maintain temperature of the work above freezing until mortar has fully hardened.
Rake out and replace mortar damaged by frost. when instructed, rebuild damaged work.
Protect newly erected walling against rain and snow by covering when precipitation occurs, and at all times when the work is not proceeding.

Cavity Walls

All cavity walls are to be constructed with a cavity width to match existing unless otherwise specified and be built at the same time, due allowance being made for the use of insulation batts

CAVITIES

CONCRETE FILL: Fill cavities with concrete up to 225mm below ground level dpc. Concrete mix to BS 5328, Designated mix GEN 3 or standard mix ST4, high workability.

CLEANLINESS: clean off surplus mortar from joints on cavity faces as the work proceeds. Keep cavities, ties and dpcs free from mortar and debris with laths or other suitable means.

WEEP HOLES: Neatly form 10mm diameter weep holes in horizontal joint immediately above base of cavity, external opening and stepped dpcs at 900mm centres coinciding with perpends. Ensure that holes are not blocked. Provide not less than two holes over openings.

WEEP HOLES
Form with plastics perpend units to manufacture's recommendations at 900mm centres immediately above base of cavity, external openings and stepped dpcs. Provide not less than two weep holes over openings.

FULL FILL CAVITY INSULATION
Insulation: Mineral fibre batts to BS 6676: Part 1 or Agrément certified.
Store, handle and install to BS 6676: Part 2, clauses 4 and 5, ensuring that no gaps are left in the insulation layer. Keep insulation dry and free from mortar droppings, grout and other debris during the course of construction.

PARTIAL FILL CAVITY INSULATION
Fix securely to inner leaf, ensuring that:
- edges are not damaged.
- boards are close butted at horizontal and vertical joints and at closures
- Joints between boards are kept clean and dry and free from mortar droppings, grout and other debris.
- the residual cavity is not blocked or bridged by offcuts of insulation.

Place and secure each course of insulation before building up inner leaf above level of previous course of insulation.

AIR BRICK:
To BS 493, Class 1, built in as the work proceeds.

VENTILATION DUCTS:
Install across cavity, sloping from inner leaf, bedding fully in mortar to seal cavity.
Form a stepped dpc cavity tray above duct, extending 150mm on each side and with stop ends.

Wetting

Bricks and blocks shall be wetted as necessary during hot or dry weather.

Mortar Mixing

All materials shall be accurately gauged by using preformed gauge boxes and be mechanically mixed. All plant and equipment shall be kept clean and free from hardened material.

Reconstitution

Mortars shall be used before the initial set takes place (normally this is within two hours of the cement and water being added). Any mortar left after this time shall be discarded; on no account shall mortars be reconstituted.

MORTAR GROUPS: Where mortar is specified by group number, select any mortar in that group as set out below. Mix proportions are by volume. Use the same throughout any one type of facing work.

Mortar group	1	2	3	4
Cement: lime: sand	1:0-1/4:3	1:1/2:4-4 1/2	1:1:5-6	1:2:8-9
Cement: premixed lime & sand (proportion of lime to sand given in brackets)	1:3 (1:12)	1:4-4 1/2 (1:9)	1:5-6 (1:6)	1:8-9 (1:4 1/2)

Cement: sand & air entrainer -	1:3-4	1:5-6	1:7-8	
Masonry cement: sand	-	1:2½-3½	1:4-5	1:5½-6½

MORTARS

SAND FOR MORTAR:
To BS 1200 unless specified otherwise.
Sand for facework mortars to be from one source, different loads to be mixed if necessary to ensure consistency of colour and texture.
When a range is specified (e.g. 1:1:5-6) use lower proportion of sand for Grade G sands and higher proportion for Grade S.

READY-MIXED LIME:SAND:
Unless specified otherwise, use ready-mixed lime: sand to BS 4721.
Coloured mortar, where required, to be made using a proprietary coloured ready-mixed lime: sand, colour to approval where not specified.

SITE PREPARED LIME: SAND MIX:
use lime putty to BS 890, ready prepared from quicklime.
Thoroughly mix lime putty with sand, store in airtight bins and prevent from drying out.
Before gauging with other constituents, thoroughly ram, beat and chop the mix.

PUTTY PREPARED FROM SLAKED QUICKLIME:
Ensure that operatives are experienced in the safe handling and slaking of quicklime and are thoroughly protected against contact with it.
Use fresh quicklime to BS 890 and store in cool, dry and secure non-combustible containers.
Slake quicklime in suitable sound metal tanks. Add quicklime to clean water whilst stirring and raking continuously. Do not add water to quicklime.
Sieve putty to remove any lumps and run into a suitable storage or lined pit. Cover the putty with water and store for at least six weeks. Prevent access with a strong, well secured cover over the tank or pit.

PUTTY PREPARED FROM HYDRATED LIME:
Mix fresh hydrated lime to BS 890 with clean water to form a putty of creamy consistency.
Store putty in airtight containers for not less than 24 hours before using.

HYDRAULIC LIME: SAND MORTAR:
Thoroughly mix eminently hydraulic hydrated lime powder with sand, first in the dry state and then with water. Add only sufficient water to produce a workable mix.
Do not use mortar which has begun to stiffen.

CEMENT FOR MORTAR: When not specified otherwise, to be Portland cement or Portland blast furnace cement, to class 42.5 or 52.5, manufactured and supplied under BSI Kitemark scheme for cement. All cements must comply with the appropriate British Standard.

RETARDED READY-MIXED MORTARS: may be used provided they are:
Of materials and proportions specified in this section and to BS 4721.
Used within the working time and site temperature recommended by the manufacturer and not remixed on site.

ADMIXTURES: Do not use in mortar unless specified or approved. Do not use calcium chloride or any admixtures containing calcium chloride. Admixtures, if specified, to be BS 4887.

MAKING MORTAR:
Keep plant and banker boards clean at all times.
measure materials accurately by volume using clean gauge boxes. Proportions of mixes are for dry sand; allow for bulking if sand is damp.
Mix ingredients thoroughly to a consistence suitable for the work and free lumps. Mortars containing air entraining admixtures must be mixed by machine, but do not overmix.

Do not mix mortar when the air temperature is at or below 3°C and falling or below 1°C and rising.
Use mortar within about two hours f mixing at normal temperatures. Use retarded mortar within the time and site temperatures recommended by the manufacturer. Mortar may be retempered to restore workability, but only within these time limits.

<u>Damp Proof Courses</u>

All damp proof courses shall be kept back 6mm from the facework and be bedded top and bottom on mortar. The resultant joint shall not exceed 10mm in width.

DAMP PROOF COURSE:
Bitumen based to BS 6398
DAMP PROOF COURSE:
Polyethylene to BS 6515.

Build in carefully in accordance with manufacturer's recommendations to ensure a fully watertight installation.

INSTALLATION OF DPCS/CAVITY TRAYS

COLD WEATHER WORKING: In cold weather warm dpc rolls before unrolling, to avoid cracking.

HORIZONTAL DPCS:
Lay in continuous lengths o a full even bed of fresh mortar, with 100 mm laps at joints and full laps at angles.
Width of dpc to be at least full width of masonry leaf unless otherwise specified. Do not cover edges of dpc with mortar.
Where there are separate dpcs in each leaf of a cavity wall, ensure that edges do not project into the cavity.
Immediately lay at least one further course of masonry on a thin even bed of fresh mortar. Keep finished joint thickness as close to normal as practicable.

GROUND LEVEL DPCS: Ensure continuity of dpc with damp proof membrane.

STEPPED DPCS: Where dpcs are installed in external walls on sloping ground, ensure that they are never less that 150mm above finished ground level.

SILL DPCS: to be in one piece and turned up at back if the sill is in contact with any part of the inner leaf.

COPING/CAPPING DPCS:
Bed dpcs and copings/ cappings in one operation to ensure maximum bond between masonry units, mortar and dpc.
Provide rigid support for dpcs in cavity walls.

CAVITY TRAYS FORMED IN SITU: Dpcs which span cavities to prevent the downward ingress of water to be:

Accurately formed to the profiles shown on drawings, and firmly secured.
In unjointed lengths wherever possible, otherwise lapped at least 100mm and sealed using adhesive/mastic/torching in accordance with manufacturer's recommendations to ensure a fully watertight installation.
Fully supported over the cavity, when horizontal, by a cavity closer.
Prevented from sagging when stepped up towards the inner leaf.
Carefully cleaned to remove debris and mortar droppings before they set
Carefully protected from perforation and other damage.

CAVITY TRAYS OVER OPENINGS AND OTHER CAVITY BRIDGINGS to extend not less than 150mm beyond ends of lintels/bridgings.

GAS RESTRAINT DPCS/CAVITY TRAYS:
Overlap joints in dpc/cavity tray not less tan 150mm and heat seal to form a gas and watertight joint.
Ensure that dpc/cavity tray overlaps damp proof membrane by not less than 150mm.

FACEWORK: Keep leading edge of dpcs/cavity trays flush with face of wall.
Do not bridge with mortar.

VERTICAL DPCS to be in one piece wherever possible; otherwise overlap by not less than 100mm with upper piece outermost.

JAMB DPCS: Ensure that dpcs to jambs of openings:
Fully lap behind cavity tray/lintel at head and over horizontal dpc at sill
Project not less than 25mm into cavity.
Are in full contact with frames

JAMB DPCS: Fix to back of timber frames which are to be built in, using galvanised clout nails or staples.

JOINTS

MOVEMENT JOINTS WITH SEALANT

Filler: As details
Build in as the work proceeds ensuring no projections into cavities and correct depth of joint to receive sealant system.
Thickness of filler to match design width of joint.
Sealant: As details
Colour: As details
Prepare joints and apply sealant.

MOVEMENT JOINTS WITHOUT SEALANT

Fire Resistant filler: As detailed
Thickness: As detailed
Fire resistance period: As detailed.
Compress, insert and slide into place in open joint. Install with accessories or adhesives where recommended by manufacturer.

CONTRACTION JOINTS which will not be exposed to view to be close-butt joints formed as the work proceeds.

POINTING IN FLASHINGS: Remove dust, lightly wet and neatly point with mortar specified for walling. Ensure joint is completely filled and finish flush.

POINTING IN ASPHALT ROOF SKIRTINGS: Remove dust, lightly wet and neatly point with 1:4 cement: sand mortar incorporating a bonding agent and colour matched to adjacent work. ensure joint is completely filled and finish flush.

PINNING UP TO SOFFITS: Completely fill joint at top of load bearing walls with mortar, well rammed into position using temporary shuttering.

TOPS OF NON-LOADBEARING WALLS:
Securely fix restraints to soffit and completely fill space between wall and soffit leaving no gaps to ensure compliance with design requirements. See fire compartment details.

PRE-CAST CONCRETE LINTELS:
To BS 5977: Part 2
Bed on mortar used for adjacent work with bearing of not less than 150mm unless specified otherwise. Use slate packing pieces.

PRESTRESSED CONCRETE LINTELS:
Bed on mortar used for adjacent work with bearing of not less than 150mm unless specified otherwise. Adequately prop at not more than 1.2m centres during construction of walling above. Retain props in position for not less than 14 days or until mortar has matured, whichever is longer.

PREFABRICATED STEEL LINTELS:
To BS 5977: Part 2
Bed on mortar used for adjacent work with bearing of not less than 150mm unless specified otherwise.

Preparation of Samples

Trial mixes shall be made for all specified mortars. Six specimens of each mortar shall be made to a consistence corresponding to a 10mm penetration of the dropping ball as specified in the test set out in BS:4551. The specimens shall be either 75mm or 100mm cube. The specimens shall be made and stored hydraulically in accordance with BS:4551.

Testing of Samples

At the end of seven days, three mortar specimens shall be tested for strength in accordance with BS:4551. The remaining three mortar specimens be tested at an age of twenty eight days. The results of the tests be communicated to the Engineer as soon as each series of tests has been completed.

Requirements to Pass Testing Mortar Strength

Have tests carried out to determine comprehensive strength of mortars listed below. Tests to be carried out in accordance with BS 5628:Part 1, Appendix A.1 by Contractor.
Submit results to Main Contractor immediately they are available.
A provisional sum for testing is included elsewhere.
Preliminary tests: Specimens to be prepared at least six weeks before walling commences, using materials from the source(s) from which the site will be supplied. Half of the specimens to be tested at seven days and the remainder at 28 days. For any walling type, if the mean compressive strength of mortar at 28 days is less than the value given below then repeat the tests using either a more suitable sand or the next higher designation of mortar.
Site tests: During construction, specimens to be prepared for every 150 sq. m of each walling type, or for every storey of the building, whichever is the more frequent. Half of the specimens to be tested at seven days and the remainder at 28 days.
Mean compressive strength of mortar at 28 days to be not less than the following:

Average compressive Strengths of Preliminary and Site Specimens of Mortar

Designation	Description	Mix (vol)	Av. Compressive strength (N/mm^2)			
			Preliminary (days)		Site (days)	
		Cement Lime Sand	7	28	7	28
(i)	cement:sand	1 0-$^1/_4$ 3	10.7	16.0	7.3	11.0
(iii)	cement:sand	1 1 5-6	2.4	3.6	1.7	2.5

Reinforcement in Bed Joints

Reinforcement shall be laid pressed into a full bed of mortar to the lengths shown on the drawings.

Forming of Chases and Holes

Sleeves, chases, holes, etc. Shall be provided during the erection of the walls. Chasing of completed work shall only be allowed with the written approval of the Engineer using tools designed to produce a neat and tidy end product. No horizontal or diagonal chases will be permitted.

Each leaf is to be tied together using stainless steel vertical twist type ties generally at 900mm centres horizontally and 450mm centres vertically. Tie centres at vertical cavity closers shall be at 225mm centres. No cavity tie shall slope towards the inner leaf.

Cavities shall be kept clean of mortar droppings by the use of battens and the brick and block faces cleaned of excess mortar to leave a clean face.

Protection of Constructed Work

Newly erected brick and blockwork shall be protected to prevent mortar being washed out of the joints by rain.

The tops of all walls shall be covered by tarpaulins or similar at the end of each day and when rained off. This protection shall be maintained on the tops of completed walls exposed to the weather until windows, roofing, flashings, etc. have been installed to give permanent protection.

Great care must be exercised on site to avoid mortar splashing of the facing bricks and all inner boards of scaffolding platforms shall be turned up away from the wall when not in use.

Cold Weather Working

No brickwork shall be built during inclement weather or when the temperature of the atmosphere or any of the materials is lower than 3^{o}C on a falling thermometer or 2^{o}C on a rising thermometer.

Patent anti-freeze preparations may be used with the prior written approval of the Architect.
Notwithstanding the foregoing the Contractor will be held liable to make good any defective work at his own expense.

All new masonry shall be suitable covered for a period of three to seven days as required and the temperature of the brickwork/blockwork shall not be allowed to fall below freezing point.

Loading of brick or Blockwork

A period of not less than seven days must elapse before any brickwork or blockwork is loaded.

MISCELLANEOUS ITEMS

TILE SILLS:
Plain clay tiles to BS 402;Part 1,
Lay two courses as detailed, to break joint, true to line and level, fully bedded in 1:^{1}/4:3 cement:lime:sand mortar with all joints filled and neatly finished flush.

TILE CREASING:
Plain clay tiles to BS 402:Part 1
Lay two courses to break joint, fully bedded in mortar used for adjacent work, all joints filled and neatly finished flush.

BUILDING IN FRAMES: Adequately support and protect frames permitted to be built in, to prevent distortion and damage. Remove horns from frames and fully bed cramps in mortar.

TEMPLATES: Where frames are not built in (specified elsewhere) form openings using rigid templates accurately fabricated to the required size.

FALL PLATES: Bed solid in mortar to give a level top surface.

FLUE LINING SYSTEM:
Linings: Clay to BS 1181,
Mortar: 1:2:8-9 cement:lime:sand
Fully bed linings in mortar with socket or rebate uppermost and neatly finish joints flush, to provide an unrestricted flueway with smooth interior surfaces. Fill void between lining and surrounding work with mortar. Use correct starters, adapters, bends etc. On completion, carry out a core ball test and smoke test in the presence of the main contractor. If any obstructions or leaks are revealed, submit for approval proposals for making good.

FLUE BLOCK SYSTEM:
Mortar: 1:4-5 cement:sand
Position blocks accurately and finish joints flush to ensure a smooth, unrestricted flueway. Use correct starter, offset and transfer blocks.
Seal joints between blocks
On completion, carry out a core ball test and smoke test in the presence of the Main Contractor. If any obstruction or leaks are revealed, submit for approval proposals for making good.

GENERAL REQUIREMENTS

MOULDS must be:
Constructed accurately to give straight, square and true components. permissible deviations on length +0, -6mm, other dimensions +/-3mm.
Maintained in clean, sound condition and inspected carefully for defects before each reuse.
Damaged moulds must not be repaired and refused if this would impair the surface appearance of the components.
Constructed to prevent loss of grout.
Designed to permit demoulding without damage to the components.
Coates evenly with a suitable release agent, which must not be allowed to touch the reinforcement.

CONCRETE GENERALLY: Constituent materials, composition of mixes, production of concrete, information to be provided, sampling, testing and compliance to be in accordance with BS 5328 unless otherwise specified.

AGGREGATES: Unless specified otherwise:
To comply with BS 882

To give a drying shrinkage of concrete not exceeding 0.075% when tested to BS 812:Part 120.

CHLORIDES: The total chloride ion content of the constituents of each mix, expressed as a percentage by weight of cement (including GGBS or PFA is used) in the mix, must not exceed 0.4. Do not use admixtures containing calcium chloride.

REINFORCEMENT:
In addition to reinforcement required for structural purposes, precast units must be reinforced as necessary to resist shrinkage and handling stresses.
Type of reinforcement, unless otherwise specified: To BS 4449 and/or BS 4483, cut and bent to BS 4466.
Galvanised reinforcement: Galvanised to BS 729 after cutting, chromate treated.
Stainless steel reinforcement: To BS 6744, type 304 or 316.
Ensure that the metal of the reinforcement is compatible with the metal of any fixings and accessories that may make contact.
At time of placing concrete, reinforcement to be clean and free of corrosive pitting, loose mill scale, loose rust, ice, oil and other substances which may adversely affect the reinforcement, concrete or bond between the two.
Fix accurately and securely using tying wire, approved steel clips, or tack welding if permitted.
Wire or clips must not encroach into the concrete cover.

CASTING AND CURING:
Thoroughly compact concrete by vibration.
Do not demould components prematurely
Prevent damage to and distortion of immature components from movement, vibration, overloading, physical shock, rapid cooling and thermal shock.
Ensure that components are protected from sun and drying winds until they are at least 5 days old.
Do not deliver components to site until at least 14 days after casting.

STANDARD SPECIFICATION

FOR

CEMENT: SAND/CONCRETE SCREEDS/TOPPINGS

TYPE(S) OF SCREED/TOPPING

CEMENT: SAND SCREED: Construction: Bonded
Minimum thickness at any point:25 mm
Maximum thickness at any point: 45 mm
Mix:
Cement: Portland to BS 12 or Portland blasturnace to BS 146, class 42.5.
Sand: To BS 882, grading limited M, but with not more than 10% passing sieve size 150 mircometres.
Proportions: 1:3-4 1/2
Admixture: Water reducing to BS 5075:Part 1, dosage to manufacturer's recommendations.
Other requirements:
Finish: As required to receive finishes
Soundness: Test to BS 8204:Part 1, Appendix B.

CEMENT: SAND SCREED: Construction: De-Bonded
Minimum thickness at any point: 50 mm
Mix:
Cement: Portland to BS 12 or Portland blastfurance to BS 146, class 42.5.
Sand: To BS 882, grading limit M, but with not more than 10% passing sieve size 150 mircometres.
Proportions: 1:3-4 1/2
Admixture: Water reducing to BS 5075:Part 1, dosage to manufacturer's recommendations.
Finish: As required to receive finishes
Soundness: Test to BS 8204: Part 1, Appendix B.

FINE CONCRETE SCREED: Construction: De-Bonded
Minimum thickness at any point: 50 mm
Mix:
Cement: Portland to BS 12 or Portland blastfurance to BS 146, class 42.5.
Sand: To BS 882, grading limit M, but with not more than 10% passing sieve size 150 mircometres.
Proportions: 1:4-5 total aggregate, proportion of sand to coarse aggregate between 60/40 and 40/60, adjusted to facilitate trowelling.
Admixture: Water reducing to BS 5075:Part 1, dosage to manufacturer's recommendations.
Finish: As required to receive finishes.
Soundness: Test to BS 8204:Part 1, Appendix B.

GENERALLY/PREPARATION

SUITABILITY OF BASES: Before starting work ensure that: Bases are such as to permit specified levels and flatness/regularity of finished surfaces, bearing in
mind the permissible minimum and maximum thickness of the screed/topping.
Bases are sound and free from significant cracks and gaps.
Bases are clean and free from plaster, dirt, dust and oil.
Concrete slabs to receive fully or partially bonded construction have been allowed to dry out by exposure to air for not less than 6 weeks.
PROPRIETARY SCREEDS/TOPPINGS: Where any screed/topping is described as 'proprietary', all materials, mix proportions, mixing methods, minimum/maximum thickness and workmanship must be in accordance with the recommendations at the stated manufacturer even though that manufacturer may not supply all of the required materials.

ROOF SCREEDS: Before laying screed cut small neat holes through roof slab at low points to effectively drain surplus water. Locations and method of cutting to be approved. When screed has drained completely, fill and seal holes to approval.

CONDUITS UNDER FLOATING SCREEDS: Haunch up in 1:4 cement:sand on both sides of conduits before laying insulation for floating screeds.

PIPE DUCTS/TRUNKING: Before laying screed, ensure that preformed access ducts are securely fixed on the base and accurately levelled in relation to the finished floor surface.

FULLY BONDED CONSTRUCTION: Shortly before laying screed/topping completely remove mortar matrix from surface to expose coarse aggregate over entire area of hardened base using abrasive blasting or, for in situ slabs only, pneumatic scabbling. Remove all dust and debris and wash clean.
Keep surface well wetted for several hours before laying screed/topping. Remove free water then brush in a slurry bonding coat of creamy consistency.
As an alternative to wetting and slurrying, prepare, prime as necessary and apply a bonding agent to manufacturer's recommendations.
Lay screed/topping while slurry or bonding agent is still wet to ensure a good bond.

PARTIALLY BONDED CONSTRUCTION: The surface of the base must have a brushed finish with no surface laitance.
Shortly before laying screed, thoroughly wash clean the surface and keep well wetted for several hours. Remove free water then brush in a slurry bonding coat of creamy consistency.
As an alternative to wetting and slurrying, prepare, prime as necessary and apply a bonding agent to manufacturer's recommendations.
Lay screed/topping while slurry or bonding agent is still wet to ensure a good bond.

UNBONDED CONSTRUCTION: Unless the screed is laid over a suitable sheet dpm, lay a separating layer on clean base, lapping 100 mm at joints.

BATCHING/MIXING/LAYING

BATCHING: Proportions of mixes made with dense aggregates are specified by weight and, where practicable should be batched by weight. Volume batching will be permitted on the basis of the previously established weight:volume relationship(s) of the particular materials and using accurate gauge boxes. Allow for bulking of damp sand.

BATCHING: Proportions of made by lightweight aggregates are specified by volume and should be batched using accurate gauge boxes.

MIXING: Do not use admixtures containing calcium chloride.
Water content of mixes to be the minimum necessary to achieve full compaction, low enough to prevent excessive water being brought to the surface during compaction. Mix materials thoroughly to a uniform consistence. Mixes other than no-fines must be mixed in a suitable forced action mechanical mixer. Do not use a free fall type (drum) mixer.
Use while sufficiently plastic for full compaction.
Use ready-mixed retarded screed mortar within the working time and site temperatures recommended by the manufacturer. Do not retemper.

ADVERSE WEATHER: Do not lay screeds/toppings unless their surface temperature can be maintained above 5°C for not less than 4 days thereafter.
In hot weather reduce the time between operations of use other measures to prevent premature setting or drying out.

JOINTS IN SCREEDS: Unless otherwise specified: Cast screeds continuously, as far as possible without defined joints, using 'wet screeds' between strips or bays.
Obtain approval for positions of bay joints.
Form day joints with a vertical edge.

JOINTS IN TOPPINGS: Unless otherwise specified, bay sizes to be not more than 15 m2, ratio of length to breadth not more than 3:2, a joint occurring over every construction joint in the base slab.
Where location of bay joints is not shown on drawings obtain approval before starting work.
Forms to be square edged with steel top surfaces, securely fixed. Compact thoroughly at edges to give level, closely abutted joints with no lipping.
Alternatively, toppings may be cast continuously, bay joints being formed with approval plastics or metal diving strips.

LEVELS OF FLOOR SCREEDS/TOPPINGS: Permissible deviation in level of surface of screeds (allowing for thickness of coverings) and toppings from datum ± 10 mm.

FLATNESSS/REGULARITY OF FLOOR SCREEDS: Sudden irregularities are not permitted. When measured with a slip gauge to BS 8204:Part 1, Figure 3 or
equivalent, the variation in gap under a straightedge (with feet) placed anywhere on the surface to be not more than the following:
Screeds to receive toppings or beds 15-30 mm thick:
10 mm under a 3 m straightedge
Screeds to receive mastic asphalt flooring/underlays:
5 mm under a 3 m straightedge.
creeds to receive sheet or tile finishes bedded in adhesive:
5 mm under a 3 m straightedge
2 mm under a 1 m staightedge.

FLATNESS/REGULARITY OF ROOF SCREEDS: Sudden irregularities not permitted. Variation in gap under a 2 m straightedge (with feet) placed anywhere on the surface to be not more than 6 mm.
Ensure that falls are sufficiently even to prevent ponding.

COMPACTION OF SCREEDS: Compact proprietary screeds using methods recommended by the manufacturer.
Compact other screeds as follows:
Compact screed layer(s) thoroughly by mechanical means (e.g. plate vibrator) or, where this is not practicable by hand using a handrammer or weighted roller.
Lay screeds over 50 mm thick in two layers of approximately equal thickness. Roughen the surface of the compacted lower layer and immediately lay the upper layer.

STAIR SCREEDS/TOPPINGS: Construction: Bonded as clause 260 to treads, risers and landings.
Form risers with fine finish formwork.
Make good surfaces of toppings with cement:fine aggregate and a wood float, and when hardened rub to remove laitance.

CRACK CONTROL REINFORCEMENT:
To BS 4483.
Place between the two layers of screed, lap edges not less than 100 mm and tie securely with steel wire. Ensure continuity through daywork joints.
Where necessary arrange reinforcement to avoid a four layer build up at corners.

HEATED SCREEDS: Collaborate with the services subcontractor to ensure that screed bays are properly coordinated with the heating circuits and that all technical requirements are satisfied.
Ensure that the heating elements are properly secured to prevent displacement whilst the screed is laid.
Lay screed carefully ensuring thorough compaction around the heating elements without damaging them.

Ensure that recommendations for curing and controlled heating of screed are followed.

STRIP MOVEMENT JOINTS: Manufacturer and reference:
Size:
Set joints securely into screed/topping to exact finished level of floor. Ensure that joints extend through to the base.

FINISHING/CURING

TIMING: Carry out all finishing operations at optimum times in relation to the setting and hardening of the material. Do not wet surfaces to assist surface working. Do not sprinkle cement onto surface.

WOOD FLOATED FINISH: Use a wood float to give an even slightly coarse texture with no ridges or steps.
TROWELLED FINISH TO RECEIVE APPLIED FLOOR FINISHES: Float to an even surface with no ridges or steps.
Hand or power trowel to give a uniform smooth but not polished surface free from trowel marks and other blemishes, and suitable to receive the specified flooring material.
If, because of inadequate finishing or protection, the surface of the screed is not suitable to receive the specified flooring material, it must be made good by application of a smoothing compound by and to the satisfaction of the flooring subcontractor. Allow for the cost of any such making good.

TROWELLED FINISH FOR WEARING SURFACES: Float to an even surface with no ridge or steps.
As soon as the surface is sufficiently hard, steel trowel by hand or machine. Retrowel at least twice at intervals until a hard closed finished is obtained and there is little or no effect from further trowelling.
Finished surfaces must be uniform, smooth and free from trowel marks and other blemishes.

DEWATERED TROWELLED FINISH FOR WEARING SURFACES: Immediately after compaction of the concrete, apply the vacuum dewatering process in accordance with the equipment manufacturer's recommendation's.
Without delay float the surface using a power float to give an even surface with no ridges or steps.
As soon as the surface is sufficiently hard, steel trowel by machine or hand. Retrowel at least twice at intervals until a hard closed finish is obtained and there is little or no effect from further trowelling.
Finished surfaces must be uniform, smooth and free from trowel marks and other blemishes.

NONSLIP TROWELLED FINISH FOR WEARING SURFACES: Float to an even surface with no ridges or steps.
A soon as the surface is sufficiently hard, steel trowel by machine or hand. Retrowel at least twice at intervals until a hard closed finish is obtained and there is little or no effect from further trowelling.
Finished surfaces must be uniform, smooth and free from trowel marks and other blemishes.
Apply silicon carbide or aluminium oxide, graded between BS 410 sieves 1.7 mm and 500 micrometres, sprinkling evenly at the rate of 1 kg/m2. Trowel into the surface while the concrete is still plastic.

POWER GROUND FINISH FOR WEARING SURFACES: Float to an even surface with no ridges or steps.
When the concrete is sufficiently hard for sand particles not to be torn from the surface, power grind to remove 1-2mm from surface to give an even glass-paper texture, free from blemishes and trowel marks.
Remove all dust and wash down. Replace waterproof sheeting without delay to complete the specified curing.

CURING: Unless specified otherwise:
Immediately after laying, protect surface from wind, draughts and strong sunlight.
As soon as screed/topping has set, closely cover with polyethylene sheeting and keep in position for not less than 7 days.
Do not heat screeds/toppings or the building artificially during first 4 to 6 weeks after laying, thereafter raise temperature slowly.

PROTECTION: Adequately protect screeds/toppings from damage and contamination by subsequent building operations.

ROOF SCREEDS: Cover screeds during wet weather and arrange building programme to ensure that they are as dry as practicable when weather tight coverings are laid.

STANDARD SPECIFICATION

FOR

FENCING

FENCING

CHAIN LINK FENCING/GATES

To BS 1722:Part 1
Height: As required
Mesh and wire: To BS 1722 Part 1
Posts and struts: BS 1722
Treatment: Does not apply to concrete posts and struts. Steel posts and struts can be supplied with various finishes specified in BS 1722, the following now being the most commonly available:
Sparyed zinc or aluminium
Hot dip galvanized
Calcium plumbate primer
Proprietary plastics coatings are also available but not covered by BS 1722.
Timber will usually require preservative treatment depending on species and whether sapwood is included.
BS 1722 specifies treatment by reference to BS 5589. Not only must the type of treatment be specified but also the desired service life. BS 5589 recommends treatment schedules for fencing in two performance categories:
A to give a desired service life of 40 years using CCA or creosote.
B to give 20 years using CCA, cresote or PCP in heavy oil.
Maximum centre of posts:
Straining posts: 69 m in straight runs and at all ends, corners, changes of direction and acute variations in level.
Intermediate posts: 3m
Method of setting posts: As table below

POSTS FOR CHAIN LINK FENCING

	Straining posts	Struts	Intermediate posts	
Method of setting concrete posts	Concrete	Concrete	Concrete	
Method of setting steel posts	Concrete or rammed earth	Concrete or rammed earth	1800 high-concrete Others-concrete,rammed earth or driven.	
Method of setting timber posts	Concrete or rammed earth	Concrete or rammed earth	Concrete,rammed earth or driven.	
Plan size of post holes for setting in concrete (mm)	450x450 or 300 diameter	300x450	To give 75mm cover all around or 300 diam	
Minimum depth of post holes for any method of setting: Height of fence (mm) Depth of hole (mm)	900,1200,1400 600	Over 1400 750	900,1200,1400 600	Over 1400 750

ANTI-INTRUDER FENCING/GATES

To BS 1722:Part 10
Mesh and wire: To BS 1722 Part 10 Table 1
Posts and struts: As above
Maximum centres of posts
Straining posts: 69m in straight runs and at all ends, corners changes of direction and acute variations in level.
Intermediate posts: 3m
Set posts in holes of the following dimensions, filled to not less than half the depth with concrete
Straining posts: 450 x 450 x 760 mm deep.
Intermediate posts: 300 x 300 x 760 mm deep.
Bottom of fencing to be as detailed

OPEN MESH STEEL PANEL GENERAL PURPOSE FENCING/GATES

BS 1722 Part 14 specifies four categories of open mesh panel fencing in expanded metal or welded mesh:
1. General purpose fences up to 2400mm high.
2. Security fences at least 2400mm high.
3. High security fences at least 3000mm high.
4. Maximum security fences at least 3000mm high.

To BS 1722: Part 14, category 1.
Height: Not less than minimum given above
Mesh and wire: BS 1722 Part 14
Posts: As above
Maximum centres of posts: 3m
Set posts in holes of the following dimensions, filled to not less than the depth with concrete.
Bottom fencing to be as detailed

OPEN MESH STEEL PANEL SECURITY FENCING/GATES

To BS1722 Part 14, category 1

Height: As above
Mesh and wire: BS 1722
Posts: As above
Maximum centres of posts: 3m
Set posts in concrete foundations to comply with the design loading requirements specified by BS 1722:Part 14 for this category of fence.
Bottom of fencing to be as detailed

GENERAL PATTERN WIRE MESH FENCING

To BS1722 Part 2
Height: As detailed
Mesh: BS1722 Part 2
Posts and struts: As table
Treatment: As specified
Maximum centres of posts:
Straining posts: 150m in straight runs and at all ends, corners, changes of direction and acute variations in level.
Intermediate posts: 3.5m
Method of setting posts: A table below.

POSTS FOR WOVEN WIRE FENCING

	Straining posts		Struts	Intermediate posts
Method of setting concrete posts	Concrete		Concrete	Concrete
Method of setting steel and timber posts	Concrete or rammed earth		Concrete or rammed earth	Concrete, rammed earth or driven
Plan size of post holes for setting in concrete (mm)	450 x 450 x 450 diameter		300 x 450	To give 75 mm cover all round or 300 diam
Minimum depth of post holes for any method of setting (mm)	General pattern	Others		
- for concrete	750	900	450	600
- for rammed earth	1050	900	450	600

SPRING STEEL PATTERN WIRE MESH FENCING

To BS 1722:Part 2
Treatment of posts and struts: CCA or creosote to performance category B.
Maximum centres of posts:
Straining posts: 1000m in straight runs and at all ends.
Turning posts: At corners and lateral changes of direction.
Contour posts: At acute variations in level.
Intermediate posts: 15m
Method of setting posts: As table above.

HIGH TENSILE MESH FENCING

To BS 1722:Part 2
Treatment of posts and struts: CCA or creosote to performance category B.
Maximum centres of posts:
Straining posts: 400m in straight runs and at all ends.
Turning posts: At corners and lateral changes of direction.
Contour posts: At acute variations in level.
Intermediate posts: 10m
Method of setting posts: As table above.

STRAINED WIRE FENCING

To BS 1722:Part 3
Height: See drawings
Droppers: BS 1722 Part 3
Posts and struts: BS 1722 Part 3
Treatment: As detailed
Maximum centres of posts:
Straining posts: 150m in straight runs and at all ends, corners, changes of direction and acute variations in level.
Intermediate posts: As required
Method of setting posts: As table below

POSTS FOR STRAINED WIRE FENCING

	Straining posts	Struts	Intermediate posts

Method of setting concrete posts	Concrete			Concrete	Concrete	
Method of setting steel and timber posts	Concrete or rammed earth			Concrete or rammed earth	Concrete, rammed earth or driven	
Plan size of post holes for setting in concrete (mm)	450 x 450 or 300 diam			300 x 450	To give 75mm cover all round or 300 diam	
Minimum depth of post holes for any method of setting: Height of fence (mm)						
Depth of hole (mm)	900	1050-1350	1800,2100	All heights	Less than 1800	1800,2100
- for concrete						
- for rammed earth	600	750	900	450	600	750
	900	1050	1200	450	600	750

WOODEN POST AND RAIL FENCING

To BS 1722:Part 7
Height: As detailed
Timber: As detailed
Preservative treatment: As detailed
Maximum centres of posts BS1722:Part 7 specifies:

- 2.85 m for morticed fences
- 1.8 m for nailed fences

Method of setting posts: BS 1722:Part 7 specifies setting in concrete or rammed earth, or posts can be driven. They should be set to a depth of 600mm for 1100mm high fences and 700mm for 1300mm high fences. Holes for posts set in concrete should be 300mm square or diameter in plan and filled to not less than half the depth with concrete.
Morticed fences have an intermediate ('prick') post which is set by driving to a depth of 450mm.

MILD STEEL CONTINUOUS BAR FENCING

To BS 1722:Part 8
Height: As detailed
Bars: As detailed
Posts: Flats/tee section
Treatment: As detailed
Maximum centres of posts:
Joiner posts: 5m
Intermediate posts: 100mm
Method of setting:

BS 1722:Part 8 specifies the following minimum depths (mm):

Height of fence (mm)	Flat posts	Tee posts	End/corner posts
1000	300	400	450
1200	350	500	550
1400	350	600	600

CONCRETE POST AND RAIL FENCING

To manufactures specification and details.

WOOD PANEL FENCING

To BS 1722 Part 11
Type of infill: Woven wood. Waney edged overlapping horizontal boards. Square sawn overlapping horizontal or vertical boards.
BS 1722:Part 11 specifies preservative treatment for panels other than those made from western red cedar. State which is required.
Height: To BS 1722 Part 11
Posts: Set in concrete in 300 mm square or diameter x 600 mm deep holes filled to not less than half the depth.

CONCRETE POST AND PANEL FENCING

To manufactures specification and details.

CLOSE BOARDED FENCING

To BS 1722:Part 5.
Height: BS 1722 Part 5
Boards/rails: BS 1722 Part 5
Posts: BS1722 Part 5
Preservative treatment: As specified
Maximum centres of posts: 3m
Method of setting posts: BS 1722 Part 5

CLEFT CHESTNUT PALE FENCING

To BS1722:Part 4
Height: to top of pales to BS 1722 Part 4
Posts and struts: BS 1722 Part 4
Maximum centres of posts:
Straining posts: 70m in straight runs at all ends, corners, changes of direction and acute variations in level.
Intermediate posts: As table below: BS 1722:Part 4 specifies the following centres for intermediate posts:

Height of fence mm	Concrete posts m	Timber posts m
900, 1050	3.0	2.5
1200, 1350	2.75	2.25
1500, 1800	2.25	2.0

Method of setting posts: As table below

POSTS FOR CLEFT CHESTNUT PALE FENCING

	Straining posts		Struts	Intermediate posts	
Method of setting concrete posts	Concrete		Concrete	Concrete	
method of setting timber posts	Concrete or rammed earth		Concrete or rammed earth	driven	
plan size of post for setting in concrete (mm)	300 x 300 or 300 diameter		300 x 450	To give 75mm cover all round or 300 diam	
Minimum depth of post for any method of setting: Height of fence (mm)					
Depth of hole (mm)	Less than 1500	1500,1800	All heights	Less than 1500	1500,1800
	600	750	450	600	750

WOODEN PALISADE FENCING

To BS 1722: Part 6
Palisades and rails: As detailed
Posts: BS 1722 Part 6
Preservative treatment: As detailed
Maximum centres of posts: 3m
Method of setting posts: BS 1722: Part 6 specifies concrete posts to be set in concrete and timber posts to be set in rammed earth or concrete. Posts for fences 1050 and 1200 mm high should be set to a minimum depth of 600mm; for fences over 1200mm high the minimum depth is 750mm, post holes for concrete should be 300mm square or diameter in plan and filled to not less than half the depth with concrete.

MILD STEEL VERTICAL BAR RAILINGS

To BS 1722 Part 9
Height BS 1722 Part 9
Verticals: BS 1722 Part 9
Centres of verticals: BS 1722 Part 9
Posts: BS 1722 Part 9
Treatment As detailed
Maximum centres of posts: 2.75m
Method of setting/stays/legs: To Bs 1722 Part 9.

STEEL PALISADE FENCING/GATES

To BS 1722 Part 12
Height: As detailed
Tops of pales to be BS 1722 Part 12

Treatment:
Fencing components and accessories: Fastenings should be galvanized steel or stainless steel. Sherardized or plated fastenings will normally be adequate if fence is to be painted. BS 1722 Part 12 requires bolts to be burred over to prevent removal and, if galvanized, to be touched up with zinc rich primer.
Maximum centres of posts: 2.75m
Set posts in holes not less than 300mm square in plan, depth not less than the fence height/3mm, completely filled to ground level with concrete.

CONCRETE PALISADE FENCING

To be designed and detailed by specialists

FIELD GATES AND POSTS

To BS 3470

BRIDLE GATES AND POSTS

To BS 5709

KISSING GATES AND POSTS

To BS 5709

TIMBER GATE(S)/GATE POSTS

Timber to BS 1186 Part 1, Class 3
Preservative treatment: British Wood Preserving and Damp-proofing Association Commodity Specification C3.
Type and desired service life: 40 years
Adhesive: Synthetic resin to BS EN 301, type 1.

INSTALLATION

Set out and erect fencing:
In straight lines or smoothly flowing curves as shown on drawings,
With tops of posts following profile of the ground,
With posts set rigid, plumb and to specified depth, or greater where necessary to ensure adequate support.
With correct fastenings and all components securely fixed.

SETTING POSTS IN CONCRETE

Mix: To BS 5328, Designated mix not less than GEN 3 or Standard mix not less than ST3 (alternative mix for small quantities: 50 kg Portland cement, class 42.5 to 120 kg fine aggregate to 200kg 20mm nominal maximum size coarse aggregate, medium workability). Do not use admixtures.
Excavate holes neatly and with vertical sides.
Position post/strut and fill hole with concrete to not less than the specified depth, well rammed as filling proceeds and consolidated.
Holes not completely filled with concrete to be backfilled with excavated material, well rammed and consolidated.

EXPOSED CONCRETE FOUNATIONS

Not subsequently covered by paving to be compacted until air bubbles cease to appear on the upper surface, then weathered to shed water and trowelled smooth.

SETTING POSTS IN EARTH

Excavate holes neatly, with vertical sides and as small as practicable to allow refilling.
Position posts/struts and replace excavated material, well rammed as filling proceeds.

DRIVING POSTS

Prevent damage to heads of posts when driving.

TIMBER RAILS

Each rail must span not less than two bays with joints in adjacent rails staggered. Nail each length of rail to each post with two 100mm galvanized wire nails.
Rails with split ends must be replaced.

DAMAGE TO GALVANIZED SURFACES

Touch up minor damage, including on fastenings and fittings, using low melting point zinc alloy repair rods or powders made for this purpose or at least two coats of zinc-rich paint to BS 4652. Apply sufficient material to provide a zinc coating at least equal in thickness to the original layer.

STANDARD SPECIFICATION

FOR

STONE/CONCRETE/BRICK KERBS/
EDGINGS/CHANNELS

TYPE(S) OF KERBS/EDGING/CHANNEL

PRECAST CONCRETE KERBS OR EDGINGS OR CHANNELS

To BS 7263 Part 1
Type/size: 'Kerbs, channels and edgings-to BS 7263 Part 1: 1994' for details and dimensions of the following widely available standard units:

Type	Description/size (bed width x height)
BN	Kerb, bullnosed 125 x 150mm
SP	Kerb, splayed 125 x 225mm
HB1	Kerb, half battered 150 x 305mm
HB2	Kerb half battered 125 x 255mm
HB3	Kerb half battered 125 x 150mm
CS1	Channel, square 255 x 125mm
CS2	Channel, square 150 x 125mm
CD	Channel, dished 255 x 125mm
ER	Edging round 50 x 150,200 or 250mm
EF	Edging, flat top 50 x 150, 200 or 250mm
EBN	Edging bullnosed 50 x 150, 200 or 250mm

Accessories such as quadrants, angles and dropper kerbs e.g. 'Special shapes' will be listed separately under manufacturers literature.
Many manufacturers also supply sizes and profiles not covered by BS 7263 Part 1; these will be specified by proprietary reference. Lengths are normally from 450 to 915mm. Consideration of ease of handling must be considered, and dimensional co-ordination with the paving units.
Special shapes: Listed accessories such as radius kerbs and channel, and those listed in the table below. BS 7263 Part 1 gives dimensions of these components, which are made to match the standard kerb profiles.

Type	Description/size (bed width x height (L) = Left hand (R) = Right hand
TL	Transition kerb HB to SP 125 x 255mm
TR	Transition kerb HB to SP 125 x 255mm
DL1	Dropper kerb HB2 to BN 125 x 255m/150mm (L)
DR1	Dropper kerb HB2 to BN 125 x 255m/150mm (R)
DL2	Dropper kerb SP to BN 125 x 255m/150mm (L)
DR2	Dropper kerb SP to BN 125 x 255m/150mm (R)
QBN	Quadrant, bullnose 305/455 x 150mm
QHB	Quadrant, half battered 305/455 x 150/255mm
QSP	Quadrant, splayed 305/455 x 255mm
BNIA	Internal angle, bullnose 125 x 255mm
HBIA	Internal angle, half battered 125 x 255mm
SPIA	Internal angle, splayed 125 x 255mm
BNXA	External angle, bullnose 125 x 255mm
HBXA	External angle, half battered 125 x 255mm
SPXA	External angle, splayed 125 x 255mm

Internal and external radius kerbs and channels are available as standard in 1 or 2m (external only), 3, 4.5,6,7.5,9,10.5 and 12m radius, and in lengths from 450 to 915mm.
Radii and lengths are measured on the line where kerb and channel meet.
Specification by reference to BS 7263 Part 1 only, alternatives will be separately listed.
Either dry, thickness of trowel blade. Narrow filled or tooled..
Dry joints with a small gap will take up thermal movement in long runs of concrete kerbs.

PRECAST CONCRETE SAFETY KERB

Could be used, these will be specifically listed on the Architects drawings.

STONE KERBS OR CHANNELS

To BS 435
Size: As BS 435

Edge kerbs:	200/150 x 300mm
	150 x 250/200mm
	125 x 250mm
Flat kerbs:	300 x 200/150mm
	250 x 125/150mm
Channels:	300/250 x 150mm

Minimum length of kerbs and channels is given as 600mm unless specified otherwise by the purchaser or stipulated by the supplier.
Special shapes: As listed
Finish: To BS 435 specifies and gives illustrations for three types of finish
A-Fine picked

B-Fair picked and single axed or ridged
C-Rough punched
Advice must be obtained from supplier before selecting finish. Existing kerbs, channels and quadrants which have been redressed or reshaped and redressed to BS 435 may be supplied as new.
Joints: Either tooled or tooled coloured

CLAY BRICK KERBS/EDGINGS OR CHANNELS

Bricks: To BS 3921
Manufacturer and reference: To be determined
Special shapes As specified on drawings
Joints: Either tooled or coloured tooled
Other requirements: As specified on drawings

CONCRETE BLOCK KERBS/EDGINGS OR CHANNELS

Blocks: To BS 6717 Part 1
Manufacturer and reference: To be determined
Size: As referenced
Special shapes: As referenced
Finish/colour: As referenced
Joints: Dry, tightly butted or tooled or coloured tooled
Other requirements: As specified on drawings

LINEAR SLOT DRAINAGE CHANNEL SYSTEM

For units with a continuous narrow slot (either flat topped or with an integral raised battered kerb).
Lay the units to a gradient of 0.75% or greater to achieve self cleansing velocity. Consider a different type of channel if located where the narrow slot design may be prone to blockage.
Units suitable for heavy vehicle loadings often have a cast iron edge insert to withstand point loads. If a 'pedestrian' type is used, the contractor must protect units from site traffic, particularly if stones or debris become lodged in the slots.
Accessories: Accessories such as slit boxes, integral inspection units and transition units for raised kerb systems.
Joints: A gap of 1mm is usual to allow for thermal movement. If a watertight joint is required (e.g. to avoid ground pollution from contaminated water), specify a sealant. Check with the manufacturer if laying units to follow a curve.

DRAINAGE CHANNEL SYSTEM WITH REMOVABLE GRATING

Type of fall: The minimum fall required for self cleansing (indicated on drawing)
Accessories: Such as anchors for casting in, sump units, junctions, or special features such as heated or flushing channels
Joints: Expansion joints may be necessary at intervals, with compressible filler and sealant capping - check with the manufacturer. Otherwise, joints are not generally sealed unless a watertight joint is required (e.g. to avoid ground pollution from contaminated water or in a suspended car park floor slab).
Loading capacities vary between materials but gratings and covers can be obtained for loadings from class A (light pedestrian) to Class F (heavy industrial/airport), as defined by BS EN 124.

Gratings (especially those with a scrap value) may require antipilfer fixings and a high resistance to malicious impact or fire damage.
Fixings, including antipilfer types, should be resistant to seizing due to corrosion or dirt ingress and adequately robust for the type of traffic.
Other requirements: This item can be used to describe concrete foundations and haunching if these are not shown on a drawing.

CARRIAGEWAY KERB AND DRAINAGE CHANNEL SYSTEM

All items to be designed and detailed by specialist subcontractors and approved by the Design Team Highway Engineer.

LAYING GENERALLY

Where necessary cut units neatly and accurately with a masonry saw and without spalling to give neat junctions. Bed units in mortar, true to line and level along top and front faces, on accurately cast foundations and secure with a continuous haunching of concrete. Allow bedding to set before placing haunching.
Keep exposed faces of units clean and free from concrete and mortar droppings.

ADVERSE WEATHER

Do not cast foundations, lay units or place haunching 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.

CONCRETE FOR FOUNDATIONS AND HAUNCHING

To BS 5328 designated mix not less than GEN 1 or Standard mix not less than ST1, very low workability.

MORTAR BEDDING

Mix: 1:3 Portland cement, Class 42.5: BS 882 sand, grading M or F.
Bed thickness: 10mm minimum to 40mm maximum

KERB DOWELS

Steel bars to BS 4482 for use with holed kerbs, 12mm diameter, 150mm long.
Insert dowels vertically into foundation while concrete is still plastic, at centres to suit holes in kerbs and with 75mm projecting.
Grout holes in kerbs with 1:3 cement:sand mortar finished flush

HAUNCHING DOWELS

Steel bars to BS 4482, 12mm diameter, 150mm long.
Insert dowels vertically into foundation while concrete is still plastic, at 450mm centres, 50mm from back face of kerb and with 75mm projecting.
Haunching to be rectangular cross section, cast against formwork, so as to enclose and project dowels.

CHANNELS

Set out to an even gradient to ensure no ponding or backfall. Lowest points of channels to be 6mm above drainage outlets. Channels should be set higher than drainage outlets to allow for settlement.

DRAINAGE CHANNEL SYSTEM

It is advisable to check the installation procedure with the manufacturer.
If using a system with built in fall and the top laid level, amend the first item to read, e.g Lay with top of channels level, installed in the correct sequence to form an even gradient without ponding or backfall.
Laying away from the outlets means that heavy rainfall during laying is likely to damage foundations and bedding. Lay to an even gradient to ensure no ponding or backfall. Commence laying from outlets.
Other requirements: U shaped channels may need to have their sides braced during installation to prevent overloading.
Channels must be secure against wheel loads and frost uplift. The casting-in arrangements and method of placing the concrete surround become more important with increasing channel size and load bearing capacity.
Remove silt and debris from the entire system immediately before handover.
Safety dispose of washings and any detritus without discharging them into sewers or watercourses.

RADIUS KERBS/CHANNELS

To be used for all radii of 12m or less

ANGLE KERBS

To be used for both internal and external 90’ changes of direction; cutting of mitres will not be permitted.

ACCURACY

Maximum deviations: Level + 6mm
Horizontal and vertical alignment: 3mm in 3m

NARROW MORTAR JOINTS

Butter ends of units with bedding mortar as laying proceeds to completely fill joints. Tightly butt to a thickness of 3mm and clean off surplus mortar immediately.

TOOLED MORTAR JOINTS

Butter ends of units with bedding mortar as laying proceeds to completely fill joints to a thickness of 6mm. Tool to a neat flush profile.

TOOLED COLOURED MORTAR JOINTS

Butter ends of units with bedding mortar as laying proceeds to completely fill joints to a thickness of 6mm. Rake out to a depth of 10mm and point with 1:3 cement:sand mortar with pigment, colour to approval.

SEALANT MOVEMENT JOINTS IN BRICK KERBS AND CHANNELS

Joint filler to be compressible cellular rubber or plastics compatible with the specified sealant. Build in as the work proceeds, extending through haunching and foundation. Position filler accurately to fully support sealant at the recommended distance from exposed faces of units. Joint width: 10mm
Sealant: To be determined to BS 6213
Colour: To match channels. Applied to manufacturers instructions

REFERENCE DOCUMENTS

Contractor to check the currency of documents cited in this section.

BRITISH STANDS INSTITUTION (BSI)

BS 435 Specification for dressed natural stone kerbs, channels, quadrants and setts
BS 882 Specification for aggregates from natural sources for concrete
BS 3921 Specification for clay bricks
BS 4482 Specification for cold reduced steel wire for the reinforcement of concrete
BS 5328 Concrete
Part 1 Guide to specifying concrete
Part 2 Methods for specifying concrete mixes
Part 3 Specification for the procedures to be used in producing and transporting concrete
Part 4 Specification for the procedures to be used in sampling, testing and assessing compliance of concrete
BS 6213 Guide to the selection of constructional sealants
BS 6367 Code of practice for drainage of roofs and paved areas
Part 1 Specification for paving blocks
BS 7263 Precast concrete flags, kerbs, channels, edgings and quadrants.
Part 1 Specification
BS EN 124 Gully tops and manhole tops for vehicular and pedestrian areas-Design requirements, type testing, marking, quality control

DEPARTMENT OF TRANSPORT (DOT)

Manual of contract documents for highway works:
Volume 1 Specification for highway works
Volume 2 Notes for guidance on the specification for highway works
Volume 3 Highway construction works
Disability Unit Circular: The use of dropped kerbs and tactile surfaces at pedestrian crossings

HEALTH AND SAFETY EXECUTIVE (HSE)

SS7 Avoiding danger from buried services. Third document is out of print but photocopies may be obtained from local HSE offices.

STANDARD SPECIFICATION

FOR

SOFT
LANDSCAPING

Soiling operations to be carried out prior to the landscape sub-contract.

SUBSOIL CULTIVATION

Subsoil cultivation will be carried out over all areas to be planted or seeded including raised planting areas.
After correct reduced levels have been achieved stiff clays and other cohesive subsoils shall be ripped by means of a single tine ripper to a depth of 400mm at 500mm minimum centres.
This operation is to be carried out when the soil is in a dry condition in order to achieve maximum heave.

TOPSOIL

Following subsoil cultivation all planting areas are to be backfilled with topsoil, when in a dry friable condition, in layers not exceeding 150mm.
Final grading shall ensure that finished levels are 30mm above adjoining paving or kerbs in planting areas and 30mm below the edge of raised planting areas, after settlement.

Topsoil backfilling shall be to the following minimum depths:-

Shrubs, Herbaceous and Transplant Areas	450mm
Grass Seeded Areas	300mm
Raised Planting Areas	600mm
Raised Planting Areas with Trees	1000mm

GAS MEMBRANE-IF INCLUDED IN WORKS

Gas membrane to be cut back locally, to allow, tree planting. Gas membrane must extend 800mm minimum from edge of kerb into planted area.
Raised planting areas for shrubs must not perforate the gas membrane unless otherwise indicated.
All other planted and seeded areas must not perforate the gas membrane unless otherwise indicated.
If for any reason the gas membrane is exposed, the Structural Engineer must be notified for inspection before gas membrane is covered over.
For details of depth of gas membrane see Structural Engineers drawing.

SPECIFICATION FOR SOFTWORKS

MATERIALS

BRITISH STANDARDS

Expect where otherwise specified, all materials and workmanship shall be in accordance with the appropriate British Standards current at the time of tendering:
British Standards Institution (BSI)
BS 1722 Fences
Part 3 Specification for strained wire fences
Part 4 Specification for cleft chestnut pale fences
BS 3936 Nursery stock
Part 1 Specification for trees and shrubs
BS 4043 Recommendations for transplanting semimature trees
BS 4072 Wood preservation by means of copper/chromium/arsenic compositions
Part 1 Specification for preservatives
Part 2 Wood preservation by means of copper/chromium/arsenic compositions
BS 4156 Specification for peat
BS 5236 Recommendations for cultivation and planting of trees in the advanced nursery stock category
BS 5837 Code of practice for trees in relation to construction.

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD (MAFF)

Code of practice for the use of herbicides on weeds in water courses and lakes
Approved products for farmers and growers.

ORIGIN OF PLANTS

All trees and plants supplied shall have been grown at the Contractor's own nursery stock or shall have been obtained from a reputable nursery of equivalent standing.

INSPECTION AND NOTIFICATION

The Architect requires to inspect all planting materials prior to the time of planting, and the Landscape Contractor shall notify the Architect when and where the materials may be inspected.

Any materials which, in the opinion of the Architect do not meet with the requirements of the specification, or are unsuitable or defective in any other way

may be rejected. The minimum specified sizes in the plant schedule will be strictly enforced.
The Architects will require to inspect the setting out of all planting areas and tree pits prior to any planting being undertaken.

The Architect will also require to inspect all tree and climber pits prior to backfilling
The Architect must be given at least two working days notice of when the above will be ready for inspection.
The Architect will also require to inspect the quality and quantities of all additives used (mushroom compost/peat, fertilisers, etc) These must therefore be applied using a dispenser which will release the exact amount required per m2 or per plant pit, so that the rates of usage can be monitored.

The Architect shall be notified whenever work is taking place on site, including defect replacement work.

SUBSTITUTION

Upon submission of evidence that certain materials, including trees, are not available at the time of the Landscape Contract, the contractor's may in exceptional circumstances be permitted to substitute other materials and trees during the contract with an agrees adjustment or price. All substitutions shall be of the nearest equivalent species and variety to the original specified, but shall be subject to approval by the Landscape Architect before any change is made.

CLIMATIC CONDITIONS

Carry out the work while soil and weather conditions are suitable for the relevant operations.
Transplant only during the following periods;
Deciduous trees and shrubs; Late October to late March
Conifers and evergreens: Early or late Spring
Herbaceous plants: September to October or March to April
Containerised pot grown and root balled plants: At any time if ground and weather conditions are favourable.

MACHINES AND TOOLS

Use only machinery and tools suitable for the site conditions and the work to be carried out. Use hand tools around trees, plants and in confined spaces where it is impracticable to use machinery

WATER

Will be provided by the Main Contractor up to Practicable Completion of the Main Contract works and/or thereafter by the Employer, in each case subject to availability of supply.

DROUGHT CONDITIONS

If water supply is or is likely to be restricted by emergency legislation:
Inform Architect without delay and ascertain availability and additional cost of second class water from a sewage works or other approved source.
If planting has not been carried out, do not do so until instructed.
If planting has been carried out obtain instructions on supply of water.

SETTING OUT

Clearly mark boundaries of planting areas and location of trees and obtain approval before starting work.

CHEMICALS GENERALLY

Use only where specified or approved, and then only products on the current list of the Agricultural Chemicals Approval Scheme.
Where work is near water, drainage ditches or land drains, comply with the Ministry of Agriculture, Fisheries and Food 'Code of practice for the use of herbicides on weeds in water courses and lakes'.
Observe all precautions recommended by the manufacturer and remove containers from site immediately they have been emptied or are no longer required.

TREES/PLANTS GENERALLY

Obtain from approved source(s) with soil and climate conditions similar to those prevailing on site.
Adequately and carefully pack and protect against mechanical damage, extremes of temperature and drying out.
When requested by Architect provide a certificate that plants comply with this specification.

SUBSTITUTES

The tender must be based on plants which are available. If specified plants are unobtainable alternatives may be submitted with tender, stating price and how they differ from the specification. Such substitutions may not be acceptable and submission of further alternatives may be required. Obtain approval before making a substitution

STORAGE

Plants which are not to be planted on day of delivery to site to be stored as follows or by a other approved methods:
Root balled plants: Place close together and cover root balls with sand, moist peat or wet straw.
Bare rooted plants: Heel in prepared trenches, cover with soil and water thoroughly.

PROTECT EXISTING GRASS

During planting operations by laying boards or tarpaulins. Do not place excavated material directly on to grass.

SURPLUS MATERIAL

Including subsoil, stones, debris, wrapping material and prunings to be removed from site.

PLANTING TREES

CONIFERS/EVERGREENS

Dip in or thoroughly spray with antidesiccant before delivering to site. Apply again soon after planting. Do not apply in rainy or frosty weather. Ensure full coverage of underside of foliage.

SEMIMATURE TREES

To BS 4043, Sizes as scheduled
Transplant to BS 4043 unless specified otherwise in this clause.
Pits: Not less than 2100mm diameter x 900mm depth.
Where necessary, increase these dimensions to ensure that pits are at least 250mm deeper and 600mm wider than root ball.
Break up bottom of pit to a depth of 250mm.
Protection: Wrap trunks and lower branches with hessian strips, straw ropes or treated crepe paper, and leave on for at least two summers.
Support: Overhead guying to BS 4043
Support: Securing underground to BS 4043

ADVANCED NURSERY STOCK TREES

To BS 5236 size categories as scheduled
Transplant to BS 5236 unless otherwise specified in this clause.
Pits: Not less than 1500mm diameter x 900mm depth
Where necessary increase these dimensions to ensure that pits are at least 250mm deeper and 500mm wider than root system when fully spread. Break up bottom of pits to a depth of 200mm
Backfilling material: As specification
Support: Vertical staking to BS 5236
Support: Oblique staking to BS 5236
Support: Guying as follows:
Use three guys of galvanised wire passed through crotch of lowest branch and stem.
Protect tree with rubber hose sleeves threaded on to wire.
Secure wire at each end with two U-bolts
Positions stakes equidistant from tree from each other and to give an angle of approximately 60' between wire and ground.
Incorporate a galvanised turnbuckle in each guy and adjust until wires are just taut.

NURSERY STOCK TREES

To BS 3936:Part 1, size designation as scheduled.
Pits: Not less than the following:

	Diameter	Depth
Brush, whip and small feathered trees	600mm	450mm
Standard and large feathered trees	900mm	600mm
Tall standard trees	1200mm	750mm

Where necessary increase these dimensions to ensure that pits are at least 75mm deeper than root system and wide enough to accommodate roots when fully spread. Break up bottom of pit to a depth of 150mm
Orientation: Before lifting, mark north side of trees to ensure that orientation is the same when replanted.
Cut back any broken or damaged roots to sound growth.
Treat cut ends over 25mm diameter with fungicidal sealant.
Plant trees upright, unless otherwise instructed, in centre of pit and at original soil depth.
Bare root trees: Place backfilling material in 150-250mm layers, shaking tree to ensure close contact with roots and elimination of air pockets. Firm the soil as backfilling proceeds taking care not to damage any roots. Heel in firmly around root collar.
Root balled trees: Firm backfilling material around root ball in 150mm layers taking care not to disturb roots.
Support:
Single stake bare root
Double stake bare root balled trees as clause 380
Stakes: 75mm thick (100mm for trees over 3m high)
softwood, pressure impregnated to BS 4072, straight, free of projections and pointed at one end.
Water trees thoroughly immediately after backfilling.

After watering spread a 50mm layer of peat or equivalent mulch over the whole area of the tree pit

BACKFILLING MATERIAL

A previously thorough mixture of:
x % by volume topsoil excavated from the pit and additional topsoil as required.
x % by volume loosened peat to BS 4156 or other approved well rotted organic material
x % by volume coarse grained washed river sand.
600g/m3 bonemeal of medium fine texture, containing not less than 20% soluble potash and 3-5% nitrogen.
See chart below for percentages:

Insert proportions based on the nature of the existing topsoil e.g.

Light soils	70% topsoil 30% peat (Delete sand)
Medium soils	80% topsoil 10% peat (Delete sand)
Medium Heavy soils	70% topsoil 20% peat 10% sand
Heavy soils	60% topsoil 25% peat 15% sand

SINGLE STAKING BARE ROOT NURSERY STOCK

Position stake close to tree on windward side and drive vertically at least 150mm into bottom of pit and cut off just below first crotch of tree. Consolidate material around stake during backfilling.
Secure tree firmly but not rigidly to stake with at least two ties of approved type. Use three ties if necessary to prevent tree touching stake. Position top tie within 25mm of top of stake and lower tie approximately halfway down.

DOUBLE STAKING ROOT BALLED NURSERY STOCK

Drive stakes vertically at least 150mm into bottom of pit on either side of tree position and cut off just below first crotch of tree. Consolidate material round stakes during backfilling.
Firmly fix cross bar on windward side of tree and as close as possible to stem.
Secure tree firmly but not rigidly to cross bar with tie of approved type.

DAMAGED STAKES

Replace any stakes which are split. Remove any snags and burrs which may cause chafing of trees.

TREE GUARDS

Where specified securely fix to stakes with galvanised staples at 300mm centres. Use two guards opened out on double staked trees.

PREPARATION OF PLANTING BEDS

HERBICIDE

A type recommended for the purpose in the current list of the Agricultural Chemicals Approval Scheme.
Apply to perennial weeds and allow period of time to elapse as recommended by manufacturer before cultivation.
Sand: Course graded washed river sand with neutral pH.

LIME

Fine ground limestone containing not less than 50% of CaO equivalent.
Apply evenly over land immediately before cultivation

GENERAL FERTILISER

Bonemeal: Medium coarse texture, containing not less than 20% soluble potash and 3-5% nitrogen
Fishmeal: Finely ground free from large particles and containing not less than 8% nitrogen, 8% phosphate and up to 1 1/2% potash
Hoof and horn: Medium fine, with particle size 3mm down to dust, containing not less than 12% nitrogen and 5% phosphate.
Apply evenly over all planting areas immediately before cultivation

PEAT

Spagnum peat to BS 4156. Do not use alkaline peat unless instructed.
Spread over all planting areas at 1m3 of loosened material per x m2 prior to cultivation.

COMPOST

One of the following spread over all planting areas at 1m3 of material per x m2 prior to cultivation:
Sewage sludge: Dewatered solid sludge cake with a maximum moisture content

of 10% and containing not less than 6% nitrogen, 3% phosphate, 5% potash.
Manure: Well rotted horse or farmyard dung but not poultry or pig manure.
Mushroom compost: Spent mushroom beds containing only well rotted manure, peat, chalk and residual mushroom growth.
Leaf mould: Well rotted broad leaves from deciduous trees but not ash, poplar or sycamore leaves.
Other well rotted organic material subject to approval.

CULTIVATION

Break up any compacted topsoil to full depth.
Within a few days before planting cultivate top 300mm of all planting beds by rotating and/or double digging. Leave surface regular and even.
Remove undesirable material brought to the surface including stones and clay balls larger than 50mm in any dimension, roots, tufts of grass and foreign matter.

PLANTING SHRUBS/HERBACEOUS PLANTS/BULBS

CONIFERS/EVERGREENS

Dip in antidesiccant before delivering to site. Spray with antidesiccant soon after planting. Do not apply in apply in rainy or frosty weather.

PLANTING GENERALLY

Before planting remove any nonpreishable containers and carefully prune any badly damaged roots.
Plant upright or well balanced with best side to front.
Carefully return excavated topsoil, packing around evenly spread roots or root ball and heel in.
Water plants thoroughly immediately after planting, using a fine rose.
Immediately after planting shrubs carefully cut back any damaged, dead or diseased branches and remove any weak, thin or malformed growth. Where and to the extent appropriate for the species cut back to encourage growth.
After planting fork and/or rake soil to a fine tilth with approved cambers and no hollows.
Mulch the whole surface of planting beds with moist peat at 1m3 of loosened material per 20 m2.

SHRUBS

To BS 3936 Part 1
Planting holes for climbers to be 150mm wider than root spread and 400mm deep.
Finish level to be at original soil mark on shrubs and 30mm above surrounding level to allow for settlement.

HEDGES

Shrubs for hedges: To BS 3936 Part 1, consistent in species, cultivate and clone to ensure a uniform hedge.
Before planting: Softer hedging plants benefit from some support when young and this can be achieved with a low post and wire fence to BS 1722 Part 3. Where some immediate form of enclosure is required a chestnut paling fence to BS 1722 Part 4 can be used. If not required delete the second item.
Planting schedule should state centres, whether in one or two rows, staggered etc.
Plant shrubs in trenches large enough to take full spread of roots. Set out plants evenly as scheduled.

CLIMBERS

Planting holes for climbers to be 300mm wider than root spread and 500mm deep.
Plant 150mm clear of wall with roots spread outward.
Lightly secure branches to supports. Retain canes of plants which are too small to reach supports.
Climber supports: Plastic coated galvanised wires fixed horizontally to walls at 300mm centres starting 600mm from ground level. Stretch wire tight between galvanised screw eyes screwed into wall plugs at 2m centres.

HERBACEOUS PLANTS

Well rooted, healthy, hardy and not less than one year of full growth.
Where there is no planting plan evenly space at the rate stated over the allocated area avoiding straight lines. Plant carefully in generously sized holes with finely broken soil returned around the roots. Lightly firm the soil.

BULBS

Plant at the correct depth with base in contact with bottom of hole. Backfill with finely broken soil and lightly firm. When planting in existing grassed areas neatly remove a plug of turf and replace after planting.

NATURALISED BULBS

Scatter at random over the allocated area and plant where they fall.

IDENTIFICATION OF PLANTS

Attach a plastic label, clearly marked with species and variety, to each tree/shrub/plant.

SEEDING

GRASS SEED FOR SMALL AREAS/FINE LAWNS

Mixture: To specification
Supplier and reference: To specification
Rate of application: To BS 4428 15-30g/m2

GRASS SEED FOR LARGE SPORTS AREAS

Mixture: To specification
Supplier and reference: To specification
Rate of application:To BS 4428 100/200kg/hectare

QUALITY OF SEED

Purchase fresh seed for each growing season and do not use seed purchased for previous seasons.
Germination capacity: Not less than 80%
Purity of mixture: Not less than 90%
Total weed seed content: Not more than 0.5%
Total content of other crop seeds: Not more than 1%
When requested submit results of testing for germination, purity and composition carried out by an Official Seed Testing Station.

SOWING

Sow seed during calm weather conditions
Spread seed evenly at the specified rate(s) applied in two equal sowings in transverse directions.
Lightly harrow or rake. On light soil roll and cross roll after seeding using a lightweight roller.

PRE-EMERGENT HERBICIDE

Where soil has not been allowed to lie fallow apply a suitable pre-emergent herbicide immediately after sowing.

TURF EDGING TO SEEDED AREAS

Before sowing rake back a 300mm wide margin around prepared seed beds where shown on drawings.
Lay a single row of turves (to BS 3639 with no ryegrass) end to end and trim to a line.
Marry in level of seed bed with the turf and water turf on completion.

HYDRAULIC SEEDING

A proprietary seeding system suitable for the location and conditions, including all necessary preparation and ancillary work, all carried out by an approved specialist subcontractor.
Remove hardcore and stones exceeding 100mm in any dimension and all rubbish.
Kill all pernicious weeds using a selective hormone weedkiller and other weeds using a contact selective weedkiller.
Smooth surface by filling depressions and ruts and levelling ridges to avoid sudden changes in level of more than 100mm.
Carry out as much basic cultivation as possible to ensure that the roots can penetrate into the substrate, and apply fertiliser as recommended by the subcontractor. Cut the grass when well established and leave approximately 75mm of growth. Spread arisings evenly over the cut grass.

PROTECTION-GRASS AREA

The Contractor shall take all necessary precautions to protect seeded areas to ensure satisfactory establishment. Any such protection should be included in the Contractors prices for the grass seeding work.

TURFING

TURF FOR GRASS BANKS

To BS 3969 with rye-grass and from an approved source. Free from undesirable grasses and weeds. Treated with herbicide not less than four weeks and not more than three months before lifting.

TURF FOR ORNAMENTAL LAWNS

To BS 3969 with no rye-grass from an approved source. Free from undesirable grasses and weeds. Treated with herbicide not less than four weeks and not more than three months before lifting.

STORAGE

Arrange supply of turves to avoid stacking for more than three days. Do not stack to a height of more than 1m. Use turves which show any signs of deterioration without delay or lay out on topsoil and keep moist.

TURFING GENERALLY

Lay turf during autumn or early winter or at times agreed with Architects. Do not lay turf when persistent cold or drying winds are likely to occur or soil is frost bound. Waterlogged or excessively dry.

Lay turf with broken joints, well butted up, working from planks laid on previously laid turves.
Use whole turves at edges. Trim to a true line. Adjust levels by raking out or infilling with fine soil under turves.
Consolidate by lightly and evenly firming with wooden beaters as the laying proceeds. Do not use rollers. Dress turf with finely sifted topsoil/peat/sand and brush well in to completely fill all joints.
Thoroughly water the completed turf within 24 hours of laying.

BANKS EXCEEDING 30' SLOPE

Lay turves diagonally or horizontally and secure with either:
Pointed softwood pegs, 200mm long x 25mm square, or
galvanised wire pins, bent or hairpin pattern, 200mm long x 4mm diameter.
Remove all pegs or pins when turf is well established.

GRASS CUTTING AND TRIMMING

All grass areas shall be mown not less than 12 times during the 12 months Defects Liability Period. Mowing shall be at regular intervals, unless by agreement or by weather conditions. The height of the grass shall not exceed 50mm before cutting for the first time and 100mm on subsequent occasions.

If in the process of cutting, the Contractor leaves large swatches of grass which are detrimental to further growth, he shall at his own expense collect up the cuttings and remove them from site.

The Contractor shall be responsible for the establishment and maintenance of the grass throughout the twelve month defects liability period.

The Contractor will be required to make good any damage caused by his workmen, plant or machinery whilst carrying out maintaining his work on site. Any ruts or ridges shall be levelled off, topped up as necessary with topsoil and recultivated and seeded to original specification.

All grass edges shall be trimmed not less than 3 times during the mowing season.
At the beginning and end of the maintenance period all edges shall be cut with a half-moon edging tool to the lines shown on the Planting Drawing.

FIRST CUT OF SEEDED/TURFED LAWNS

When grass is approximately 50mm high remove debris, litter and all stones and clay balls larger then 25mm in any dimension and roll with a light roller.
About 48 hours later and when grass is reasonably dry, cut with a sharp five bladed cylinder box mower to approximately 25mm high. Remove and dispose of all arisings.

FIRST CUT OF GENERAL AREAS

When grass is between 40 and 75mm high remove debris, litter and all stones and clay balls larger then 40mm in any dimension and roll with a light roller.
About 48 hours later cut with a rotoscythe to approximately 35mm high. Remove and dispose of all arisings.

GRASS FERTILIZER

During the Defects Liability Period apply one of the following according to when during the year the Period falls:
In March: 15:10:10 Spring turf fertiliser at 35g/m2 or equivalent.
In September: 5:10:10 Autumn turf fertiliser at 50g/m2 or equivalent.

PROTECTING/MAINTAINING/MAKING GOOD DEFECTS

PROTECTIVE FENCING

Protect newly planted areas with 900mm high timber post and wire fencing to BS 1722 Part 3 where shown on drawings. Maintain fencing until planting is well established then remove and reinstate ground. Make good any damage to planting until area is accepted. The fencing will remain the property of the Contractor.

WATERING (BEFORE PRACTICAL COMPLETION)

During establishment of planting ensure that sufficient water is applied to maintain healthy growth.

CLEANNESS

Remove soil from all hard surfaces and grassed areas and leave the works in a clean tidy condition at Practical Completion.

FAILURES OF PLANTING

Post Practical Completion maintenance of the planting is to be carried out by the Landscape Contractor as specified in this section. Any trees/shrubs/plants which are dead, dying or otherwise defective at the end of the Defects Liability Period will be regarded as defects due to materials or workmanship not in accordance with the Contract. They must be replaced by approved equivalent trees/shrubs/plants at the next suitable planting season unless otherwise instructed. This will not apply if the defects are caused by malicious damage after Practical Completion.

PLANTING MAINTENANCE

During the Defects Liability Period carry out maintenance of the planted areas as follows:
Make visits at approximately monthly intervals during the growing season and as necessary to fulfil the requirements of this specification. Keep all beds clear of weeds by cultivating and use of approved herbicides. Fork over beds as necessary to keep soil loose, with approved cambers and no hollows.
Once during the Period, in March or April, evenly spread 15:15:15 N:P:K Straight Agricultural or slow release type fertiliser. 70g per feathered, standard or heavier tree. 40g per whip or shrub. Prune plants at appropriate time to remove dead or dying and diseased wood and suckers, to promote healthy growth and natural shape. Dress cut ends exceeding 25mm diameter with fungicidal sealant. Regularly check conditions of stakes, ties, guys and guards. Replace broken or missing items. Adjust ties if necessary to prevent rubbing of bark. Cut back any damaged bark and treat wound with fungicidal sealant.Insert number of waterings. Ensure that sufficient water is applied to maintain healthy growth. Suggest to Architect when watering may be required and when instructed carry out using a fine rose or sprinkler until full depth of topsoil is saturated. Spray crown of trees when in leaf during warm weather. Carry out in the evening.

MAINTENANCE INSTRUCTIONS

Before the end of the Defects Liability Period submit typewritten instructions recommending procedures to be established by the Employer for maintenance of the planting work for one full year.

FINAL MULCHING

At the end of the Defects Liability Period mulch the whole surface of planting beds with moist peat at 1m3 of loosened material per 30m2.

CULTIVATED AND GRASS SEEDING

TOPSOIL

At the time of starting the subcontract work, the areas to be seeded/turfed will be covered by either: Undisturbed topsoil prepared as necessary by the Main Contractor so that it is in a suitable state for the cultivation operations specified in this section, or Topsoil 300mm thick provided and spread by the Main Contractor.

CLIMATIC CONDITIONS

Carry out the work during appropriate seasons and while soil and weather conditions are suitable for the relevant operations.

MACHINES AND TOOLS

Use only machinery and tools suitable for the site conditions and the work to be carried out. Use hand tools around trees, plants and in confined spaces where it is impracticable to use machinery.

WATER

Will be provided by the Main Contractor up to Practical completion of the Main Contract Works and/or thereafter by the Employer, in each case subject to availability of supply.

DROUGHT CONDITIONS

If water supply is or is likely to be restricted by emergency legislation:
Inform Architect without delay and ascertain availability and additional cost of second class water from a sewage works or other approved source.
If seeding/turfing has not been carried out, do not do so until instructed.
If seeding/turfing has been carried out, obtain instructions on supply of water.

STANDARD SPECIFICATION

FOR

COATED MACADAM PAVINGS

COATED MACADAM PAVING TO FOOTPATHS

Materials and workmanship to Department of Transport Manual of contract documents for highway works, Volume 1: Specification for highway works including all Amendments current at 13 October 2000.
Wearing course: Thickness 20 mm
Material: 6mm medium graded macadam
Basecourse: Thickness 60 mm
Material: 40 mm size dense macadam
Ganular sub-base thickness as specified by Structural Engineers

PREPARATORY WORK/REQUIREMENTS

TIMBER EDGING: to paving
Softwood board 150 mm x 38 mm, nailed to 50 mm x 50 mm x 600 mm long softwood pegs driven into the ground at 1200 mm centres.
Preservative treatment: As section British Wood Preserving and Damp-proofing Association Commodity Specification C4.
Type/desired service life: CCA or Creosote, 20 years.

MATERIALS GENERALLY: Not less than 2 weeks before starting work submit to the Architect the name(s) of all supplier(s) of bituminous material.
At the time of delivery submit to the Architect a test certificate for each manufacturing batch of bituminous material, certifying compliance with this specification and the relevant British Standard and giving complete information on the composition of each mix.

ACCEPTANCE OF SUB-BASE: Before starting work ensure that:
The base is sound, free of debris, mud and soft spots, and suitably close textured.
The levels and falls of the sub-base are as detailed, within the specified tolerances of ± 20 mm (veicular areas) and ± 12 mm (pedestrain areas).
Drainage outlets are within +0 to -10 mm of the required finished level.
Kerbs and edgings are complete, adequately bedded and haunched and to the required levels.

ABUTMENTS: Cleans edges of manholes, kerbs and other abutments and paint with a thin uniform coating of bitumen.

LAYING

LAYING GENERALLY: Remove all loose material, foreign matter and standing water from surfaces to receive paving materials.
Form neat junctions with and prevent damage to adjacent work. Keep clean all channels, kerbs, inspection covers etc.
Keep new paving free from traffic until it has cooled to prevailing atmostpheric temperature. Do not allow rollers to stand on paving at any time.
Do not use pavings as a building platform or for storing, mixing or preparing materials.
Lines and levels of finished surface to be smooth and even, with regular falls to prevent ponding.
Finished surface of paving to have an even overall texture.
Leave in a clean state on completion.

COLD WEATHER: Do not use frozen materials or lay paving on frozen or ice covered surfaces.
Do not lay coated macadam if the temperature of the laying surface is below 2°C (or-1°C on a rising thermometer). Do not lay rolled asphalt it the temperature on the laying surface is below 5°C or the air temperature is below 0°C.

LEVELS: Of finished surface to be within ± 6 mm of required levels (+6 mm-omm adjacent to gullies and manholes).

REGULARITY: Where appropriate in relation to the geometry of the surface, the variation in gap under a 3 m straighedge (with feet) placed anywhere on the surface to be not more then:

Wearing course:	3mm
Basecourse	6mm
Basecourse/Roadbase	6mm
Roadbase	25 mm

Where a straightedge cannot be used the surface must be of a comparable standard of accuracy when judged by eye.

CONTRACTOR'S USE OF PAVEMENTS: Defer laying of final surfacing until as late practicable in the contract.
Before using roadbase/basecourse for construction traffic, fill interstices of open-grained surface with coated grit to BS 4978:Part 1, Tables 34-36 and removes surplus, then apply binder and chippings as clause 360.
Immediately before laying final surfacing, thoroughly clean and make good the roadbase/basecourse, allow to dry and uniform apply, without puddles, a tack coat of sprayed bitumen emulsion of a suitable grade BS 434:Part 1 at 0.3 to 0.5 litres/m2. Allow emulsion to break completely before applying surfacing.

UNCOATED CHIPPINGS FOR SUFACE DRESSING: Chippings to BS 63: Part 2, Nominal size 6 mm.
Binder: Cutback bitumen to BS 3690:Part 1 or bitumen emulsion to BS 434:Part 1. Do not use modified binders without prior approval of CA.
Application: Uniformly spray binder of a suitable grade at a rate in accordance with Transport Research Laboratory Road Note 39, Table 8 and 9; adjust application rate for modified binders in accordance with manufacturer's instructions. Dress with chippings at a rate to achieve 100-150% shoulder to shoulder coverage as determined by BS 598:Part 108; roll in without crushing chippings and remove excess chippings before trafficking commences. Do not use cut-back bitumen at temperatures below 15°C.
Carry out further removal of loose chippings disturbed by traffic as necessary.

STANDARD SPECIFICATION

FOR

MORTARS

MORTARS

SAND FOR MORTAR

To BS 1200 unless specified otherwise.
Sand for facework mortar to be from one source, different loads to be mixed if necessary to ensure consistency of colour and texture.
When a range is specified (e.g 1:1:5-6) use lower proportion of sand for Grade G sands and higher proportion for Grade S.

READY-LIME LIME:SAND

Unless specified otherwise, use ready-mixed lime: sand to BS 4721.
Coloured mortar, where required, to be made using a proprietary coloured ready-mixed lime: sand, colour to approval where not specified.

SITE PREPARED LIME: SAND MIX

Use lime putty to BS 890, either ready prepared from quicklime or site prepared from hydrated lime.
Thoroughly mix lime putty with sand, store in airtight bins and prevent from drying out.
Before gauging with other constituents, thoroughly ram, beat and chop the mix.

PUTTY PREPARED FROM SLAKED QUICKLIME

Ensure that operatives are experienced in the safe handling and slaking of quicklime and are thoroughly protected against contact with it.
Use fresh quicklime to BS 890 and store in cool, dry and secure noncombustible containers.
Stake quicklime in suitable sound metal tanks. Add quicklime to clean water whilst stirring and raking continuously. Do not add water to quicklime.
Sieve putty to remove any lumps and run into a suitable storage tank or lined pit. Cover the putty with water and store for at least six weeks. Prevent access with a strong, well secured cover over the tank or pit.

PUTTY PREPARED FROM HYDRATED LIME

Mix fresh hydrated lime to BS 890 with clean water to form putty of creamy consistency.
Store putty in airtight containers for not less than 24 hours before using.

HYDRAULIC LIME: SAND MORTAR

Thoroughly mix eminently hydraulic hydrated lime powder with sand, first in the dry state and then with water. Add only sufficient water to produce a workable mix.

Do not use mortar which has begun to stiffen.

CEMENT FOR MORTAR

When not specified otherwise, to be Portland cement or Portland blastfurnace cement, to class 42.5 or 52.5, manufactured and supplied under the BSI Kitemark scheme for cement. All cements must comply with the appropriate British Standard.

RETARDED READY-MIXED MORTARS

May be used provided they are:
Of materials and proportions specified in this and to BS 4721.
Used within the working time and site temperatures recommended by the manufacturer and not remixed on site.
Obtained from approved sources.

ADMIXTURES

Do not use in mortar unless specified or approved.
Do not use calcium chloride or any admixtures containing calcium chloride. Admixtures, if specified, to be to BS 4887.

SITE STORAGE

Store different sands and aggregates in different stockpiles on hard clean bases which allow free drainage.
Store factory produced premixed lime:sand for mortar and ready-to-use retarded mortars in covered containers to prevent excessive drying out or wetting.
Store bags of cement and hydrated lime in dry conditions, raised off the ground and not touching damp surfaces. Do not use cement or hydrated lime affected by damp.
Avoid intermixing and contamination between stored materials and other building materials, debris or other deleterious matter.

MAKING MORTAR

Keep plant and banker boards clean at all times.
Measure materials accurately by volume using clean gauge boxes. Proportions of mixes are for dry sand; allow for bulking if sand is damp.

Mix ingredients thoroughly to a consistence suitable for the work and free from lumps. Mortars containing air entraining admixtures must be mixed by machine, but do not over mix.
Do not mix mortar when air temperature is at or below 3'C and falling or below 1'C and raising.

Use mortar within about two hours of mixing at normal temperatures. Use retarded mortar within the time and site temperatures recommended by the manufacturer. Mortar may be retempered to restore workability, but only within these time limits.

PAINTING & DECORATING

WORKMANSHIP AND SPECIFICATION

PAINTING AND DECORATING

Materials

The whole of the materials for painting work except proprietary treatments described by name shall be obtained from Crown Decorative Products Limited or other equal approved manufacturer, and all paint must be of the best quality manufactured.

All the paint shall be store, prepared mixed and applied on the various surfaces all in accordance with the latest edition of the Manufacturer's printed instructions.

All paint shall be delivered to the site in full new sealed drums properly labelled as to quality and bearing the Manufacturer's name and the following:

a) The type of product.
b) The brand name.
c) The use for which it is intended.
d) The manufacturer's batch number.

The batch deliveries shall be dated and used strictly in order of delivery. No paints other than water based paint shall be delivered in containers exceeding five litres capacity.

Emulsion Paint

The emulsion paint is to be applied in three coats, the first is to be made up by adding up to two pints of water to one gallon of paint. The second and third coat is to be applied neat.

Knotting

The knotting shall be free from resin and shall consist of only a solution of shellac and methylated spirits and shall comply with BS:1336.

Sizes

Sizes shall comply with BS:3357.

Sealers and Primers

All primers for use on external woodwork, iron and steel shall be lead based primers to BS:2521 and lead based primers to BS:2523 Type B respectively.

Primers, Undercoats and Finishes

These shall all be obtained from the same manufacturers as to ensure compatibility.
Polyurethane Lacquer

The polyurethane lacquer shall be obtained from an approved supplier.

Linseed Oil

Refined, raw and boiled linseed oil shall comply with BS:242, 243 and 259 respectively.

Spray Work

Spray work will not be permitted except where specified and with the written approval of the engineer.

Storage of Materials

All materials shall be kept in and mixed in a dry clean store provided with a suitable threshold and protected from frost.

Workmanship Generally

The whole of the work shall be carried out in accordance with BS:6510:1982. All materials shall be used strictly in accordance with the manufacturer's instructions and recommendations. All adjacent untreated surfaces shall be adequately protected during the execution of the work.

Preparation

Allow for thoroughly sweeping out and dusting before commencing to apply any surface finish. All surfaces to be painted shall be carefully prepared, inspected and approved by the Architect prior to the application of finishes. The word "prepared" shall be held to include all appropriate preparatory work in the items described as follows:

New Plaster Surfaces

Carefully rub down with glass paper and dust off to remove nibs and loose material. Make good other surface imperfections with Albastine or other approved filler and allow to dry thoroughly before painting.

New Metal Surfaces

All exposed surfaces of metalwork whether delivered primed or if unprimed shall be thoroughly scraped, wire brushed and cleaned down as necessary to remove all rust and loose scale and prime with metal primer before or after fixing as directed.

New Woodwork

Treat all knots with one coat best Shellac knotting, well glass paper down and paint with one coat of primer carried out by the painter at the joiner's shop after inspection and before delivery. Allow to dry thoroughly, stop all cracks, nail holes, etc. and face up uneven surfaces with linseed oil putty. After fixing on site, make good or renew the shop priming coat and treat surfaces with filler as is necessary before the required undercoats and finishings coats are applied. The woodwork is to be well glass papered down and brought to smooth finish before each coat of paint is applied.

Existing Woodwork

Stop all cracks, nail holes, etc and face up uneven surfaces with linseed oil putty. After fixing on site, make good or renew primer as necessary. the woodwork is to be well glass papered down and brought to smooth finish before each coat of paint is applied.

Generally

The whole of the Paint Work shall have the full number of coats specified. Each coat shall be of a different tint and all surfaces shall be rubbed smooth and dust removed before applying succeeding coats.

All painting work shall be carried out strictly in accordance with the colour schedule to be issued by the Architect.

Generally the final colours will be selected from British Standard range of colours. The Contractor shall provide samples of all tints to be used before commencement of the Work.

Apply all paint liberally and lay off evenly, care being taken to avoid runs, rub down with glass paper and dust off between coats and allow at least twenty four hours for each coat to harden thoroughly before application of succeeding coat.

No painting on exterior work shall be done during wet or foggy weather or upon surfaces that are not thoroughly dry.

The prices shall allow for all locks and fastenings to be removed before the preparatory processes are commended and to be refixed on completion.

The bottom edges of all doors shall be primed and painted prior to hanging.

All floors, walls and any items of equipment shall be fully sheeted down before any painting work is commenced and all spills and drips shall be cleaned off. Any item damaged by paint spills and drips and/or splashes shall be replaced at the contractor's expense.

Efflorescence

When efflorescence or salting of the surface finish has occurred or is suspected the application of all finishes shall be deferred until the Contractor is instructed by the Architect to proceed. The same shall apply to wet surfaces.

Wallpapers

The type of papers to be used are as specified on the drawings and shall be plumb and any pattern shall be truly matched.

The papers used in any one room shall have the same batch numbers.

STANDARD SPECIFICATION

FOR

GRANULAR SUB-BASES TO ROAD/PAVINGS

CHECKING CBR SUBGRADE

The specified thickness of sub bases are based on an assumed subgrade of (see below) with an assumed CBR of (see below) %. If the subgrade material appears to be different from this or if there are extensive soft spots, test CBR of subgrade, report results to Architect, and if different from the assumed CBR obtain instructions before proceeding with laying sub-grade.

TABLE 1: ESTIMATED CBR VALUES FOR BRITISH SOIL

Type of soil (compacted at the natural moisture content)	CBR (per cent) Depth of water table below formation level	
	More than 1000mm	300-1000mm
Heavy clay	1.5-3	1.5-2.5
Silty clay	3-4	2.5-3.5
Sandy clay	2.5-6	1.5-4.5
Silt	1-2	1-2
Sand (poorly graded)	20	20
Sand (well graded)	40	40
Well graded sandy Gravel	60	60

TABLE 2: SUB-BASE THICKNESS FOR AREAS CARRYING PEDESTRIAN OR LIGHT TRAFFIC

California Bearing Ratio (CBR)	Footways, pedestrian areas & private driveways	Footways & pedestrian areas with occasional over-riding by commerical vehicles	Cul-de-sac parks and minor residential roads
%	mm	mm	mm
Less than 2	380	500	550
2	230	350	400
3	180	260	300
4	160	200	230
5	140	160	190
6	120	120	140
7 or over	100	100	100

TABLE 3: SUB-BASE THICKNESS FOR AREAS CARRYING HEAVY OR CONSTRUCTION TRAFFIC

	Option 1	Option 2		
California Bearing Ratio (CBR)	Granular sub-base (without subgrade improvement layer)	Subgrade improvement layer		Granular sub-base (in addition to subgrade improvement layer) (see note f)
%	mm	mm		mm
Less than 2	-	600	+	150
2	-	450	+	150
2.5	350(e)	400	+	150
3	300(e)	350	+	150
4	270(e)	300	+	150
5	240	250	+	150
6	220	230	+	150
7-15	200	220	+	150
over 15	150	-		150

NOTES

(a) Table 1 is based on table C1 of TRL LR 1132, which provides more detail about the effect of factors such as depth of water table, construction conditions and total thickness of pavement. Wet construction conditions can result in a permanently lowered CBR.BS 7533 has a similar table (table 1), and provides some useful comments on CBR measurement and subgrade assessment.
The CBR values in the table are necessarily approximate. Take specialist advice if necessary, especially:
On low CBRs (less than 3) such as silts and other highly compressible soils, particularly in wet conditions.
If there is doubt about soil identification the drainage conditions, or interpretation of the table into CBR values.
(b) A high water table will have major effect on the bearing capacity of the soil. Subsoil drainage (specify in section R13) should be provided where necessary to keep the water table at least 300mm, and preferably 600mm, below formation level.

(c) Table 2 is based on tables found in BS 6677:Part 2 and BACMI Information Sheet 2. Use table 3 site access roads and any areas where construction vehicles may use the sub-bases prior to the roadbase and wearing course being laid.
(d) For the purposes of Table 3 'heavy traffic' means a bus route of a road carrying more than 10 commercial vehicles (over 1.5 tonnes) per day. Table 2 may be used for lighter loadings. Table 3 is based on DOT HD 25/94 and BS 7533 and is for flexible pavements (e.g. roads surfaced with bituminous materials, concrete blocks or clay pavers. For rigid pavements (e.g. concrete roads), see DOT HD 25/94 and Specification for highway works. BS 7533 Figure 2 advises 225mm thick sub-bases for the heaviest construction traffic.

HERBICIDE

Apply an approved type of herbicide in accordance with manufacturers recommendations to subgrade of shallow nature.

COMPACTION OF SUBGRADE

Defer final excavation of formation level until immediately before compaction of subgrade.
Soft spots must be brought to the attention of the Engineers.
Obtain instructions before proceeding.
Where use of roller is impracticable use a suitable mechanical rammer. Subgrade must be relatively dry at time of compaction.
Where local excavation and backfilling has taken place make additional passes of the roller.

SUBGRADE FOR VEHICULAR AREAS

Immediately before placing sub-base prepare and compact subgrade in accordance with Department of Transport Specification for highway works, clauses 616 and 617.

SUBGRADE FOR VEHICULAR AREAS

Immediately before placing sub-base compact subgrade with not less than four passes of a roller weighing 8-10 tonnes or by equivalent other means.

SUBGRADE FOR PEDESTRIAN AREAS

Immediately before placing thoroughly compact subgrade with a roller weighing not less than 2.5 tonnes or equivalent other plant.

GEOTEXTILE FILTER

Lay an approved type in accordance with manufacturer's recommendations to compacted subgrade at the discretion of the engineers.
Do not allow construction or other vehicles over the geotextile until it is fully covered by the granular sub-base.

SUBGRADE IMPROVEMENT LAYER (CAPPING)

Material: To Department of Transport Specification for highway works, Table 6/1, Class 6F1 or 6F2.
Place and compact to Department of Transport Specification for highway works, Table 6/1, clause 612 and clause 613.3,613.9 and 613.10.
Suitable for:
Large projects where the contractor is familiar the DOT Specification.
Heavy traffic loads
For simplicity on smaller projects, omit the subgrade improvement layer and substitute an increased thickness of sub-base material. This will apply if the savings from the use of the cheaper materials for subgrade improvement are out weighed by the cost or inconvenience of using two different materials on site.

GRANULAR MATERIAL

a) T Department of Transport Specification for the highway works, clause 804 (Type 2) or approved equivalent. Minimum CBR: 30% as clause 804.3. Test materials as clause 804.6 if required by the Engineer.
b) To Department of Transport Specification for the highway works, clause 803 (Type 1) or approved equivalent. Test materials as clause 803.5 if required by the engineer.
These are suitable for:
Large projects where Contractor is familiar with DOT Specification.
Heavy traffic loads, (permanent traffic flows exceeding 10 commercial vehicles per day, one way) calling for a more precise control of quality.
Sites where there will be major use of sub-bases by construction vehicles.
Poor ground conditions.
DOT Type 2 granular material (clause 205) includes sands and gravel's, and is cheaper than Type 1, but can deteriorate when wet, and for this reason is much less commonly used. Its use is not recommended where moisture is more likely to penetrate the layers above, e.g. unbound roadbases or interlocking paving without a roadbase.
Type 1 material, typically crushed rock, is recommended unless site conditions are likely to be dry, testing facilities and supervision are good, and construction traffic over the sub-base is light.
The DOT clauses both provide for testing of aggregate sources. Consult the DOT Specification for highway works documents for details if required. Testing is intended to demonstrate compliance of the contractor's proposed material with the DOT Specification, not for routine site testing. If appropriate, include a provisional item for Bills of Quantities.

GRANULAR MATERIAL

Free from harmful matter and excessive dust, well graded, passing a 75mm BS sieve and in any one layer only one of the following:
Crushed hard rock or quarry waste (other than chalk), with not more binding materials than is required to help hold the stone together.
Crushed concrete, crushed brick or tile, free from plaster, timber or metal.
Gravel or hoggin with not more clay content than is required to bind the material together, with no large lumps of clay.
Sound blastfurnce slag (other than from steelmaking foundries)
Unburnt colliery spoil (minestone)

FROST SUSCEPTIBLE GRANULAR MATERIAL

As defined by Department of Transport Specification for highway works clause 705.5 must not be used within 450mm of the final surface of the paving. Test materials used if required by engineer and supply certificate(s).

SULFATE CONTENT

Slag and other granular materials when placed within 500mm of cement bound materials, concrete pavements, structure or products, must comply with Department of Transport Specification for highway works clause 801.2.

PLACING GRANULAR MATERIAL GENERALLY

Ensure that subgrade is free from loose soil, rubbish and standing water.
Take all necessary precautions to ensure stability of adjacent structures. Place and compact material against or over structures, membranes or buried services in a sequence and manner which will ensure stability and avoid damage.

LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS: FAMILIAR WITH DOT SPECIFICATION

Spread and level in layers and as soon as possible thereafter compact each layer. Lay and compact to the Department of Transport Specification for highway works clauses 705.1, 705.2, 705.3, 801.3, 802.
Take particular care to compact fully around drainage fittings, inspection cover bases and at perimeters.

LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS-FOR SMALLER PROJECTS

Spread and level in layers as soon as possible thereafter compact each layer using plant and methods suitable to the type of material. Well in advance of doing the work submit details of proposals for:
Maximum depth of each compacted layer
Type of plant
Minimum number of passes per layer
Immediately before overlaying, the sub-base surface must be uniformly well closed and free from loose material, cracks ruts or hollows. Take particular care to compact fully around drainage fittings, inspection cover bases and at perimeters.

LAYING GRANULAR SUB-BASES FOR PEDESTRIAN AREAS

Spread and level and, as soon as possible thereafter, compact with a roller weighing not less than 2.5 tonnes or other equivalent plant.

ACCURACY

Maximum permissible deviation from the required levels, falls and cambers to be as follows:

	Roads Parking areas	Footways Recreation areas
Subgrade	+25mm	+20mm
Sub-base	+20mm	+12mm

BLINDING

Surfaces to receive interlocking brick or block paving to have sufficient sand, fine gravel, PFA or other approved fine material applied and surface vibrated to provide a close and smooth surface.

COLD WEATHER WORKING

Do not use frozen materials containing ice.
D not lay materials on frozen surfaces

PROTECTION

Cover sub-bases as soon as practicable with subsequent layers, specified elsewhere.
Prevent damage to subgrades and sub-bases from construction operations and inclement weather.

REFERENCE DOCUMENTS

The Contractor must check the currency of documents cited in this section

BRITISH STANDARDS INSTITUTION (BSI)

BS 6677 Clay and calcium silicate pavers for flexible pavements
Part 2 Code of practice for design of lightly trafficked pavements
BS 7533 Guide for structural design of pavements constructed with clay or concrete block pavers.

BRITISH AGGREGATE CONSTRUCTION MATERIALS INDUSTRIES (BACMI)

Information sheet 2 Construction and surfacing of parking areas for medium and heavy weight vehicles.

DEPARTMENT OF TRANSPORT (DOT)

Manual of contract for highway works:
Volume 1 Specification for highway works
Volume 2 Notes for guidance on the specification for highway works
Design manual for Roads and Bridges:
Volume 7 Pavement design and maintenance
Section 2 Pavement design and construction
Part 2: HD25 Foundations

TRANSPORT RESEARCH LABORATORY (TRL)

Laboratory Report 1132 The Structural design of bituminous roads.

WOODWORKING SPECIFICATION

AND WORKMANSHIP

WOODWORK

Generally:

The materials throughout shall be from sources approved by the Architect.

The whole of the timbers shall be the best of their respective kinds, thoroughly well-seasoned, close-grained, uniform in substance, free from sap, shakes, large loose or dead knots, sapwood, waney edges, black markings and any other defects, which impair the strength or appearance of the finished product and shall comply with BS:5268.

Softwood:

The softwood shall comply with BS:5268 and shall be selected from one of the following:

1) Swedish Grade V Redwood;
2) Finnish Grade V Redwood;
3) Russian Grade IV Redwood.

The grade is to be 50 complying with Table 3 and 2 of BS:5268.

The whole of the joinery shall be made in the best and most approved manner and shall be worked in strict accordance with the Engineer's detail drawings.
Joints are to be designed and executed to comply with the requirements of BS 1186:Part 2. All carcassed and framed work shall comply with the requirements of BS 5268.

Finish:

All joinery shall be neatly and fully wrought on all exposed faces unless otherwise described and shall have all exposed arises pencil-rounded. Surfaces of softwood intended for painting shall be such that if properly finished with matt paint, imperfections in manufacture will not be apparent. Surfaces of softwood or hardwood intended for transparent finish shall be such that when so finished, imperfections in manufacture will not be apparent.

Fixing:

Joinery intended to be painted shall be fixed by nails. Nail heads shall be punched below the surface and filled with an approved filler. Joinery intended for polishing shall be secretly fixed. heads of screws on exposed surfaces shall be let in and pelleted in the same wood and with matching grain.

All joinery shall be left in perfect condition, to received the decoration stated, hammer marks and damaged arises will be considered sufficient ground for rejection and the Contractor must include for protecting the work against damage by tradesman. Any joinery which may shrink, warp, wind or become in any way defective before the termination of the defects liability period shall be replaced and must be made good at the Contractor's expense.

All surfaces of joinery, where in contact with brickwork or plasterwork or otherwise unexposed, shall be primed before fixing; the bottom edges of all doors shall be prepared and finished before hanging.

Nails:

Nails shall be wire or cut nails to comply with BS:1201.

Screws:

Screws shall be countersunk wood screws to comply with BS:1210.

Steel screws are to be used in concealed positions not subject to dampness. Brass screws (with brass cups where specified) are to be used on exposed faces of joinery and in positions subject to dampness.

Hardwood:

The hardwoods for joinery work shall be "prime grade of F.A.S." and shall be sustainable forest mahogany as specified on the drawings.

Blockboard:

Shall be best quality British manufacture Gaboon faced if to be painted and is to comply with BS:3444 type boil-resistant. (BR).

Plywood:

The plywood shall be British made to comply with BS:1455 Grade 2 where painted and Grade 3 where hidden or foreign made plywood of equivalent bonding and grade. Plywood to be painted shall be Alder faced. Plywood to be polished shall be Sapele faced or other wood specified by the Architect.

Moisture Content

The moisture content of all timbers for joinery shall be within the limits specified in BS:1186:Part 1 which are to be maintained until the building is completed. The Architect will require evidence of correct ,moisture content to be submitted

to him before the joinery is fixed. The Contractor shall include in his price for the
cost of any kiln drying that may be necessary in order to adjust the moisture content of the timber to within the required limits.

Sizes:

The sizes of all timber members, unless otherwise described are finished sizes. The specified thickness of blockboard, plywood, hardboard, chipboard and other manufactured building boards are the actual thickness.

The specified thickness of the flush doors are the finished sizes.

Notwithstanding the sizes of timber linings and grounds measured and the nominal sizes of bricks measured elsewhere, the Contractor will be held responsible for the provision of timber linings and ground of such sections as are necessary to provide for the wall and plaster thickness specified elsewhere.

Framed Work:

When described as 'Framed' the prices must include for all mortising, tenoning, housing, notching, tonguing, grooving, rounding edges and corners, gluing, wedging and blocking, etc. complete.

Glues

Glues for joinery in exposed positions shall be synthetic resin adhesive to BS:1204, weather and boil proof (Coding W.B.P.). Glues for internal joinery shall be synthetic resin adhesive to BS:1204 Type INT. All gluing is to be done under pressure.

Storing Joinery

None of the joinery shall be delivered until it is required for fixing in the building. Joinery which does not require to be built in as the work proceeds shall not be brought to the Site and fixed until the building is enclosed and the heating is in operation.

The joinery shall be kept under a waterproof cover during transit and shall be similarly covered and kept clear of the ground on the site.

Storage of Timber

All timber shall be properly stacked on the Site to ensure sufficient ventilation and shall be protected against rain or inclement weather by suitable covers.

Flush doors shall be stacked flat under cover in a close shed in accordance with the manufacturer's instructions with timber battens supporting and separating each door.

Pressure Impregnation

Timber described as treated with preservative shall be impregnated with tanalith C dry salt retention 5.3kg/m^3.

Preservatives containing copper chrome arsenate shall not be used. Treatment certificates shall be provided for the Architect.

All timber shall be worked, placed, machined and joints formed before treatment. All ends cut after treatment on or off site shall be liberally swabbed with the preservative fluid, supplied for the purpose by the Manufacturer.

Preparation for Decoration

After inspection and approval by the Architect, joinery scheduled for painting shall be knotted and given one coat of approved primer on all surfaces including the back before fixing.

Manufactured joinery scheduled for painting shall be knotted and given one coat of approved primer on all surfaces including the backs, as soon after manufacture as possible and in the joiner's shop.

Existing joinery in sound condition and scheduled for painting shall be washed with a sugar soap solution, rinsed with clean water and then lightly rubbed down before touching up with primer.

Existing joinery in sound condition but with unsound paintwork shall be stripped down to bare wood and rubbed down before priming all bare wood.

Shop Details

The Contractor shall submit to the Architect approval, any shop or setting out drawings and details before any work is commenced.

Skirtings shall be fixed after the completion of the floor finish and prices shall include for the necessary scribing to the floor finish.

Inclusive Labour

The prices of all rails, architrave's and other general finishings in softwood not exceeding 0.004m^2 in sectional area, and in hardwood not exceeding 0.002m^2,

shall include for fitted ends and all other labours except those specifically mentioned and for which separate items have been given.

The prices shall include for all labours, nails, spikes, glues, screws and for all hoisting and fixing complete.

Timber shall be deemed to be fixed with nails, unless otherwise described and shall include for fixing to sub-frame, framing, joints, etc. or to hardwood blocks or slips.

Workmanship Generally:

The quality of workmanship shall be not less than set out in the provision of BS:1186:Part 2.

All joinery work shall be executed in workmanlike manner and all work described as framed shall be properly mortised, tennoned and wedged.

All joinery work shall be properly wrought on all faces, put together, framed up and cross tongued as required, properly stacked and allowed to dry and any timber twisting or developing any defect shall be replaced before fixing.

All joints shall be properly made and accurately machined to give a tight fit without gaps between the shoulders of joints and abutting surfaces so that both form part of the effective glue area of the joint.

All joints shall be glued under pressure and care shall be taken to ensure full cover of all glued surfaces. Open joints disguised with filler will not be accepted.

All joinery shall be glued up when ready for hanging or fixing and securely fixed. All hardwood where described as screwed shall be fixed with screws, let in, and, where described, pelleted with hardwood pellets to match grain. All nails and pin holes in hardwood timbers and veneers shall be stopped to match grain.

Surfaces of hardwood and softwood for transparent and paint finished shall be such that, when finished, they shall be free from imperfections. Joinery shall be furnished by hand to give a clean wrought face with exposed arises slightly sanded off.

All external joinery components (e.g. frames, etc.) where described as joined together on site to form a composite unit shall have relevant and adjacent faces butted together and jointed with mastic before screwing up.

Joinery shall not be primed before inspection by the Architect.

In the event of the Contractor not making the joinery himself the firm supplying the joinery shall be approved by the Architect and made aware by the Contractor of all specification clauses relating to joinery.

hangars, straps, fixings etc. shall be purpose made and of the manufacture or performance stated on the drawings. Metal work shall be pressed or welded construction, hot drip galvanised after fabrication or made from pre galvanised sheet. Steel for metal work shall be a minimum 2.5mm thickness unless specified otherwise on the drawings.