

Construction Services

Design brief

**External works -
Construction of grass
playing fields**

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Environment Directorate

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Construction Services - Design Brief

External works - Construction of grass playing fields

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1.0 Construction of grass playing fields generally

Playing field works shall be carried out by specialists.

The Contractor should provide a statement describing how the works are to be carried out (e.g. a 'Method Statement'), including details of machinery, staffing (with relevant qualifications) and a timetable for monitoring purposes.

The Contractor should provide at least 24 hours notice before starting a number of tasks, such as the following (This should provide for an inspection or quality control check to take place if required):

- The start date of the works
- The initial and completed marking out of the work area especially the line of the pipe to the outlet and the perimeter and lateral drain runs
- The start of the drainage pipe excavations
- The start of each component part of the drainage pipe runs i.e. the laying of the gravel backfill, the pipe itself, blinding layer and final material fill
- The start of each component part of the sand -gravel slits, i.e. the gravel backfill and the sand fill
- The start of laying any sand-top / carpet
- Initial surface preparation and seeding works
- Completion of the construction phase
- Completion of the maintenance phase

In addition to the Contract Administrator (CA) the Council may wish to carry out random checks on a periodic basis to assess the progress and standard of the work.

All materials must comply with the relevant material specifications. Samples of all materials should be provided to the CA as acceptance by the Contractor from his supplier. The samples will act as a comparison for future deliveries.

Any materials which do not meet the required material specification may be classed as being unsuitable and may have to be removed from the site at the Contractor's own expense. This will encourage the Contractor to implement quality control on materials.

To comply with relevant Highway Acts etc. and ensure residents are not unduly inconvenienced, it is essential that the Contractor takes measures to prevent dirt or foreign matter from being deposited upon any highway, footpath or access way. Where this does occur it is up to the Contractor to remove the material and clean the area, at their own expense.

Any damage whatsoever caused by the Contractor will also have to be rectified at their own expense.

2.0 Earthworks

2.1 Site clearance

Affected services must be protected or lowered as appropriate.

Work on sites where trees are present must be carried out in accordance with **BS 5837:2012** - *Trees in relation to design, demolition and construction. Recommendations*

Tree root protection areas **must** be identified at the design stage and clearly marked on all plans

No part of any development, including landscape works involving excavation or change of ground levels, should normally be within the minimum tree root protection area(s) of any retained tree(s).

Verify with the CA before commencing site clearance, identify and mark plants, trees, shrubs, hedges, areas of scrub etc to be retained and protect and preserve throughout period of works.

Trees within the construction area agreed to be felled, shall be removed and have all associated roots grubbed up. Roots of retained shrubs and trees shall not be cut, lopped or severed without approval.

Cut and clear away long grass, weeds, brambles, saplings etc and grub up stumps and major root runs without unduly disturbing top soil.

Dispose of all rubbish and unwanted spoil to an approved tip.

Burning on site will not be permitted.

2.2 Rotovation

Before top soil is removed, the platforms should be rotovated to help break down the turfs.

2.3 Top Soil

Top soil should be stripped and stacked in heaps not exceeding 2.0m high. Weeds must not be allowed to seed or perennial weeds become established.

Preference is for the soil to be spread on the remaining site and if this is not possible, to be taken to an approved tip.

2.4 Cut and Fill

Regrading the field will involve altering the levels in the subsoil using the surplus 'cut' from high parts to fill lower areas. Filling must be done in consecutive layers not exceeding 250mm. Each layer must be adequately consolidated to avoid subsequent settlement.

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The gradient of the arena should be no steeper than 1:80–100 along the line of play and 1:40–50 across the line of play.

The final formation must be trimmed smooth to within +/-25mm of the required design levels before replacing the topsoil. and have a minimum undrained shear strength of at least 50kN/m² or a California Bearing Ratio (CBR) of 2%.

2.5 Surface Water

All excavations should be kept clear of water, and sumps should be created to avoid flooding neighbouring properties during playing field construction. These should be filled in when no longer required.

2.6 Banks

Banks formed must be gently graded, to match the existing but in any case no steeper than 1:3, in order to facilitate subsequent safe and effective maintenance. Along the top of the fill bank, a slight back fall no steeper than 1:30 and approx 5.0m wide to meet the line of the carrier drain should be formed.

2.7 Top Soil Replacement

On completion of the grading operations the topsoil is replaced to a uniform depth to produce a finished surface that marries in with the surrounding ground levels. Where there are only shallow depressions these can be infilled with imported topsoil of a similar nature to the existing material.

Surface grading involves smoothing out the surface by moving soil from slightly higher parts to lower areas by means of a blade grader. There must be a minimum 'firmed' depth of 150mm of topsoil to give adequate cover on completion of the project.

Maximum depth of top soil shall be no greater than 250mm.

3.0 Drainage

3.1 Drainage generally

Good drainage is a key requirement and a naturally well-drained site will form a sound basis for a playing surface. On land where the soil tends to be impervious, adequate provision for supplementary drainage must be provided to meet the needs of the intended use.

At the feasibility stage it is essential to consider the effects of 'run-off' from adjacent areas of land or hard surface on to the playing surface so that appropriate provision can be made.

All drainage works should be undertaken in accordance with latest codes of good practice for techniques, equipment and materials for drainage works and the relevant clauses of '[Drainage and Service Ducts](#)' series requirements of the Department for Transport, Highways Agency - [Manual of Contract Documents for Highway Works Volume 1 - Specification for Highway Works](#)

3.2 Lateral Drains

On-field pitch drainage should consist of 50-60mm diameter lateral drains, installed at a constant 300mm below finished level, laid to pitch gradient at 2 – 3m centres. All pipes should be in polymer perforated corrugated drainage tube in accordance with **BS 4962** - [Specification for plastics pipes and fittings for use as subsoil field drains \(incorporating amendment No.1\)](#), laid onto a 25mm depth of 3-6mm gravel in the centre of the trench.

All trenches should be backfilled with clean porous material. The sides of the trenches are to have a uniform evenness and gradient throughout the whole full extent of each drainage run.

Predominantly single-sized, hard, angular gravel or broken stone within the range 6–10mm must be used as backfill. This should be brought to within 125mm of the surface.

This is blinded with a 50mm thick layer of sand capped with a 75mm layer of sand/soil mix.

The gradient of the trenches and pipes are to be as follows:

- Minimum fall (i.e. no shallower) of 1 in 200
- Maximum fall (i.e. no steeper) of 1 in 100.

Excavated material to be spread around the site and covered with top soil. To ensure an even grade, pipe-laying machinery should be laser guided. The drain lines will probably need topping up with sand after a period of 6 months.

3.3 Carrier Drains

Carrier drains should be 160mm diameter perforated corrugated drainage tube in accordance with **BS 4962** - [Specification for plastics pipes and fittings for use as subsoil field drains \(incorporating amendment No.1\)](#) and backfilled to the same specification as lateral drains. Stone fill to be brought to the surface.

All carrier drains should be laid no flatter than 1:200. If the sub base is permeable then hi-performance polypropylene (HP) stormwater cells should be inserted along the line of the carrier drain, to reduce run-off and slow the flow at the outfall. However, these should not be used on fill ground: here the carrier drain should be continuous between catch pits

3.4 Catch Pits

Catch pits shall be constructed from pre-cast concrete rectangular rings with clear internal dimensions of 750 x 600mm and should be sited on all corners of the platform, and not further apart than 30m. During construction 150mm inlet/outlet pipes in solid wall Unplasticized Poly-Vinyl Chloride (PVC-U) pipe conforming to **BS EN 1401-1:2009** - *Plastic piping systems for non-pressure underground drainage and sewerage. Unplasticized poly (vinyl chloride) (PVC-U). Specifications for pipes, fittings and the system* and **BS EN 13598-1:2010** *Plastics piping systems for non-pressure underground drainage and sewerage. Unplasticized poly (vinylchloride) (PVC-U), polypropylene (PP) and polyethylene (PE). Specifications for ancillary fittings including shallow inspection chambers* should be firmly fixed in concrete.

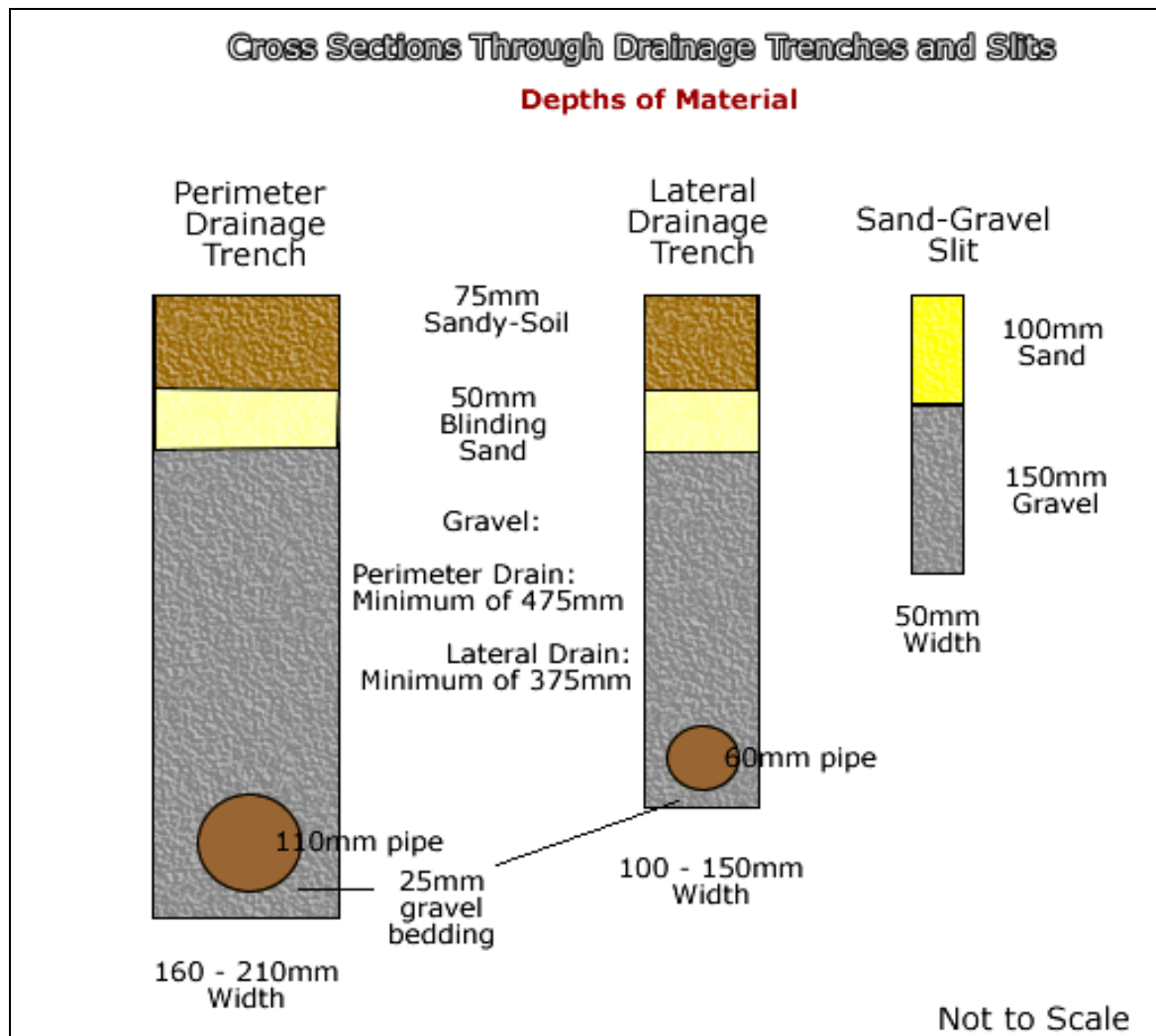
A 1.0m length of rigid plastic pipe should be used to connect the corrugated main and lateral drainage pipes into and out of the catch pit. An approved connection and sealant must be used where the pipes join. The outlet pipe, connecting to the outfall structure, should be as above but with a minimum length of 2.0m.

Concrete base slab shall be provided to 300mm below invert of outlet pipe. Covers and frames to be set level and flush with surrounds

Manhole covers should comply with **BS EN 124:1994** - *Gully tops and manhole tops for vehicular and pedestrian areas*. Design requirements, type testing, marking, quality control and state size, for example 600mm x 450mm.

Where steps are to be used within inspection pits then these should comply with **BS EN 13101:2002** - *Steps for underground man entry chambers. Requirements, marking, testing and evaluation of conformity*.

Catch pits constructed from precast concrete sections shall comply with **BS 5911-1:2002+A2:2010** – *Concrete pipes and ancillary concrete products. Specification for unreinforced and reinforced concrete pipes (including jacking pipes) and fittings with flexible joints (complementary to BS EN 1916:2002)*.



3.5 Soakaways

The depth of the soakaway should be such that it is in permeable material, and the pit filled with HP storm water cells with provision for a large vertical perforated pipe and an inspection chamber, so the water levels can be monitored. The cells should be within 150-200mm of the surface.

The top should be lined with geotextile before placement of top soil. Gaps between the cells and the sides of the pit should be filled with clean drainage stone. The pit shall not be lined with geotextile.

The soakaway should be fitted with an overflow drain of suitable diameter that will be connected to the existing surface water outfall

4.0 Cultivation

4.1 Cultivation generally

General cultivation is an essential part of seedbed preparation. Cultivation at a deeper level (with a 'subsoiler') will be necessary. It is important that

the works are correctly timed and that soils are only worked in appropriate conditions. To achieve the desired tilth it is essential that the appropriate equipment is used.

4.2 Stone Picking

Allowance must be made for the removal of stones or other debris using appropriate stone picking/rotary equipment. Large stones should be removed first with a stone picking machine.

4.3 Stone Burying

A stone burying machine shall be used to take care of the smaller stones. The final seedbed must produce a smooth surface that is uniformly firm but not over-compacted. An appropriate fertiliser dressing should be applied prior to the establishment of the grass.

4.4 Pre-Seeding Fertiliser

- Mini-granular type
- 6% nitrogen / 9% phosphate / 6% potash
- or to be of a similar type with a unit ratio of 1:11/2:1; $\pm 10\%$ of either nutrient.

4.5 Spring / Summer Fertiliser

- Mini-granular type
- 10-20 % nitrogen / 5-10% phosphate / 5-10% potash
- or to be of a similar type with a unit ratio of 2:1:1; $\pm 10\%$ of either nutrient.

4.6 Autumn Fertiliser

- Mini-granular type
- 4 - 11 % nitrogen / 2 - 6% phosphate / 4 - 10% potash
- the nitrogen content will depend at what stage of the autumn the fertiliser is applied.

4.7 Grass Seed for Arena

- 100% Perennial Ryegrass, consisting of three different turf-type cultivars, each being one-third of the total.

The cultivars may also be named, that meet a certain level of criteria may be deemed as acceptable. For example, Perennial Ryegrass Cultivars should appear in both the top 25% of cultivars for football type use within the wear tolerance criterion, plus the top 33% from the visual merit criterion. In addition it may be considered appropriate to state that one, two, or all cultivars used have also been in the lists for at least three years and state some criteria that they should have achieved over the period of time.

Sow seed during calm weather. Carry out operation in two equal sowings in transverse directions. Contractor to guarantee seed germination and an even thickness grass sward over the field and banks.

4.8 Grass Seed for Reinstatement and Surrounds

- 10 - 40% Chewings Fescue;
- 10 - 40% Strong Creeping Red Fescue
- 05 - 20% Browntop Bent
- 00 - 30% Smooth Stalked Meadow Grass
- 10 - 25% Perennial Ryegrass

The cultivars may also be named and qualified by various criteria as stated in the seed for the football pitch. For example, Strong Creeping Fescue Cultivars must appear in the top 50% of cultivars for the mean figure for shoot density and visual merit.

The pitch surrounds should be blended in with the constructed pitch to provide a smooth transition between the relevant areas. The tolerance of evenness should be no greater than 12mm between the surface of the constructed pitch or the pitch surrounds and a 0.5m straight edge.

4.9 Cutting

The Contractor shall be responsible for the first two cuts when the seed has established and about 65mm long, using a sharp cutter to leave about 40mm of growth and remove arisings from site. The surface should be lightly rolled prior to cutting.

5.0 Handover standard

5.1 Surface Evenness

The tolerances of evenness for the whole of the arena (including drainage runs and the reinstated surrounds: should be no more than 8mm using a 2m straight edge.

5.2 Ground Cover

- The total vegetative ground cover is to be at least 95%,
- Minimum ground cover of 85% of perennial ryegrass.
- Maximum ground cover of 5% of both large leaved and small leaved weeds.

5.3 Appearance

- This is to be tested by visual means
- 100% Uniform Texture (good evenness of cut with no bruising etc.)

5.4 Disease

- This is to be tested in accordance with BS7 **BS 7370-1:1991** *Grounds maintenance. Recommendations for establishing and managing grounds maintenance organizations and for design considerations related to maintenance*
- No presence of disease is permitted

5.5 Pests

- This is to be tested in accordance with **BS 7370-1:1991** *Grounds maintenance. Recommendations for establishing and managing grounds maintenance organizations and for design considerations related to maintenance*
- No presence of any pest is permitted.

5.6 Sward Colour

- This is to be tested by visual means.
- 100% Uniform, being of a medium-dark green colour.

5.7 Surface Debris

- This is to be tested by visual means
- No debris is to be present

6.0 Post construction maintenance

The most likely time when settling occurs within the slits and drainage runs will be during this initial post-construction period. The Contractor will then need to apply additional topdressing material to make good the unevenness that may develop.

Regular checking of the standards should be carried out, for both the benefit of the Client and Contractor to show that the standard is being maintained on a consistent basis. This will ensure that the pitch becomes established under correct turf management practices. A monthly check may be considered appropriate for this situation.

7.0 Acknowledgements

Sport England

Design, Guidance Note: - *Natural Turf for Sport*

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