Bedford Passage Development

Onsite Pavement Build-up Specification

Middlesex Annexe LLP

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Quality information

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Preamble to the Specification

The Specification referred to in this document is based on NBS Building 5.6.3 by RIBA Enterprises Ltd 2016.

Q20 Granular sub-bases to roads/ pavings

110 THICKNESSES OF SUB-BASE/ SUBGRADE IMPROVEMENT LAYERS
- Thicknesses: See sections: Q20.

120 CHECKING OF SUBGRADES
- Anticipated subgrade conditions:
  - Soil type: Made Ground.
  - Plasticity index: approx. 21% - 22%, taken from the Middlesex Hospital Annexe Site Investigation Report (Concept, 2018).
  - CBR (minimum): 1.0%, estimated by the Geotechnical Engineer following a review of the Middlesex Hospital Annexe Site Investigation Report (Concept, 2018).
  - Depth below formation level to groundwater table: approx. 480mm below formation level.
- Subgrade variation: If material appears to vary from anticipated conditions, or if there are extensive soft spots, test subgrade CBR to BS EN 1997-2.
- Submit: Results and obtain instructions before proceeding.

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

145 PREPARATION AND COMPACTION OF SUBGRADES
- Timing: Immediately before placing sub-base.
- Soft or damaged areas: Excavate and replace with sub-base material, compacted in layers 150 mm (maximum) thick.
- Compaction: Thoroughly, by roller or other suitable means, adequate to resist subsidence or deformation of the subgrade during construction and of the completed roads/ pavings when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.

150 SUBGRADES FOR VEHICULAR AREAS
- Preparation and treatment: To Department for Transport ‘Specification for highway works’, clauses 616 and 617.

200 SUBGRADE IMPROVEMENT LAYER (CAPPING)
- To be provided only if testing of subgrade at formation level indicates CBR is less than 2.5%.
- Material: To Department for Transport ‘Specification for highway works’, table 6/1, Class 6F1 or 6F2.
- Standard: Placed and compacted to Department for Transport ‘Specification for highway works', table 6/1, clauses 612 and 613.3, 613.8, 613.9, 613.10 and 613.13.

210 TYPE 1 UNBOUND MIXTURE FOR SUB-BASE
- Material: Type 1 unbound mixture to Department for Transport ‘Specification for highway works’, clauses 801 and 803.
  - Recycled aggregate: Permitted.
- Compaction: To Department for Transport ‘Specification for highway works’, clause 802.

211 GRANULAR MATERIAL
- Quality: Of a known suitability for use in sub-bases, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50kN when tested in a soaked condition to BS 812-111 or a resistance to fragmentation of LA50 for the Los Angeles test to BS EN 1097-2, and in any one layer only one of the following:

  - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
  - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
  - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
  - Natural gravel.
  - Natural sand.
- Filling: Spread and levelled in 150 mm maximum layers, each layer thoroughly compacted.

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

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

240 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS
- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
- Standard: To Department for Transport ‘Specification for highway works’ clause 802.
- At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.

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

310 ACCURACY
- Permissible deviation from required levels, falls and cambers (maximum):
  - Subgrades:
    Roads and parking areas: +20 -30 mm.
    Footways and recreation areas: ± 20 mm.
  - Sub-bases:
    Roads and parking areas: ± 20 mm.

    Footways and recreation areas: ± 12 mm.

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

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

Q21 In situ concrete roads/ pavings/ bases

GENERAL/ PREPARATION

140 READY-MIXED CONCRETE

- Production plant: Currently certified by a body accredited by UKAS to BS EN ISO/IEC 17065 for product conformity certification.
- Source of ready-mixed concrete: Obtain from one source if possible. Otherwise, submit proposals.
  - Name and address of depot: Submit before any concrete is delivered.
  - Delivery notes: Retain for inspection.
- Declarations of nonconformity from concrete producer: Notify immediately.

141A SITE MIXED CONCRETE

- Batching by mass:
  - To BS 8002
  - Accuracy of measuring devices: To BS EN 206-1, clause 9.6.2.2
  - Tolerances for quantity of constituent material: To BS EN 206-1, table 21.
- Mixing: To BS 8000-2.1, subsections 2, 3 and 4.

142A RECYCLED AGGREGATE

- Standard: To BS 8500-2, clause 4.3 and BS EN 12620.
- Contractor to submit proposals to Designer.

155 PROJECT TESTING OF CONCRETE - GENERAL

- Testing: To BS EN 206-1, annex B and BS 8500-1, annex B.
- Recording: Maintain complete correlated records including:
  - Concrete designation.
  - Sampling, site tests, and identification numbers of specimens tested in the laboratory.
  - Location of the parts of the structure represented by each sample.
  - Location in the structure of the batch from which each sample is taken.
- Testing laboratory: Accredited by UKAS or other national equivalent.
- Tests results:
  - Submission of reports: Within one day of completion of each test.
    Number of copies: 2.
  - Reports on site: A complete set, available for inspection.
- Nonconformity: Obtain instructions immediately.

160A INITIAL PROJECT TESTING OF CONCRETE C32/40

- Tests: Compressive strength.
- Sampling
  - Point: At site.
  - Number of batches: 50.
  - Number of samples from each batch: 2.

LAYING CONCRETE

310 TRANSPORTING CONCRETE

- General: Avoid contamination, segregation, loss of ingredients, excessive evaporation and loss of workability. Protect from heavy rain.
- Entrained air: Anticipate effects of transport and placing methods in order to achieve specified air content.
- Placing: Use suitable walkways and barrow runs for traffic over reinforcement and freshly placed concrete.

320 LAYING CONCRETE GENERALLY

- Timing: Place as soon as practicable after mixing and while sufficiently plastic for full compaction. After discharge from the mixer do not add water or retemper.
- Temperature of concrete at point of delivery:
  - In hot weather (maximum): 30°C.
  - In cold weather (minimum): 5°C.
- Cold weather:
  - Do not use frozen materials.
  - Do not place concrete against frozen or frost covered surfaces.
  - Do not place concrete when air temperature is below 3°C on a falling thermometer. Do not resume placing until rising air temperature has reached 3°C.
- Surfaces on which concrete is to be placed: Free from debris and standing water.
- Placing in final position: Place in one continuous operation up to construction joints.
  - Do not place concrete simultaneously on both sides of movement joints.
- Spreading: Spread and strike off with surcharge sufficient to obtain required compacted thickness.
- Adjacent work: Form neat junctions and prevent damage. Keep clean all channels, kerbs, inspection covers, etc.

330 COMPACTING

- General: Fully compact concrete to full depth (until air bubbles cease to appear on the surface) especially around reinforcement, cast-in accessories, into corners and at joints.
- Poker vibrators: Do not use to make concrete flow into position. Do not allow to come into contact with fabric reinforcement.
- Wet formed joint grooves: Rectify any irregularities by means of a vibrating float.
- Finish: A dense, even textured surface free from laitance or excessive water.
  - Excess concrete: Remove from top of groove formers.

340 MANHOLE COVER AND GULLY GRATING FRAMES

- General: Set frames in independent concrete slabs placed over, but slightly larger than, exterior of manhole shaft or gully pot and any concrete surround.
- Positioning of joints in main slab: Set out so that manhole/ gully slabs are adjacent to a main transverse joint, wherever possible.
- Joints: Separate the independent slabs from main slabs with 25 mm thick joint filler board. Set board 20 mm below top of slab to form a sealing groove.

350 LEVELS

- Lines and levels of finished surface: Smooth and even, with regular falls to prevent ponding.
- Finished surfaces: Within ±6 mm of required levels (+6 or -0 mm adjacent to gullies and manholes).

JOINTS

410 JOINTS GENERALLY

- Layout: All joints to be accurately located, straight and well aligned.
- Construction joints made at end of working day: Form as contraction joints.
- Modifications to joint design or location: Submit proposals.
- Temporary support: Prior to concreting, set formwork, dowel bars, tie bars, joint filler boards, sealing groove fillets and the like rigidly in position and support to prevent displacement. Maintain support until concrete has set.
- Keep clean:
  - Do not allow concrete to enter gaps or voids in formwork or to render movement joints ineffective.
  - Do not allow concrete to impregnate or penetrate materials used as compressible joint fillers.

610 CURING

- General: Immediately after completion of surface treatment prevent evaporation from surface and exposed edges of slabs for a minimum period of seven days.
- Early curing:
  - Cover with waterproof sheeting held clear of surface. Seal against draughts at edges and junctions.

  - Do not apply sprayed compounds or sheets in direct contact until surface is in a suitable state and will not be marked.
- Coverings for curing: Contractor's choice of:
  - Impervious sheet material.
  - Resin based aluminized curing compound containing a fugitive dye and with an efficiency index of 90% when tested to BS 7542.
  - Sprayed plastics film.

615A CURING PERIODS RIGID BASE

- General: Curing periods are in days (minimum).
  - Definition of 't': The average surface temperature of concrete in degrees Celsius during the curing period.
- Curing periods:
  - To BS 8110-1.

Q24 Interlocking brick/ block roads/ pavings

132A NATURAL STONE SETT PAVING WITH BOUND BASE TO PAVEMENTS

- Subgrade improvement layer: As section Q20.
- Granular sub-base: Type 1 unbound mixture to Department for Transport 'Specification for highway works', clauses 801 and 803, as section Q20.
  - Thickness: Refer to drawing MHA-ACM-XX-XX-DR-C-00020.
- Base: Concrete as section Q21.
  - Thickness: Refer to drawing MHA-ACM-XX-XX-DR-C-00020.
- Laying course: In accordance with BS 7533-4
- Setts: Refer to Landscape Architect drawings and specifications.
- Jointing:
  - Material: In accordance with BS 7533-4
  - Joint width: 6-10mm for 50mm impermeable Yorkstone and 8-12mm for 50mm Granite setts.
- Setting out: Refer to Landscape Architect drawings and specifications.
- Sealer/ Stabilizer: Refer to Landscape Architect drawings and specifications.
- Accessories: Refer to Landscape Architect drawings and specifications.

EXECUTION

205 EXECUTION GENERALLY - NATURAL STONE PAVING

- Standard: In accordance with BS 7533-4
- Subgrade, sub-base and road base presentation: Tight and dense surface, to prevent loss of laying course material into it during construction and use.
- Joint filling: Do not work in damp conditions. Top joints up at the earliest opportunity.

240 ADVERSE WEATHER

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

420 TOOLED JOINTS IN MORTAR BEDDED UNITS

- Jointing: Butter ends of units with bedding mortar as work proceeds, to fill joints.
  - Joint width: 6-10 mm or 8-12 mm (see 132A).
  - Finish: Tool to a neat flush profile.

430A SEALANT MOVEMENT JOINTS IN MORTAR BEDDED UNITS

- Spacing: 6.0 m.
- Extent of joints: Through edge units, haunching and foundation.
- Joint filler: Compressible cellular rubber or plastics compatible with specified sealant. Build in as work proceeds.
  - Joint width: 25 mm.
- Barrier (joint breaker): As recommended by sealant manufacturer. Position filler and barrier accurately to fully support sealant at recommended distance from exposed faces of units.
- Sealant: High performance trafficable joint sealant.

452 PREPARED EXISTING AND NEW BOUND BASES (ROADBASES)

- Condition before placing laying course: Sound, clean, free from rutting or major cracking and cleared of sharp stones, projections or debris.

485 LAYING BLOCKS/ PAVERS/ SETTS

- Setting out: Start from an edge restraint.
- Cutting: Cleanly, accurately and vertically, without spalling. Do not mark or damage visible surfaces.
- Cut edges: Turn inwards where possible; do not position against edge restraints or other features.
- In situ mortar or concrete infill: Do not use.

- Compaction: Vibrate to produce thoroughly interlocked paving of even overall appearance with regular joints and accurate to line, level and profile. Do not mark or damage paving units, kerbs and adjacent work.
  - Concrete blocks and clay pavers: In accordance with BS 7533-3, Annex F, to site category required for laying course material.

500 REGULARITY OF PAVED SURFACES

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

505 REGULARITY OF PAVED SURFACES

- Maximum undulations in the surface of pavings (except tactile paving surfaces) under a 1 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface): 3 mm.
- Joints between paving units or utility access covers:
  - Joints flush with the surface: difference in level between adjacent units to be no more than twice the joint width (with a 5 mm max difference in level).
  - Recessed, filled joints: difference in level between adjacent units to be no greater than 2 mm; the recess to be no deeper than 5 mm.
  - Unfilled joints: difference in level between adjacent units to be no greater than 2 mm.
- Sudden irregularities: Not permitted.