B1 EXCAVATING AND FILLING

To be read with Preliminaries/General conditions.

GENERALLY/THE SITE

B1.1 GROUND WATER LEVEL on the site is not known. Make all necessary enquiries concerning ground water level and allow for variations from this level when working on any part of the site.

CLEARANCE/EXCAVATING

B1.2 SITE FEATURES: Before starting work verify with CA which existing fences, gates, walls, roads, paved areas and other site features are to be removed. Materials arising are to be removed from site.

B1.3 REMOVING TREES, SHRUBS AND HEDGES:
- Before starting work verify with CA which trees, shrubs and hedges are to be removed.
- Check for below and above ground services in the vicinity. Inform CA if they may be affected and obtain instructions before proceeding.
- Comply with Forestry and Arboriculture Safety and Training Council Safety Guides.
- Cut down, grub up main roots and dispose of all wood.
- Take down trees carefully in small sections to avoid damage to adjacent trees that are to be retained, where tree canopies overlap and in confined spaces generally.
- Comply with the Dutch Elm Disease (Restriction on Movement of Elms) Order.

B1.4 SITE CLEARANCE:
- Clear site of rubbish and vegetation.
- Grub up and dispose of large roots without undue disturbance of soil and adjacent areas.
- Do not use herbicide without approval.

B1.5 CULTIVATED TURF: Before starting work verify with CA which areas of turf are to be retained. At the Contractor's discretion, cost and/or profit, other turf may be either:
- Lifted and sold, or
- Left to be incorporated with the existing topsoil.

B1.6 MATERIALS ARISING from the excavations and surplus to requirements for filling are to remain the property of the Employer unless the Contractor:
- Is instructed to remove them from the site, or
- Purchases them at a price to be agreed.

B1.7 STRIPPING TOPSOIL:
- Before beginning general excavation or filling, excavate topsoil from areas where there will be regrading, buildings, pavings/roads and other areas where specified.
- Avoid compaction by plant and contamination by subsoil, stone, hardcore or rubbish.
- At the time of excavation the topsoil must be reasonably dry and never wetter than the plastic limit.
- Do not remove topsoil from below the spread of trees to be retained.

B1.8 TOPSOIL: Not less than two weeks before excavating topsoil treat with a suitable herbicide.

B1.9 BENCHING: Surfaces of excavations with a gradient greater than 1 in 5 which are to receive filling must have horizontal benches cut to match the depths of compacted layers of filling.

B1.10 ACCURACY: Permissible deviations from formation levels:
- Beneath mass concrete foundations: +/-25 mm
- Beneath ground bearing slabs and r.c. foundations: +/-15 mm

- Embankments and cuttings: +/-50 mm
- Ground abutting external walls: +/-50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

B1.11 FORMATIONS GENERALLY:
- Remove the last 150 mm of excavations just before inspection. Trim excavations to required profiles and levels, and remove all loose material.
- Unless otherwise instructed seal formations within 4 hours of inspection with concrete or other specified fill.

B1.12 FOUNDATIONS GENERALLY: Obtain instructions if:
- A natural bearing formation of undisturbed subsoil is not obtained at the depth shown on the drawings.
- The formation contains soft or hard spots or highly variable material.

B1.13 TRENCH FILL FOUNDATIONS:
- Excavate the whole depth of the trench down to formation by machine in one operation. Make advance arrangements with CA for inspection of formation as soon as it is exposed.
- Unless otherwise instructed place concrete immediately after inspection.

B1.14 FOUNDATIONS IN MADE UP GROUND: Excavate down to a natural formation of undisturbed subsoil. Obtain instructions if this is at a lesser depth than that shown on the drawings.

B1.15 UNSTABLE GROUND: Inform CA without delay if any newly excavated face will not remain unsupported sufficiently long to allow the necessary earthwork support to be inserted. If the instability is likely to affect adjacent structures or roadways, take appropriate emergency action until instructions are obtained.

B1.16 RECORDED FEATURES: Break out old foundations, beds, drains, manholes, etc. where and to the extent stated on the drawings. Seal off drain ends, remove contaminated earth and disinfect as required by local authority. Backfill as specified on drawings.

B1.17 UNRECORDED FEATURES: Where old foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered, do not disturb or enter and obtain instructions before proceeding.

B1.18 EXISTING WATERCOURSES which have been diverted and are to be filled must be cleared of all vegetable growths and soft deposits before filling.

B1.19 EXCESS EXCAVATION: Backfill any excavations taken:
- Wider than required with the material specified for backfilling.
- Deeper than required with well graded granular material or lean mix concrete.

DISPOSAL OF MATERIALS

B1.20 TOPSOIL: Stockpile all excavated preserved topsoil in temporary spoil heaps or remove from site as instructed

B1.21 SURPLUS EXCAVATED TOPSOIL AND SUBSOIL: Spread and level on site or remove from site as instructed

B1.22 WATER: Keep all excavations free from water until formations are covered and below ground constructions are completed.

B1.23 GROUND WATER LEVEL: Inform the CA immediately if it is considered that the excavations are below the water table so that the ground water level can be determined.

B1.24 PUMPING:
- Do not disturb excavated faces or the stability of adjacent ground or structures.

- Avoid flooding of the site, or adjoining property, by disposal of pumped water.
- Construct sumps clear of the excavations and fill as specified on completion.

FILLING

B1.25 HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS:

- Do not import or use fill materials which would, either in themselves or in combination with other material or ground water, give rise to a health hazard, damage to building structures or instability in the filling.

B1.26 PLACING FILL GENERALLY:

- Ensure that excavations and areas to be filled are free from loose soil, rubbish and standing water.
- Do not use frozen materials or materials containing ice. Do not place fill on frozen surfaces.
- Take all necessary precautions to ensure stability of adjacent structures. Place and compact fill against structures, membranes or buried services in a sequence and manner which will ensure stability and avoid damage.
- Plant employed for transporting, laying and compacting must be suited to the type of material.
- Lay differing materials separately so that only one type of material occurs in each layer.

B1.27 GENERAL LANDSCAPE SUBSOIL FILLING:

- Materials arising from the excavations or imported, capable of compaction by light earthmoving plant to form free draining ground, and excluding the following:
  - Material from marshes or bogs.
  - Peat, logs, stumps, slurry, mud and perishable material.
  - Material susceptible to spontaneous combustion.
  - Material in a frozen condition.
  - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
  - Material with excessive moisture content.
- Lay in layers not more than 200 mm thick and consolidate each layer with the earthmoving plant to exclude large voids but without overcompaction.

B1.28 COMPACTED SUBSOIL FILLING:

- Materials arising from the excavations or imported, but excluding the following:
  - Material from marshes or bogs.
  - Peat, logs, stumps, slurry, mud and perishable material.
  - Material susceptible to spontaneous combustion.
  - Material in a frozen condition.
  - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
  - Material with excessive moisture content.

  If both suitable and unsuitable material is excavated, select and keep separate sufficient suitable material. If there is insufficient suitable excavated material provide CA with details and obtain instructions regarding the importation of material.
- Ensure that at time of placing and compacting the moisture content of cohesive subsoils is such that they just bind together when squeezed in the hand. Adjust the moisture content of the cohesive subsoil as necessary to achieve adequate compaction, if necessary by delaying the timing of the work.
- Spread material in layers and as soon as possible thereafter compact each layer using plant and methods suitable to the type of material.
- Well in advance of starting work submit details of:
  Materials to be used
  Proposed type of plant
  Proposed maximum depth of each compacted layer
  Proposed minimum number of passes per layer.

B1.29 COMPACTED GRANULAR FILLING:

- Materials arising from the excavations (or, where instructed, imported) as defined below. If both suitable and unsuitable material is excavated, select and keep separate sufficient suitable material. If there is insufficient suitable excavated material provide CA with details and obtain instructions regarding the importation of material.
  - Well graded sands and gravels with a uniformity coefficient of more than 10.
  - Crushed hard rock or quarry waste (other than chalk).

- Crushed concrete, crushed brick or tile, free from plaster, wood, organic material and rubbish.
- Sound blastfurnace slag (other than from steelmaking foundries)
- Well burnt nonplastic shale.

- Spread and level material in layers and as soon as possible thereafter compact each layer using plant and methods suitable to the type of material. Well in advance of starting work submit details of proposed:
  Type of plant
  Maximum depth of each compacted layer
  Minimum number of passes per layer.

B1.30 BACKFILLING TO FOUNDATIONS:

- Under oversite concrete and pavings: Hardcore as clause B1.31.
- Under grassed or landscaped areas: Material excavated from the trench, laid and compacted in layers not exceeding 300 mm thick.

B1.31 HARDCORE:

- Granular material, free from harmful matter and excessive dust, well graded, passing a 75 mm 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 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
  - Sound blastfurnace slag (other than from steelmaking foundries)
  - Unburnt colliery spoil (minestone).
- Spread and level both backfilling and general filling in layers not exceeding 150 mm. Thoroughly compact each layer with a vibratory roller, vibrating plate compactor, vibro-tamper, power rammer or other suitable means.

B1.32 VENTING HARDCORE LAYER:

- Clean granular material, well graded, passing a 75 mm BS sieve but retained on a 20 mm BS sieve and in any one layer one of the following:
  - crush hard rock
  - crushed concrete, crushed brick or tile, free from plaster, timber and metal
  - gravel.
- spread and level both backfilling and general filling in layers not exceeding 150 mm. Thoroughly compact each layer using a vibrating roller, vibrating plate compactor, vibro-tamper, power rammer or other suitable means.

B1.33 BLINDING:

- Surfaces to receive sheet overlays or concrete to have sufficient sand, fine gravel, PFA or other approved fine material applied to fill interstices and provide a close smooth surface.
- Permissible deviations on surface level: +0 -25 mm.

TOPSOIL AREAS

B1.34 GRADE SUBSOIL to smooth flowing contours and to achieve the specified finished levels of the topsoil. Excavate locally as necessary for areas of thicker topsoil. Small planting beds located in general landscape areas may be excavated separately at a later date.

B1.35 LOOSEN SUBSOIL consisting of light, noncohesive material with a 3 tine ripper, drawn 300 mm deep at 600 mm centres in two directions obliquely across the slope, when ground conditions are reasonably dry.

B1.36 LOOSEN SUBSOIL consisting of stiff clays or other cohesive material with a single tine ripper, driven 450 mm deep at 1 m centres and drawn by a crawler tractor in two directions obliquely across the slope, when ground conditions are reasonably dry.

B1.37 LIGHTLY SCARIFY subgrades consisting mostly of rock or chalk to promote free drainage.

B1.38 UNDISTURBED TOPSOIL WHICH IS TO BE LANDSCAPED: Prepare as necessary to ensure that the topsoil is in a suitable state for the cultivation operations specified in sections Q30 and/or Q31. In particular:
- Where the ground is hard, break up with a ripper operated in transverse directions, removing any roots and boulders.
- Where the ground is covered with turf or a thick sward plough or dig over to the full depth of the topsoil.
- After any such cultivation leave fallow During this period treat with a suitable herbicide at appropriate times to prevent seeding of weeds.

B1.39 IMPORTED TOPSOIL
- Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.
- To BS 3882.
- From an approved source.
- Provide a declaration of analysis including information detailing each of the relevant parameters given in BS 3882, clause 6 and table 2 for the grade of topsoil specified.
- Obtain approval of a sample load of not less than 5 cu m. Retain for comparison with subsequent loads.

B1.40 IMPORTED TOPSOIL: Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.

B1.41 CONTAMINATION: Do not use topsoil contaminated with subsoil, rubbish, oil based products, or other materials toxic to plant life. Dispose of contaminated topsoil as instructed.

B1.42 SPREAD TOPSOIL over prepared subsoil in layers not exceeding 150 mm and firm each layer before spreading the next. At the time of laying, both the material and the weather must be reasonably dry.

B1.43 FINISHED LEVELS OF TOPSOIL after settlement, unless otherwise stated, to be:
- 30 mm above adjoining paving or kerbs,
- Unchanged where abutting existing trees,
- Not less than 150 mm below dpc of adjoining buildings,
- 30 mm higher for shrub areas than for adjoining grass areas,
- Married-in with adjoining soil areas.

P2 GRANULAR SUB-BASES TO ROADS/PAVINGS

To be read with Preliminaries/General conditions.

P2.1 THICKNESSES OF SUB-BASE/SUBGRADE IMPROVEMENT LAYERS are specified in the following related sections:
P3 Coated macadam/Asphalt roads/pavings
P4 Interlocking brick/block roads/pavings
P5 Slab/Brick/Sett/Cobble pavings.

P2.2 HERBICIDE: Apply an approved type of herbicide in accordance with manufacturer's recommendations to subgrade

P2.3 COMPACTION OF SUBGRADE:
- Defer final excavation to formation level until immediately before compaction of subgrade.
- Soft spots must be brought to the attention of the CA.
  Obtain instructions before proceeding.
- Subgrade must be relatively dry at time of compaction.
- Where use of a roller is impracticable use a suitable mechanical rammer.
- Where local excavation and backfilling has taken place make additional passes of the roller.

P2.4 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.

P2.5 SUBGRADE FOR PEDESTRIAN AREAS: Immediately before placing sub-base thoroughly compact subgrade with a roller weighing not less than 2.5 tonnes or equivalent other plant.

P2.6 GRANULAR MATERIAL: Free from harmful matter and excessive dust, well graded, passing a 75 mm 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 material 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, and with no large lumps of clay
- Sound blastfurnace slag (other than from steelmaking foundries)
- Unburnt colliery spoil (minestone).

P2.7 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.

P2.8 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS: Spread and level in layers and 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.

P2.9 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.

P2.10 ACCURACY: Maximum permissible deviation from the required levels, falls and cambers to be as follows:

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

P2.11 BLINDING: Surfaces to receive interlocking brick or block paving to section Q24 to have sufficient sand, fine gravel, PFA or other approved fine material applied and surface vibrated to provide a close and smooth surface.

P2.12 COLD WEATHER WORKING:
- Do not use frozen materials containing ice.
- Do not lay materials on frozen surfaces.

P2.13 PROTECTION:
- Cover sub-bases as soon as practicable with subsequent layers, specified elsewhere.
- Prevent damage to subgrades and sub-bases from construction traffic, construction operations and inclement weather.

P3 COATED MACADAM/ASPHALT ROADS/PAVINGS

To be read with Preliminaries/General conditions.

TYPE(S) OF PAVING

P3.1 COATED MACADAM PAVING
- Materials and workmanship to BS 4987.
- Granular sub-base as section P2.

P3.2 SURFACE TREATMENT TO EXISTING PAVING:
Before applying dressing ensure that the existing surface is clean and dry and all patching work is complete.

PREPARATORY WORK/REQUIREMENTS

P3.3 TIMBER EDGING
- 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 V3 and British Wood Preserving and Damp-proofing Association Commodity Specification C4.
Type/desired service life: CCA or Creosote, 20 years.

LAYING

P3.4 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 atmospheric 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.

P3.5 LEVELS of finished surface to be within B 6 mm of required levels (+6 mm -0 mm adjacent to gullies and manholes).

P3.6 CONTRACTOR'S USE OF PAVEMENTS:
- Defer laying of final surfacing until as late as practicable in the contract.
- Immediately before laying final surfacing, thoroughly clean and make good the roadbase/basecourse, allow to dry and uniformly apply, without puddles, a tack coat of sprayed bitumen emulsion of a suitable grade to BS 434: Part 1 at 0.3 to 0.5 litres/m2. Allow emulsion to break completely before applying surfacing.

P3.7 UNCOATED CHIPPINGS FOR SURFACE 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, Tables 8 and 9; adjust application rate for modified binders in accordance with manufacturer's instructions. Dress with chippings at a rate to achieve 100-105% 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 degC. Carry- out further removal of loose chippings disturbed by traffic as necessary.

P3.8 PAVEMENT MARKING

- Paint: To BS 6044, Type A.
  Reflectorisation: Uniformly apply solid glass beads to Class B of BS 6088 on wet paint film at rate of 400-500 g/sq m.
- Surfaces to receive markings must be clean and dry. Remove all loose material and apply paint uniformly with no streaks or ragged edges. Use thinners in accordance with paint manufacturer's instructions.