

Section D – EXCAVATIONS AND EARTHWORKS

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Section D – EXCAVATIONS AND EARTHWORKS

D.0 Compliance with Materials and Workmanship with the Building Regulations

In order to demonstrate conformity with the Building Regulations (Part D; Materials and Workmanship), and with the Construction Products Regulation (Regulation (EU) No.305/2011) as set out in national rules for Ireland (S.I. No.225 of 2013), the Contractor shall provide proof (a Declaration of Performance (DoP)) and (where applicable) a CE marking for all building products to be placed in the works.

The Contractor shall ensure that the product to be incorporated in the works, while complying with CPR, is fit for the use for which it is intended. The Contractor may be required to demonstrate this by means of manufacturer's confirmation, or independent testing certificate.

GENERALLY

D.1 Setting out and Levels

The Contractor shall be responsible for setting up and maintaining an accurate site datum level reference point.

The Contractor, at the commencement of the works and in consultation with the Clerk of Works shall carry out and record a check grid of existing ground levels. The positions of all buildings and roads together with floor levels and road centre level shall also be set out. No excavations, site stripping or changes in levels shall be made until the above setting out and levels have been agreed with the Architect.

D.2 Nil

D.3 Soil Conditions

It will be deemed that the Contractor has inspected the drawings and site and has consulted available information concerning sub-soil conditions before submitting his tender.

The information in the contract documents giving details and levels of the sub-soil and water levels is supplied as an indication only and gives no assurance that there may not be considerable variation of sub-soil conditions over the site as a whole.

D.4 Unauthorised Excavations

The Contractor is prohibited from making excavations other than those approved by the Architect as necessary for the works. In the event of the Contractor making unauthorized excavations he will be required to backfill such excavations with material as directed, at his own expense.

D.5 Use of Explosives for removal of obstructions

See Clause A34/310. Not Permitted.

D.6 Excavation through rock

When rock is met within the course of excavation it must be removed by mechanical means.

The Contractor shall be responsible for informing all other interested parties of his intention and shall take all precautions to prevent damage to any services of statutory undertakings or local authorities or to adjacent property.

D.7 Disposal of water

Allow for keeping the surface of the site and the excavations, free of surface water.

The Contractor shall notify the Architect as soon as water percolation or water logging becomes apparent and he shall obtain the written permission of the Architect before carrying out any continuous pumping.

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The Contractor shall ensure that no nuisance is caused by the outfall of pumped water and shall obtain the permission of Water Services Department before connecting temporary drainage to existing drains or sewers.

D.8 Depths of Excavations

All excavations shown on the drawings are to be taken down until, in the Architects judgement, a good bearing level is reached.

D.9 Re-use of Excavated Materials

Only excavated top-soil where it complies with Clause D.27 and A12/220 may be re-used.

Excavated material shall not be used for back filling around foundations or under paved areas. Material for filling around foundations and under paved areas shall comply with Clause D.23.

Excavated material for making up levels to cultivated areas and mounding shall comply with Clause D.26.

D.10 Planking and Strutting

Provide and perform all planking, strutting, casing and timbering as may be required to uphold sides of excavations including drain trenches and manholes during construction.

D.11 Existing Trees and Shrubs

All existing trees and shrubs shall be protected, unless otherwise instructed, in accordance with BS 5837:2012. See also Clauses A34/540 and A34/550.

Temporary fencing shall extend sufficiently to protect the perimeter of branches and root spread.

The Contractor shall maintain such temporary fencing until the completion of the work or commencement of cultivation. The Contractor shall remove all trees and shrubs as indicated and agreed by the Architect. They shall be removed without damage to adjacent trees, shrubs and buildings that are to remain. Roots, stems, trunks and side branches are to be removed from site in accordance with Clause A30/590. On no account shall any material be burnt on site as (Clause A34/400).

All areas within the boundaries of the protective fencing shall be left untouched and the use of such ground for dumping, depositing or storing any materials or waste matter or for any other purpose is forbidden and the Contractor shall take steps to prevent the penetration of water-borne foreign matter into such areas.

Where earth-moving work takes place within the vicinity of existing tree and shrub roots care is to be taken to ensure that they are in no way damaged or destroyed, whether by impact or by compaction due to heavy vehicles, by lowering the ground within the root spread of trees or by placing of fill above existing soil level.

D.12 Cultivated Areas

Planting of cultivated areas will be carried out by the Employer as Clause A13/130, Grassing, turfing and seeding shall be carried out by the Contractor who shall complete the preparatory work described hereafter and subsequently allow free access to the Employer to the appropriate parts of the site when required, so that planting and additional landscaping may proceed without interruption.

D.13 Removal of Surplus Material

Notwithstanding the requirements of Clause A34/430 all surplus materials such as debris, tree roots, soil, old drains and foundations etc. shall be removed at the Contractors expense to a tip authorised by the Local Authority.

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Should the Contractor be permitted to remove suitable material from the site to suit his operation procedure, he shall then make good at his own expense any consequent deficit of filling arising therefrom.

D.14 **Destruction of Noxious Weeds**

Provide for the destruction of all noxious weeds on the site, in accordance with the Current Noxious Weeds Act and Noxious Weed (Thistle, Ragwort and Dock) Order.

D.15

to **Nil**

D.20

MATERIALS

D.21 **Blinding for polythene membranes**

Blinding for polythene membranes shall be clean soft sand free from stones and other foreign matter.

D.22 **Hardcore**

Unless otherwise specified all hardcore shall be granular filling complying with Clause 803 of "Specification for Road Works" NRA except under Macadam pavements and carriageways when granular fill shall comply with Clause 804. When requested samples of hardcore shall be sent to the Fingal County Council, Road Testing Laboratory or other approved testing authority. Samples of all hardcore are to be provided by the Contractor for the Architect's approval before any is placed.

Hardcore under concrete paths and floor slabs shall conform to IS EN 13242:2013 and the specification in Annex "E" of SR 21: 2004 + (A1:2007) (or the most recent standard at the time of tender); and shall be tested and certified to this effect. Certificates shall be available on request by Fingal County Council.

D.23 **Material for filling under Paved Areas and around Foundations**

Material for filling to make up levels under paved areas and for backfilling around foundations shall be as specified in the "Engineering Specification" appended and/or as indicated on the drawings.

D.24

to **Nil**

D.25

D.26 **Filling to make up levels of Cultivated Areas**

Filling to make up levels of cultivated areas and mounding shall be basically sub-soil, but may contain an admixture of coarse sand, gravel and other small hard materials up to approximately 25% of the total bulk. Sub-soil shall be free from excessive proportion of lime, any lumps of clay, rubbish, ash, clinker, concrete, weeds (eg. couch grass), roots and the like.

If filling needs to be imported the Contractor is to supply a sample for approval by the Architect.

D.27 **Top Soil**

Generally:

All Topsoil shall conform to BS 3882:2007 and shall be good quality medium top spit loam, easily moulded when moist but not very sticky and not leaving a smooth surface when smeared. It shall be

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free from sub-soil, chemical or other pollution, noxious weeds, roots, turf, couch grass, rubbish, or an excessive proportion of clay, sand, gravel, chalk or lime. It shall not contain stones or flints in quantities exceeding 10% of the total bulk and those present shall not exceed 30mm in any dimension.

Before any top soil is laid the Architect shall inspect and agree the existing levels of made up areas, the height and shaping mounds where these occur and the degree of compaction of the ground. All stones with any dimension greater than 30mm in size, weeds, roots, debris etc. shall be raked off.

The suitability of the topsoil has to be confirmed by the Architect before commencing work.

Top soil stripped from site:

Any suitable top soil stripped off the site shall be stored in areas agreed with the Architect, in suitably sized spoil heaps of not more than 2m high, and in an approved manner. The Contractor is to allow the Architect or his authorised agent, access to the topsoil heaps.

Undisturbed topsoil to be prepared as necessary by the Contractor so that it is in a suitable state for the cultivation operation i.e. seeding and planting using sand and compost.

Break up any compacted soil before spreading topsoil.

Topsoil filling for making up levels in gardens and planted areas shall, unless otherwise stated, to be flush with adjoining paving after settlement, to allow for draining into planted and grassed areas.

Top-soil, which is to be spread as Clause D 27, shall be 300mm in depth and not less than 200mm in planted areas, 150mm in grassed areas and 100mm depth for areas to be turfed as Clause D 29.

Imported topsoil:

Provide imported topsoil as necessary to make up deficiencies in existing topsoil on site, and to complete the works. Where top soil is to be imported the Contractor shall submit a sample load for approval and shall ensure that all subsequent deliveries are similar to the approved sample load.

Requirements of imported topsoil are as follows:

- Source to be approved by the Architect
- Texture shall be friable, well-aerated, with good crumb structure to BS 3882:2007
- Topsoil shall fall between pH 5.5 and 6.0 to BS 1377-3:1990.
- Nutrient content shall be nitrogen, phosphorus, potassium and magnesium with minimum index value for general purpose grade BS 3882:2007.
- Maximum size of stones in any dimension :30mm
- Maximum stone content by dry weight : 5%
- Shall be free of fragments and roots of aggressive weeds, sticks, straw, subsoil, pieces of brick, large lumps of clay or vegetation or foreign matter.
- Shall not be stripped from under canopy of tree nor closer than 4 metres to a hedge.
- Organic material from sewage works shall not be used as a soil substitute.
-

D.28 **Grass Seed Mixture**

Grass seed shall be Department of Agriculture certified as to source, purity and germination, shall be delivered to site in sealed bags and certificates shall be handed to the Architect. The seed mixture shall, unless otherwise specified, be of a utility grade amenity (lawn) grass mixture comprised of the following species

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60% Perennial Rye Grass

20% Chewings Fescue

20% Slender Creeping Red Fescue

D.29 **Supply of grass turf**

Turf shall be approved good quality meadow or downland turf, fibrous well rooted, mown, free from matter or dead grass and pernicious weeds, following treatment by selective weedkiller not less than three months previously and shall be cut 900mm x 300mm of regular size and shall be not less than 50mm of regular size even thickness throughout, and generally in accordance with BS 3969:1998 (+A1:2013).

The Contractor shall supply a sample for approval and all subsequent deliveries shall be equal to the approved sample.

Any turf brought onto the site, or laid prior to such approval, will be deemed to have been brought on or laid at the Contractor's risk, and he will be instructed to lift and/or cart away such turf off the site and replace and/or relay at his own expense unless instruction in writing to the contrary to be given by the Architect.

D.30 **Nil.**

WORKMANSHIP

D.31 **Site Clearance and Preparation**

Before commencing excavations, clear site of rubbish, shrubs and general vegetation, unless otherwise instructed, and remove from site in accordance with Clause D.13.

Reduce levels down to the specified formation level and store top-soil and sub-soil in separate heaps. Top-soil shall not be heaped more than 2 metres high and shall be stripped, moved and stockpiled under favourable weather conditions, to avoid compaction and loss of soil structure. Site-stripping shall only be carried out in areas where building work is to be immediately carried out.

All tree stumps and offensive matter is to be dug up and removed from site and any deep excavation so made is to be backfilled with filling in accordance with Clauses D22 and D26 as directed on site by the Architect.

In cultivated areas where new ground level is lower than existing, reduce level to a minimum of 150mm below new level for topping with top soil.

D.32 **Existing Live Services**

Report any live services or drains, not otherwise indicated, as soon as encountered and protect pending instructions and notify all authorities concerned.

D.33 **Disused Drains**

Plug any disused drain pipes etc. cut off at the perimeter of excavations with Class F-20 concrete rammed into refusal but not less than 300mm.

D.34 **Sides of Excavations**

Sides of excavations shall be vertical unless otherwise directed. In the event of the Contractor taking out excavation with other than vertical sides without permission he will be required to backfill such excavation with material as directed at his own expense.

D.35 **Bottoms of Excavations to be approved**

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The Contractor shall give the Architect at least 48 hours notice when the excavations will be ready for inspection. The bottom of every excavation will be inspected by the Architect and the level thereof agreed between the Architect and the Contractor. If a good bearing bottom is obtained at a lesser depth than that shown on the drawings, or is not obtained at the level so shown, the Architect is to be informed. No concrete is to be laid until the bottom has been approved and the level thereof taken.

Notwithstanding such approval, any bottom which becomes waterlogged or otherwise spoilt after approval, shall be cleaned out and reformed to the Architects satisfaction before any concrete is placed.

Notwithstanding approval as aforesaid, concrete, hardcore, etc. shall not be laid on frozen ground. Protection shall be provided to prevent the penetration of frost into the ground adjacent to or under concrete which has been placed.

D.36 Filling

Filling around foundations or to make up levels under pavings shall be executed in layers not exceeding 150mm in compacted thickness and consolidated to ensure proper compaction.

Filling to make up levels of cultivated areas and mounding shall be completed sufficiently in advance of subsequent treatment to allow for natural settlement to take place. Any settlement below the required levels shall be made up with soil and any areas panned hard by subsequent traffic shall be loosened.

Backfill shall not be placed against concrete masonry walls within 10 days of completion of wall. Building debris and standing water shall be removed from the excavation prior to backfilling. Both sides of walls shall be filled and compacted in alternate layers.

Backfilling unless, otherwise specified, under floor slabs, concrete hardstandings and pavings shall be Hardcore as Clause D.22.

Backfilling to foundation trenches under cultivated areas shall be, unless otherwise specified, shall be excavated sub-soil in accordance with Clause D.23.

Where trenches for drains or services are adjacent to and greater in depth than foundation trenches, such trenches for drains or mains shall be backfilled to the level of the underside of adjacent foundations in lean mix concrete Class F-7.5.

D.37 Consolidation of Hardcore and Granular Filling

Hardcore and granular filling material unless otherwise described, shall be consolidated to the required levels and contours in accordance with Clause 802 of "Specification for Road Works" NRA.

Care shall be taken to ensure that no damage is done to the foundations, walls or adjoining works.

D.38 Consolidation of Formation for Paths and Pavings

After completion of excavation and consolidation of filling, the whole of the formations for paths and pavings for pedestrian traffic shall be consolidated to the required levels and contours with a roller, vibrating roller or mechanical punner to a compaction equivalent to that obtained with a 2.5 to 3 tonnes roller, care being taken that no damage is done to adjoining work.

Formations for pavings subject to vehicular traffic shall be consolidated in accordance with the "Engineering Specification" appended and/or as indicated on the drawings.

D.39 De-compaction of Sub-soil

The sub soil to landscaped and cultivated areas shall be maintained free of compaction during construction. Where heavy machinery is to be used the contractor shall ensure that these areas are properly de-compacted to a depth of 500mm.

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If the subsoil becomes heavily de-compacted during building works and the de-compaction of the sub-soil does not allow for drainage, the contractor shall construct soak-pits to ensure drainage on his own cost.

Where possible all de-compaction operations shall take place in dry weather conditions when the soil profile is dry enough to fracture.

Where soil has not been de-compacted prior to hand-over, the contractor shall present alternative solutions for de-compaction to the architect. The design and timing of the above will be the responsibility of the contractor.

Any soil filling shall be deposited in 225mm layers and shall be suitably compacted in such a way that allows water to drain freely through.

D.40 **Nil**

D.41 **Preparation of Cultivated Areas**

Cultivation shall be carried out to the depths indicated with a mechanical cultivator with fixed tines or other means. All weeds and roots shall be removed and destroyed and all rubble, large stones and rubbish shall be removed and replaced with filling as Clause D.26.

Cultivation shall be completed sufficiently in advance of subsequent treatment to allow for natural settlement to take place. Any settlement below the required levels shall be made up with soil as Clause D.26 and any areas panned hard by subsequent traffic shall be ripped and re-cultivated. Any areas ponding shall be ripped, drained and reinstated, or as otherwise instructed, to remedy problem.

D.42 **Level of Cultivated Areas**

Areas to be grassed over shall be graded to a uniform level depending on the contours. "Flat" grassed areas shall be graded to a general "domed" grade such that a continuous run off shall occur leaving no puddles after heavy rain.

Planted beds adjoining hard surfaces, manholes etc., shall be finished flush with such areas and grassed areas finished 25mm higher.

Where applicable finished levels shall be minimum 150mm below the D.P.C. level of the adjacent building. Surfaces shall be graded to give surface drainage away from buildings and so as to avoid ponding.

D.43 **Nil**

D.44 **Grass Seeding Generally**

Where areas are to be grass seeded it shall be carried out before handover. Where grass seeding is not appropriate due to time of year/weather, the contractor shall ensure that the areas are covered with a suitable alternative such as grass turf as Clause D 46.

The contractor will be required to mow established grassed areas twice before hand over. Grass areas shall be sufficiently established to recover fully from mowing.

All grassed areas to be treated with a weed killer and then ploughed and harrowed to a minimum depth of 150 mm and all stones larger than 30 mm, perennial weeds and rubbish shall be removed.

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D.45 Sowing of Grass Seed

Before sowing a base dressing of approved fertiliser (N.P.K., 50:50:50) shall be lightly raked or harrowed into seed bed at a rate of 40g/m².

Certified seed, as Clause D28, shall be cross-sown in two directions at right angles to each other, half the seed being used in each direction, and the ground lightly raked over on a still dry day when the top 25mm of soil is dry. Seed shall be sown at a rate of 150kg/ha in open spaces and 30grams/m in gardens.

Where grass has failed, the contractor must rectify by raking over the appropriate area and re-sowing within one month from date of sowing.

D.46 Laying of Grass Turf (as Clause D29)

This clause applies where areas are shown to be turfed or required under Clause D.28.

No turf is to be brought on site, or laid, until the top soiling has been approved by the Architect.

Prior to the laying of turf, top soil shall be brought to an even tilth and necessary firmness, and thoroughly watered if dry. A base dressing of approved fertiliser (N.P.K. 50.50.50) shall be worked into the top 50mm of topsoil, at a rate of 40g/m², as the final tilth is reached.

Turfs shall be unloaded on an area clear of that to be turfed. Turf shall be laid in rows, commencing at the rear end of the area, and laid progressively by placing planks over the last row of turf laid and laying subsequent turf there from. The planks shall be moved forward as each line of turf is laid and so on to the end of the area.

Turfs shall be laid with half lapped joints, well butted up and evenly beaten, twice over the whole area with wooden turf beaters. No rollers shall be used. Any inequalities in finished levels owing to variation in turf thickness or unequal consolidation of soil shall be adjusted by raking and/or packing fine soil beneath the turfs. The finished level of turf abutting paving must be 25mm above the paving surface after laying and beating operations are completed. The Contractor shall allow for pegging on steep slopes. Turf shall not be laid in exceptionally dry or frosty weather.

D.47 Maintenance of Grassed Areas

The Contractor shall carry out at least two cuts of grass to all seeded areas and in any event maintain grassed areas until handover.

Maintain the condition of grassed areas by:

- Grass cutting as Clause D 48.
- Re-form edges abutting paths, borders, manhole covers and the like with a suitable edging tool, to form clean straight lines or smooth flowing curves. Form a clean edge, sloping slightly back from vertical.
- Draw back soil from edges to permit the use of edging shears and remove debris.
- Make good worn or damaged areas by re-seeding to BS 7370-3:1991, Clause 12.6, using seed to match the existing in appearance and quality.
- Provide suitable protection and watering to promote successful germination and/or establishment. Turfed areas to be watered, as necessary, to avoid shrinkage.
- The prompt removal of litter, fallen leaves and other rubbish.

D.48 Grass Cutting

First cut:

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When grass is 60 mm high remove debris, litter and all stones and earth clods larger than 25 mm in any dimension. When grass is reasonably dry, cut at the second cut to approximately 30 mm high, Removed all cuttings and debris from site.

Generally:

Remove litter, rubbish and debris from grassed areas before mowing. The height of growth must not exceed 50 mm at any time. Cut as and when necessary to a height of 25 mm, using a cylinder mower.

Cut to a neat even finish, without rutting or compaction of the surface, especially when ground conditions are soft.

Leave edges neat and well defined.

At the time of each cut, neatly trim all grass edges round the base of trees, manholes, the base of lighting columns and the like and remove all cuttings. Sweep all adjoining hard areas clear of cuttings and remove.

Do not cut during periods of drought, or when ground conditions or grass are wet, without the prior agreement of the Architect.

Do not allow nylon filament rotary cutters or other mechanical tools closer than 100 mm to the stem of any tree or plant. Complete operations close to stems using hand tools.

When seeded areas are well established, form edges to planting beds and around newly planted trees with a suitable edging tool, to form clean straight lines or smooth curves. Draw back soil from edges to permit use of edging shears and remove all cuttings

D.49 Repair of Damaged Areas

Any shrinkage, to cultivated areas, below the finished levels shall be rectified at the Contractors own expense at the end of the Defects Liability Period.

The Contractor shall also rectify and overseed any bare patches caused to grassed areas, in accordance with Clause D.47 up to the end of the Defects Liability Period excepting any grass destroyed or damaged by vandalism or similar cause through no fault of the Contractor.

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Appendix A: List of References and Specifications.

Item No.	Clause	Reference	Comment
1.	D.11	BS 5837:2012	Trees in relation to design, demolition and construction – Recommendations.
2.	D.22	“Specification for Road Works” by NRA (www.nre.ie)	Clauses 803 and 804.
3.	D.22	IS EN 13242:2013	Aggregates for unbound and hydraulically bound materials for use in civil engineering work and road construction.
4.	D.22	Annex E of SR:2004 (+A1:2007)	Guidance on the use of IS EN 13242:2013 (at the time of most recent revision of Section D - Excavations and Earthworks, document SR 21:2004 was still current but under review for amendment at time of this spec revision in October 2013)
5.	D.27	BS 3882:2007	Specification for topsoil and requirements for use. (to replace BS 3882:1994)
6.	D.27	BS 1377-3:1990	Methods of test for soils for civil engineering purposes – Chemical and Electro-chemical tests, (added date)
7.	D.29	BS 3969:1998 (+A1:2013)	Recommendations for turf for general purposes. (to replace 3969:1993)
8.	D.47	BS 7370-3:1991	Grounds maintenance – Recommendations for maintenance of amenity and functional turf (other than sports turf) (added date)

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Appendix B: Amendments List	
Date of Amendments	Amendments
1/05/2014	This section was amended by Barry Sheils and approved by David Byrne, Senior Architect, Fingal County Council.