
Series 600: Earthworks

Definitions

1 The Earthworks Outline, unless expressly stated otherwise, is defined as the finished earthworks levels and dimensions (prior to topsoiling) required by the Contract for the construction, where specified, of:

- (a) carriageway, hard shoulder, hard strip, footway, paved area, central reserve, verge, side slope;
- (b) sub-base;
- (c) fill on sub-base material, base and capping;
- (d) contiguous filter material, lightweight aggregate infill;
- (e) surface water channels;
- (f) landscape areas, screening mounds, environmental bunds.

In all cases of filter drains, except narrow filter drains, the Earthworks Outline shall be the top of the filter material.

2 Where capping or stabilisation to form capping is required by the Contract in cutting or on embankment, the Earthworks Outline shall be as defined in paragraph 1 of this Series i.e. as the top of capping.

3 Where an embankment is required by the Contract to be surcharged, the Earthworks Outline shall be as defined in paragraph 1 of this Series and exclude the surcharge.

4 Where permanent storage or stockpiling of topsoil is required by the Contract, the Earthworks Outline shall be as defined in paragraph 1 of this Series and exclude stored topsoil.

5 Where the bottom of a structural foundation for an earth retaining structure (other than for reinforced earth and an anchored earth structure) is below Existing Ground Level, the Earthworks Outline shall be the permanently exposed face of the structure below Existing Ground Level.

6 Where the bottom of the facing foundation for a reinforced earth structure or an anchored earth structure is below Existing Ground Level, the Earthworks Outline shall be the inside face of the facing above Existing Ground Level to the underside of the capping unit, or where no capping unit is required, to the finished earthworks level prior to topsoiling.

7 Where the ground has been subjected to treatment under the Contract in respect of ground improvement, mine workings, swallow holes and the like, for the purpose of this Series Existing Ground Level shall be the level obtained upon completion of any such treatment of the areas affected.

8 Sub-soil Level is defined as the level of the ground after the removal of topsoil required by the Contract.

9 Surcharge is defined as material placed on embankments for the purpose of loading the embankment for the periods stated in the Contract.

Measurement General

10 For the purposes of this Series it shall be assumed that one cubic metre of material excavated forms one cubic metre of compacted fill. No allowance shall be made in the measurement for bulking and shrinkage of any material.

11 Earthworks within Designated Outlines shall not be measured in this Series.

12 For the purpose of this Series no account shall be taken of excavated material arising from the Works measured in accordance with Series 100 to 500 and 700 to 3000 hereof.

13 Where deposition and compaction of an embankment has been carried out in accordance with the Contract and settlement occurs:

- (a) subsequent to the Earthworks Outline having been reached, or in the case of a surcharged embankment subsequent to the removal of the surcharge; or
- (b) from settlement of or penetration into the ground beneath the embankment;

then the additional fill, deposition and compaction required shall be measured immediately prior to the preparation of formation, provided that the first 75 mm of settlement or penetration shall not be measured.

In the case of landscape areas, screening mounds, environmental bunds and other areas of fill where settlement or penetration occurs, the additional fill, deposition and compaction required shall not be measured.

Excavation

Units

14 The unit of excavation shall be:

- (i) excavation cubic metre.

Measurement

15 The measurement of excavation shall be, for:

- (a) Topsoil Class 5A - the volume of the void formed by the excavation of material designated topsoil Class 5A.
- (b) Cutting and other excavation:
 - (i) cutting and bulk excavation - the volume of the void formed by the excavation of material from Existing Ground Level down to the Earthworks Outline, together with the volume of the void formed by the excavation of material below that Outline; or
 - (ii) under embankments and other areas of fill - the volume of the void formed by the excavation of material below Existing Ground Level;

less in each case the volume of topsoil Class 5A in the void included in the measurement under paragraph 15(a). The volume of excavation of soft spots measured under paragraph 62 of this Series shall not be included.

- (c) Removal of surcharge - the volume of material remaining as

surcharge to be removed down to the datum stated in the Contract, or if none is stated, to the Earthworks Outline.

- (d) Structural foundations - the volume of the void to accommodate the structural foundation calculated on the basis of the horizontal area of the bottom of the foundation with the depth being measured from the bottom of the foundation (including blinding concrete) to:
- (i) where the bottom of the foundation is below Existing Ground Level - the Existing Ground Level; provided that where the Earthworks Outline is below Existing Ground Level the depth shall be measured to the Earthworks Outline;
 - (ii) where the bottom of the foundation is at or above Existing Ground Level - the datum stated in the Contract, or where none is stated to the Earthworks Outline;

less in each case the volume of topsoil Class 5A in the void included in the measurement under paragraph 15(a). The volume of excavation of soft spots measured under paragraph 62 of this Series shall not be included.

The classification of stage depths for the excavation of structural foundations shall be the maximum depth of excavation obtained in accordance with this sub-paragraph.

- (e) Foundations for corrugated steel buried structures and the like – the volume of the void to accommodate the structure, bedding and surround down to the outline stated in the Contract from:
- (i) where the bottom of the bedding is below Existing Ground Level - Existing Ground Level;
 - (ii) where the bottom of the bedding is at or above Existing Ground Level - the datum stated in the Contract or where none is stated - Earthworks Outline;

less in each case the volume of topsoil Class 5A in the void included in the measurement under paragraph 15(a). The volume of excavation of soft spots measured under paragraph 62 of this Series shall not be included.

The classification of stage depths for the excavation of the foundation shall be the maximum depth of excavation obtained in accordance with this sub-paragraph.

- (f) New and enlarged watercourses, intercepting ditches - the volume of the void formed from Existing Ground Level down to the outline stated in the Contract less the volume of topsoil Class 5A in the void included in the measurement under paragraph 15(a) of this Series.
- (g) Clearing abandoned watercourses - the volume of the void formed from Existing Ground Level down to the outline stated in the Contract.
- (h) Gabion walling, mattresses and crib walling - as for structural foundations sub-paragraph (d) of this paragraph.

- (i) Caps to mine working, well, swallow hole and the like – the volume of the voids formed to accommodate the caps.

Itemisation

16 Separate items shall be provided for excavation in accordance with Chapter II paragraphs 3 and 4, and the following:

Group Feature		
I	1	Excavation.
II	1	Acceptable material Class 5A.
	2	Acceptable material excluding Class 5A.
	3	Unacceptable material Class U1.
	4	Unacceptable material Class U2.
III	1	Cutting and other excavation.
	2	Structural foundations.
	3	Foundations for corrugated steel buried structures and the like.
	4	New watercourses.
	5	Enlarged watercourses.
	6	Intercepting ditches.
	7	Clearing abandoned watercourses.
	8	Removal of surcharge.
	9	Gabion walling and mattresses.
	10	Crib walling.
	11	Caps to mine working, well, swallow hole and the like.
IV	1	0 metres to 3 metres in depth.
	2	0 metres to 6 metres in depth and so on in steps of 3 metres.

Note 1: Acceptable material Class 5A shall not be separately identified by any Group III or IV feature.

Note 2: Group IV features shall be applied only to Features 2, 3, 9, 10 and 11 of Group III.

Excavation of Acceptable Material Class 5A

17 The items for excavation of acceptable material Class 5A shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) selection and separation of materials;
- (b) loading into transport;
- (c) multiple handling of material;
- (d) keeping earthworks free of water;
- (e) haulage and deposition in temporary stockpiles including the provision of sites for stockpiles;
- (f) taking precautions to avoid damage to property, structures, drains, sewers, services, instrumentation and the like;
- (g) grading beds and trimming side slopes of watercourses and the like;
- (h) replacing acceptable material rendered unacceptable.
- (i) facilitating Archaeologist

**Excavation of Acceptable
Material Excluding Class 5A**

18 The items for excavation of acceptable material excluding Class 5A shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) loosening or breaking up material before or in the process of excavation;
- (b) upholding the sides;
- (c) working around and between piles;
- (d) overbreak and making good;
- (e) keeping earthworks free of water;
- (f) selection and separation of materials;
- (g) forming and trimming side slopes, benchings and berms;
- (h) trimming the bottom and sides of foundations;
- (i) grading beds and trimming sides of watercourses and the like;
- (j) protection of subgrade;
- (k) additional excavation the Contractor may require for working space, timbering, formwork or other temporary works and its subsequent backfilling with approved materials and compaction;
- (l) taking precautions to avoid damage to property, structures, drains, sewers, services, instrumentation and the like;
- (m) treatment of faces of cuttings which are not to receive topsoil;
- (n) loading into transport;
- (o) multiple handling of material;
- (p) disposal of surcharge material (as this Series paragraph 39)
- (q) disposal of surcharge material rendered unacceptable (as this Series paragraph 39);
- (r) haulage, deposition and compaction in temporary stockpiles including provision of sites for stockpiles;
- (s) replacing acceptable material rendered unacceptable;
- (t) breaking down and processing material necessary to comply with the requirements of fill;
- (u) complying with special requirements for materials requiring special treatments.
- (v) excavation difficulties due to the presence of traffic on public road
- (w) facilitating installation of permanent drainage before excavation reaches 300mm before formation.

Excavation of Unacceptable Material Classes U1 and U2

19 The items for excavation of unacceptable material U1 and U2 shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) excavation (as this Series paragraph 18);
 - (b) special measures for dealing with Class U2 material.

Excavation in Hard Material

Units **20** The unit of measurement shall be:

- (i) extra over excavation for excavation in Hard Material cubic metre.

Measurement **21** The measurement of extra over excavation for excavation in Hard Material shall be the volume of Hard Material within the void measured under paragraph 15 of this Series.

Itemisation **22** Separate items shall be provided for extra over excavation for excavation in Hard Material in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Extra over excavation for excavation in Hard Material.
II	1	Cutting and other excavation.
	2	Structural foundations.
	3	Foundations for corrugated steel buried structures and the like.
	4	New watercourses.
	5	Enlarged watercourses.
	6	Intercepting ditches.
	7	Clearing abandoned watercourses.
	8	Gabion walling and mattresses.
	9	Crib walling.
	10	Caps to mine working, well, swallow hole and the like.

Extra Over Excavation for Excavation in Hard Material

23 The items for extra over excavation for excavation in Hard Material shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) preliminary site trials of blasting;
 - (b) blasting, splitting, breaking and the like;
 - (c) cutting through reinforcement;
 - (d) saw cutting and trimming;
 - (e) removal of existing paved areas by course or layer, cleaning surfaces, milling or planing, stepping out and treatment to bottoms of foundations.

Processing of Unacceptable Material Class U1

Definition **24** The term ‘processing’ shall refer to treatment whereby material arising from the Site is rendered acceptable for a particular use in the Works by mechanical, chemical, hydraulic or other means.

Units **25** The unit of measurement shall be:

(i) processing of unacceptable material Class U1 cubic metre.

Measurement **26** The processing of unacceptable material Class U1 shall be measured only when the Contract specifically requires particular material to be obtained for use in the Works by processing. Other processing carried out by the Contractor shall not be measured. The measurement of processing of unacceptable material Class U1 shall be the volume of the void required to be filled with the processed material.

Itemisation **27** Separate items shall be provided for processing of unacceptable material Class U1 in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Processing of unacceptable material Class U1.
II	1 Different locations.
III	1 Into different classes of acceptable material.

Processing of Unacceptable Material Class U1

28 The items for processing of unacceptable material Class U1 shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) selection and separation of materials;
 - (b) taking precautions to avoid damage to property, structures, drains, sewers, services, instrumentation and the like;
 - (c) loading into transport;
 - (d) multiple handling of material;
 - (e) replacing acceptable material rendered unacceptable;
 - (f) haulage, deposition and compaction in temporary stockpiles including provision of sites for stockpiles;
 - (g) crushing, screening, mixing, grading, drying, wetting and sieving;
 - (h) mechanical, chemical, hydraulic and other methods;
 - (i) producing the required classification of material from Site-won materials;
 - (j) obtaining permissions and approvals.

Deposition of Fill

Units **29** The unit of measurement shall be:

(i) deposition of fill cubic metre.

Measurement **30** The measurement of deposition of fill shall be the volume of compacted fill, calculated in accordance with paragraphs 47, 48 and 49 of this Series, less the volume of imported fill calculated in accordance with paragraphs 41 and 42 of this Series.

31 Deposition of Class 1C and 6B materials shall be separately measured only where Class 1C or 6B material is specifically stated by the Contract to be required

to be placed in a particular location.

Itemisation

32 Separate items shall be provided for deposition of fill in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Deposition.
II	1 Acceptable material.
	2 Acceptable material Class 1C.
	3 Acceptable material Class 6B.
III	1 Embankments and other areas of fill.
	2 Strengthened embankments.
	3 Reinforced earth structures.
	4 Anchored earth structures.
	5 Landscape areas.
	6 Environmental bunds.
	7 Fill to structures.
	8 Fill above structural concrete foundations.
	9 Fill on sub-base material, base and capping.
	10 Fill on bridges (under footways, verges and central reserves).
	11 Upper bedding to corrugated steel buried structures and the like.
	12 Lower bedding to corrugated steel buried structures and the like.
	13 Surround to corrugated steel buried structures and the like.
	14 Fill above corrugated steel buried structures and the like.

Deposition of Fill

Item coverage

33 The items for deposition of fill shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- (a) protection of subgrade;
- (b) multiple handling of material;
- (c) keeping earthworks free of water;
- (d) complying with requirements and constraints on the sequence, timing and rate of deposition and filling, and equalisation of earth pressures;
- (e) complying with the special requirements for materials requiring special treatments;
- (f) complying with the particular requirements and constraints with regard to soil stabilisation, reinforced earth structures, strengthened embankments, anchored earth structures, corrugated steel buried structures and the like;
- (g) taking precautions to avoid damage to property, structures, sewers, drains, services, instrumentation and the like;
- (h) haulage;
- (i) replacing acceptable material rendered unacceptable;
- (j) selection of material of stated Classes and layering or depositing in locations stated in the Contract;
- (k) depositing fill to slope away from vertical drainage layers and measures to prevent surface water entering such layers;

- (l) treatment of soil as the Contractor may require to facilitate the use of particular plant;
- (m) trimming and shaping to levels and contours;
- (n) deposition of fill resulting from settlement and penetration of landscape areas, environmental bunds and other areas of fill, and from the first 75 mm of settlement and penetration of embankments.

Disposal of Material

Units

34 The unit of measurement shall be:

- (i) disposal of material cubic metre.

Measurement

35 The measurement of disposal of acceptable material shall be, for:

- (a) acceptable material excluding Class 5A - the volume excavated from within the Site measured in this Series less the volume of compacted fill calculated in accordance with paragraphs 47, 48 and 49 of this Series, after deduction from the latter of the volume of imported fill calculated in accordance with paragraphs 41 and 42 of this Series.
- (b) acceptable material Class 5A - the volume excavated from within the Site measured in accordance with paragraph 15(a) of this Series less the volume of topsoil to be permanently stored and the volume of topsoil calculated from the areas and thicknesses to be topsoiled in accordance with paragraph 78 of this Series.

36 The measurement of disposal of unacceptable material Class U1 shall be the volume of unacceptable material Class U1 excavated from within the Site and measured under this Series less the volume of processed unacceptable material Class U1 calculated in accordance with paragraph 26 of this Series.

37 The measurement of disposal of unacceptable material Class U2 shall be the volume of unacceptable material Class U2 excavated from within the Site and measured under this Series.

Itemisation

38 Separate items shall be provided for disposal of material in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Disposal.
II	1	Acceptable material excluding Class 5A.
	2	Acceptable material Class 5A.
	3	Unacceptable material Class U1.
	4	Unacceptable material Class U2.

Disposal of Material

39 The items for disposal of material shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) haulage and deposition in tips off Site provide by the Contractor;
- (b) multiple handling of material;
- (c) special measures for dealing with Class U2 material;

- (d) allowing for deposition in lieu of disposal of acceptable fill resulting from settlement and penetration of landscape areas, environmental bunds and other areas of fill, and from the first 75 mm of settlement and penetration of embankments.

Imported Fill

Units **40** The unit of measurement shall be:

- (i) imported fill cubic metre.

Measurement **41** The measurement of imported acceptable fill shall be the volume of compacted fill, calculated in accordance with paragraphs 47, 48 and 49 of this Series less the volumes of:

- (a) acceptable material (including that measured in accordance with this Series paragraph 26), excluding topsoil Class 5A and acceptable material of a particular Class being both surplus to the requirements of the Contract for that Class of material and which does not meet the requirements for acceptability for use elsewhere within the measured volume of compacted fill, excavated from within the Site and measured in this Series;
- (b) other stated classes of imported acceptable fill excluding topsoil Class 5B.

42 The measurement of other stated classes of imported acceptable fill, other than topsoil Class 5B, shall be the volume of the void filled with the stated class of imported acceptable fill to the outline stated in the Contract.

43 The measurement of imported topsoil Class 5B shall be the volume of topsoil calculated from the areas and thicknesses to be topsoiled less the volume of topsoil Class 5A excavated from within the Site and measured in accordance with paragraph 15(a) of this Series. Notwithstanding paragraph 45(j) and (k) of this Series, when an item for imported topsoil is measured, corresponding items for placing shall be measured under paragraphs 77 to 81 inclusive of this Series for Topsoiling and Storage of Topsoil.

Itemisation **44** Separate items shall be provided for imported acceptable fill in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Imported acceptable material.
	2 Other stated classes of imported acceptable fill.
	3 Imported topsoil Class 5B
II	1 Embankments and other areas of fill.
	2 Strengthened embankments.
	3 Reinforced earth structures.
	4 Anchored earth structures.
	5 Landscape areas.
	6 Environmental bunds.
	7 Fill to structures.
	8 Fill above structural concrete foundations.
	9 Fill on sub-base material, base and capping.
	10 Fill on bridges (under footways, verges, and central reserves).
	11 Upper bedding to corrugated steel buried structures and the like.
	12 Lower bedding to corrugated steel buried structures and the like.

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- 13 Surround to corrugated steel buried structures and the like.
 - 14 Fill above corrugated steel buried structures and the like.
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Note: Group I Feature 3 imported topsoil Class 5B shall not be separately identified by any Group II feature.

Imported Fill

45 The items for imported fill shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) protection of subgrade;
- (b) multiple handling of material;
- (c) keeping earthworks free of water;
- (d) complying with requirements and constraints on the sequence, timing and rate of deposition and filling, and equalisation of earth pressures;
- (e) complying with the special requirements for materials requiring special treatments;
- (f) complying with the particular requirements and constraints with regard to soil stabilisation, reinforced earth structures, strengthened embankments, anchored earth structures, corrugated steel buried structures and the like;
- (g) taking precautions to avoid damage to property, structures, sewers, drains, services, instrumentation and the like;
- (h) fill provided by the Contractor from sources outside the Site;
- (i) replacing acceptable material rendered unacceptable;
- (j) selection of material of stated Classes and layering or depositing in locations stated in the Contract;
- (k) depositing fill to slope away from vertical drainage layers and measures to prevent surface water entering such layers;
- (l) trimming and shaping to levels and contours;
- (m) imported fill resulting from settlement and penetration of landscape areas, environmental bunds and other areas of fill, and from the first 75 mm of settlement and penetration of embankments;
- (n) reports.

Compaction of Fill

Units

46 The unit of measurement shall be:

- (i) compaction of fill cubic metre.

Measurement

47 The measurement of compaction of fill in embankments and other areas of fill, in strengthened embankments, in reinforced earth structures, in anchored earth structures, in landscape areas and in environmental bunds shall be the volume of the embankment or void filled from Existing Ground Level up to the Earthworks

Outline plus, where required by the Contract, the volume of:

- (a) the void formed by the removal of topsoil Class 5A beneath the fill in question, and included in the measurement under paragraph 15(a) of this Series;
- (b) the void formed by excavation for the fill in question:
 - (i) below the Earthworks Outline included in the measurement under paragraph 15(b)(i) of this Series; and
 - (ii) below Existing Ground Level included in the measurement under paragraph 15(b) (ii) of this Series;
- (c) surcharge, being the void filled from the Earthworks Outline up to the profile stated in the Contract to which the surcharge is required to be constructed;

less in each case the volume of any compaction of fill to structures, and bedding and surround to corrugated steel buried structures and the like included in the volume so obtained and which is measured separately under paragraph 49 of this Series.

48 The measurement of compaction of fill above structural concrete foundations shall be the volume of the void measured in accordance with paragraph 15(d) of this Series less the volume of the structural foundation and structure within that void.

49 The measurement of compaction of:

- (a) fill to structures;
- (b) fill on sub-base material, base course and capping;
- (c) fill on bridges (under footways, verges and central reserves);
- (d) bedding to corrugated steel buried structures and the like;
- (e) surround to corrugated steel buried structures and the like;

in each case, shall be the volume of the voids filled to the outline stated in the Contract less the volume of corrugated steel buried structures and the like within that void.

50 Compaction of Class 1C and 6B materials shall be separately measured only where Class 1C or 6B material as such is specifically stated by the Contract to be required to be placed in a particular location.

Itemisation

51 Separate items shall be provided for compaction of fill in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Compaction.
II	1 Acceptable material.
	2 Acceptable material Class 1C.
	3 Acceptable material Class 6B.
III	1 Embankments and other areas of fill.
	2 Strengthened embankments.
	3 Reinforced earth structures.

- 4 Anchored earth structures.
- 5 Landscape areas.
- 6 Environmental bunds.
- 7 Fill to structures.
- 8 Fill above structural concrete foundations.
- 9 Fill on sub-base material, base course and capping.
- 10 Fill on bridges (under footways, verges and central reserves).
- 11 Upper bedding to corrugated steel buried structures and the like.
- 12 Lower bedding to corrugated steel buried structures and the like.
- 13 Surround to corrugated steel buried structures and the like.
- 14 Fill above corrugated steel buried structures and the like.

Compaction of Fill

- 52** The items for compaction of fill shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) protection of subgrade;
- (b) multiple handling of material;
- (c) keeping earthworks free of water;
- (d) complying with requirements and constraints on the sequence, timing and rate of deposition and filling, and equalisation of earth pressures;
- (e) complying with the requirements for materials requiring special treatment;
- (f) complying with the particular requirements and constraints with regard to soil stabilisation, reinforced earth structures, strengthened embankments, anchored earth structures, corrugated steel buried structures and the like;
- (g) taking precautions to avoid damage to property, structures, sewers, drains, services, instrumentation and the like;
- (h) spreading and levelling;
- (i) trial areas, trials and demonstrations;
- (j) making good after sampling and testing;
- (k) forming and trimming side slopes, benchings and berms;
- (l) treatment of side slopes and berms;
- (m) compaction of fill resulting from settlement and penetration of landscape areas, environmental bunds and other areas of fill, and from the first 75 mm of settlement and penetration of embankments;
- (n) blinding.

Soil Stabilisation

Units **53** The unit of measurement shall be:

- (i) soil stabilisation cubic metre.

Measurement **54** The measurement of soil stabilisation shall be the volume of the material to be stabilised measured to the outlines stated in the Contract irrespective of the number of layers or thicknesses, methods or sequences of operations involved in stabilising the material to the depth required.

Note: Soil stabilisation means the process of stabilisation whether the material is intact and undisturbed or deposited and compacted prior to stabilisation.

Excavation, fill, import, disposal, deposition and compaction required to expose or produce the layer to be stabilised, as appropriate, shall be included under the measurement of earthworks elsewhere in this Series.

Excavation, deposition and compaction involved in the process of stabilization itself shall not be measured.

Itemisation **55** Separate items shall be provided for soil stabilisation in accordance with Chapter II paragraphs 3 and 4 and the following:

Group	Feature
I	1 Soil stabilisation.
II	1 Capping.
III	1 Cement.
	2 Lime.

Soil Stabilisation with Cement, Soil Stabilisation with Lime **56** The items for soil stabilisation shall in accordance with the Peambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) excavation of acceptable material (as this Series paragraphs 17 and 18);
 - (b) deposition (as this Series paragraph 33);
 - (c) compaction of fill (as this Series paragraph 52);
 - (d) pulverising, measuring and mixing;
 - (e) laps and joints;
 - (f) curing, protection and sealing;
 - (g) shaping to cambers, falls and crowns;
 - (h) edge supports;
 - (i) additional fill, deposition, compaction or disposal resulting from the process of stabilisation;
 - (j) additional fill and stabilisation resulting from the first 75 mm of settlement and penetration of embankments.

Geotextiles

- Units **57** The unit of measurement shall be:
- (i) geotextile square metre.
- Measurement **58** The measurement of geotextile shall be the developed area of the geotextile measured to the limits stated in the Contract.
- Itemisation **59** Separate items shall be provided for geotextile in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Geotextile.
II	1	Different types.
III	1	Different grades.

- Geotextile** **60** The items for geotextile shall in accordance with the Preambles to Bill of Quantities General Directions include for:
- Item coverage
- (a) cleaning, trimming, regulating and preparing surfaces;
- (b) laps;
- (c) measures to protect material;
- (d) cutting, jointing, sealing and fixing;
- (e) securing material in place;
- (f) complying with the requirements of strengthened earthworks.
- (g) turn ups and overlaps at edges

Soft Spots and Other Voids

- Units **61** The unit of measurement shall be:
- (i) soft spots, other voids cubic metre.
- Measurement **62** The measurement of soft spots and other voids shall be the volume of the voids directed to be excavated or filled. Soft spots and other voids shall be measured separately from the main excavation or filling where the volume:
- (a) below structural foundations, foundations for corrugated steel buried structures or in side slopes of cuttings is less than 1 cubic metre;
- (b) elsewhere is less than 25 cubic metres.
- Itemisation **63** Separate items shall be provided for soft spots and other voids in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Excavation of soft spots and other voids.
	2	Filling of soft spots and other voids.
II	1	Below cuttings or under embankments.

- 2 In side slopes.
- 3 Below structural foundations and foundations for corrugated steel buried structures.

III 1 Different types of fill.

Excavation of Soft Spots and Other Voids

64 The items for excavation of soft spots and other voids shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) excavation of acceptable material (as this Series paragraphs 17 and 18);
 - (b) excavation of unacceptable material (as this Series paragraph 19);
 - (c) disposal of material (as this Series paragraph 39);
 - (d) trimming back cutting faces.

Filling of Soft Spots Spots In Other Voids

65 The items for filling of soft spots and other voids shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) deposition of fill (as this Series paragraph 33);
 - (b) compaction of fill (as this Series paragraph 52);
 - (c) formwork (as Series 1700 paragraph 15);
 - (d) treatment of cutting faces;
 - (e) in situ concrete (as Series 1700 paragraph 5).

Disused Sewers, Drains, Cables, Ducts, Pipelines and the Like Occurring at Formation or Sub-formation Level; Disused Basements, Cellars and the Like and Gullies

Definition

66 The term ‘services’ in paragraphs 67 to 72 inclusive shall be deemed to include sewers, drains, cables, ducts, pipelines and the like, together with associated chambers, fittings etc. Units

67 The units of measurement shall be:

- (i) removal of disused services linear metre.
- (ii) backfilling disused services cubic metre.
- (iii) backfilling disused basement, cellar and the like cubic metre.
- (iv) backfilling disused gullies number.

Measurement

68 The measurement of removal of disused services shall be applied only to those existing services occurring at or below formation or sub-formation level in cutting and/or which are specifically stated in the Contract to be removed. The measurement shall be the distance along the centre line of the route of the services and, unless stated otherwise in the Contract no deduction shall be made for chambers and the like.

The measurement of backfilling disused services shall be applied only to those

existing services occurring at or below formation or sub-formation level in cutting and/or which are specifically stated in the Contract to be backfilled. The measurement shall be the volume of the void directed to be filled, and unless stated otherwise in the Contract shall include chambers and the like. The removal or backfilling of other disused services occurring elsewhere in the Works shall not qualify for separate measurement under this paragraph.

69 The measurement of backfilling disused basements, cellars and the like shall be the volume of the void directed to be filled. The measurement of backfilling disused gullies shall be the complete operation.

Itemisation

70 Separate items shall be provided for removal, backfilling disused services, backfilling disused basements, cellars and the like and gullies in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Removal.
	2	Backfilling.
II	1	Different types.
III	1	Different sizes.
IV	1	Disused service with one metre or less of cover to formation level.
	2	Disused service exceeding one metre and not exceeding two metres of cover to formation level, and so on in steps of one metre.
	3	Disused basement, cellar and the like.
	4	Disused gully.
V	1	Different materials.

Note: Group IV Features 3 and 4 shall not be applied to Group I Feature 1.

Removal of Disused

71 The items for removal of disused services shall be in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation of acceptable material (as this Series paragraphs 17 and 18);
- (b) excavation of unacceptable material (as this Series paragraph 19);
- (c) breaking up beds, haunches and surrounds;
- (d) disposal of material (as this Series paragraph 39);
- (e) sealing ends of services;
- (f) credit value of materials.

Backfilling, Disused Services, Basements, Cellars and the Like and Gullies

72 The items for backfilling disused services, basements, cellars and the like and gullies shall in accordance with the Preambles to Bill of Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) compaction (as this Series paragraph 52);
- (b) perforation of existing slabs and cleaning;
- (c) in situ concrete (as Series 1700 paragraph 5);
- (d) reinforcement (as Series 1700 paragraph 26);

- (e) formwork (as Series 1700 paragraph 15);
- (f) sealing ends of services;
- (g) grouting.

Supports Left in Excavation

Units **73** The unit of measurement shall be:

- (i) supports left in excavation square metre.

Measurement **74** The measurement of supports left in excavation shall be the area of face directed to be left with supports in position.

Itemisation **75** Separate items shall be provided for supports left in excavation in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Supports.
II	1	Timber.
	2	Steel.
III	1	Different types.

Supports Left in Excavation **76** The items for supports left in excavation shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage (a) struts, wallings and the like and working around them.

Topsoiling and Storage of Topsoil

Units **77** The units of measurement shall be:

- (i) topsoiling..... square metre.
- (ii) permanent storage of topsoil cubic metre.

Measurement **78** The measurement of the topsoiling shall be the area of the surface to be topsoiled and shall include topsoil Class 5A excavated from within the site and imported topsoil Class 5B. The measurement of the permanent storage of topsoil shall be the volume of topsoil Class 5A excavated from within the Site and measured in accordance with paragraph 15(a) of this Series less the volume of topsoil calculated from the areas and thicknesses to be topsoiled.

Itemisation **79** Separate items shall be provided for topsoiling in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Topsoiling of different thicknesses.
	2	Permanent storage of topsoil.
II	1	Surfaces sloping at 10o or less to the horizontal.
	2	Surfaces sloping at more than 10o to the horizontal.

Note: Group I feature 2 shall not be identified by any Group II feature.

Topsoiling **80** The items for topsoiling shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) the removal of debris;
 - (b) taking delivery of imported topsoil;
 - (c) excavation from stockpile;
 - (d) loading into transport;
 - (e) haulage, deposition, spreading, levelling and compaction;
 - (f) trimming and shaping to levels and contours;
 - (g) herbicide treatment.

Permanent Storage of Topsoil **81** The items for permanent storage of topsoil shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) excavation from stockpile;
 - (b) loading into transport;
 - (c) hauling, deposition, spreading, levelling and compaction in permanent storage area;
 - (d) trimming and shaping to levels and contours;
 - (e) multiple handling of material.

Grass seeding and Turfing

Units **82** Unit of measurement shall be:

- (i) grass seeding, turfing square metre

Itemisation **83** Separate items shall be provided for grass seeding and turfing in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Grass Seeding
	2	Turfing
	3	Hydraulic mulch grass seeding
II	1	Surfaces sloping at 10 °C or less to the horizontal
	2	Surface slopping at more than 10 °C to the horizontal
III	1	Turfing in two layers
IV	1	Different mixture

Grass seeding and Turfing **84** The item for grass seeding and turfing topsoil shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item Coverage
- (a) freeing surfaces of areas to be grassed or turfed from stones and other debris and reducing the soil to a tilth immediately prior to grassing;
 - (b) fertilising including additional plant nutrients
 - (c) mowing and clearance of grass cuttings;

- (d) pegging and wiring of turfs;
- (e) raking, watering, retaining agent and herbicide treatment;
- (f) additives;

Completion of Formation and Sub-formation

Units

85 The unit of measurement shall be:

- (i) completion of formation, sub-formation square metre.

Measurement

86 The measurement of completion of formation shall be the area of the surface immediately beneath the sub-base except that where capping is required the measurement shall be the area of the surface of the capping excluding sloping sides and edges.

The measurement of completion of sub-formation shall be the area of the surface immediately beneath capping.

Completion of formation and sub-formation on Classes 1C and 6B materials shall be measured separately only when the Contract states specifically that those materials are to be provided at formation or sub-formation level.

Itemisation

87 Separate items shall be provided for completion of formation and sub-formation in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Completion of sub-formation.
	2	Completion of formation.
II	1	On material other than Class 1C, 6B or rock in cuttings.
	2	On Class 1C material.
	3	On Class 6B material.
	4	On rock in cuttings.

Completion of Formation and Sub-formation

88 The items for completion of formation and sub-formation shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) removal of protective layer, mud and slurry;
- (b) compaction;
- (c) cleaning, trimming, regulating, making good and rolling;
- (d) cement bound materials;
- (e) excavation, processing, compaction of naturally occurring Hard Material;
- (f) measures to protect formation and sub-formation against deterioration or degradation.

Lining of Watercourses

Units

89 The unit of measurement shall be:

- (i) lining of watercourses square metre.

Measurement **90** The measurement of lining of watercourses shall be the permanently exposed face area of the work.

The measurement of bagwork shall be the flat undeveloped area of the work.

Itemisation **91** Separate items shall be provided for lining of watercourses in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Lining of new watercourse.
	2	Lining of enlarged watercourse.
	3	Lining of intercepting ditches.
II	1	To inverts.
	2	To side slopes.
III	1	Different types.
IV	1	Different thicknesses.

Lining of Watercourses **92** The items for lining of watercourses shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage**
- (a) bedding and compaction;
 - (b) laying, setting, bedding, jointing, wedging, cutting and pointing;
 - (c) building in pipes;
 - (d) concrete (as Series 1700 paragraphs 5 and 10);
 - (e) formwork (as Series 1700 paragraph 15);
 - (f) reinforcement (as Series 1700 paragraph 26);
 - (g) bags, filling, staking and securing.
 - (h) blinding concrete (as series 1720 Paragraph 4)

Clearing of Existing Ditches

Units **93** The unit of measurement shall be:

- (i) clearing of existing ditches linear metre.

Measurement **94** The measurement of clearing of existing ditches shall be the length along the centre line of the ditch.

Itemisation **95** Separate items shall be provided for clearing of existing ditches in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Clearing of existing ditches.
II	1	Different locations.

Clearing of Existing Ditches **96** The items for clearing of existing ditches shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage**
- (a) excavation of acceptable material (as this Series paragraphs 17 and 18);

- (b) excavation of unacceptable material (as this Series paragraph19);
- (c) disposal of material (as this Series paragraph39);
- (d) clearing debris and vegetable growth;
- (e) trimming side slopes and grading bottoms;
- (f) maintaining existing outfalls.

Ground Improvement - Establishment of Plant

Units

97 The unit of measurement shall be:

- (i) establishment of ground improvement plant item.

Measurement

98 The establishment of ground improvement plant shall be measured once only to each separate location for each method of ground improvement on the Site. Any additional establishment of plant to suit the Contractor’s method of working shall not be measured.

Itemisation

99 Separate items shall be provided for establishment of ground improvement plant in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Establishment of dynamic compaction plant.
	2	Establishment of vibrated stone columns plant.
II	1	Different locations.

Establishment of Ground Improvement Plant

100 The items for establishment of ground improvement plant shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) bringing plant and equipment to the location of the ground improvement;
- (b) erecting and setting up plant and equipment including site preparation, levelling, and access ramps;
- (c) moving and setting up plant and equipment at each position including site preparation, levelling and access ramps;
- (d) dismantling and removing plant and equipment from the Site on completion.

Ground Improvement - Dynamic Compaction

Units

101 The units of measurement shall be:

- (i) dynamic compaction linear metre.
- (ii) dynamic compaction plant standing time hour.
- (iii) granular blanket tonne.

Measurement

102 The measurement of dynamic compaction shall be the sum of the distances through which the pounder is required to fall. The distance for each drop shall be the vertical measurement from the underside of the pounder immediately prior to release, to the level of the ground beneath the pounder immediately prior to the first drop at that point.

103 The measurement of dynamic compaction plant standing time shall be for the period or periods of standing time ordered by the Overseeing Organisation. Periods of less than half an hour shall not be measured. Any other standing time due to the Contractor's method of working, necessitated by the process of ground improvement provided for in the Contract or other than that ordered by the Overseeing Organisation shall not be measured.

104 The measurement of granular blanket shall be the tonnage of material certified by the Overseeing Organisation, being only that material included on delivery tickets which is incorporated within the Permanent Works in the locations to the extent and thicknesses stated in the Contract or ordered by the Overseeing Organisation.

Itemisation

105 Separate items shall be provided for dynamic compaction, dynamic compaction plant standing time, and granular blanket in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Dynamic compaction.
	2	Dynamic compaction plant standing time.
	3	Granular blanket.
II	1	Trial compaction.
	2	Main compaction.
III	1	Different weight of pounder.
IV	1	Different materials.

Note: Group II and III features shall be applied only to Group I Feature 1.

Dynamic Compaction

106 The items for dynamic compaction shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) preparation and levelling prior to placing the granular blanket;
- (b) pounding;
- (c) filling craters with adjacent material and compaction;
- (d) keeping earthworks free of water;
- (e) compaction of surface after the final pass;
- (f) complying with particular requirements and constraints;
- (g) keeping records;
- (h) extracting buried pounder.

Dynamic Compaction Plant Standing Time

107 The items for dynamic compaction plant standing time shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) ancillary plant;
- (b) equipment and operatives;
- (c) periods of less than half an hour.

Granular Blanket

108 The items for granular blanket shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- (a) deposition of fill (as this Series paragraph 33);
- (b) compaction of fill (as this Series paragraph 52).

Ground Improvement - Vibrated Stone Columns

Units

109 The units of measurement shall be:

- (i) vibrated stone columns linear metre.
- (ii) vibrated stone column plant standing time hour.

Measurement

110 The measurement of vibrated stone columns shall be the length measured along the axis of the stone column from the maximum depth of the vibrator tip to the specified finished level.

111 The measurement of vibrated stone column plant standing time shall be for the period or periods of standing time ordered by the Overseeing Organisation. Periods of less than half an hour shall not be measured. Any other standing time due to the Contractor's method of working, necessitated by the process of ground improvement provided for in the Contract or other than that ordered by the Overseeing Organisation shall not be measured.

Itemisation

112 Separate items shall be provided for vibrated stone columns and vibrated stone columns plant standing time in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Vibrated stone columns.
	2	Vibrated stone columns plant standing time.
II	1	Different minimum diameters.
III	1	Different methods of installation.
IV	1	Columns not exceeding 5 metres in length.
	2	Columns exceeding 5 metres in length but not exceeding 10 metres and so on in steps of 5 metres.

Note: Group II, III and IV features shall be applied only to Group I Feature 1.

Vibrated Stone Columns

113 The items for vibrated stone columns shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) complying with design criteria;
- (b) certificates;
- (c) provision of data and drawings;
- (d) resubmissions and modifications;
- (e) amendments to the Works;
- (f) air or water supply;
- (g) effluent/slurry disposal;

- (h) precautions to prevent ingress of surface water or foreign matter;
- (i) preliminary treatment areas;
- (j) trial areas;
- (k) demonstrations;
- (l) site control, observations, records and reports;
- (m) additional stone required due to penetration into surrounding ground.

**Vibrated Stone Columns
Plant Standing Time**

114 The items for vibrated stone columns plant standing time shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) ancillary plant;
- (b) equipment and operatives;
- (c) periods of less than half an hour.

Gabion Walling and Mattresses

Units

115 The unit of measurement shall be:

- (i) gabion walling, mattresses cubic metre.

Measurement

116 The measurement of gabion walling and mattresses shall be the volume contained within the outline of the gabions or mattresses as stated in the Contract.

Itemisation

117 Separate items shall be provided for gabion walling and mattresses in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Gabion walling.
	2	Mattresses.
II	1	Different mesh materials.
III	1	Different mesh size.
IV	1	Different types of fill.
V	1	Mattresses installed at 10o or less to the horizontal.
	2	Mattresses installed at more than 10o to the horizontal.
VI	1	In environmental bunds.

**Gabion Walling and
Mattresses**

118 The items for gabion walling and mattresses shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) assembling, tying, fixing, staking and tensioning;
- (b) fill, compaction and finishes;
- (c) mesh including cutting and folding to form special units and shapes;
- (d) bracing and wiring lids.

Itemisation

126 Separate items shall be provided for filling and caps to mine working, well, swallow hole and the like in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Filling.
	2	Caps.
II	1	Mine working.
	2	Well.
	3	Swallow hole and the like.
III	1	Different materials.

Filling and Caps to Mine Working, Well, Swallow Hole and the Like

127 The items for filling and caps to mine working, well, swallow hole and the like shall in accordance with the Preambles to Bill of Quantities and the like. Directions include for:

Item coverage

- (a) excavation of acceptable material (as this Series paragraphs 17 and 18);
- (b) excavation of unacceptable material (as this Series paragraph 19);
- (c) backfilling and compaction;
- (d) concrete (as Series 1700 paragraphs 5 and 10);
- (e) formwork including permanent formwork (as Series 1700 paragraph 15);
- (f) reinforcement (as Series 1700 paragraph 26);
- (g) flushing;
- (h) disposal of material (as this Series paragraph 39);
- (i) investigation and monitoring;
- (j) material not used as filling.

Ground Anchorages - Ground Anchorage Plant

Units

128 The unit of measurement shall be:

- (i) establishment of ground anchorage plant item.

Measurement

129 The establishment of ground anchorage plant shall be measured once only to each separate location of ground anchorages on the Site. Any additional establishment of ground anchorage plant to suit the Contractor's method of working shall not be measured.

Itemisation

130 Separate items shall be provided for ground anchorage plant in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Establishment of ground anchorage plant.
II	1	Different locations.

Establishment of Ground Anchorage Plant

131 The items for establishment of ground anchorage plant shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) bringing plant and equipment to the location of ground anchorages;
 - (b) erecting and setting up plant and equipment including site preparation, levelling and access ramps;
 - (c) moving and setting up plant and equipment at each position including site preparation, levelling and access ramps;
 - (d) dismantling and removing plant and equipment from Site on completion.

Ground Anchorages

Units **132** The unit of measurement shall be:

- (i) ground anchorages linear metre.

Measurement **133** The measurement of ground anchorages shall be for the complete anchorage assembly and shall be the length from the bottom of the fixed anchorage to the bearing face.

Itemisation **134** Separate items shall be provided for ground anchorages in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Ground anchorages.
II	1	Different types.
III	1	Different capacities.
IV	1	Not exceeding 5 metres in length.
	2	Exceeding 5 metres in length but not exceeding 10 metres in length and so on in steps of 5 metres.
V	1	Trial anchorages.
	2	Main anchorages.

Ground Anchorages **135** The items for ground anchorages shall in accordance with the Preambles to Bill of Quantities General Directions include for:

- Item coverage
- (a) design;
 - (b) provision of data and drawings;
 - (c) certificates;
 - (d) resubmissions and modifications;
 - (e) amendments to the Works;
 - (f) boring, augering, lining, under-reaming, removing and disposing of material;
 - (g) cables, wires or strands with couplers, binders and spacers;
 - (h) anchorages, bearing plates, reinforcing helices, grout inlets, vents and the like;
 - (i) applying water under pressure and proving watertightness of boreholes;

- (j) flushing borehole, cleaning and preparation;
- (k) protective system (as Series 1900 paragraph 4);
- (l) grouting ground anchorages including fixed length and free stressing length;
- (m) applying prestress in one or more stages;
- (n) checking the accuracy of load measuring equipment and adjusting;
- (o) taking observations and compiling a record of stressing and grouting operations and supplying one copy to the Overseeing Organisation;
- (p) measures to prove anchorage suitability.
- (q) proof loading
- (r) facilities for Engineers's poof loading;

Ground Anchorages - Waterproofing Anchorage Boreholes

Units

136 The unit of measurement shall be:

- (i) waterproofing of boreholes linear metre.

Measurement

137 The measurement of waterproofing of boreholes shall be the total length of waterproofing operation instructed by the Overseeing Organisation.

Itemisation

138 Separate items shall be provided for waterproofing of boreholes in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Waterproofing of boreholes.
II	1	Standard grouting.
	2	Pressure grouting.

Waterproofing of Boreholes

139 The items for waterproofing of boreholes shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) pre-grouting;
- (b) re-drilling and applying water under pressure and proving watertightness of borehole.

Instrumentation and Monitoring - Boring Plant

Units

140 The unit of measurement shall be:

- (i) establishment of boring plant item.

Measurement

141 The establishment of boring plant shall be measured once only to each separate location of boring on the Site. Any additional establishment of boring plant to suit the Contractor's method of working shall not be measured.

Itemisation

142 Separate items shall be provided for boring plant in accordance with

Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Establishment of boring plant.
II	1	Different locations.

Establishment of Boring Plant

143 The items for establishment of boring plant shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) bringing plant and equipment to the location of boring;
- (b) erecting and setting up plant and equipment including site preparation, levelling and access ramps;
- (c) moving and setting up plant at each position including site preparation, levelling, and access ramps;
- (d) dismantling and removing plant and equipment from Site on completion.

Instrumentation and Monitoring - Boring Holes

Units

144 The unit of measurement shall be:

- (i) boring holes linear metre.

Measurement

145 The measurement of boring holes shall be the linear distance along the axis of the borehole between the instrument base and the level stated in the Contract.

Itemisation

146 Separate items shall be provided for boring holes in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Boring holes.
II	1	Vertical.
	2	Raking.
III	1	Depth not exceeding 10 metres.
	2	Depth exceeding 10 metres but not exceeding 20 metres and so on in steps of 10 metres.

Boring Holes

147 The items for boring holes shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) boring holes in any material, including changing bits and tools;
- (b) disposal of material (as this Series paragraph 39);
- (c) taking measures to deal with the presence of water in the boreholes;
- (d) drilling fluid;
- (e) standing time including ancillary plant, equipment and operatives.

Installation of Tubing and Cabling

152 The items for installation of tubing and cabling shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) standpipes;
- (b) cutting and jointing tubing including fittings and screw caps;
- (c) connections and joints;
- (d) excavation in any material (as this Series paragraphs 17, 18, 19 and 23);
- (e) bedding and surround to cable or tube;
- (f) backfilling and compaction;
- (g) marking tape or cable covers;
- (h) extra length of cable for connection to monitoring equipment;
- (i) twisting and snaking;
- (j) incremental installation;
- (k) ducts (as Series 500 paragraph 16).

Grouting

153 The items for grouting shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) mixing and placing;
- (b) in situ concrete (as Series 1700 paragraph 5);
- (c) formwork (as Series 1700 paragraph 15);
- (d) backfilling and compaction;
- (g) disposal of material (as this Series paragraph 39);
- (h) covers, frames, seatings and bedding;
- (i) locks and keys.

Instrumentation and Monitoring - Instrument Hut or Cabinet

Units

154 The unit of measurement shall be:

- (i) erection, servicing, dismantling of instrument hut or cabinet .
..... item.

Itemisation

155 Separate items shall be provided for instrument hut or cabinet in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature

- | | | |
|---|---|--------------|
| I | 1 | Erection. |
| | 2 | Servicing. |
| | 3 | Dismantling. |

II	1	Instrument hut for the Overseeing Organisation.
	2	Instrument cabinet for the Overseeing Organisation.
III	1	Until completion of the works.
	2	After completion of the works.

Erection of Instrument Hut

156 The items for erection of instrument hut shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) preparation of site;
- (b) foundations, bases and hardstandings;
- (c) heating, power, water and lighting services;
- (d) security fence and lockable gates;
- (e) furnishings and fittings;
- (f) locks and keys.

Servicing Instrument Hut

157 The items for servicing instrument hut shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) depreciation and maintenance of building, services and fences;
- (b) depreciation and maintenance of furnishings, fittings and supplies.

Dismantling Instrument Hut

158 The items for dismantling instrument hut shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) receiving back from the Overseeing Organisation and removing furnishings and fittings;
- (b) disconnecting, removing and sealing off disused services;
- (c) demolishing and removing including hardstandings, fences and gates;
- (d) disposal of material (as this Series paragraph 39);
- (e) reinstatement of the site.

Erection of Instrument Cabinet

159 The items for erection of instrument cabinet shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) preparation of site;
- (b) foundations and bases;
- (c) power and water services;
- (d) locks and keys.

Servicing of Instrument Cabinet

160 The items for servicing of instrument cabinet shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) depreciation and maintenance of cabinet and services;
- (b) depreciation and maintenance of fittings and supplies;

- (c) servicing.

Dismantling of Instrument Cabinet

161 The items for dismantling of instrument cabinet shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) disconnecting, removing, and sealing off disused services;
- (b) removing instrument cabinet off Site;
- (c) breaking up and removal of foundations, and bases, and disposal of surplus material;
- (d) disposal of material (as this Series paragraph 39);
- (e) reinstatement of the site.

Instrumentation and Monitoring - Monitoring Equipment

Units

162 The unit of measurement shall be:

- (i) monitoring equipment item.

Itemisation

163 Separate items shall be provided for monitoring equipment in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature

I 1 Monitoring equipment.

II 1 Different types.

Monitoring Equipment

164 The items for monitoring equipment shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) installing, commissioning, calibrating and maintaining monitoring equipment in instrument hut or cabinet;
- (b) installing, commissioning, calibrating and maintaining monitoring equipment in vehicles for the Overseeing Organisation;
- (c) copies of reports and results and supplying to the Overseeing Organisation;
- (d) instructing the Overseeing Organisation's staff in the operation and maintenance of the instrumentation;
- (e) attendance during measurement carried out by the Overseeing Organisation;
- (f) removing on completion.

Ground Water Lowering

Units

165 The unit of measurement shall be:

- (i) ground water lowering item.

Measurement

166 The measurement of ground water lowering shall be the complete installation. Ground water lowering shall be separately measured only where ground water lowering is specifically required in the Contract.

Itemisation

167 Separate items shall be provided for ground water lowering in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Ground water lowering.
II	1	Different locations.

Ground Water Lowering

168 The items for ground water lowering shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) preparing, amending and submitting proposals to the Overseeing Organisation;
- (b) installation, operation, maintenance and removal of plant;
- (c) making arrangements with owners and occupiers of land temporarily acquired, and cost arising therefrom;
- (d) diversion of rivers and the like;
- (e) soakaways, lagoons and the like;
- (f) measures to safeguard water supplies including liaising with water companies.

Trial Pits

Units

169 The unit of measurement shall be:

- (j) trial pits cubic metre.

Measurement

170 The measurement of trial pits shall be the volume of the void, calculated on the basis of the horizontal area of the bottom of the excavation with the depth being measured from the bottom of the excavation to the level at which excavation is directed to be commenced.

Itemisation

171 Separate items shall be provided for trial pits in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Trial pits.
II	1	0 metres to 3 metres in depth.
	2	0 metres to 6 metres in depth, and so on in steps of 3 metres.

Trial Pits

172 The items for trial pits shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation of acceptable material (as this Series paragraphs 17 and 18);
- (b) excavation of unacceptable material (as this Series paragraph 19);
- (c) excavation in Hard Material (as this Series paragraph 23);
- (d) locating, working around and supporting pipes, cables, services, apparatus and the like;

- (e) attendance on the Overseeing Organisation and others for inspection and investigation purposes;
- (f) disposal of material (as this Series paragraph 39);
- (g) backfilling and compaction;
- (h) reinstatement of surfaces.

Breaking Up and Perforation of Redundant Pavements

Units

173 The unit of measurement shall be:

- (i) breaking up of redundant pavements, perforation of redundant pavements square metre.

Measurement

174 The measurement of breaking up and perforation of redundant pavements shall be the areas stated in the Contract to be broken up or perforated and left in place. The depth of the pavement shall be the depth from the existing surface of the pavement to the underside of bituminous or cementitious material.

Itemisation

175 Separate items shall be provided for breaking up and perforation of redundant pavements in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Breaking up of redundant pavements.
	2	Perforation of redundant pavements.
II	1	Different types of pavement.
III	1	Depth not exceeding 100 mm.
	2	Depth exceeding 100 mm but not exceeding 200 mm, and so on in steps of 100 mm.

Breaking up and Perforation of Redundant Pavements

176 The items for breaking up and perforation of redundant pavements shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation in Hard Material (as this Series paragraph 23);
- (b) taking precautions to avoid damage to property, structures, drains, sewers, services, instrumentation and the like.

Perforation of Redundant Slabs, Basements and the Like

Units

177 The unit of measurement shall be:

- (i) perforation of redundant slabs, basements and the like square metre.

Measurement

178 The measurement of perforation of redundant slabs, basements and the like shall be the areas stated in the Contract to be perforated and left in place.

Itemisation

179 Separate items shall be provided for perforation of redundant slabs, basements and the like in accordance with Chapter II paragraphs 3 and 4 and the following:

Group Feature		
I	1	Perforation of redundant slabs, basements and the like.
II	1	Different types of slabs, basements and the like.
III	1	Thickness not exceeding 100 mm.
	2	Thickness exceeding 100 mm but not exceeding 200 mm, and so on in steps of 100 mm.

Perforation of Redundant Slabs, Basements and the Like

180 The items for perforation of redundant slabs, basements and the like shall in accordance with the Preambles to Bill of Quantities General Directions include for:

Item coverage

- (a) excavation in Hard Material (as this Series paragraph 23);
- (b) taking precautions to avoid damage to property, structures, drains, sewers, services, instrumentation and the like.