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FIRST STREET PLOT 9A

CIVILS SPECIFICATION

FIRST STREET PLOT 9A

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Project no. **1620002943**
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Q10

KERBS/ EDGINGS/ CHANNELS/ PAVING ACCESSORIES

TYPES OF KERBS/EDGINGS AND CHANNELS

170 Linear slot drainage channels Type A

- Manufacturer: [ACO Technologies plc](#)
 - Contact details
 - Address: ACO Technologies plc
ACO Business Park
Hitchin Road
Shefford
Bedfordshire
SG17 5TE
 - Telephone: [+44 \(0\)1462 816666](tel:+44(0)1462816666)
 - Web: www.aco.co.uk
 - Email: technical@aco.co.uk
 - Product reference: [ACO MultiDrain M100D Brickslot and M100DS Brickslot \(M100D Brickslot\)](#)
- Material: Galvanized steel-edged channel and galvanized steel slot top.
- Integral accessories: Sump unit with removable recessed cover and galvanized steel sediment bucket.
Endcap, closing piece.
Endcap, inlet/ outlet.
Inspection unit with removable galvanized steel inspection lid.
- Type of fall: Constant invert.
- Bore (nominal): 100 mm.

170 Linear slot drainage channels Type B

- Manufacturer: [ACO Technologies plc](#)
 - Contact details
 - Address: ACO Technologies plc
ACO Business Park
Hitchin Road
Shefford
Bedfordshire
SG17 5TE
 - Telephone: [+44 \(0\)1462 816666](tel:+44(0)1462816666)
 - Web: www.aco.co.uk
 - Email: technical@aco.co.uk
 - Product reference: [ACO MultiDrain M150D Brickslot and M150DS Brickslot \(M150D Brickslot\)](#)
- Material: Galvanized steel-edged channel and galvanized steel slot top.
- Slot body
 - Material: BrickSlot access unit galvanized steel single slot offset
BrickSlot top galvanized steel single slot offset
- Load class (minimum): D 400.
- Integral accessories:
 - Sump unit with sediment bucket.
 - Universal Endcap.

- Fall: Constant invert.
- Invert depth: Refer to below ground drainage drawings.
- Bore (nominal): 150 mm.

180 Drainage channels with gratings Type A

- Manufacturer: [ACO Technologies plc](#)
 - Contact details
 - Address: ACO Technologies plc
ACO Business Park
Hitchin Road
Shefford
Bedfordshire
SG17 5TE
 - Telephone: [+44 \(0\)1462 816666](tel:+44(0)1462816666)
 - Web: www.aco.co.uk
 - Email: technical@aco.co.uk
 - Product reference: [ACO Multidrain MD \(23075 - ACO MultiDrain® M100D No. 075 Shallow Drainage Channel with Galvanised Rail 1000mm D 400\)](#)
- Standard: To EN 1433: 2002.
- Third party certification: CE Approved.
- Material: Polymer concrete.
- Gratings
 - Colour: Natural.
- Load class (minimum): D 400.
- Integral accessories:
 - 23404 ACO MultiDrain® M100D Multifunctional End Cap.
 - 44355 150/225/350 Grating and Frame 400mm D 400.
 - 23410 ACO MultiDrain® M100D Universal Sump with Galvanised Rail and Plastic Silt Bucket 500mm D 400.
 - 23405 ACO MultiDrain® M100D/PPD Heelguard™ Ductile Iron Grate 500 mm D 400.
- Invert depth: Refer to below ground drainage drawings.
- Type: Non-sloping.
- Dimensions: Refer to below ground drainage drawings.

LAYING

510 Laying kerbs, edgings, and channels

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

520 Adverse weathers

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

530 Concrete for foundations, races and haunching

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

540 Cement mortar bedding

- General: To section Z21.
- Mix (Portland cement: sand): 1:3.
 - Portland cement: Class CEM I 42.5 to BS EN 197-1.
 - Sand: to BS EN 12620, grade 0/4 or 0/2 (MP).
- Bed thickness: 12-40 mm.

550 Kerb dowels

- Dowels: Steel bar to BS 4482.
 - Size: 12 mm diameter, 150 mm long.
- Installation of dowels: Vertically into foundation while concrete is plastic.
 - Centres: To suit holes in kerbs.
 - Projection: 75 mm.
- Grouting of holes in kerbs: Filled with 1:3 cement: sand mortar finished flush.

560 Haunching dowels

- Dowels: Steel bar to BS 4482.
 - Size: 12 mm diameter, 150 mm long.
- Installation of dowels: Vertically into foundation while concrete is plastic.
 - Centres: 450 mm.
 - Distance from back face of kerb: 50 mm.
 - Projection: 75 mm.
- Haunching: Rectangular cross section, cast against formwork, fully enclosing, and protecting dowels.

570 Channels

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

580 Drainage channel systems

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

590 Drainage channel systems with built in fall

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

600 Radius kerbs/ channels

- Usage: Radii of 15 m or less.

620 Accuracy

- Deviations (maximum)

- Level: ± 6 mm.
- Horizontal and vertical alignment: 3 mm in 3 m.

625 Regularity of paved surfaces

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

630 Narrow mortar joints

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints filled, tightly butted and surplus mortar removed immediately.
 - Joint width: 3 mm.

640 Tooled mortar joints

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints filled and tooled to a neat flush profile.
 - Joint width: 6 mm.

641 Tooled colored mortar joints

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints filled and raked out to a depth of 10 mm for pointing.
 - Joint width: 6 mm.
- Pointing: Joints refilled and tooled to a neat flush profile.
 - Pointing mortar: 1:3 cement: sand.
 - Pigment colour: Select from list

650 Sealant movement joints

- Joint filler: Compressible cellular rubber or plastics compatible with specified sealant.
- Filler installation: Built in as work proceeds, extending through haunching and foundation. Filler positioned accurately to fully support sealant at the recommended depth below exposed faces of units.
- Joint width: Refer to external works drawings.
- Sealant: Refer to external works drawings.
 - Colour: Colour match to kerbs
- Sealant application: As section Z22.

Q20

GRANULAR SUB-BASES TO ROADS/ PAVINGS

TO BE READ WITH PRELIMINARIES/ GENERAL CONDITIONS.

110 Thicknesses of sub-base/ subgrade improvement layers

- Thicknesses: See sections: Refer to external works drawings.

120 Checking of subgrades

- Anticipated subgrade conditions
 - Soil type: Refer to ground investigations.
 - Plasticity index: Refer to ground investigations.
 - CBR (minimum): Assume 2.5% for Stage 3.
 - Depth below formation level to groundwater table: Refer to ground investigations.
- Subgrade variation: If material appears to vary from anticipated conditions, or if there are extensive soft spots, test subgrade CBR to BS 1377-4.
- Submit: Results and obtain instructions before proceeding.

130 Herbicides

- Type: Translocated, selective
- Application: To subgrade of footpath.

140 Excavation of subgrades

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

145 Preparation and compaction of subgrades

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

150 Subgrades for vehicular areas

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

170 Geotextile filter/ separator membrane

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Jointing: 300 mm overlap
- Protect from
 - Exposure to light, except during laying (maximum five hours).
 - Contaminants.

- Materials listed as potentially deleterious by geotextile manufacturer.
- Damage, until fully covered by fill.
- Wind uplift, by laying not more than 15 m before covering with fill.
- Preparation: Remove humps and sharp projections and fill hollows before laying.

175 Impermeable membranes

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Jointing: 300 mm overlap
- Protect from:
 - Exposure to light, except during laying (maximum five hours).
 - Contaminants.
 - Materials listed as potentially deleterious by geotextile manufacturer.
 - Damage, until fully covered by fill.
 - Wind uplift, by laying not more than 15 m before covering with fill.
- Preparation: Remove humps and sharp projections and fill hollows before laying.

180 Notice

- Give notice: After preparation and compaction of subgrades
For inspection of granular sub-base material before spreading
On completion of compaction of sub-base
 - Period of notice: 5 working days

200 Subgrade improvement layer (capping)

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

210 Highways agency Type 1 unbound mixture for sub-base

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

211 Granular materials

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

215 Coarse graded aggregate for permeable paving

- Description: - HYDRAULICALLY BOUND
- Material: Hard crushed rock

- Standard: To BS EN 13242 and paving manufacturers recommendations.
- Aggregate size: 4/20
- Grading: As Interpave 'Guide to the design, construction and maintenance of concrete block permeable pavements edition 6', table 12
- Other properties: As Interpave 'Guide to the design, construction and maintenance of concrete block permeable pavements edition 6', table 13
- Testing
 - Materials: Provide suppliers' certificates for grading and specified properties
 - Sub-base: Not required
- Laying: Lay in 150mm thick layers and lightly compact to ensure maximum density and aggregate interlock without crushing individual particles or unacceptably reducing the void ratio
- Protection: Prevent damage by traffic and contamination by mud and soil.

220 Frost susceptible granular material

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

225 Placing of material with high sulfate content

- Standard: To Highways Agency 'Specification for highway works', clauses 801.2 and 801.3.
 - Separation distance (minimum): Increased to 1000 mm

230 Placing granular material generally

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

240 Laying granular sub-bases for vehicular areas

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

241 Laying granular sub-bases for vehicular areas

- Proposals: Well in advance of starting work submit details of:
 - Maximum depth of each compacted layer.
 - Type of plant.
 - Minimum number of passes per layer.
- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
- At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.
- Defective areas: Remove loose, segregated or otherwise defective areas to the full thickness of the layer and lay and compact new material.
- Sub-base surface after compaction and immediately before overlaying: Uniformly well closed and free from loose material, cracks, ruts, or hollows.

250 Laying granular sub-bases

- 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

320 Surfaces to receive sand bedding for paving

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

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.

Q23

GRAVEL/ HOGGIN/ WOODCHIP/ RESIN BOUND ROADS/ PAVINGS/ OVERLAYS

TYPES OF SURFACING

110 Hard binding gravel

- Subgrade improvement layer: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Geotextile: Refer to external works drawings.
 - Manufacturer: Refer to landscape architect's drawings & specification.
 - Product reference: Refer to landscape architect's drawings & specification.
- Granular sub-base: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Blinding to sub-base: Refer to external works drawings.
- Surface course: Angular gravel, free from clay, with sufficient grit to enable compaction.
 - Type: Refer to landscape architect's drawings & specification.
 - Source: Refer to landscape architect's drawings & specification.
 - Colour: Refer to landscape architect's drawings & specification.
 - Size: Refer to landscape architect's drawings & specification.
 - Compacted thickness: Refer to landscape architect's drawings & specification.
- Completion: Compact to produce a firm, regular surface, stable in use.

LAYING

315 Materials

- Compatibility: Chippings suitable for use with respective binders/ emulsions/ resin/ epoxy.

340 Laying generally

- Channels, gullies, etc: Keep clear.
- Finished surfaces
 - Lines and levels: To prevent ponding.
 - Overall texture: Even.
 - State at completion: Clean.

350 Cold weathers working

- Frozen materials: Do not use.
- Freezing conditions: Do not lay pavings.
- Cold bituminous surface dressings: Do not apply when ambient temperature is below 10°C.
- Other dressings or overlays: As manufacturers' recommendations.

360 Drainage falls

- Sealed surfaces
 - Falls and cross falls (minimum): 1:40.
 - Camber (minimum): 1:50.
- Unsealed surfaces (minimum): 1:30.

370 Laying granular surfaces in vehicular areas

- Permissible deviation from required levels, falls and cambers (maximum): $\pm 20\text{mm}$.
- General: Spread and level in 150 mm maximum layers. As soon as possible compact each layer.
- Dry weather: Lightly water layers during compaction.

380 Laying granular surfaces in pedestrian areas and cycle tracks

- Permissible deviation from required levels, falls and cambers (maximum): $\pm 12\text{ mm}$.
- General: Spread and level in 100 mm maximum layers. As soon as possible, compact each layer.
- Dry weather: Lightly water layers during compaction.

390 Protection from traffic and plant

- Paved areas: Restrict access to prevent damage.

Q24

INTERLOCKING BRICK/ BLOCK ROADS/ PAVINGS

TYPES OF PAVING

110 Conventional concrete block paving

- Subgrade improvement layer: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Geotextile: Refer to external works drawings.
 - Manufacturer: Contractor's choice
 - Product reference: Contractor's choice
- Granular sub-base: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Laying course
 - Material: In accordance with BS 7533-3.
 - Category: Refer to external works drawings.
 - Method of screeding, in accordance with BS 7533-3: Contractor's choice of compaction or uncompacted
 - Nominal thickness after compaction: Refer to external works drawings.
- Blocks: To BS EN 1338.
 - Manufacturer: Refer to landscape architect's drawings & specification.
 - Product reference: Refer to landscape architect's drawings & specification.
 - Sizes: Refer to landscape architect's drawings & specification.
 - Special blocks: Refer to landscape architect's drawings & specification.
 - Arrises: Refer to landscape architect's drawings & specification.
 - Colour/ Finish: Refer to landscape architect's drawings & specification.
 - Recycled content: Refer to landscape architect's drawings & specification.
 - Requirements: Refer to landscape architect's drawings & specification.
 - Freeze/ thaw resistance: Refer to landscape architect's drawings & specification.
 - Abrasion resistance: Refer to landscape architect's drawings & specification.
 - Slip/ Skid resistance: Refer to landscape architect's drawings & specification.
- Jointing
 - Material: In accordance with BS 7533-3.
 - Joint width: Refer to external works drawings.
- Sealer/ Stabilizer: Refer to external works drawings.
- Setting out
 - Bond: Refer to landscape architect's drawings & specification.
 - Features: Refer to landscape architect's drawings & specification.
- Accessories: Refer to landscape architect's drawings & specification.

112 Conventional concrete block paving with bound base

- Subgrade improvement layer: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Granular sub-base: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Base: Refer to external works drawings.

- Thickness: Refer to external works drawings.
- Laying course
 - Material: In accordance with BS 7533-3.
 - Category: Refer to landscape architect's drawings & specification.
 - Method of screeding, in accordance with BS 7533-3: Contractor's choice of compacted or uncompacted
 - Nominal thickness after compaction: Refer to external works drawings.
- Blocks: To BS EN 1338.
 - Manufacturer: Refer to landscape architect's drawings & specification.
 - Product reference: Refer to landscape architect's drawings & specification.
 - Sizes: Refer to landscape architect's drawings & specification.
 - Special blocks: Refer to landscape architect's drawings & specification.
 - Arrises: Refer to landscape architect's drawings & specification.
 - Colour/ Finish: Refer to landscape architect's drawings & specification.
 - Recycled content: Refer to landscape architect's drawings & specification.
 - Requirements: Refer to landscape architect's drawings & specification.
 - Freeze/ thaw resistance class: Refer to landscape architect's drawings & specification.
 - Abrasion resistance (mm): Refer to landscape architect's drawings & specification.
 - Slip/ Skid resistance: Refer to landscape architect's drawings & specification.
- Jointing
 - Material: In accordance with BS 7533-3.
 - Joint width: Refer to external works drawings.
- Sealer/ Stabilizer: Refer to external works drawings.
- Setting out
 - Bond: Refer to landscape architect's drawings & specification.
 - Features: Refer to landscape architect's drawings & specification.
- Accessories: Refer to landscape architect's drawings & specification.

119 Permeable concrete block paving – no infiltration

- Subgrade improvement layer: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Impermeable membrane: Refer to external works drawings.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Water collection system: Perforated pipework
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Geotextile below granular sub-base: Contractor's choice.
- Granular sub-base: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Geotextile below laying course
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Laying course
 - Material: Refer to landscape architect's drawings & specification.

- Compaction: In accordance with BS 7533-3. Determine by trial the depth of loose bedding material needed to ensure specified bedding course thickness after final compaction of paving.
- Nominal thickness after compaction: Refer to landscape architect's drawings & specification.
- Blocks: To BS EN 1338.
 - Manufacturer: Refer to landscape architect's drawings & specification.
 - Product reference: Refer to landscape architect's drawings & specification.
 - Sizes: Refer to landscape architect's drawings & specification.
 - Special blocks: Refer to landscape architect's drawings & specification.
 - Spacer nibs: Refer to landscape architect's drawings & specification.
 - Arrises: Refer to landscape architect's drawings & specification.
 - Colour/ Finish: Refer to landscape architect's drawings & specification.
 - Recycled content: Refer to landscape architect's drawings & specification.
 - Requirements: Refer to landscape architect's drawings & specification.
 - Freeze/ thaw resistance class: Refer to landscape architect's drawings & specification.
 - Abrasion resistance (mm): Refer to landscape architect's drawings & specification.
 - Slip/ Skid resistance: Refer to landscape architect's drawings & specification.
- Jointing
 - Material: Refer to external works drawings.
 - Joint width: Refer to external works drawings.
 - Conventional sand jointing: Refer to external works drawings.
- Setting out
 - Bond: Refer to landscape architect's drawings & specification.
 - Features: Refer to landscape architect's drawings & specification.
- Accessories: Refer to landscape architect's drawings & specification.

EXECUTION

200 Execution generally – concrete block and clay paver paving

- Standard: In accordance with BS 7533-3.

205 Execution generally – natural stone paving

- Standard: In accordance with BS 7533-7, as relevant to flexible (non-rigid) laying and construction.
- Subgrade, sub-base and roadbase 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.

430 Sealant movement joints in mortar bedded units

- Spacing: Refer to external works drawings.
- Extent of joints: Refer to external works drawings.
- Joint filler: Compressible cellular rubber or plastics compatible with specified sealant. Build in as work proceeds.
 - Joint width: Refer to external works drawings.

- 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: Refer to external works drawings.
 - Colour: Refer to external works drawings.
 - Application: As section Z22.

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: 1:3 cement: sand as section Z21, coloured to match pavers, in areas up to 65 cm²
- 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.

490 Laying permeable paving

- General: Do not fill joints with sand, except for a 300 mm strip along restraining edges and around features and the like, to hold cut blocks in place

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.

COMPLETION

615 Completion of paving

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

Q25

SLAB/ BRICK/ SETT/ COBBLE PAVINGS

GENERAL

110 Natural stone slab paving system

- Subgrade improvement layer: As section Q20
 - Compacted thickness: Refer to external works drawings.
- Granular sub-base: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Base: Refer to external works drawings.
 - Thickness: Refer to external works drawings.
- Laying course: Refer to landscape architect's drawings & specification.
 - Accessories: Refer to landscape architect's drawings & specification.
- Paving units: Refer to landscape architect's drawings & specification.
- Jointing: Refer to landscape architect's drawings & specification.
 - Bond: Refer to landscape architect's drawings & specification.
- Accessories: Refer to landscape architect's drawings & specification.

140 Natural stone sett paving system

- Subgrade improvement layer: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Granular sub-base: Refer to external works drawings.
 - Compacted thickness: Refer to external works drawings.
- Base: Refer to external works drawings.
 - Thickness: Refer to external works drawings.
- Laying course: Refer to landscape architect's drawings & specification.
 - Accessories: Refer to landscape architect's drawings & specification.
- Paving units: Refer to landscape architect's drawings & specification.
- Jointing: Refer to landscape architect's drawings & specification.
 - Bond: Refer to landscape architect's drawings & specification.
- Accessories: Refer to landscape architect's drawings & specification.

145 Natural stone sett overlay paving system

- Existing base: Refer to external works drawings.
 - Preparation: Refer to external works drawings.
- Laying course: Refer to landscape architect's drawings & specification.
 - Accessories: Refer to landscape architect's drawings & specification.
- Paving units: Refer to landscape architect's drawings & specification.
- Jointing: Refer to landscape architect's drawings & specification.
 - Bond: Refer to landscape architect's drawings & specification.
- Accessories: Refer to landscape architect's drawings & specification.

SYSTEM PERFORMANCE

210 Design – natural stone slab paving system

- Design: Complete the design of the natural stone slab paving system in accordance with BS 7533-4.
- Ground conditions: Refer to ground investigations.
- Performance criteria: Refer to external works drawings.
- Proposals: Submit drawings, technical information, calculations, and manufacturers' literature.

240 Design – natural stone sett paving system

- Design: Complete the design of the natural stone sett paving system in accordance with BS 7533-7.
- Ground conditions: Refer to ground investigations.
- Performance criteria: Refer to external works drawings.
- Proposals: Submit drawings, technical information, calculations, and manufacturers' literature.

PRODUCTS

305 Granular material for layer over existing bases

- Material: Refer to external works drawings.

310 Natural stone slabs

- Standard: To BS EN 1341.
- Supplier: Refer to landscape architect's drawings & specification.
 - Product reference: Refer to landscape architect's drawings & specification.
 - Quarry: Refer to landscape architect's drawings & specification.
- Petrographical description/ stone type: Refer to landscape architect's drawings & specification.
- Finish: Refer to landscape architect's drawings & specification.
- Sizes: Refer to landscape architect's drawings & specification.
 - Plan dimension deviation class: Refer to landscape architect's drawings & specification.
 - Diagonal deviation class: Refer to landscape architect's drawings & specification.
 - Thickness deviation class: Refer to landscape architect's drawings & specification.
- Arrises: Refer to landscape architect's drawings & specification.
- Breaking strength: Refer to landscape architect's drawings & specification.
- Slip resistance: Refer to landscape architect's drawings & specification.
- Skid resistance: Refer to landscape architect's drawings & specification.
- Surface treatment: Refer to landscape architect's drawings & specification.

455 Joint filler for movement joints

- Type: Compressible rubber or plastics compatible with specified sealant
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.

470 Sealer/ stabilizer solution for blocks and setts

- Manufacturer:
 - Product reference:

475 Cleaning solution for existing blocks and setts

- Manufacturer: Contractor's choice.

- Product reference: Contractor's choice.

EXECUTION

620 Adverse weather

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

625 Laying pavings – general

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

630 Levels of paving

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

635 Regularity of paved surfaces

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

637 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.

645 Protection

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

655 Condition of sub-bases/ bases before spreading laying course

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

715 Laying flag and slab paving – mortar laying course and jointing

- Standard generally: In accordance with BS 7533-4.
- Flag installation and cutting: To Interpave 'Concrete flag paving'.
- Laying course
 - Nominal thickness: Refer to landscape architect's drawings & specification.
- Laying and jointing: Refer to landscape architect's drawings & specification.
- Joint width (nominal): Refer to landscape architect's drawings & specification.

730 Laying natural stone sett paving

- Standard generally: In accordance with BS 7533-7.
- Laying type: Rigid.
 - Laying and jointing method: Refer to external works drawings.
- Laying course
 - Target thickness after compaction: Refer to landscape architect's drawings & specification.
- Joint width (nominal): Refer to landscape architect's drawings & specification.

R11 ABOVE GROUND FOUL DRAINAGE SYSTEMS

SYSTEM PERFORMANCE

210 Design

- Design: Complete the design of the above ground foul drainage system.
- Standards: To BS EN 12056-1 and BS EN 12056-2, and in accordance with BS EN 12056-2 National Annexes NA-NG.
 - System type to BS EN 12056-2: System III.
- Proposals: Submit drawings, technical information, calculations, and manufacturers' literature.

PRODUCTS

315 Floor gullies - FG

- Manufacturer: [Alumasc Water Management Solutions](#)
 - Contact details
 - Address: Station Road
Burton Latimer
Kettering
Northamptonshire
NN15 5JP
 - Telephone: [+44 \(0\)1536 383810](tel:+44(0)1536383810)
 - Web: www.alumascwms.co.uk
 - Email: info@alumascwms.co.uk
 - Product reference: [Vari-Level floor gully, trapped](#)
- Body
 - Cast iron: GC144, bottle trapped, 50 mm seal, size 100 mm
 - Stainless steel: Not required
- Membrane clamping collar: Suffix C (optional)
- Grating
 - Cast iron: L2601, 150 x 150 mm for light vehicular traffic areas
- Accessories: T901, 4" cast iron adaptor for clay supersleve 100 mm U1404, removable bottle trap

R12

BELOW GROUND DRAINAGE SYSTEMS

GENERAL

110 Below ground drainage system

- Description: Foul & Surface water below ground drainage
- Surface water and rainwater drainage sources: One piece gullies and covers.
- Foul drainage sources: Floor gullies, as section R11;
Discharge stack and branch pipes
- Pipes, bends and junctions: Cast iron - ductile;
Clay - flexible joints;
Plastics - structured wall.
 - Accessories: Access points;
Connectors - saddle;
Flexible couplings;
Rodding points;
Root barriers
- Manholes, inspection chambers, traps, and separators: Inspection chambers - plastics;
Manholes and inspection chambers - concrete;
Oil and petrol separator units - plastics
 - Accessories: Manhole channels and branches - conventional;
Manhole channels and branches - preformed plastics;
Manhole steps;
Sealing for concrete manholes - mortar;
Vortex flow control units
- Disposal: To sewers
- Accessories – general: Access covers and frames;
Access ladders;
Concrete;
Geotextile - impervious;
Granular material;
Granular sub-base material

135 Private packaged pumping stations

- Description: To suit specialist detailed design, refer to drainage schedules for details.
- Private packaged pumping stations: Submersible pump
 - Control panel type: Refer to MEP specification
 - Location: Refer to MEP specification
 - Distance from tank: Refer to MEP specification
 - Accessories: As required by specialist design
- Pressure pipes, bends and junctions: As required by specialist design
 - Accessories: As required by specialist design
- Disposal: Below ground drainage pipelines

SYSTEM PERFORMANCE

211 Design – below ground drainage systems

- Design: Complete the design of the below ground drainage system in accordance with BS EN 752, BS EN 1295-1, and BS EN 1610.
- Ground conditions: Refer to ground investigation survey
- Performance criteria: Refer to drainage drawings and drainage strategy

- Proposals: Submit drawings, technical information, calculations, and manufacturers' literature.

235 Design – private packaged pumping station systems

- Design: Select appropriate proprietary packaged unit in accordance with BS EN 752.
- Flow capacity: Duty - 1 l/s, Standby - 1 l/s
- Ground conditions: Refer to ground investigation survey
- Submit proposals
 - Drawings, technical information, calculations, and manufacturers' literature.
 - Details of requirements for cable ducts and control panel installation.
 - Details of electrical supply required.
 - Installation details, base or bedding, surround and backfilling.
 - Details of requirements for access covers.
- Maintenance requirements: Submit details.

PRODUCTS

311 Adaptors to clay drainage

- Description: Foul water below ground drainage
- Material and standard: Polypropylene to BS EN 295-1 and Kitemark certified.
- Type: Refer to below ground drainage drawing
- Manufacturer: Contractor's choice
 - Product reference: Refer to manufacturer's guidance

315 One piece gullies and covers

- Description: Road Gullies
- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
- Material: Concrete
- Manufacturer: Contractor's choice
 - Product reference: Contractor's choice
- Sizes: 900 x 450 mm
- Outlet sizes: DN 150
- Covers: *Hinged grating*.
 - Sizes: 400 x 400 mm
 - Loading grades to BS EN 124: D400
- Silt buckets: None

329 Pipes, bends and junctions – supply

- Pipes and fittings: From same manufacturer for each pipeline.

332 Pipes, bends and junctions – cast iron – ductile

- Description: Surface water & foul water below ground drainage within building footprint
- Standard: To BS EN 598, Kitemark certified.
- Manufacturer: Saint Gobain or similar approved
 - Product reference: Refer to manufacturer's guidance
- Sizes: Refer to below ground drainage drawings.
- Jointing type: Push fit spigot and socket

336 Pipes, bends and junctions – clay – flexible joints

- Material and standard: Vitrified clay to BS EN 295-1, Kitemark certified.
- Manufacturer: Contractor's choice
 - Product reference: Refer to manufacturer's guidance.
- Sizes: Refer to below ground drainage drawings.
- Crushing strength (minimum): FN 40
- Jointing type: Polypropylene sleeve

344 Pipes, bends and junctions - plastics - structured wall

- Standard: To BS EN 13476-1 and -2 or -3, Kitemark or Agrément certified
 - Supplementary requirements: Puncture resistance, jetting resistance and longitudinal bending to requirements of WIS 4-35-01, issue 2.
- Material: HDPE
- Manufacturer: Contractor's choice
 - Product reference: Refer to manufacturer's guidance
- Recycled content: Contractor's choice
- Sizes: Refer to below ground drainage drawings.
- Jointing type: Double spigot

355 Non-return valves

- Description: Generally
- Manufacturer: As per drainage schedules
 - Product reference: As per drainage schedules

357 Connectors – saddle

- Description: Foul & Surface water below ground drainage.
- Standards
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, BS EN 13598-1 or Agrément certified.
- Material: To match pipe material.
- Manufacturer: Clay: Contractor's choice;
Cast Iron: Contractor's choice;
Plastic: Contractor's choice.
 - Product reference: Refer to manufacturers' guidance.
- Sizes: Refer to below ground drainage drawings.

359 Flexible couplings

- Standard: To BS EN 295-4 or WIS 4-41-01 and Kitemark certified, or Agrément certified.
- Manufacturer: Contractor's choice
 - Product reference: Refer to below ground drainage drawings.

373 Root barriers

- Description: Foul and Surface water below ground drainage within root protection areas or proximity of newly planted trees.
- Manufacturer: Contractor's choice
 - Product reference: Refer to manufacturer's guidance.

379 Warning marker tapes

- Type: Heavy gauge polyethylene.
- Manufacturer: Contractor's choice
 - Product reference: Contractor's choice
- Colour: Foul Drainage - Red with black lettering.
Surface Water Drainage - Blue with black lettering.
- Widths: 200 mm
- Message: As appropriate: FOUL SEWER BELOW / SURFACE WATER DRAIN BELOW
- Wire detection aid: Required

401 Inspection chambers – plastics

- Description: Foul & Surface water below ground drainage.
- Standard: To BS EN 13598-1, BS EN 13598-2 or Agrément certified.
- Diameter: 450mm
- Manufacturer: Wavin OSMA or similar approved.
- Bases
 - Product reference: Refer to manufacturer's guidance.
- Shaft units
 - Product reference: Refer to manufacturer's guidance.
- Access covers and frames
 - Product reference: Refer to manufacturer's guidance.
 - Loading grades to BS EN 124: Refer to below ground drainage drawings.

407 Manholes and inspection chambers – concrete

- Description: Foul & Surface water below ground drainage.
- Standards
 - To BS 5911-3 and BS EN 1917 and Kitemark certified; or
 - To BS 5911-4 and BS EN 1917.
- Manufacturer: FP McCann or similar approved.
- Shape: Circular
- Sizes: Refer to below ground drainage drawings.
- Cement type and content: To BS 5911-1 and BS EN 1916.
- Chamber sections
 - Product reference: Refer to manufacturer's guidance.
 - Jointing type: Refer to manufacturer's guidance.
- Cover slabs
 - Product reference: Refer to manufacturer's guidance.
 - Thickness: Refer to manufacturer's guidance.
 - Loading grades to BS EN 124: Refer to below ground drainage drawings.
 - Openings: To suit access covers.
- Steps: Required in chambers over 900 mm deep.
- Vortex flow control unit: Where required refer to below ground drainage drawings.

421 Oil and petrol separator units – plastics

- Description: In Basement
- Standards: To Environment Agency PPG 3 and BS EN 858-1, with oil level alarm.
- Manufacturer: Refer to below ground drainage drawings.

- Product reference: Refer to below ground drainage drawings.
- Type: Bypass
- Size: Refer to below ground drainage drawings.
- Inlet pipe size: Refer to below ground drainage drawings.
- Outlet pipe size: Refer to below ground drainage drawings.
- Accessories:
 - Ventilation pipe to atmosphere.
 - High level alarm
 - Suitable ducting and power supply as per the manufacturer's guidance

433 Manhole channels and branches – conventional

- Material: Clay; Plastics
- Manufacturer: Contractor's choice
 - Product reference: Contractor's choice

437 Vortex flow control units

- Description: Surface water below ground drainage.
- Manufacturer: Hydro-brake or similar approved.
 - Product reference: Refer to below ground drainage drawings.
- Material: Stainless Steel.
- Drain down secondary outlet pipe: Integral
 - Control type: Disc valve
 - Operation: From surface.

439 Manhole steps

- Description: To manholes over 1m deep.
- Standard: To BS EN 13101.
- Type: Contractor's choice.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Material: Contractor's choice.

444 Sealing for concrete manholes – bituminous strips

- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.

464 Modular stormwater attenuation units

- Manufacturer: [ACO Technologies plc](#)
 - Contact details
 - Address: ACO Technologies plc
ACO Business Park
Hitchin Road
Shefford
Bedfordshire
SG17 5TE
 - Telephone: [+44 \(0\)1462 816666](tel:+44(0)1462816666)
 - Web: www.aco.co.uk
 - Email: technical@aco.co.uk
 - Product reference: [ACO StormBrixx HD \(StormBrixx HD LAYER PIECE.\)](#)

- Accessories: 27038 STORMBRIXX ACOTEX NON-WOVEN GEOTEX ROLL.
27041 STORMBRIXX ACOTEX PLUS PROTEC FLEECE.
27042 STORMBRIXX ACOWRAP GEOMEMBRANE ROLL.
27057 StormBrixx 160 mm dia.
27058 StormBrixx 225 mm dia.
- Colour: Black.
- Dimensions: Refer to below ground drainage drawings.

468 Precast concrete cover slabs

- Standard: To BS 5911-3 and BS EN 1917 and Kitemark certified.
- Manufacturer: FP McCann or similar approved.
 - Product reference: Refer to manufacturer's guidance.
- Size: Refer to below ground drainage drawings.
- Openings: Refer to below ground drainage drawings.

471 Access covers and frames

- Description: Foul & Surface water below ground drainage.
- Standard: To BS EN 124.
- Types: Double seals and grease (foul water), lock bolts; Gratings; Recessed covers for concrete filling; Single seal (surface water)
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Material: Solid cover - Ductile cast iron
Recessed - Galvanized steel
- Finishes: Self finish
- Sizes: Refer to below ground drainage drawings.
- Loading grades to BS EN 124: Refer to below ground drainage drawings.
- Edging trims: Not required
- Accessories: Chains to restrain covers

483 Concrete

- Description: Generally
- Standard: To BS 8500-2.
- Concrete: Designated, GEN 3, as section E10.

492 Geotextile membranes – filter

- Description: Permeable geotextile membrane.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.

494 Geotextile membranes – impervious

- Description: Impermeable geotextile membrane.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.

496 Granular material – natural

- Standards: To Water Industry Specification WIS 4-08-02 (as amended by WIS 4-08-02A, 2008).
- Supplier: Contractor's choice.
- Recycled content: Contractor's choice.

- Size: Dependent on location – see Execution clauses in this section, and in sections R16, R17 and R18, if used.

498 Granular sub-base material

- Standard: To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.
- Recycled content: Contractor's choice.

EXECUTION

610 Stripping out

- Extent of stripping out: Drainage within new building footprint.
- Exposed ends of existing drainage to be abandoned: Seal with concrete.

611 Existing drains

- Setting out: Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
- Protection: Protect existing drains to be retained and maintain normal operation if in use.

613 Excavated materials

- Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.

616 Selected fills for backfilling

- Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil, and material retained on a 40 mm sieve.
 - Compaction: By hand in 100 mm layers.

623 Lower part of trench – general

- Trench up to 300 mm above crown of pipe: Vertical sides, width as small as practicable.
 - Width (minimum): External diameter of pipe plus 300 mm.

625 Lower part of trench – transition depth

- Trench widths up to 300 mm above crown of pipe (maximum)
 - DN 100 pipelines more than 6.0 m deep: 600 mm.
 - DN 150 pipelines more than 5.4 m deep: 700 mm.
 - DN 225 pipelines more than 4.0 m deep: 800 mm.
 - DN 300 pipelines more than 2.9 m deep: 900 mm.

631 Type of subsoil

- General: Where type of subsoil at level of crown of pipe differs from that stated for the type of bedding, surround or support, give notice.

635 Formation for beddings

- Timing: Excavate to formation immediately before laying beddings or pipes.
- Mud, rock projections, boulders, and hard spots: Remove. Replace with consolidated bedding material.
- Local soft spots: Harden by tamping in bedding material.
- Inspection of excavated formations: Give notice.

641 Pipes at different levels in common trench

- Sub trench: Permissible provided soil of step is stable and unlikely to break away.

- Sub trench not permissible: Trench depth as required for lower pipe. Increase thickness of bedding to upper pipe as necessary.
- Lower pipe: Backfill with compacted granular material to at least halfway up higher pipe.
- Clear horizontal distance between pipes (minimum)
 - Pipes up to DN 700: 350 mm.
 - Pipes exceeding DN 700: 500 mm.

667 Class S surround

- Description: For drains > 1.2m cover under hard landscaping or beneath structure
- Type of subsoil: Refer to ground investigation survey.
- Trench width up to 300 mm above crown of pipe (maximum)
 - DN 100 nominal pipe size: 600 mm.
 - DN 150 nominal pipe size: 700 mm.
 - DN 225 nominal pipe size: 800 mm.
 - DN 300 nominal pipe size: 900 mm.
- Granular material: Contractor's choice.
 - Sizes: To Water Industry Specification WIS 4-08-02 (as amended by WIS 4-08-02A, 2008).
- Bedding
 - Material: Granular, compacted over full width of trench.
 - Thickness (minimum): 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes. Where trench bottom is uneven, increase depth by 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before placing surround: Required
- Surround
 - Material: Granular.
 - Depth: To 50 mm above crown of pipe.
 - Compaction: By hand in 100 mm layers.
- Backfilling
 - Material: Protective cushion of selected fill.
 - Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.
 - Compaction: By hand in 100 mm layers.

676 Class Y surround

- Description: For drains with less than 300mm cover from underside of slab
- Type of subsoil: Refer to ground investigation survey.
- Timing: Excavate trench after hardcore has been laid and compacted.
- Blinding
 - Material: Concrete.
 - Thickness (minimum): 25 mm.
 - Width: Full width of trench.
 - Allow to set before proceeding.
- Pipes
 - Temporary support: Folding wedges of compressible board. Prevent flotation.
 - Clearance under pipes (minimum): 100 mm.
 - Adjust pipes to line and gradient.
- Initial testing before placing surround: Required.

- Surround, cast integrally with slab
 - Material: Concrete of same mix as slab.
 - Width (minimum): External diameter of pipe plus 200 mm.
- Extent of surround: To within 150 mm of nearest flexible joint.

678 Class Z surround

- Description: For drains < 1.2m cover under hard landscaping
- Type of subsoil: Refer to ground investigation survey.
- Blinding
 - Material: Concrete.
 - Thickness (minimum): 25 mm.
 - Width: Full width of trench.
 - Allow to set before proceeding.
- Pipes
 - Temporary support: Folding wedges of compressible board. Prevent flotation.
 - Clearance under pipes (minimum): 100 mm.
 - Adjust pipes to line and gradient.
- Initial testing before placing surround: Required.
- Surround
 - Material: Concrete.
 - Depth: To 150 mm above crown of pipe.
 - Width: Full width of trench.
- Vertical construction joints
 - Location: At face of flexible pipe joints.
 - Material: 18 mm thick compressible board precut to profile of pipe.
 - Socketed pipes: Fill gaps between spigots and sockets with resilient material to prevent entry of concrete.

680 Concrete surround for pipe runs near foundations

- Class Z surround: Provide in locations where bottom of trench is lower than bottom of foundation and as follows (horizontal clear distance between nearest edges of foundations and pipe trenches):
 - Trenches less than 1 m from foundations: Top of concrete surround not lower than bottom of foundation.
 - Trenches more than 1 m from foundations: Top of concrete surround not lower than D mm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150 mm.

683 Laying pipelines

- Laying pipes: To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
- Ingress of debris: Seal exposed ends during construction.
- Timing: Minimize time between laying and testing.

685 Jointing pipelines

- Connections: Durable, effective, and free from leakage.
- Junctions, including to differing pipework systems: With adaptors intended for the purpose.
- Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.

- Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
- Allowance for movement: Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
- Jointing material: Do not allow to project into bore of pipes and fittings.

687 Concrete surround for crossovers

- Class Z surround: Provide where two pipelines (other than plastics pipes) cross with less than 300 mm separation.
 - Extent, on both pipes: 1 m centered on the crossing point, and beyond as necessary to come within 150 mm of nearest flexible joints.

689 Pipelines passing through structures

- Pipelines that must be cast in or fixed to structures (including manholes, catchpits, and inspection chambers): Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g., walls to footings), with flexible joints at both ends.
 - Distance to rocker pipe from structure (maximum): 150 mm.
- Provision for movement for pipelines that need not be cast in or fixed to structures (e.g., walls to footings)
 - Rocker pipes as specified above; or
 - Openings in the structures to give 50 mm minimum clearance around the pipeline. Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

691 Bends at base of soil stacks

- Type: Nominal 90° rest bends; Two nominal 45° bends
 - Radius to centreline of pipe (minimum): 200 mm
- Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 450 mm
- Bedding: Do not impair flexibility of pipe couplings.
 - Material: Concrete.

697 Installing flexible couplings

- Ends of pipes to be joined: Cut cleanly and square.
- Outer surfaces of pipes to be joined: Clean and smooth. Where necessary, e.g., on concrete or iron pipes, smooth out mould lines and/ or apply a cement grout over the sealing area.
- Clamping bands: Tighten carefully to make gastight and watertight seals.

699 Connections to sewers

- General: Connect new pipework to existing adopted sewers to the requirements of the adopting authority or its agent.

705 Initial testing of pipelines

- Before testing
 - Cement mortar jointing: Leave 24 h.
 - Solvent welded pipelines: Leave 1 h.
- Method: Block open ends of pipelines to be tested and pressurise. Air test short lengths to BS EN 1610.

711 Trench supports

- Removal of trench supports and other obstacles: Sufficient to permit compacted filling of all spaces.

713 Installing root barriers

- Root barrier installation: Full depth of excavation. Fit closely to trench wall nearest the tree.

715 Backfilling to pipelines

- Backfilling above top of surround or protective cushion: Material excavated from trench, compacted in layers 300 mm (maximum) thick.
- Heavy compactors: Do not use before there is 600 mm (total) of material over pipes.

718 Backfilling over concrete

- Minimum times from placing concrete
 - Backfilling generally: 24 h.
 - Heavy compactors and traffic loads: 72 h.

720 Backfilling under roads and pavings

- Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.

722 Public roads and pavings – Eng, Wales, Scot

- Excavating and backfilling of trenches: To Department for Transport 'Specification for the reinstatement of openings in highways.

728 Laying warning marker tapes

- Installation: During backfilling, lay continuously over pipelines.
- Depth: 300-400 mm.
 - Pipelines deeper than 2 m: Lay an additional tape 600 mm above the top of the pipeline.

732 Temporary bridges

- Trench bridges: As necessary to prevent construction traffic damaging pipes after backfilling.

734 Installing access points and gullies

- Bedding
 - Material: Concrete
 - Thickness (minimum): 150 mm
- Surround
 - Material: Concrete
 - Thickness (minimum): 150 mm
 - Height: Full height
- Backfilling
 - Material: Granular - natural, size 4/10 to BS EN 13242, to 100 mm above crown of pipes, then selected fill
 - Compaction: By hand in 100 mm layers.
- Setting out relative to adjacent construction features: Square and tightly jointed.
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.
- Raising pieces (clay and concrete units): Joint with 1:3 cement: sand mortar.
- Exposed openings: Fit purpose made temporary caps. Protect from traffic.

741 Installing inspection chambers – plastics

- Bedding
 - Material: Concrete
 - Thickness (minimum): 150 mm

- Surround
 - Material: Concrete
 - Thickness (minimum): 150 mm
- Backfilling: Granular material - natural, size 4/10 to BS EN 13242, to 100 mm above crown of pipes, then selected fill
 - Compaction: By hand in 100 mm layers.
- Concrete collar
 - Material: Not required
 - Thickness (minimum): Not required
 - Width (minimum): Not required
- Seating: Brickwork.

743 Installing concrete manholes

- Bases
 - Material: Concrete
 - Thickness (minimum): 225 mm
- Surround
 - Material: Concrete
 - Thickness (minimum): 150 mm
 - Height: Full height
- Backfilling
 - Material: Granular - natural, size 4/10 to BS EN 13242, to 100 mm above crown of pipes, then selected fill
 - Compaction: By hand in 100 mm layers.

747 Installing oil and petrol separator units

- Base
 - Material: In accordance with manufacturer guidance.
 - Thickness (minimum): In accordance with manufacturer guidance.
- Surround
 - Material: In accordance with manufacturer guidance.
 - Thickness (minimum): In accordance with manufacturer guidance.
- Backfilling: In accordance with manufacturer guidance.
 - Compaction: By hand in 100 mm layers.
- Installation: Fill tank with water then encase tank and access shafts with concrete to fully support tank.
- Vent pipe termination: In accordance with manufacturer guidance.

750 Installing vortex flow control units

- Benching
 - Material: Concrete.
 - Profile: Rise from manhole base to a level not lower than soffit of outlet pipe, then slope upwards at 10% towards soffit of inlet pipe.
 - Topping
 - Material: Concrete.
 - Application: Before benching concrete has set, and with dense smooth uniform finish.
- Vortex flow control mounting block (cast in situ)

- Material: Refer to manufacture guidance.
- Profile: Rise from manhole base vertically to provide plane surface for attachment of unit.
- Outlet pipe: Build in.
- Drain down secondary outlet pipe: Build in

755 Jointing concrete manhole chamber sections

- Jointing and sealing: Bituminous strips.
- Inner joint surface: Trim surplus jointing material extruded into chamber and point neatly.

757 Laying conventional channels, branches, and benching

- Main channel: Bed solid in 1:3 cement: sand mortar.
 - Branches: Connect to main channel at or slightly above invert level, but not higher than half channel level, so that discharge flows smoothly in direction of main flow.
 - Branches greater than nominal size 150 mm: Connect the branch soffit level with the main drain soffit.
 - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
- Benching
 - Material: Concrete.
 - Profile: Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.
 - Topping
 - Material: Concrete
 - Application: Before benching concrete has set, and with dense smooth uniform finish.

759 Laying preformed plastics channels, branches, and benching

- Main channel: Bed solid in 1:3 cement: sand mortar.
 - Branches: Connect to main channel at or slightly above invert level, but not higher than half channel level, so that discharge flows smoothly in direction of main flow.
 - Connecting angles more than 45° to direction of flow: Use three-quarter section channel bends.
- Bedding: 1:3 cement: sand mortar. Use clips or ensure adequate mechanical key.
- Benching
 - Material: Concrete.
 - Profile: Rise vertically from top of main channel to a level not lower than soffit of outlet pipe, then slope upwards at 10% to walls.
 - Topping
 - Material: Concrete
 - Application: Before benching concrete has set, and with dense smooth uniform finish.

761 Laying sealed access fittings, branches, and benching

- Unused branches: Fit caps.
- Bedding: 1:3 cement: sand mortar.
- Benching
 - Material: Concrete.
 - Profile: 10% fall from manhole walls to component rim.
 - Topping

- Material: Concrete
- Application: Before benching concrete has set, and with dense smooth uniform finish.

766 Installing underground storage tank units

- Base
 - Material: Concrete.
 - Thickness (minimum): 150 mm
- Stabilizing: Before placing surround, fill with water to One third full or above groundwater level, whichever is the higher.
- Surround
 - Material: Concrete
 - Thickness (minimum): 150 mm
 - Height above top of base: One third height of tank
- Backfilling to upper part of tank: Granular material - natural, size 4/10 to BS EN 13242, to 100 mm above crown of pipes, then selected fill
 - Compaction: By hand in 100 mm layers.

771 Installing outfalls

- Pipe outflow invert (minimum): Seasonal peak level or 150 mm above normal water level, whichever is the higher.
- Pipe surround and backfill to the last 2 m run of drain: Excavated subsoil, rammed home.

773 Installing access covers and frames

- Seating: Precast concrete
- Bedding and haunching of frames: Continuously.
 - Material: 1:3 cement: sand mortar
 - Top of haunching: 30 mm below surrounding surfaces.
- Horizontal positioning of frames
 - Centered over openings.
 - Square with joints in surrounding paving.
- Vertical positioning of frames
 - Level; or
 - Marry in with levels of surrounding paving.
- Permissible deviation in level of external covers and frames: +0 to -6 mm.

776 Exposed openings in inspection chambers, access points, fittings, and equipment

- General: Fit purpose made temporary caps. Protect from site traffic.

COMPLETION

901 Removal of debris and cleaning

- Preparation: Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris, and loose wrappings.
 - Timing: Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- Cleaning: Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
- Washings and detritus: Do not discharge into sewers or watercourses.
- Covers: Securely replace after cleaning and testing.

903 Temporary measures

- Water used to stabilize tanks and the like during installation: Drain.

911 Testing and inspection

- Dates for testing and inspection: Give notice.
 - Period of notice: 2 weeks.

921 Final testing of private gravity drains and sewers up to dn 300

- Before testing
 - Cement mortar jointing: Leave 24 h.
 - Solvent welded pipelines: Leave 1 h.
- Standard: To Building Regulations.
- Method: Air.

941 Water testing of manholes and inspection chambers

- Timing: Before backfilling.
- Standard
 - Exfiltration: To BS EN 1610.
 - Method: Testing with water (method W).
 - Infiltration: No identifiable flow of water penetrating the chamber.

951 Testing of ancillary components

- Components: Petrol interceptors; Surface water storage tanks
- Standard: To BS EN 1610.
 - Tests: Contractor's choice.
 - Method: Contractor's choice.

971 CCTV inspection of private pipelines

- General: Carry out and record internal inspection using CCTV equipment.
 - Locations to be inspected: Foul and surface water drains.
- Illumination: Of adequate intensity.
- Recording: Provide continuous position recording, still photographs and stopping of the camera at any point.
 - Copy of videotape recording: Submit.

978 Lifting keys

- Lifting keys: Supply suitable keys for each type of access cover.
 - Timing: At completion.

980 Instructions

- Manufacturer's user instructions: Submit for oil and petrol separator units