

TORBAY COUNCIL

Part 2 Specification

Contract Reference

TBS3320

Contract Title

**Babbacombe Beach Road
Stabilisation Scheme**



SPECIFICATION

BEACH ROAD, BABBACOMBE, TORQUAY

FOR

TORBAY COUNCIL

Revision	Description	Author	Date
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SECTION A10 PRELIMINARIES

A10.01 THE PROJECT

Beach Road, Babbacombe – Road stabilisation

A10.02 THE CONTRACT

Employer: Torbay Council

Engineer: Torbay Council

Designer: John Grimes Partnership Ltd

Principal Designer: Torbay Council

Principal Contractor: (Successful tenderer)

The form of contract shall be Infrastructure Conditions Of Contract – Measurement Version (ICC).

The contract documents will comprise:-

Letter of Invitation
Schedule of Rates with Principal Quantities
Tender Drawings
Specification
Pre-Construction Information

Upon award of the contract the Contractor will be provided with electronic copies of the Specification and two copies of construction drawings. Further copies will be provided on request.

A10.03 TENDER DRAWINGS

John Grimes Partnership

14682_201_T1 - Stabilisation plan and typical Section
14682_202_T1 - Stabilisation layout and Section
14682_203_T2_Typical Details
14682_204_T1_test anchor details
14682_205_T2_Setting out
14682_210_T2_Road plan and sections
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SECTION A10 PRELIMINARIES

A10.04 DESCRIPTION OF THE WORKS

Beach road is suffering from detrimental effects of lateral movement. The works are designed to stabilise the existing road. The stabilisation works principally comprise a Ground anchored space piled wall incorporating reinforced concrete capping beam and drilled drainage. A stonework parapet to match existing and reinstatement of the highway construction at an improved profile is also to be installed.

A10.05 INSPECTION OF THE SITE

Tenderers should visit the site prior to submission of their tenders. Tenderers should note that the site is a public road. Permission can be obtained from Ian Jones, Highways and Transport Service Manager for Torbay Council (telephone number 01803 207835)

A10.06 EXISTING MAINS SERVICES

Service information will be contained within the service search.

A10.07 GROUND CONDITIONS

The Contractor shall inspect and examine the site and borehole logs in sufficient detail to ensure that the nature of the ground and ground conditions and the means of access to the site are suitable in every respect for the construction and that all the information necessary to execute the work is available.

Ground Conditions are described in JGP 2007 Ground investigation and Frederick Sherrell Ground investigation dated 2002.

A10.08 STANDARDS

Workmanship, goods and materials shall comply with the standards specified in the Contract.

Except where the specified standard implements or is technically equivalent to a Harmonised European Standard or to a European Standard adopted for use within the European Communities after 31 December 1985, any requirement for goods or materials to comply with the specified standard shall be satisfied by compliance with:

- a) a relevant standard or code of practice of a national standards institution or equivalent body of any member state of the European Communities; or
- b) a relevant international standard recognised in any member state of the European Communities; or
- c) a relevant technical specification acknowledged for use as a standard by a public authority of any member state of the European Communities; or

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- d) traditional procedures of manufacture of any member state of the European Communities where these are the subject of a written technical description sufficiently detailed to permit assessment of the goods or materials for the use specified;

provided that the proposed standard, code of practice, technical specification or technical description provides in use levels of safety, suitability and fitness for purpose equivalent to those required by the specified standard in so far as they are not inconsistent with the 'Essential Requirements' of Construction Products Directive (89/106/EEC). This sub-clause applies also to works only in so far as the means of carrying out such works are indivisibly associated with the goods or materials for which an alternative standard, code of practice, technical specification or technical description is proposed.

A10.09 REGULATIONS

The Contractor shall conform to the provisions of any relevant Acts of Parliament and the Regulation and Bylaws of any Local Authority, fire officer and the insurance offices, the requirements of the Factories Act and all other relevant Factory Orders and Building Regulations, the requirement of the Environment Protection Act relating to the works, the requirement of the Health and Safety Executive etc. and shall acquaint himself with such requirements.

The works shall be carried out under the CDM Regulations.

The Contractor shall be responsible for giving all necessary notice due to Local and Statutory Authorities.

A10.10 DISCREPANCIES BETWEEN DOCUMENTS

In the event of any discrepancy between the Specification and the contract drawings, the drawings shall prevail. The Contractor shall notify the Engineer of any such discrepancy before starting any affected work.

A10.11 DRAWINGS, ETC. SUBMITTED FOR APPROVAL

The Contractor shall accept responsibility for the accuracy of all drawings and documents submitted for the Engineer's approval. Approval or acceptance by the Engineer in no way diminishes the Contractor's responsibility for any errors or omissions contained in such drawings or documents nor for his other contractual and legal obligations. Where changes are required in drawings previously submitted, the Contractor shall arrange for the changes to be made and submit revised drawings for approval.

A10.12 TAKING DIMENSIONS FROM DRAWINGS

Do not scale from drawings but obtain from the Engineer any dimensions required but not given in figures or calculable from figures shown on drawings.

The Contractor shall check the compatibility of drawings with each other, with the site and work completed to date (including any drawings prepared by sub-contractors or others employed direct).

SECTION A10 PRELIMINARIES

The Contractor shall inform the Engineer of any discrepancy and seek his instructions.

A10.13 SPECIFICATION REFERENCES ON DRAWINGS

Where specification references are given on drawings to define the clause (or clauses) applicable to that part of the construction drawn, they must not be taken as excluding any other relevant information contained in other clauses of this Specification.

A10.14 MATERIALS

New materials are to be used unless stated otherwise.

Details of all materials to be incorporated in the permanent works shall be submitted for the approval of the Engineer. Such tests as may be required by the Engineer to prove the proposed materials to be used are satisfactory are to be carried out at the Contractor's cost.

The Contractor shall certify to the Engineer when required that materials not of UK manufacture have been tested by and comply with the prescribed standards of a recognised authority.

Specified materials that conform to BS are to be clearly and indelibly marked with the reference specified. Where this is impracticable, the relevant advice / delivery notes must include the BS reference with which the materials are to comply. A certificate of compliance with BS is to be provided when required by the Engineer.

Unless the whole quantity of any particular material or component required to complete the work is supplied by one manufacturer, approval of any change in source of supply is required. Produce written evidence of sources of supply when requested by the Engineer.

Materials shall be stored in such a way that they are protected from deterioration prior to their use.

A10.15 SPECIFICATION BY MANUFACTURER'S NAME

Nomination of any firm or proprietary item, in this Specification or on the drawing(s), is to be taken as an indication of the quality, performance and workmanship required. Articles of equal quality, performance and workmanship may be submitted for approval.

A10.16 SAMPLES

The Contractor shall provide and bear the cost of samples of materials or items where specified or requested by the Engineer and submit for his approval, which must be obtained before orders are confirmed. Approved samples are to be retained on site for comparison with materials and items used in the works and removed when no longer required.

SECTION A10 PRELIMINARIES

The Contractor is to provide and bear the cost of samples of finished work where specified, and seek the Engineer's approval before proceeding with the works. Retain approved samples on site for comparison with the works and remove when no longer required.

A10.17 PROCEDURE FOR APPROVAL

The Contractor must apply to the Engineer in adequate time where any approval is required. Approval must be received before any commitment is entered into or expense is incurred.

A10.18 THIRD PARTY QUALITY ASSURANCE

Where materials, articles, or services are specified to be manufactured, constructed or installed by a licensee or registered firm of a third party Quality Assurance Scheme, the manufacturer, supplier or firm must be a current participant in the specified Scheme. Names of current members of any Scheme can be obtained from the appropriate Certification Authority.

A10.19 BRITISH BOARD OF AGRÉMENT CERTIFIED PRODUCTS

Where materials or articles are specified as Agrément Certified, they must be obtained from a manufacturer currently holding a certificate for that material or article.

A10.20 DIMENSIONS AND TOLERANCES OF COMPONENTS

The Contractor shall check the dimensions of components following delivery to site and draw the Engineer's attention to any departure from specified manufacturing tolerances.

The Contractor shall adjust the position of components and / or the size of the joints within their respective specified limits so that adverse results caused by an accumulation of individual acceptable tolerances are avoided. Where, in spite of such adjustment, adverse effects cannot be avoided, the Contractor shall immediately inform the Engineer and seek instruction.

A10.21 INSPECTION, EXAMINATION AND TESTING

The Contractor shall arrange facilities for and bear all costs of the inspection, examination and testing of materials and items specified including concrete cubes and miscellaneous metalwork.

A10.22 ACCURACY / SETTING OUT

The Contractor shall use instruments and methods described in BS 5606: 1990 to give degrees of accuracy defined in the drawings and Specification.

A10.23 STABILITY OF UNFINISHED WORKS

The Contractor shall ensure the stability of unfinished work at all times.

SECTION A10 PRELIMINARIES

A10.24 PROTECTION OF THE WORKS

The Contractor shall take all reasonable precautions to prevent and to minimise the extent of loss or damage to the works and anything for incorporation on the site arising from any cause whatsoever, including loss or damage by weather and water flow conditions.

A10.25 PROTECTION OF EXISTING EQUIPMENT

The Contractor shall protect existing plant, installations and equipment throughout the progress of the Works.

A10.26 CLEANING THE WORKS

The Contractor shall clean the works thoroughly, removing all splashes, deposits and rubbish. Temporary markings, coverings and other protection shall be removed unless instructed otherwise and on completion the Works shall be left in a condition that is fit for occupation and use.

A10.27 SITE ORGANISATION AND SUPERVISION

The Contractor shall maintain an adequate site organisation under the full-time control of an experienced supervisor who is conversant with:

- a) British Standards and Codes of Practice
- b) Health, safety and welfare regulations
- c) CDM regulations

and is capable of assuming complete responsibility for a contract of this nature.

A10.28 WEEKLY REPORTS

The Contractor shall prepare and submit written weekly site reports to the Engineer giving details of work carried out, materials, labour and plant returns, weather conditions (including an accurate record of 24hr maximum and minimum temperatures on site and delays due to adverse weather including description of the weather, type(s) of work affected and number of hours lost) and visitors to site. The report shall be issued no later than three working days following the week covered by the report.

A10.29 SITE MEETINGS

The Contractor shall attend such regular site meetings with the Engineer as are necessary for the proper management and co-ordination of the contract.

A10.30 OFFICE, STORAGE AND WORKSHOP ACCOMMODATION

The Contractor shall provide all office, welfare, storage and workshop accommodation during execution of the Works. This will include:

- obtaining approval for location of temporary buildings

SECTION A10 PRELIMINARIES

- providing accommodation suitable for holding site meetings when required by the Engineer.
- providing temperature and weather protection for materials stored.
- removal at completion and making good to the satisfaction of the Engineer.

A10.31 WATER SUPPLY

The Contractor shall provide a sufficient supply of water for the execution of the Works. He shall make connections (subject to Water Company byelaws) at such points as the Engineer and the Employer may agree and provide and fix water meters of an approved pattern, if so required. He shall pay all charges and restore the service to its original condition on completion of the Works.

A10.32 ELECTRICITY SUPPLY

The Contractor shall provide all temporary electricity supplies necessary for the execution of the Works. The Contractor shall make any necessary approved connections at such points as the Engineer and statutory undertaker may agree and provide and fix meters of an approved pattern if required. He shall pay all charges and restore the service to its original condition on completion of the Works.

A10.33 ROADS, HARDSTANDINGS, ETC

The Contractor shall maintain all existing roads, footpaths, etc. in a clean and tidy condition; provide all temporary roads, footpaths, walkways, crossings, hard standings and protective coverings to existing surfaces as required for the execution of the Works to the approval of the Engineer.

The Contractor shall provide facilities to the approval of the Engineer at the exit from the site to clean effectively the wheels and under body of all vehicles leaving the work site before travelling on private roads or the public highway to ensure that chemical contamination, mud, dirt or other nuisance are not deposited away from the work site.

Obtaining all approvals, utilities connections, consents and all costs of providing and commissioning the facilities shall be the Contractor's responsibility.

A10.34 HOARDINGS, FENCING AND GATES, ETC.

The Contractor shall provide temporary hoardings, fencing, gates, guardrails, signage, gantries and wind-breaks as necessary for the execution of the works, protection of the public and others, protection of the site and to meet the requirements of the Employer.

A10.35 SAFEGUARDING THE WORKS

If required by the Employer, the Contractor shall provide all watchmen, barriers, security and lighting necessary for the protection and navigation of the site and the works by workpeople and any other persons.

SECTION A10 PRELIMINARIES

Steps, ladders or other plant that may allow access for unauthorised persons to access the site, works or adjoining property are to be kept secure and out of view.

A10.36 PREVENTION OF NUISANCE

The Contractor shall comply with the Control of Noise (Codes of Practice for Construction and Open Sites) Order 1984 Regulations which give approval to BS 5228: Code of Practice for Noise Control on Construction and Demolition Sites, unless otherwise instructed by the Engineer.

All spoil, rubbish and surplus materials are to be removed from the site as it accumulates unless otherwise specified.

The Contractor is to comply with legislation governing the tipping of refuse and the disposal of contaminated water and include for all associated costs.

The Contractor is to:

- avoid infestation by vermin by disposing promptly of any matter attractive to pests.
- prevent pollution being caused by the execution of the Works.
- ensure the minimum of inconvenience and nuisance to occupants of premises in the vicinity of the Works.

A10.37 WORKING HOURS

Monday to Friday 8 a.m. – 5 p.m. Arrangements to work outside of these hours are subject to agreement with the site management which shall not be unreasonably withheld.

A10.38 SAFETY CLOTHING

The Contractor shall provide general purpose industrial safety helmets to BS 5240, high visibility jackets/vests, gloves, goggles, dust masks and safety footwear for use by all persons, including visitors to the work site.

The Contractor shall provide personal protective equipment (PPE) and at all times shall ensure that appropriate PPE is being used. The Contractor shall comply with any stipulation regarding site clothing made by the Employer.

The Contractor shall supply life jackets for any personnel or visitor working near or over water.

A10.39 WEATHER

The Contractor shall keep an accurate record of daily maximum and minimum temperatures on site (including overnight).

Delays due to adverse weather including description of weather, type(s) of work affected and number of hours lost are to be recorded.

SECTION A10 PRELIMINARIES

A10.40 TOPOGRAPHIC AND CONDITION SURVEYS

The Contractor shall undertake level and condition surveys of site and plant within the immediate vicinity of the Works before starting work on site and agree findings with the Engineer.

A10.41 SURVEY MONUMENTS / SETTING OUT

The Contractor will be provided with temporary stations and must maintain permanent survey monuments to the approval of the Engineer that are readily accessible for setting out the works and/or monitoring purposes.

A10.42 REINSTATEMENT

On completion of the Works the Contractor shall reinstate all areas affected by the Works to the condition equivalent to that at the start of works or as directed by the Engineer.

A10.43 CAR PARKING

Cars shall only be parked in the quarry in designated car park spaces. The Employer may limit the number of private vehicles parked in the quarry by the Contractor's employees.

A10.44 LOCATION OF UNDERGROUND SITE SERVICES

Service information will be contained within the preconstruction information. Notwithstanding the above, the Principal Contractor shall obtain a permit to work from the Client and dig starter pits and undertake CAT surveys to satisfy himself that there are no services within the area of work.

A10.45 PROGRAMME

The Contractor shall furnish a programme within 14 days of award of the Contract for the approval of the Engineer. The programme shall make provision for any Employer requirements.

A10.46 RECORD DRAWINGS

During the course of the Contract the Contractor shall keep sufficient records to enable as-built drawings to be produced at completion of the works on site.

C20 DEMOLITION

SECTION C20 DEMOLITION

C20 Demolition

To be read with Preliminaries/ General conditions

GENERAL REQUIREMENTS

110 DESK STUDY/ SURVEY

- Scope: Before starting deconstruction/ demolition work, examine available information, and carry out a survey of:
 - the structure or structures to be deconstructed/ demolished,
 - the site on which the structure or structures stand, and
 - the surrounding area.
- Report and method statements: Submit, describing:
 - Form, condition and details of the structure or structures, the site, and the surrounding area.
 - Type, location and condition of features of historical, archaeological, geological or ecological importance.
 - Type, location and condition of adjoining or surrounding premises that might be adversely affected by removal of the structure or structures, or by noise, vibration and/ or dust generated during deconstruction/ demolition.
 - Identity and location of services above and below ground, including those required for the Contractor's use, and arrangements for their disconnection and removal.
 - Form and location of flammable, toxic or hazardous materials, including lead-based paint, and proposed methods for their removal and disposal.
 - Form and location of materials identified for reuse or recycling, and proposed methods for removal and temporary storage.
 - Proposed programme of work, including sequence and methods of deconstruction/ demolition.
 - Details of specific pre-weakening required.
 - Arrangements for protection of personnel and the general public, including exclusion of unauthorized persons.
 - Arrangements for control of site transport and traffic.
 - Special requirements: None.

120 EXTENT OF DECONSTRUCTION/ DEMOLITION

- General: Subject to retention requirements specified elsewhere, deconstruct/ demolish structures down to underside of foundations

130 GROUNDWORKS

- General.
- Old foundations, slabs and the like: Break out in locations and to the extents stated.
- Contaminated material: Remove, and carry out remediation required by the Enforcing Authority.

140 BENCH MARKS

- Unrecorded bench marks and other survey information: Give notice when found. Do not remove marks or destroy the fabric on which they are found.

150 FEATURES TO BE RETAINED

- General: Keep in place and protect the following: Trees and structures as detailed on drawings.

SECTION C20 DEMOLITION

SERVICES AFFECTED BY DECONSTRUCTION/ DEMOLITION

210 SERVICES REGULATIONS

- Work carried out to or affecting new and/ or existing services: Carry out in accordance with the byelaws and/ or regulations of the relevant Statutory Authority.

220 LOCATION OF SERVICES

- Services affected by deconstruction/ demolition work: Locate and mark positions.
- Mains services marking: Arrange with the appropriate authorities for services to be located and marked.
 - Marking standard: In accordance with National Joint Utilities Group 'Guidelines on the positioning and colour coding of underground utilities' apparatus'.

230 SERVICES DISCONNECTION ARRANGED BY CONTRACTOR

- General: Arrange with the appropriate authorities for disconnection of services and removal of fittings and equipment owned by those authorities prior to starting deconstruction/ demolition.

240 DISCONNECTION OF DRAINS

- General: Locate, disconnect and seal disused foul and surface water drains.
- Sealing: Permanent, and within the site.

250 LIVE FOUL AND SURFACE WATER DRAINS

- Drains and associated manholes, inspection chambers, gullies, vent pipes and fittings:
 - Protect; maintain normal flow during deconstruction/ demolition.
 - Make good any damage arising from deconstruction/ demolition work.
 - Leave clean and in working order at completion of deconstruction/ demolition work.

260 SERVICE BYPASS CONNECTIONS

- General: Provide as necessary to maintain continuity of services to occupied areas of the site on which the deconstruction/ demolition is taking place and to adjoining sites/ properties.
- Minimum notice to adjoining owners and all affected occupiers: 72 hours, if shutdown is necessary during changeover.

270 SERVICES TO BE RETAINED

- Damage to services: Give notice, and notify relevant service authorities and/ or owner/ occupier regarding damage arising from deconstruction/ demolition.
- Repairs to services: Complete as directed, and to the satisfaction of the service authority or owner.

DECONSTRUCTION/ DEMOLITION WORK

310 WORKMANSHIP

- Standard: Demolish structures in accordance with BS 6187.
- Operatives:
 - Appropriately skilled and experienced for the type of work.
 - Holding, or in training to obtain, relevant CITB Certificates of Competence.
- Site staff responsible for supervision and control of work: Experienced in the assessment of risks involved and methods of deconstruction/ demolition to be used.

320 GAS OR VAPOUR RISKS

- Precautions: Prevent fire and/ or explosion caused by gas and/ or vapour from tanks, pipes, etc.

330 DUST CONTROL

SECTION C20 DEMOLITION

- General: Reduce airborne dust by periodically spraying deconstruction/ demolition works with an appropriate wetting agent. Keep public roadways and footpaths clear of mud and debris.
 - Lead dust: Submit method statement for control, containment and clean-up regimes.
- 340 HEALTH HAZARDS
- Precautions: Protect site operatives and general public from hazards associated with vibration, dangerous fumes and dust arising during the course of the Works.
- 350 ADJOINING PROPERTY
- Temporary support and protection: Provide. Maintain and alter, as necessary, as work proceeds. Do not leave unnecessary or unstable projections.
 - Defects: Report immediately on discovery.
 - Damage: Minimize. Repair promptly to ensure safety, stability, weather protection and security.
 - Support to foundations: Do not disturb.
- 360 STRUCTURES TO BE RETAINED
- Parts which are to be kept in place: Protect.
 - Extent of work: Cut away and strip out with care to reduce the amount of making good to a minimum.
- 370 PARTLY DEMOLISHED STRUCTURES
- General: Leave in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse. Make secure outside working hours.
 - Temporary works: Prevent overloading due to debris.
 - Access: Prevent access by unauthorised persons.
- 380 DANGEROUS OPENINGS
- General: Illuminate and protect. Keep safe outside working hours.
- 390 ASBESTOS-CONTAINING MATERIALS – KNOWN OCCURRENCES
- Removal: By a contractor licensed by the Health and Safety Executive and prior to other works starting in these locations.
- 391 ASBESTOS-CONTAINING MATERIALS – UNKNOWN OCCURRENCES
- Discovery: Give notice immediately of suspected asbestos-containing materials when discovered during deconstruction/ demolition work. Avoid disturbing such materials.
 - Removal: Submit statutory risk assessments and details of proposed methods for safe removal.
- 410 UNFORESEEN HAZARDS
- Discovery: Give notice immediately when hazards such as unrecorded voids, tanks, chemicals, are discovered during deconstruction/ demolition.
 - Removal: Submit details of proposed methods for filling, removal, etc.
- 420 OPEN BASEMENTS, ETC
- Temporary support: Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
 - Safety: Make remaining sections of retaining and buttress walls safe and secure.
 - Water movement: Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10m², not less than 600mm in diameter.
- 430 FILLING OF BASEMENTS, ETC
- Temporary support: Leave adequate buttress walls or provide temporary support to

SECTION C20 DEMOLITION

- basement retaining walls up to ground level.
 - Water movement: Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10m², not less than 600mm in diameter.
 - Filling: Remove organic material and soil from basements and other voids. Fill and consolidate with concrete or quarry waste as advised by the C.A.
- 442 SITE SURFACE AT COMPLETION
- Levels: Grade the site to follow the levels of adjacent areas.
 - Temporary surface: Cover the site with _____.
- 450 SITE CONDITION AT COMPLETION
- Debris: Clear away and leave the site in a tidy condition.
 - Other requirements: Leave site secure with all temporary or permanent protection intact.

MATERIALS ARISING

- 510 CONTRACTOR'S PROPERTY
- Components and materials arising from the deconstruction/ demolition work: Property of the Contractor except where otherwise provided.
 - Action: Remove from site as work proceeds where not to be reused or recycled for site use.
- 520 RECYCLED MATERIALS
- Materials arising from deconstruction/ demolition work: Can be recycled or reused elsewhere in the project, subject to compliance with the appropriate specification and in accordance with any site waste management plan.
 - Evidence of compliance: Submit full details and supporting documentation.
 - Verification: Allow adequate time in programme for verification of compliance.

D20 EXCAVATING AND FILING

SECTION D20 EXCAVATING AND FILLING

D20 Excavating and filling

To be read with Preliminaries/General conditions

GENERALLY/THE SITE

110 SITE INVESTIGATION

- Report: Reports and drawings are contained in the Pre Construction Information .
 - The ground conditions across the site are described in the above documents.
 - It is intended that excavated material shall be stockpiled in temporary storage heaps on site and acceptable material selected for re-use as fill on site. Stockpiles shall be located outside of the floodplain or surface water flow routes. Surplus material shall be disposed of at an approved tip.
 - Reports: The site investigation was limited to the geotechnical appraisal of ground conditions in relation to foundations. No contaminated land testing was undertaken.
 - Safe methods of working shall be employed in dealing with any potentially harmful materials.

150 EXISTING SERVICES, FEATURES AND STRUCTURES

- Services: See Pre-Construction information.
- Site features to be retained: See drawings.
- Structures: See drawings.

CLEARANCE/EXCAVATING

164 TREE ROOTS

- Trees to be retained: Protect in accordance with BS 5837
- Protected area: Do not cut roots within precautionary protection area.
- Excavation in protected area:
 - Backfill as soon as possible or temporarily line with polyethylene sheet to reduce evaporation.
- Outside protected area: Give notice of roots exceeding 25 mm and do not cut without approval.
- Cutting:
 - Make clean smooth cuts with no ragged edges.
 - Pare cut surfaces smooth with a sharp knife.
 - Treatment of cut roots: _____.

168 SITE CLEARANCE

- Timing: Before topsoil stripping, if any.
- General: Clear site of rubbish, debris and vegetation. Do not compact topsoil.

170 REMOVING SMALL TREES, SHRUBS, HEDGES AND ROOTS

- Identification: Clearly mark trees to be removed.
- Small trees, shrubs and hedges:
 - Cut down.
 - Roots: Grub up and dispose of without undue disturbance of soil and adjacent areas.
- Safety: Comply with HSE/ Arboriculture and Forestry Advisory Group safety leaflets.

175 FELLING LARGE TREES

- Definition: Girth over 600mm.
- Identification: Clearly mark trees to be removed.
- Safety: Comply with HSE/ Arboriculture and Forestry Advisory Group safety leaflets.
- Felling: As close to the ground as possible.
- Stumps: Remove mechanically to a minimum of 300mm below ground level.
- Work near retained trees: Take down trees carefully in small sections to avoid

SECTION D20 EXCAVATING AND FILLING

damage to adjacent trees that are to be retained, where tree canopies overlap and in confined spaces generally.

220 STRIPPING TOPSOIL/ MADE GROUND

- General: Before beginning general excavation or filling, strip topsoil from areas where there will be regrading, buildings, pavings/ roads and other areas shown on drawings.
- Depth:
 - Remove to an average depth of _____.
 - Give notice where the depth of topsoil is difficult to determine.
- Handling: Handle topsoil for reuse or sale in accordance with clause 225.
- Around trees: Do not remove topsoil from below the spread of trees to be retained.
- Site storage: _____.
- Stockpile in temporary storage heaps onsite located outside of the floodplain or surface water flow routes.

221 TREATING TOPSOIL

- Treatment: Apply a suitable translocated non-residual herbicide.
- Timing: Not less than two weeks before excavating topsoil.

225 HANDLING TOPSOIL

- Standard: To BS 3882.
- Aggressive weeds:
 - Species: Included in the Weeds Act, section 2 or the Wildlife and Countryside Act, Schedule 9, part II. Schedule 9, part II, INCLUDING Japanese Knotweed.
 - Give notice: Obtain instructions before moving topsoil.
 - Earthmoving equipment: Select and use to minimize disturbance, trafficking and compaction.
- Contamination: Do not mix topsoil with:
 - Subsoil, stone, hardcore, rubbish or material from demolition work.
 - Other soil or material containing aggressive weeds, sharps, plastics and non-soil forming materials and notifiable animal or plant diseases.
 - Oil, fuel, cement or other substances harmful to plant growth.
 - Other grades of topsoil.
 - Other classifications of topsoil.
- Multiple handling: Keep to a minimum. Use topsoil immediately after stripping.
 - Wet conditions: Handle topsoil in the driest condition possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limit as defined by BS 3882, Annex N2.

240 ADJACENT EXCAVATIONS

- Requirement: Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto must be completed before the higher excavation is made.
- Angle of line below horizontal: 30°.

250 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.

260 INSPECTING FORMATIONS

- Give notice: Make advance arrangements for inspection of formations.
 - Notice (minimum): 48 hours.
- Preparation: Just before inspection remove the last 150 mm of excavation.

SECTION D20 EXCAVATING AND FILLING

- Trim to required profiles and levels, and remove.
 - Seal: Within 4 hours of inspection,
- 265 INSPECTING FORMATIONS IN SAND AND GRAVEL
- Notice for inspection (minimum): 48 hours
 - Preparation: Just before inspection remove the last 150mm of excavation. Trim to required profiles and levels and mechanically compact formation. Remove loose material.
 - Seal: Within 4 hours of inspection,
- 267 INSPECTION OF FORMATIONS IN SHRINKABLE SOILS
- Inspect formation: For signs of conducting and fine moisture absorbing roots.
 - Give notice: If significant quantities of roots are visible in the formation or in the bottom 75mm of the walls of the excavation.
- 270 FOUNDATIONS GENERALLY
- Give notice 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.
- 280 TRENCH FILL FOUNDATIONS
- Excavation: Form trench down to formation in one operation.
 - Safety: Prepare formation from ground level.
 - Inspection of formations: Give notice before commencing excavation.
 - Period of notice: 48 hours.
 - Shoring: Where inspection of formation is required, provide localised shoring to suit ground conditions.
 - Concrete fill: Place concrete immediately after inspection and no more than four hours after exposing the formation.
- 290 FOUNDATIONS IN MADE UP GROUND
- Depth: Excavate down to a natural formation of undisturbed subsoil.
 - Discrepancy: Give notice if this is greater or lesser than depth given.
- 310 UNSTABLE GROUND
- Generally: Ensure that the excavation remains stable at all times.
 - Give notice: Without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.
 - Take action: If instability is likely to affect adjacent structures or roadways, take appropriate emergency action.
- 320 RECORDED FEATURES
- Recorded foundations, beds, drains, manholes, etc: Break out and seal drain ends.
 - Contaminated earth: Remove and disinfect as required by local/statutory authorities.
- 330 UNRECORDED FEATURES
- Give notice: If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered.
- 330^{gp} UNRECORDED FEATURES
- Give notice: If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered.

SECTION D20 EXCAVATING AND FILLING

350 EXISTING WATERCOURSES

- Diverted watercourses which are to be filled: Before filling, remove vegetation growths and soft deposits.

360 EXCESS EXCAVATION

- Excavation taken wider than required:
 - Backfill: Obtain instructions from Contract Administrator
- Excavation taken deeper than required:
 - Backfill: Obtain instructions from Contract Administrator

DISPOSAL OF MATERIALS

410 EXCAVATED TOPSOIL STORAGE

- Storage: Stockpile in temporary storage heaps for re-use on site. All stockpiles shall be located outside of the floodplain or surface water flow routes.

415 EXCAVATED TOPSOIL REMOVAL

- General: Remove from site.

415^{gpp} EXCAVATED TOPSOIL/PEAT REMOVAL

- General: Remove surplus topsoil/peat from temporary storage heaps to an approved tip.

441 SURPLUS SUBSOIL

- Excavated material: Stockpile in temporary storage heaps on site for re-use on site. All stockpiles shall be located outside of the floodplain or surface water flow routes.
- Remaining material: Remove surplus subsoil from temporary storage heaps to an approved tip
- Remaining material: Remove from site.

450 WATER

- Generally: Keep all excavations free from water until:
 - Formations are covered.
 - Below ground constructions are completed.
 - Basement structures and retaining walls are able to resist leakage, water pressure and flotation.
- Drainage: Form surfaces of excavations and fill to provide adequate falls.
- Removal of water: Provide temporary drains, sumps and pumping as necessary. Do not pollute watercourses with silt laden water.

454 GROUND WATER LEVEL, SPRINGS OR RUNNING WATER

- Give notice: If it is considered that the excavations are below the water table.
- Springs/ Running water: Give notice immediately if encountered.

457 PUMPING

- General: Do not disturb excavated faces or stability of adjacent ground or structures.
- Pumped water: Discharge without flooding the site or adjoining property.
- Sumps: Construct clear of excavations. Fill on completion.

FILLING

500 PROPOSED FILL MATERIALS

- Details: Submit full details of proposed fill materials to demonstrate compliance with specification, including:
 - Type and source of imported fill.

SECTION D20 EXCAVATING AND FILLING

- Proposals for processing and reuse of material excavated on site.
- Test reports as required elsewhere.

510 HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS

- General: Do not use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling, including material that is:
 - Frozen or containing ice.
 - Organic.
 - Contaminated or noxious.
 - Susceptible to spontaneous combustion.
 - Likely to erode or decay and cause voids.
 - With excessive moisture content, slurry, mud or from marshes or bogs.
 - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
 - Unacceptable, class U2 as defined in the Highways Agency 'Specification for highway works', clause 601.
 - Adopt safe methods of working when handling materials.

520 FROST SUSCEPTIBILITY

- General: Except as allowed below, fill must be non frost-susceptible as defined in Highways Agency 'Specification for highway works', clause 801.8 & 801.17.
- Test reports: If the following fill materials are proposed, submit a laboratory report confirming they are non frost-susceptible:
 - Fine grained soil with a plasticity index less than 20%.
 - Coarse grained soil or crushed granite with more than 10% retained on a 0.063mm sieve.
 - Crushed chalk.
 - Crushed limestone fill with average saturation moisture content in excess of 3%.
 - Burnt colliery shale.
- Frost-susceptible fill: May only be used:
 - At depths below the finished ground surface greater than 450mm.
 - Within the external walls of buildings below spaces that will be heated. Protect from frost during construction.

Where frost heave will not affect structural elements.

525 TESTING OF SUITABILITY OF FILL MATERIALS BEFORE START OF FILLING

- To be carried out in sufficient time for their inclusion in the works without detriment to the programme.

530 PLACING FILL

- Surfaces of excavations and areas to be filled: Free from loose soil, topsoil, organic material, rubbish and standing water.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
- Adjacent structures, membranes and buried services:
 - Do not overload, destabilise or damage.
 - Submit proposals for temporary support necessary to ensure stability during filling.
 - Allow 14 days (minimum) before backfilling against in situ concrete structures.
- Layers: Place so that only one type of material occurs in each layer.
- Earthmoving equipment: Vary route to avoid rutting.

610 COMPACTED FILLING FOR LANDSCAPE AREAS

- Fill: Material capable of compaction by light earthmoving plant.
- Filling: Layers not more than 200mm thick. Lightly compact each layer to produce a

SECTION D20 EXCAVATING AND FILLING

stable soil structure.

617 HIGHWAYS AGENCY TYPE 1 UNBOUND MIXTURE/ GRANULAR FILLING

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 803:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Recycled aggregates.
 - Crushed non-expansive slag to clause 801.2.
 - Well-burned non-plastic colliery shale.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

618 HIGHWAYS AGENCY TYPE 2 UNBOUND MIXTURE / GRANULAR FILLING

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 804:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Crushed non-expansive slag to clause 801.2.
 - Well-burned non-plastic colliery shale.
 - Natural gravel.
 - Natural sand.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

625 COMPACTED GENERAL FILLING/EARTHWORKS

- Specification: Highways Agency 'Specification for highway works' Series 600 Earthworks.
- Definition: References to the 'Overseeing Organisation' are deemed to be to the issuer of this specification.

626 COMPACTED GENERAL FILL

- Excavated material: Select suitable material and keep separate.
- Filling: Spread and level material in layers. As soon as possible thoroughly compact each layer.
- Proposals: Well in advance of starting work submit details of proposed:
 - Materials to be used, including quantities of each type.
 - Type of plant.
 - Maximum depth of each compacted layer.
 - Minimum number of passes per layer.

700 BACKFILLING AROUND FOUNDATIONS

- Under oversite concrete and pavings: Hardcore.
- Under grassed or soil areas: Material excavated from the trench, laid and compacted in 300mm maximum layers.

710 HARDCORE FILLING

- Fill: Granular material, free from excessive dust, well graded, all pieces less than 75mm in any direction:
 - Test requirements:
Minimum 10% fines value tested in a soaked condition to BS 812-111.
Impact value SZ tested to BS EN 1097-2 .
- In any one layer only one of the following:
- Fill: Granular material, free from excessive dust, well graded, all pieces less than 75mm in any direction, minimum 10% fines value of 50kN when tested in a soaked condition to BS EN1097-2 1998 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.
 - Crushed non-expansive slag.
 - Gravel or hoggin with not more clay content than is required to bind the

SECTION D20 EXCAVATING AND FILLING

- material together, and with no large lumps of clay.
 - Well-burned non-plastic colliery shale.
 - Natural gravel.
 - Natural sand.
 - Filling: Spread and level in 150mm maximum layers. Thoroughly compact each layer.
- 730 BLINDING
- Surfaces to receive sheet overlays or concrete:
Blind with:
 - Concrete where shown on drawings; or
 - Sand, fine gravel, or other approved fine material applied to fill interstices.
Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
 - Sand for blinding: To BS EN 12620, grade 0/4 or 0/2 (MP).
 - Permissible deviations on surface level: +0 -25 mm.

D30 PILING

Drawing contains necessary specification notes for Piling technique specified.

SECTION E05 IN-SITU CONCRETE CONSTRUCTION GENERALLY

E05 IN-SITU CONCRETE CONSTRUCTION GENERALLY

SECTION E05 IN-SITU CONCRETE CONSTRUCTION GENERALLY

E05 In situ concrete construction generally

To be read with Preliminaries/General conditions.

220 DESIGN OF STRUCTURAL CONCRETE

- Standards:
- Design: To BS EN 1992.
- Reinforcement schedules: To BS8666.
- Finished product: To comply with the requirements of design standard.

290 ACCURACY OF CONSTRUCTION

- Setting out: To BS 5964-1.
 - Element shape and position: To Section 7 of the National Structural Concrete Specification for Building Construction.
 - Substitution of alternative requirements: None.
 - Conflicts: Notwithstanding tolerances specified elsewhere, do not exceed requirements for compliance with the designated code of practice.
 - Substitution of alternative requirements: None.

300 LEVELS OF STRUCTURAL CONCRETE FLOORS

- Tolerances (maximum):
 - Level of floor: As preliminaries A33 ± 10 mm as measured from the nearest temporary benchmark.
 - Steps in floor level: ± 5 mm.

310 SURFACE REGULARITY OF CONCRETE FLOORS TO BS 8204 - GENERAL

- Standard: To BS 8204-1 or -2.
- Measurement: From underside of a 2m straightedge (between points of contact) placed anywhere on surface and using a slip gauge.

315 SURFACE REGULARITY OF CONCRETE FLOORS TO BS 8204 - TOLERANCE CLASS SR1

- Location: All surfaces.
- Abrupt changes: Not Permitted.

SECTION E10 MIXING/CASTING/CURING IN-SITU CONCRETE

E10 MIXING/CASTING/CURING IN-SITU CONCRETE

SECTION E10 MIXING/CASTING/CURING IN-SITU CONCRETE

E10 Mixing/casting/curing in situ concrete

To be read with Preliminaries/General conditions.

CONCRETE MIXES

101 SPECIFICATION

- Concrete generally: To BS 8500-2.
- Exchange of information: Provide concrete producer with information required by BS 8500-1, clauses 4 and 5.

132_b DESIGNED CONCRETE FOR REINFORCED CONCRETE GROUND BEAM AND THE CORE OF THE REINFORCED WALLS

- Embedded metal: Carbon steel reinforcement.
- Compressive strength class (cylinder/cube minimum): C32/40
- Target density (oven-dry): Normal.
- Fibres: Not required.
- Aggregates:
 - Size (maximum): 20mm,
 - Type/Density: Normal weight.
 - Coarse recycled aggregates: Not Permitted.
 - Additional aggregate requirements: See additional mix requirements.
- Design chemical class: XD3+XC3/XC4+XF1+AC1
- Limiting values for composition:
 - Water cement or combination ratio (maximum): dependent on combination type, ANTICIPATED 0.45 .
 - Cement/combination content (minimum): 360kg/m³.
 - Cement/combination content (maximum): 380kg/m³.
 - Air content in situ (minimum): Not Required.
- Consistence class: Contractor's Choice.
- Permitted cement/combinations: As prescribed in BS8500-2.
 - Chloride class: CL 0.40.
 - Admixtures: Concrete Producer's.
 - Colour: Not Required.
- Additional mix requirements: Contractor to provide Mix design including petrographic assessment of aggregates and chemical composition of the concrete constituents to the engineer for inspection.

MATERIALS, BATCHING AND MIXING

215 READY-MIXED CONCRETE

- i Production plant: Currently certified by a body accredited by UKAS to BS EN 45011 for product conformity certification of ready-mixed concrete.
- 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.

225 CHANGES TO SPECIFICATION

- Changes to specification of fresh concrete (outside concrete producer's responsibility): Not permitted

315 AGGREGATES FOR EXPOSED VISUAL CONCRETE

- Limitations on contaminants: Free from absorbent particles which may cause

SECTION E10 MIXING/CASTING/CURING IN-SITU CONCRETE

'popouts', and other particles such as coal and iron sulfide which may be unsightly or cause unacceptable staining.

- Colour: Consistent.
- Supply: From a single source and maintained throughout the contract.
- Samples: Submit on request.

415 ADMIXTURES

- Calcium chloride and admixtures containing calcium chloride: Do not use.

PROJECT TESTING/ CERTIFICATION

505 PROJECT TESTING OF CONCRETE - GENERAL

- Testing: BS EN206-1 Annex B and BS 8500 Annex B.
 - Nonconformity: Obtain instructions immediately.
- 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.

508 REGULAR PROJECT TESTING OF CONCRETE

- Tests: Compressive Strength.
- Sampling:
 - Rate: Three samples per 15m³.
- Other requirements: One sample to be tested at 7 days. Two sample to be tested at 28 days.

530 TESTS RESULTS

- Submission of reports: Within one day of completion of each test.
 - i - Number of copies: 2
- Reports on site: A complete set, available for inspection.

PLACING/ COMPACTION/ CURING AND PROTECTION

630 PREMATURE WATER LOSS

- Requirement: Prevent water loss from concrete laid on absorbent substrates.
 - Underlay: Select from:
 - Polyethylene sheet: 250 micrometres thick.
 - Installation: Lap edges 150mm.

640 CONSTRUCTION JOINTS

- Location of joints: Submit proposals not shown on the drawings.
- Preparation of joint surfaces: Preparation of joint surfaces: As Section E40.

650 SURFACES TO RECEIVE CONCRETE

- Cleanliness of surfaces immediately before placing concrete: Clean with no debris, tying wire clippings, fastenings or free water.

680 PLACING

- Records: Maintain for time, date and location of all pours.
- Timing: Place as soon as practicable after mixing and while sufficiently plastic for full compaction.
- Temperature limitations for concrete: 30°C (maximum) and 5°C (minimum), unless otherwise specified. Do not place against frozen or frost covered surfaces.

SECTION E10 MIXING/CASTING/CURING IN-SITU CONCRETE

- Continuity of pours: Place in final position in one continuous operation up to construction joints. Avoid formation of cold joints.
- Discharging concrete: Prevent uneven dispersal, segregation or loss of ingredients or any adverse effect on the formwork or formed finishes.
- Thickness of layers: To suit methods of compaction and achieve efficient amalgamation during compaction.
- Poker vibrators: Do not use to make concrete flow horizontally into position, except where necessary to achieve full compaction under void formers and cast-in accessories and at vertical joints.

690 COMPACTING

- General: Fully compact concrete to full depth to remove entrapped air. Continue until air bubbles cease to appear on the top surface.
 - Areas for particular attention: Around reinforcement, under void formers, cast-in accessories, into corners of formwork and at joints.
- Consecutive batches of concrete: Amalgamate without damaging adjacent partly hardened concrete.
- Methods of compaction: To suit consistence class and use of concrete.

810 CURING GENERALLY

- Evaporation from surfaces of concrete: Prevent, including from perimeters and abutments, throughout curing period.
 - Surfaces covered by formwork: Retain formwork in position and, where necessary to satisfy curing period, cover surfaces immediately after striking.
 - Top surfaces: Cover immediately after placing and compacting. If covering is removed for finishing operations, replace it immediately afterwards.
- Surface temperature: Maintain above 5°C throughout the specified curing period or four days, whichever is longer.
- Records: Maintain details of location and timing of casting of individual batches, removal of formwork and removal of coverings. Keep records on site, available for inspection.

811 COVERINGS FOR CURING

- Sheet coverings: Suitable impervious material.
- Curing compounds: Selection criteria:
 - Curing efficiency: Not less than 75% or for surfaces exposed to abrasion 90%.
 - Colouring: Fugitive dye.
 - Application to concrete exposed in the finished work: Readily removable without disfiguring the surface.
 - Application to concrete to receive bonded construction/ finish: No impediment to subsequent bonding.
- Interim covering to top surfaces of concrete: Until surfaces are in a suitable state to receive coverings in direct contact, cover with impervious sheeting held clear of the surface and sealed against draughts at perimeters and junctions.

817 CURING CLASS

- Standard: To BS EN 13670 – Curing class 2.

818 CURING PERIODS GENERALLY

- Minimum periods: When not otherwise indicated, to BS EN 13670

840 PROTECTION

- Prevent damage to concrete, including:
 - Surfaces generally: From rain, indentation and other physical damage.
 - Surfaces to exposed visual concrete: From dirt, staining, rust marks and other disfiguration.

SECTION E10 MIXING/CASTING/CURING IN-SITU CONCRETE

- Immature concrete: From thermal shock, physical shock, overloading, movement and vibration.
- In cold weather: From entrapment and freezing expansion of water in pockets, etc.

E20 FORMWORK FOR IN-SITU CONCRETE

SECTION E20 FORMWORK FOR IN-SITU CONCRETE

E20 Formwork for in situ concrete

To be read with Preliminaries/ General conditions.

GENERALLY/ PREPARATION

110 LOADINGS

- Requirement: Design and construct formwork to withstand the worst combination of the following:
 - Total weight of formwork, reinforcement and concrete.
 - Construction loads including dynamic effects of placing, compacting and construction traffic.
- Wind and snow loads.

170 WORK BELOW GROUND_____

- Casting vertical faces against faces of excavation: Obtain consent
 - Requirements: _____.
- Casting walls against faces of excavation: Use formwork on both sides.

CONSTRUCTION

310 ACCURACY

- General requirement for formwork: Accurately and robustly constructed to produce finished concrete in the required positions and to the required dimensions.
- Formed surfaces: Free from twist and bow (other than any required cambers).
- Intersections, lines and angles: Square, plumb and true.

320 JOINTS IN FORMS

- Requirements including joints in form linings and between forms and completed work:
 - Prevent loss of grout, using seals where necessary.
 - Prevent formation of steps. Secure formwork tight against adjacent concrete.

330 INSERTS, HOLES AND CHASES

- Positions and details:
 - Dimensioned on drawings provided on behalf of the Employer: Do not change without consent.
 - Undimensioned or from other sources: Submit proposals.
- Positioning relative to reinforcement: Give notice of any conflicts well in advance of placing concrete.
- Method of forming: Fix inserts or box out as required. Do not cut hardened concrete without approval.

STRIKING

510 STRIKING FORMWORK

- Timing: Prevent any disturbance, damage or overloading of the permanent structure.

FORMED FINISHES

611 ROUGH FINISH

- This finish shall be obtained by the use of moulds or properly designed forms of closely jointed sawn boards. The surface shall be free from substantial voids honeycombing or other large blemishes.

SECTION E20 FORMWORK FOR IN-SITU CONCRETE

621 FAIR FINISH

- This finish shall be obtained from forms designed to produce a hard smooth surface with true clear arrises. Only very minor surface blemishes shall be permitted and there shall be no staining or discolouration. The colour of the exposed concrete shall not vary from member to member and lift to lift. Any projections shall be removed and the surface made good.

E30 REINFORCEMENT FOR IN-SITU CONCRETE

SECTION E30 REINFORCEMENT FOR IN-SITU CONCRETE

E30 Reinforcement for in situ concrete

To be read with Preliminaries/ General conditions.

110 QUALITY ASSURANCE OF REINFORCEMENT

- Standards:
 - Reinforcement: To BS 4449, BS 4482, BS 4483 or BS 6744.
 - Cutting and bending: To BS 8666.
- Source of reinforcement: Companies holding valid certificates of approval for product conformity issued by the UK Certification Authority for Reinforcing Steels (CARES).

140 PLAIN BAR REINFORCEMENT

- Standard: To BS 4482.
Strength grade: 250.

150 RIBBED BAR REINFORCEMENT

- Standard: To BS 4449.
 - Strength grade: B500B

210 STANDARD FABRIC REINFORCEMENT

- Standard: To BS 4483.
- Strength grade: Standard Fabric where mesh arrangement can be defined by BS 8666 table 4

255 PREFABRICATED CONTINUITY REINFORCEMENT STRIPS

- Source: Obtain from a manufacturer holding a valid Technical Product Approval certificate issued by the UK Certification Authority for Reinforcing Steels (CARES) or equivalent.

310 CUTTING AND BENDING REINFORCEMENT

- General: To schedules and to BS 8666.
- Bending on site, including minor adjustments: Obtain instructions from CA.

320 PROTECTION OF REINFORCEMENT

- Dropping from height, mechanical damage and shock loading: Prevent.
- Cleanliness of reinforcement at time of pouring concrete: Free from corrosive pitting, loose mill scale, loose rust and contaminants which may adversely affect the reinforcement, concrete, or bond between the two.

425 LAPS NOT DETAILED ON DRAWINGS

- Laps in bar reinforcement (minimum): 40 times the diameter of the smallest lapped bar.
- Laps in fabric reinforcement (minimum): 40 times the diameter of the smallest lapped bar.
 - Laps at corners: Avoid four layer build-up.

451 FIXING REINFORCEMENT

- Standard: To BS 7973-1 and -2.
- Installation: In addition to any spacers and chairs shown on drawings or schedules, provide adequate support, tie securely and maintain the specified cover.
- Tying:
 - Wire type: 16 gauge black annealed. Use stainless steel wire for stainless steel reinforcement.
 - Ends of tying wire: Prevent intrusion into the concrete cover. Remove loose ends.

SECTION E30 REINFORCEMENT FOR IN-SITU CONCRETE

- Compatibility of metals: Prevent contact between ordinary carbon steel and stainless or galvanized reinforcement.

480 NOMINAL COVER TO REINFORCEMENT

- Top face: As noted on Drawings.
- Formed faces: As noted on Drawings

E40 DESIGNED JOINTS FOR IN-SITU CONCRETE

SECTION E41 WORKED FINISH TO-SITU CONCRETE

E40 Designed joints in in situ concrete

To be read with Preliminaries/General conditions.

120 CONSTRUCTION/MOVEMENT JOINTS GENERALLY

- Accuracy: Position and form joints accurately, straight, well-aligned and truly vertical or horizontal or parallel with setting out lines of the building.
 - Modifications to joint design or location: Submit proposals.
 - Placing concrete to form movement joints:
 - Maintain effectiveness of joints. Prevent concrete entering joints or penetrating or impregnating compressible joint fillers.
- Do not place concrete simultaneously on both sides of movement joints.

132 ADDITIONAL REQUIREMENTS FOR CONSTRUCTION JOINTS

- Joints additional to those required by designer: Submit proposals and obtain approval.
- Approval of additional joints: Submit proposals.

210 FORMED JOINTS

- Forms/ stop ends generally: Rigid and grout-tight.
- Forms/ stop ends for projecting continuity reinforcement: To accommodate bars or fabric without temporary bending or displacement.

211 FORMED JOINTS IN CONCRETE WEARING SURFACES

- Temporary forms: Square edged with a steel top surface.
- Placing concrete: Compact thoroughly at edges to give level, closely abutted joints with no lipping.

230 PREPARATION OF CONSTRUCTION JOINTS

- Roughening of joint surfaces: Select from:
 - Brushing and spraying: Remove surface laitance and expose aggregate finish while concrete is still green.
 - Other methods: Submit proposals.
- Condition of joint surfaces immediately before placing fresh concrete: Clean and damp.

410 CARBON STEEL TIE BARS

- Standard: To BS 4449.
 - Product form: Rebar plain.
 - Strength grade: B500B
- Cleanliness: Free from corrosive pitting, loose mill scale, loose rust and contaminants which may adversely affect the tie bars, reinforcement, concrete, or bond between the two.
- Position: Centred on joint unless noted on drawings otherwise.
- Other requirements: None.

420 FABRIC TIE STRIPS

- Standard: To BS 4483.
- Cleanliness: Free from corrosive pitting, loose mill scale, loose rust and contaminants which may adversely affect the fabric, concrete, or bond between the two.
- Position: Width of the mesh strip centred on the joint.

430 CARBON STEEL DOWEL BARS

- Standard: To BS 4482 (for bars 5-12mm) or BS EN 13877-3.
 - Product form: Plain.
 - Strength grade: 250.
 - Properties: Perfectly straight, with sawn (not sheared) ends.

SECTION E41 WORKED FINISH TO-SITU CONCRETE

- Debonding: Achieve effective debonding of each bar
 - Material: Submit proposals of proprietary plastic sleeves.
 - Extent: Half length of bar.
- Position: At right angles to and centred on joint.
- Other requirements: None.

SECTION E41 WORKED FINISH TO-SITU CONCRETE

E41 WORKED FINISHED TO IN-SITU CONCRETE

SECTION E41 WORKED FINISH TO-SITU CONCRETE

E41 Worked finishes to in situ concrete

To be read with Preliminaries/ General conditions.

150 FINISHING

- Timing: Carry out at optimum times in relation to setting and hardening of concrete.
- Prohibited treatments to concrete surfaces:
 - Wetting to assist surface working.
 - Sprinkling cement.

230 BRUSHED FINISH

- Surface on completion: Light, even texture.

231 Tamped Finish:

Tamp surface with edge of a board or beam to give an even texture of parallel ribs.

- Regular Tamp: Undulations of -5mm / +10mm from design surface level.
- Heavy Tamp: Undulations of -10mm / +20mm from design surface level.

240 WOOD FLOATED FINISH

- Surface on completion: Slightly coarse, even texture with no ridges or steps.

310 SMOOTH FLOATED FINISH

- Surface on completion: Even, with no ridges or steps.

320 TROWELLED FINISH or STEEL TROWELLED FINISH

- Surface on completion: Uniform, smooth but not polished, free from trowel marks and blemishes, and suitable to receive specified flooring material.

330 TROWELLED FINISH FOR WEARING SURFACES

- Surface on completion: Uniform and smooth, free from trowel marks and blemishes.

331 POWER FLOATED FINISH

- Power floating shall be undertaken by steel floating the concrete to an even finish with no ridges or steps. When the concrete has taken a primary set it shall be power trowelled to a uniform smooth polished surface free from trowel marks or other blemishes. Once power floating is completed the surface finish must be adequately protected from construction traffic.
- First phase power float finish: Omit final polishing phase of power floating.

Q20 GRANULAR SUB-BASES TO ROADS/PAVING

SECTION Q20 GRANULAR SUB-BASES TO ROADS/PAVING

Q20 Granular sub-bases to roads/ pavings

To be read with Preliminaries/ General conditions.

110 THICKNESSES OF SUB-BASE/ SUBGRADE IMPROVEMENT LAYERS

- Thicknesses: 150mm

140 EXCAVATION OF SUBGRADES

- Final excavation to formation/ subformation level: Carry out immediately before compaction of subgrade.
- Soft spots and voids: Give notice and obtain instructions from Contract Administrator.
- Wet conditions: Do not excavate or compact when the subgrade may be damaged or destabilised.

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 maximum 225mm 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 MEMBRANES

- Terram 1000 or other approved.
 - 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 15m before covering with fill.
 - Preparation: Remove humpts and sharp projections and fill hollows before laying.

180^{igp} NOTICE

- Give notice: To Contract Administrator for inspection of subgrade if required.
- Period of notice 8 hours.

200^{igp} SUBGRADE IMPROVEMENT LAYER (CAPPING)

- Material: To highways Agency 'Specification for highway works', table 6/1, Classes 6F1, 6F2, 6F3, 6F4, 6F5
- Standard: Placed and compacted to Highways Agency 'Specification for highway works', table 6/1, clauses 612 and 613.3, 613.8, 613.9, 613.10 and 613.13

210 HIGHWAYS AGENCY TYPE 1 GRANULAR MATERIAL

- Material: Type 1 unbound mixture to Highways Agency 'Specification for highway works', clause 803.
- Recycled aggregate: Permitted
- Submit details of all proposed materials for approval of Contract Administrator.

220 FROST SUSCEPTIBLE GRANULAR MATERIAL

- Definition (non frost susceptible material): To Highways Agency 'Specification for highway works' clause 801.8.

SECTION Q20 GRANULAR SUB-BASES TO ROADS/PAVING

- Depth of frost susceptible material below final surface of paving (minimum): 450mm.
 - 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): 1000mm
- 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.
 - Sub-base surface after compaction and immediately before overlaying: Uniformly well closed and free from loose material, cracks, ruts or hollows.
- 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.
- 310 ACCURACY
- Permissible deviation from required levels, falls and cambers (maximum):
 - Subgrades:
Roads and parking areas: +20 -30 mm.
Footways and recreation areas: \pm 20 mm.
 - Sub-bases:
Roads and parking areas: + 10 -30mm
Footways and recreation areas: +10 -30mm
- 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.

R12 BELOW GROUND DRAINAGE SYSTEMS

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

R12 Below ground drainage systems

To be read with Preliminaries/ General conditions.

GENERAL

110 BELOW GROUND DRAINAGE SYSTEMS _____

- Surface water and rainwater drainage sources: Roofs, hardstanding areas. Gullies and Rain Water Pipes (RWPs).
- Foul drainage sources: NONE.
- Accessories - general: See Clauses 471-498.

PRODUCTS

311 ADAPTORS TO CLAY DRAINAGE

- Material and standard: Polypropylene to BS EN 295-1 and Kitemark certified.
- Type: Submit details for approval of CA

312 ADAPTORS TO PLASTICS DRAINAGE

- Material and standard: Plastics to BS 4660 and Kitemark certified or to BS EN 1401-1 and Kitemark certified.
- Type: Submit details for approval of CA

313 ONE PIECE GULLIES

- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - 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, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
 - Submit details for approval of CA.

315 ONE PIECE GULLIES AND COVERS

- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - 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, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
- Submit details for approval of CA. -

317 COMPOSITE GULLIES

- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
- Submit details for approval of CA

329 PIPES, BENDS AND JUNCTIONS - SUPPLY

- Pipes and fittings: From same manufacturer for each pipeline.
 - Submit details for approval of CA.

335 PIPES, BENDS AND JUNCTIONS – CONCRETE – FLEXIBLE JOINTS –

- Material and Standard : Concrete to BS 5911-1 and BSEN 1916. A minimum Class 3 sulphate cement shall be used.

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

- Submit details for approval of CA.
- 336 PIPES, BENDS AND JUNCTIONS - CLAY - FLEXIBLE JOINTS
 - Material and standard: Vitrified clay to BS EN 295-1, Kitemark certified.
 - Submit details for approval of CA
- 344 PIPES, BENDS AND JUNCTIONS - PLASTICS -STRUCTURED WALL
 - Standard: To WIS-04-35-01, Kitemark or Agrément certified.
 - Submit details for approval of CA.
- 346 PIPES, BENDS AND JUNCTIONS - PVC-U - SOLID WALL
 - Standard: BS EN 1401-1 with flexible joints.Submit details for approval of CA.
- 346 PIPES, BENDS AND JUNCTIONS - PVC-U - PLAIN WALL – PRIVATE AND ADOPTED DRAINS
 - Standard: To WIS-04-31-05 or BS EN 1401-1, class SN4, with flexible joints, Kitemark certified.
 -
- 352 ACCESS POINTS - PLASTICS
 - Standard: To BS 4660 and Kitemark certified, to BS EN 13589-1, or Agrément certified.
 - Submit details for approval of CA
- 359 FLEXIBLE COUPLINGS
 - Standard: To BS EN 295-4 or WIS 04-41-01 and Kitemark certified, or Agrément certified.
 - Submit details for approval of CA
- 371 RODDING POINTS
 - 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, or Agrément certified.
 - Submit details for approval of CA
- 379 WARNING MARKER TAPES
 - Type: Heavy gauge polyethylene.
- 401 INSPECTION CHAMBERS - PLASTICS
 - Standard: To BS 7158 or BS EN 13598-1, or Agrément certified.
 - Submit details for approval of CA.
- 407 MANHOLES AND INSPECTION CHAMBERS - CONCRETE
 - Standards:
 - To BS 5911-3 and BS EN 1917 and Kitemark certified; or
 - To BS 5911-4 and BS EN 1917.
 - Submit details for approval of CA
 - A minimum Class 3 sulphate resistant cement shall be used.
- 439 MANHOLE STEPS
 - Standard: To BS EN 13101.
 - Submit details for approval of CA.
- 444 SEALING FOR CONCRETE MANHOLES - BITUMINOUS STRIPS
 - Submit details for approval of CA

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

- 446 SEALING FOR CONCRETE MANHOLES - MORTAR
- Submit details for approval of Contract Administrator.
- 448 SEALING FOR CONCRETE MANHOLES - SEALANT
- Submit details for approval of Contract Administrator.
- 471 ACCESS COVERS AND FRAMES
- Standard: To BS EN 124.
 - Sizes: As stated in drawings
 - Loading grades to BS EN 124: As stated on drawings
 - Submit details for approval of Contract Administrator.
- 473 ACCESS COVERS AND FRAMES - PRECAST CONCRETE SEATINGS
- Standards: To BS 5911-3 and BS EN 1917 and Kitemark certified.
 - Opening sizes: To suit access covers.
 - Submit for approval of Contract Administrator.
- 483 CONCRETE (GENERAL)
- Standard: To BS 8500-2.
 - Concrete: GEN3
- 485 CONCRETE (STRUCTURAL)
- Standard: To BS 8500-2.
 - Concrete: See E05-E10.
- 496 GRANULAR MATERIAL- NATURAL
- Standard: To BS EN 12620.
 - Size: Dependent on location - see Execution clauses.
- 498 GRANULAR SUB-BASE MATERIAL
- Standard: To Highways Agency Volume 1, 'Specification for Highway Works', Type 1 Unbound mixtures for sub-base.

EXECUTION

- 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 MATERIAL
- Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.
- 616 SELECTED FILL FOR BACKFILLING
- Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil and material retained on a 40mm sieve.
 - Compaction: By hand in 100mm layers.
- 623 LOWER PART OF TRENCH - GENERAL
- Trench up to 300mm above crown of pipe: Vertical sides, width as small as practicable.
 - Width (minimum): External diameter of pipe plus 300mm.
- 631 TYPE OF SUBSOIL
- General: Where type of subsoil at level of crown of pipe differs from that stated for

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

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.

673 CLASS S SURROUND

-Granular material:

- Pipe sizes DN 100 and DN 150: Size 4/10.
- Pipe sizes DN 225 and DN 300: Size 4/10 or 10/20.

-Bedding:

- Material: Granular, compacted over full width of trench.
- Thickness (minimum): 150mm.
- 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 150mm above crown of pipe.
- Compaction: By hand.

-Backfilling:

- Material: Granular.
- Depth: Up to formation level.
- Compaction: In 300mm (maximum) thick layers.

678 CLASS Z SURROUND

- Blinding:
 - Material: Concrete (general).
 - Thickness (minimum): 25mm.
 - Width: Full width of trench.
 - Allow to set before proceeding.
- Pipes:
 - Temporary support: Folding wedges of compressible board. Prevent flotation.
 - Clearance under pipes (minimum): 100mm.
 - Adjust pipes to line and gradient.
- Initial testing before placing surround: Required
- Surround:
 - Material: GEN3
 - Depth: To 150mm above crown of pipe.
 - Width: Full width of trench.
- Vertical construction joints:
 - Location: At face of flexible pipe joints.
 - Material: 18mm 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 OR WHERE LIMITED COVER TO CROWN

- 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 1m from foundations: Top of concrete surround not lower than bottom of foundation.
 - Trenches more than 1m from foundations: Top of concrete surround not lower

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

than D mm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150mm.

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: Minimise 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.

689 PIPELINES PASSING THROUGH STRUCTURES

- Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers): Provide 600mm 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): 150mm.
 - 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 50mm 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

- Height of invert of horizontal drain at base of stack below centreline of lowest branch pipe (minimum): 450mm
- Bedding: Do not impair flexibility of pipe couplings.
 - Material: Concrete (general).

693 DIRECT CONNECTION OF GROUND FLOOR WCS TO DRAINS

- Drop from crown of WC trap to invert of drain (maximum): 1.3m
- Horizontal distance from the drop to a ventilated drain (maximum): 6m.

695 BACKDROP PIPES OUTSIDE MANHOLE WALLS

- Excavation beneath backdrop pipe: Backfill.
 - Material: GEN3
- Pipe encasement:
 - Material: Concrete GEN3
 - Thickness (minimum): 150mm.

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.

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

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.

715 BACKFILLING TO PIPELINES

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

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 150mm layers.

722 PUBLIC ROADS AND PAVINGS - E & W, 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: 300-400mm.
 - Pipelines deeper than 2m: Lay an additional tape 600mm above the top of the pipeline.

734 INSTALLING ACCESS POINTS AND GULLIES

- Bedding:
 - Material: Concrete GEN3
 - Thickness (minimum): 150mm
- Surround:
 - Material: Concrete GEN3
 - Thickness (minimum): 150mm
 - Height: Full height
- Backfilling:
 - 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 site traffic.

736 INSTALLING RODDING POINTS

- Bedding and surround:
 - Material: Concrete (general).
 - Thickness (minimum): 100mm
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.

741 INSTALLING INSPECTION CHAMBERS - PLASTICS

- Bedding:
 - Material: Concrete GEN3
 - Thickness (minimum): 225mm
- Surround:
 - Material: Concrete GEN3
 - Thickness (minimum): 150mm
- Backfilling:
 - Compaction: By hand in 100 mm layers.

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

743 INSTALLING CONCRETE MANHOLES

- Bases:
 - Material: Concrete GEN3
 - Thickness (minimum): 225mm
- Surround:
 - Material: Concrete GEN3
 - Thickness (minimum): 150mm
- Backfilling:
 - Compaction: By hand in 100 mm layers.

753 FIXING MANHOLE STEPS

- Fixing: Bed in joints
- Positioning: 300mm vertical centres staggered 300mm horizontally, with lowest step 300mm (maximum) above benching and top step 450mm (maximum) below top of cover.

755 JOINTING CONCRETE MANHOLE CHAMBER SECTIONS

- Jointing and sealing: Submit details for approval of CA
- 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 channel, preferably at half pipe level, so that discharge flows smoothly in direction of main flow.
 - Branches greater than nominal size 150mm: 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 GEN3
 - 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: High strength concrete
Application: Before benching concrete has set, and with dense smooth uniform finish.

773 INSTALLING ACCESS COVERS AND FRAMES

- Seating: Class B engineering bricks
- Bedding and haunching of frames: Continuously.
 - Material: 1:3 Cement:Sand Mortar
 - Top of haunching: 30mm below surrounding surfaces.
- Horizontal positioning of frames:
 - Centred 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 -6mm.

776 EXPOSED OPENINGS IN INSPECTION CHAMBERS, ACCESS POINTS, FITTINGS AND EQUIPMENT

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

SECTION R12 BELOW GROUND DRAINAGE SYSTEMS

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.

911 TESTING AND INSPECTION

- Dates for testing and inspection: Give notice.
Period of notice: 48 hours

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.

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.