



INTERNATIONAL ORGANIZATION FOR MIGRATION

Modification and Repurposing of Existing Hotel Structure
for IOM MHAC and TC

STANDARD METHOD OF MEASUREMENT

JULY 2023

SileshjConsult
Established 1984

Consulting Architects and Engineers

Sileshi Consulting Architects and Engineering Plc.

Tel +251116733492 Fax +251116733511 E-mail silcon@ethionet.et p.o.box 1405 Addis Ababa, Ethiopia

2016

CS-168

**ETHIOPIAN CONSTRUCTION PRACTICE NORMS
COMPULSORY STANDARD: CS-168**

**STANDARD METHODS OF MEASUREMENT
FOR
BUILDING WORKS**



MINISTRY OF CONSTRUCTION

NATIONAL FOREWORD

Proclamation No. 916/ 2015, that defines the powers and duties of the Executive Organs of the Federal Democratic Republic of Ethiopia, empowers the Ministry of Construction to prepare the Country's Building Codes, issue Standards for design and construction works, and follow up and supervise their implementation.

The Ethiopian Standard Method of Measurement for Buildings, having provisions related to all building works, was first published in 1991 and revised in 1995. This newly revised edition has been brought out to incorporate the Building Proclamation and changes that are necessary in the light of the usage of this set of standards and suggestions provided by various implementing bodies.

The purpose of this set of standards is to put in place a governing norm for building clients, designers, supervisors and contractors in a very transparent, sense of accountability and professional manner in the process of contract execution as well as ensure quality and value for money. Researchers in the academia can also use this document as a reference to conduct research and build on it for the benefit of the people through creating strong building construction industry. In addition to this, the introduction of this updated method of measurement is very helpful to measure the value of works during planning and execution of building projects, beginning from the time of estimation to final completion and then settlement of payments. Therefore, this document is a very essential device serving as a reference for project stakeholders while avoiding ambiguities and misunderstandings arising from inadequate information and knowledge. The major benefits to be gained in applying this set of standards include the harmonization of professional practices and ensuring of appropriate level of workmanship and quality of construction works.

This Standard Method of Measurement forms part of contract documents that govern the construction of buildings. Other documents or practices will no more overrule the standards covered here. The Ministry of Construction acknowledges this Standard Method of Measurement as a national resource, tool and reference document for the standardization of the preparation and implementation of residential, commercial, civil and industrial construction works.

This document is technical by its very nature, requiring periodic updating. Hence, incorporating contemporary innovations of the field, it will be revised and reissued by the Ministry whenever appropriate.

Ambachew Mekonnen Sisay (PhD)

Minister, Ministry of Construction,

Federal Democratic Republic of Ethiopia

MINISTRY OF CONSTRUCTION

PREFACE

This Standard Methods of Measurement is developed by HABCON CONSULT with the highest possible degree of clarity that contributes for efficient delivery of projects through minimizing ambiguity and possible disputes that may arise from lack of clear measurement rules. The standard is developed through application of contemporary best practices to the context of the local construction sector.

The order of Divisions in this Standard Methods of Measurement is presented with the same order of the newly developed Standard Technical Specifications to facilitate quicker use of the rules and simplifying cross reference. Sections under each division are systematically structured through separate headings for *Information to be Provided by specifiers, Detail description of the work, Supplementary Information required, Coverage of each work items and Measurement rules.*

HABCON CONSULT would like to acknowledge Ato Hagos Abdie, Ato Yaregal Ali and Ato Melese Haile for their unreserved effort in the Preparation of this Standard.

HAGOS ABDIE
GENERAL MANAGER
HABCON CONSULT

Contents

DIVISION 00 – GENERAL RULES	5
1. INTRODUCTION	5
2. CLASSIFICATION OF DIVISIONS	5
2.1 ITEM DESCRIPTION	5
2.2 INFORMATION TO BE PROVIDED	5
2.3 SUPPLEMENTARY INFORMATION TO BE PROVIDED	5
2.4 MEASUREMENT	5
2.5 DEFINITION	5
2.6 COVERAGE	6
3. BILL OF QUANTITIES	6
4. MEASUREMENT	6
5. ITEMS TO BE FULLY INCLUSIVE	6
6. DESCRIPTION OF ITEMS	6
7. PROVISIONAL ITEM	7
8. SYMBOLS AND ABBREVIATIONS	7
9. GLOSSARY	7
DIVISION 01 – PRELIMINARES	9
1. PROJECT, PARTIES AND CONSULTANTS	9
2. DESCRIPTION OF SITE	9
3. DRAWINGS AND OTHER DOCUMENTS	9
4. DESCRIPTION OF THE WORK	9
5. FORM, TYPE AND CONDITIONS OF CONTRACT	9
6. CONTRACTOR'S LIABILITY	10
7. EMPLOYER'S LIABILITY	10
8. AUTHORITIES' FEES AND CHARGES	10
9. OBLIGATIONS AND RESTRICTIONS IMPOSED BY THE EMPLOYER	10
10. WORKS BY NOMINATED SUB-CONTRACTORS	10
11. GOODS AND MATERIALS FROM NOMINATED SUPPLIERS	10
12. WORKS BY PUBLIC BODIES	11
13. WORKS BY OTHERS DIRECTLY ENGAGED BY THE EMPLOYER ..	11
14. PRICING	11
15. DAYWORKS	12
16. CONTINGENCIES	12
DIVISION 02 – EXISTING CONDITIONS	13
1. DEMOLITION	13

1.1. DEMOLISHING STRUCTURES	13
2. ALTERATIONS	13
2.1 SPOT ITEMS	13
DIVISION 03 – CONCRETE	15
1. CONCRETE FORMWORK	15
2. STEEL CONCRETE REINFORCEMENT	15
3. CAST-IN-PLACE CONCRETE	16
4. STRUCTURAL PRECAST CONCRETE	17
5. CONCRETE ANCILLARIES	18
DIVISION 04 - MASONRY	19
1. UNIT MASONRY	19
1.1 GENERAL	19
1.2 STONE WORK	19
1.3 BRICKWORK	20
1.4 BLOCK WORK	20
DIVISION 05 – METAL WORK	21
1. STRUCTURAL METAL FRAMING	21
1.1 DECKING	22
1.2 COMPOSITE ITEMS	22
1.3 ROOF LIGHTS	22
1.4 BALUSTRADES AND STAIRCASE RAILS	23
1.5 SUNDRIES	23
DIVISION 06 – WOOD, PLASTIC AND COMPOSITES	25
1. CARPENTRY IN GENERAL	25
DIVISION 07 – THERMAL AND MOISTURE PROTECTION	27
1. ROOF WATERPROOFING	27
2. DAMPPROOF COURSE	27
3. ROOFING AND WALL CLADDING	27
DIVISION 08 – OPENINGS	29
1. WOODEN, METAL AND PLASTIC DOORS	29
2. GLAZED ALUMINUM CURTAIN WALLS	29
3. WOODEN, METAL AND PLASTIC WINDOWS	29
4. IRONMONGERY (FINISH HARDWARE)	30
5. GLASS AND GLAZING	30
DIVISION 09 – FINISHES	33
1. GENERAL	33

1.1 PLASTERING	33
1.2 TILING	34
1.3 CEILINGS	34
1.4 PAINTING	34
DIVISION 10 – SPECIALTIES	37
DIVISION 22 – PLUMBING	39
1. GENERAL	39
1.1 INSPECTION CHAMBERS, MANHOLES, SOAKAWAYS, CESSPITS AND SEPTIC TANKS	40
DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING	41
1. GENERAL	41
1.1 PIPEWORK AND GUTTERWORK	41
1.2 DUCTWORK	41
1.3 EQUIPMENT	41
1.4 AUTOMATIC CONTROLS	42
1.5 INSULATION, INCLUDING LININGS AND PROTECTIVE COVERINGS	42
DIVISION 26 – ELECTRICAL	43
1. GENERAL	43
1.1 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS & CABLES 52	44
1.2 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS	44
1.3 SWITCHBOARDS	45
1.4 WIRING DEVICES	46
1.5 LIGHTING	46
1.6 BUILDERS WORK	47
DIVISION 27 – COMMUNICATIONS	49
1. GENERAL	49
DIVISION 28 – ELECTRONIC SAFETY AND SECURITY	51
1) GENERAL	51
DIVISION 31 – EARTHWORK	53
A. GENERAL	53
1.1 SITE CLEARNG	53
1.2 EXCAVATION AND GATEOUT	54
1.3 FILL	54
1.4 DISPOSAL OF EXCAVATED MATERIAL	55
1.5 SURFACE TREATMENT	55

1.6	SUBBASE.....	55
1.7	HARDCORE AND STONE FILLER	55
1.8	BLINDING.....	55
1.9	SLOPES TO EMBANKMENT	55
1.10	LANDSCAPING	56
DIVISION 32 – EXTERIOR IMPROVEMENTS.....		57
1.	GENERAL	57
2.1	BASES BALLASTS AND PAVING	57
2.2	ASPHALT CONCRETE PAVING	58
2.3	FENCES AND GATES.....	58
2.4	PLANTING.....	58

DIVISION 00 – GENERAL RULES

1. INTRODUCTION

- A. This Standard Methods of Measurement provides a uniform basis for measuring bills of quantities for works of building construction. More detailed information than is required by these rules shall be given where necessary in order to define the precise nature and extent of the required work.
- B. The general rules stated in this part (under ‘General Rule’) may be applied equally to measurement of proposed works and of executed works.
- C. Unless specifically stated otherwise all divisions stated hereunder in this Methods of Measurement are governed by these general rules.

2. CLASSIFICATION OF DIVISIONS

- A. Each division described in this Methods of Measurement comprises item description, information to be provided, supplementary information to be provided, measurement, definition and coverage.
- B. Some divisions may not comprise all of the classifications listed above as they may not be applicable or necessary for the respective part.

2.1 ITEM DESCRIPTION

- A. Under item description, list of descriptive features commonly encountered in building works are drawn. Each item description shall identify the work with respect to one descriptive feature.

2.2 INFORMATION TO BE PROVIDED

- A. All necessary information shall be shown on the Drawings and described in the bill of quantity.

2.3 SUPPLEMENTARY INFORMATION TO BE PROVIDED

- A. Any additional information specific to the item and also that need special work shall be shown on the Drawings and described in the bill of quantity.

2.4 MEASUREMENT

- A. Measurement set out when work shall be measured and the method by which quantities shall be computed.

2.5 DEFINITION

- A. Definition defines the extent and limits of the work represented by a word or expression used in the classifications and in a bill of quantities prepared in accordance with these classifications.

2.6 COVERAGE

- A. Coverage draw attention to particular incidental work which shall be deemed to be included in the appropriate items in a bill of quantities to the extent that such work is included in the tender documents.

3. BILL OF QUANTITIES

- A. The objects of bills of quantities are:
 - 1. To assist in the accurate preparation of tenders, by providing for measurement of quantities on a uniform basis.
 - 2. To provide a basis for the financial control of a project, in accordance with the Conditions of Contract.
- B. Bills of quantities shall describe and represent the works to be carried out; work which cannot be measured accurately shall be described as approximate or given in bills of approximate quantities.
- C. Conditions of Contract, Drawings and Specifications shall be provided with the bills of quantities.

4. MEASUREMENT

- A. Work shall be measured net as fixed in position and each measurement shall be taken and rounded to the nearest two decimal digits (e.g. 0.01 m, 0.01 m², 0.01 kg, etc.). This rule shall not apply to any dimensions stated in descriptions.

5. ITEMS TO BE FULLY INCLUSIVE

- A. Unless otherwise stated, all items shall be fully inclusive of all that is necessary to fulfill the Items to be fully liabilities and obligations arising out of the contract and shall include:
 - 1) Labor and all costs in connection therewith.
 - 2) Materials, goods and all costs in connection therewith.
 - 3) Fittings and fixing material and goods in position.
 - 4) Equipment plants and costs in connection therewith.
 - 5) Waste of materials.
 - 6) Overhead charges and profit.
 - 7) Maintenance during defects liability period.

6. DESCRIPTION OF ITEMS

- A. The order of stating dimensions in descriptions shall be consistent and generally in the sequence of length, width and height on depth. Where that sequence is not appropriate or where ambiguity could arise, the dimensions shall be specifically identified.
- B. Where classification is given in this document as being between two limiting dimensions then the interpretation shall be as exceeding the first and not exceeding the second.
- C. Each work section of a bill of quantities shall begin with a description stating the nature and location of the work unless evident from the drawn or other information required to be provided by this method of measurement.

- D. Items which are required to be enumerated or for which an item is required, shall be fully described.
- E. Items which are to be measured by length or depth shall state the cross-sectional size and shape, girth or ranges of girths or such other information as may be appropriate; for items of pipework it shall be stated whether the diameter is internal or external.
- F. Items which are to be measured by area shall state the thickness or such other information as may be appropriate.
- G. Items which are to be measured by weight shall state the material thickness and unit weight if appropriate (for example, ductwork).
- H. Notwithstanding these principles of measurement, proprietary items may be measured in a manner appropriate to the manufacturer's tariff or customary practice.
- I. The description of items in bills of quantities may refer to other documents or drawings and any reference to such information shall be understood to fulfill any requirement of these principles of measurement; alternatively, reference may be made to published information.
- J. Where the unit of billing is the meter, or kilogram, quantities shall be billed to the nearest whole unit. Fractions of a unit less than half shall be disregarded and all other fractions shall be regarded as whole unit. Where this application would cause an entire item to be eliminated, such item shall be enumerated stating size or weight as appropriate.

7. PROVISIONAL ITEM

- A. Works which cannot be measured shall be given as Provisional Item. Work the extent of which is not known shall be described as provisional or given in a bill of approximate quantities.
- B. The term 'Provisional Sum' is defined as a sum provided for work the cost of which cannot be entirely foreseen, defined or detailed at the time tender or request for offer is issued.

8. SYMBOLS AND ABBREVIATIONS

- A. The following symbols and abbreviations are used in this method of measurement:

e.g.	= for example
m	= meter
m ²	= square meter
m ³	= cubic meter
mm	= millimeter
nr	= number
kg	= kilogram
%	= percentage
<	= less than
>	= exceeding

9. GLOSSARY

- A. For the purpose of this method of measurement, the following definitions apply:
 - A. Bill of Quantities: A list of items giving brief identifying descriptions and the measured quantities of Work included in a Contract.

- B. Schedule of Rates: A list of items giving brief identifying descriptions and the measured quantities of Work included in a Contract for the purpose of obtaining unit prices only.
- C. General Conditions of Contract: The relevant general conditions of contract included in the Contract Documents. The terms defined in the relevant general conditions of contract shall bear the same interpretation in this method of measurement.
- D. Day Work: The method of valuing work on the basis time spent by the workmen, the materials used and plant employed.
- E. Original Surface: The surface before any work has been carried out under the Contract.
- F. Commencing Surface (in relation to an item in the bill of quantities): The surface before any work covered by the item has been carried out.
- G. Final Surface: The surface indicated on the Drawings to which the Work described in any item of the bill of quantities is to be carried out.
- H. Curve: Any form of curve including a circle.
- I. Range: The limits of a dimension indicated by the upper and lower limits joined by the word 'to', e.g. 80 mm to 100 mm. the range deemed to include the limiting values.

DIVISION 01 – PRELIMINARES

1. PROJECT, PARTIES AND CONSULTANTS

- A. The name, nature and location of the project shall be stated.
- B. A general description of the works shall be given.
- C. The names and addresses of the Employer and consultants to be named in the contract shall be given.

2. DESCRIPTION OF SITE

- A. Information to indicate the boundaries of the site, the means of access and the position of the works shall be given.
- B. Attention shall be drawn to any drainage, water and other mains or powers services known to exist on or over the site.
- C. Attention shall be drawn to any adjacent or abutting buildings.

3. DRAWINGS AND OTHER DOCUMENTS

- A. A list of the drawings from which the bills of quantities have been prepared shall be given. The list shall indicate the location drawings which shall accompany the bills of quantities.
- B. Addresses where drawing and other documents may be inspected by appointment or otherwise shall be given.

4. DESCRIPTION OF THE WORK

- A. Elements of each new building shall be described.
- B. Dimensions and shape relating to each building shall be given if equivalent information is not indicated on the drawings provided.
 - 1) Plan area and perimeter of each floor level.
 - 2) Heights between floors.
 - 3) Total height.
- C. Details of related work by others shall be described.

5. FORM, TYPE AND CONDITIONS OF CONTRACT

- A. Where the conditions of contract are standard and published for general use, particulars of the edition to be used and a schedule of the clause headings shall be given. Where the standard conditions provide for alternative or optional clause, the clauses which apply shall be stated. Amendments to standard conditions shall be given in full.
- B. Where the conditions of contract are not standard and not published for general use, the conditions shall be set out in full in the bill of quantities or a schedule of clause headings shall be given where a full set of conditions is supplied with the bill of quantities. In either case

where the conditions provide for alternative or optional clauses the clauses which apply shall be stated.

6. CONTRACTOR'S LIABILITY

- A. Refer to General Condition of Contract.

7. EMPLOYER'S LIABILITY

- A. Where the cost of insuring any liability of the Employer is required to be included in the contract sum such cost shall be given as a provisional sum.

8. AUTHORITIES' FEES AND CHARGES

- B. Unless the conditions of contract provides otherwise, all fees and charges which the Contractor is required to pay to authorities, shall be given as provisional sums.

9. OBLIGATIONS AND RESTRICTIONS IMPOSED BY THE EMPLOYER

- A. Particulars shall be given of any obligations or restrictions to be imposed by the Employer in respect of the following, unless they are covered by the schedules given under 5 above.
- 1) Access to and possession or use of the site.
 - 2) Limitations of working space.
 - 3) Limitations of working hours.
 - 4) The use or disposal of any materials found on site.
 - 5) Hoardings, fences, screens, temporary roofs, temporary name boards and advertising rights.
 - 6) The maintenance of existing live drainage, water, gas and other mains or power services on or over the site.
 - 7) The execution or completion of the work in any specific order or in sections or phases.

10. WORKS BY NOMINATED SUB-CONTRACTORS

- A. Works which are required to be carried out by a nominated sub-contractor shall be given as Provisional sum. The name of the firm to be nominated shall be given (if known) together with a description of the sub-contract work.
- B. An item shall be given in case of general attendance which shall be deemed to include the use of the Contractor's temporary roads, paving and paths, standing scaffolding, standing power operated hoisting plant, the provision of temporary lighting and water supplies, clearing away rubbish, provision of space for the sub-contractor's own offices and for the storage of his plant and materials and the use of mess rooms, sanitary accommodation and welfare facilities.
- C. Builders work in connection with works by nominated sub-contractors shall be given in accordance with the appropriate clauses of this document.

11. GOODS AND MATERIALS FROM NOMINATED SUPPLIERS

- A. Goods and materials which are required to be obtained from a nominated supplier shall be given as provisional sum. The name of the supplier to be nominated shall be given if known.

- B. Fixing goods and materials shall be given in accordance with the appropriate clauses in this document. Unloading, storing, hoisting the goods and materials and returning packing materials to the nominated supplier carriage paid and obtaining credits therefore shall be deemed to be included with the items for fixing. Particulars shall be given where the Contractor is required to pay the costs of conveying goods and materials to the site and/or of any special packing or similar requirements.

12. WORKS BY PUBLIC BODIES

- A. Works which are to be carried out by all Authority of public undertaking shall each be given separately as provisional sum.
- B. Works which are to be carried out by an Authority or public undertaking in accordance with statutory obligations shall be described.

13. WORKS BY OTHERS DIRECTLY ENGAGED BY THE EMPLOYER

- A. A description shall be given of works by others directly engaged by the Employer. Any attendance required shall be given in accordance with the requirements in the "Works by nominated subcontractors" section.

14. PRICING

- A. In pricing the contractor shall allow for maintaining temporary works, adapting, clearing away and making good shall be deemed to be included with the items. Notices and fees to local authorities and public undertaking related to the following items shall be deemed to be included with the items.
- 1) Plant, tools and vehicles.
 - 2) Scaffolding.
 - 3) Site administration and security.
 - 4) Transport for workpeople.
 - 5) Water for the works. Particulars shall be given if water shall be supplied by the Employer.
 - 6) Lighting and power for the works. Particulars shall be given if lighting and power will be supplied by the Employer.
 - 7) Temporary roads, hard standings, crossings and similar items.
 - 8) Temporary accommodation for the use of the Contractor and Engineer
 - 9) Temporary accommodation for the use of the Contractor and Engineer
 - 10) Temporary telephones for the use of the Contractor and Engineer.
 - 11) Traffic regulations.
 - 12) Safety, health and welfare of workpeople.
 - 13) Maintenance of public and private roads.
 - 14) Removing rubbish, protective casings and coverings and cleaning the works at completion.
 - 15) Draining the site.
 - 16) Temporary fencing, boardings, screens, fans, planked footways, guardrails, gantries and similar items.
 - 17) Control of noise, pollution and all other statutory obligations.
 - 18) Costs in connection with performance and guarantee bonds and insurances.
 - 19) Assistance to Engineer.

15. DAYWORKS

- A. The cost of labor in day works shall be given as a sum; alternatively, a schedule of the different categories of labor may be given containing a provisional quantity of hours for each category.
- B. The cost of labor included in a sum or schedule shall include wages, bonuses and all allowances paid to operatives directly engaged on day works (including those operating mechanical plant and transport) in accordance with the appropriate employment agreement or, where no such agreement exists, the actual payments made to the work people concerned.
- C. The cost of materials in day works shall be given as a sum; alternatively, 3 schedule may be given containing a provisional quantity of different materials.
- D. The cost of materials included in a sum or schedule shall be the net invoiced price, including delivery to site.
- E. The cost of constructional plant employed exclusively in day works shall be given as a sum; alternatively, a schedule of the different categories of plant may be given containing a provisional quantity of hours, or such other period of time as may be appropriate, for each category.
- F. The cost of constructional plant included in a sum or schedule shall include fuel, consumable stores, repairs, maintenance and insurance of plant.
- G. An item shall be given for the addition of establishment charges, overheads and profit to each of the sums or schedules of labor, material or plant.
- H. Establishment charges, overheads and profit shall include:
 - 1. Costs related to the employment of labor.
 - 2. Costs related to the storage of materials, including handling and waste in storage.
 - 3. Contractor's administrative arrangements.
 - 4. Constructional plant, except plant employed exclusively on day works.
 - 5. Contractor's facilities.
 - 6. Temporary works.
 - 7. Sundry items.

16. CONTINGENCIES

- A. Any provision for contingencies shall be given as provisional sum.

DIVISION 02 – EXISTING CONDITIONS

1. DEMOLITION

1.1. DEMOLISHING STRUCTURES

- A. Item Descriptions:
- 1) Demolishing all structures.
 - 2) Demolishing individual structures.
 - 3) Demolishing parts of structures.
- B. Information to be Provided:
- 1) The location and extent of existing structures to be demolished shall be indicated on Drawings and described in the bill of quantities.
 - a. Description sufficient for identification.
 - b. Levels to which structures are demolished.
 - 2) Detail description of demolishing of existing structures shall at least include the following information:
 - a. Demolished materials that remain as the property of the Employer.
 - b. Materials for re-use.
 - c. Making good structures.
 - d. Leaving parts of existing structures (e.g. walls) temporarily in position to act as buttresses.
 - e. Measured quantities of temporarily diverting, maintaining or sealing off existing services.
 - f. Toxic or other special waste.
- C. Supplementary Information to be Provided (if necessary):
- 1) Method of demolition where by specific means required.
 - 2) Employer's restrictions on methods of disposal of materials.
 - 3) Setting aside and storing materials remaining the property of the Employer or those for re-use.
- D. Coverage of items: Demolition items shall be deemed to include:
- 1) Disposal of materials other than those remaining as the property of the Employer or those for re-use.
 - 2) Providing temporary support incidental to demolitions where ever necessary.
 - 3) Setting aside and storing materials remaining as the property of the Employer or those for re-use unless otherwise stated.
- E. Measurement:
- 1) Demolishing all, individual or parts structures shall be measured as items stating information under B and C above.

2. ALTERATIONS

2.1 SPOT ITEMS

- A. Item Descriptions:
- 1) Removing fittings and fixtures.
 - 2) Removing plumbing and engineering installations.

- 3) Removing finishing.
 - 4) Cutting openings or recesses.
 - 5) Cutting back projections.
 - 6) Cutting to reduce thickness.
 - 7) Filling in openings.
- B. Information to be Provided:
- 1) The scope and location of the work relative to the existing layout indicating existing structures shall be indicated on Drawings and described in the bill of quantities.
 - a. Details sufficient for identification stated.
 - b. Dimensioned descriptions sufficient for identification including type and thickness of existing structure.
 - 2) Detail description of alterations shall at least include the following information:
 - a. Making good structures.
 - b. Extending and making good finishing.
 - c. Inserting new work, stating details.
 - d. Toxic or other special waste.
- C. Supplementary Information to be Provided (if necessary):
- 1) Method of operation where by specific means required.
 - 2) Setting aside and storing materials remaining the property of the Employer or those for re-use.
 - 3) Employer's restrictions on methods of disposal of materials.
 - 4) Employer's restrictions on methods of shoring and scaffolding to be used.
- D. Coverage of items: Alteration items shall be deemed to include:
- 1) Disposal of materials other than those remaining as the property of the Employer or those for re-use.
 - 2) Shoring and scaffolding incidental to the work and making good all work disturbed by shoring and scaffolding.
 - 3) All new fixing or joining materials required.
 - 4) Setting aside and storing materials remaining as the property of the Employer or those for re-use unless otherwise stated.
- E. Measurement:
- 1) Any operation to existing buildings involving removal of existing materials (other than for bonding purposes or renewal) shall be measured within this section.
 - 2) Details shall be stated for inserting for new work are the equivalent of those details required by the rules for the measurement of the same in other work sections.
 - a. Inserting new work includes re-fixing or re-using removed materials.
 - 3) Cutting openings or recesses in existing structure shall be measured as items stating the size of the opening or recess required, the type and thickness of the existing structure.
 - 4) Fittings and fixtures required to be removed prior to demolition shall be measured as items stating the size. Those required to be set aside for re-fixing shall also be described.
 - 5) Removing engineering and plumbing installations shall be measured as items stating the nature of the installation.
 - 6) Removing finishing or coverings to existing structures shall be measured as items stating the nature of the finishing or coverings and indicating the quantity.

DIVISION 03 – CONCRETE

1. CONCRETE FORMWORK

- A. Item Descriptions:
- 1) Ordinary finish formwork.
 - 2) Wrot formwork to produce fair faced concrete surface.
 - 3) Wrot formwork to produce patterned concrete surface.
- B. Information to be Provided:
- 1) The following information shall be indicated on Drawings and described in the bill of quantities.
 - a. The relative positions of concrete members.
 - b. The size of members.
 - c. The thickness of slabs.
 - d. The permissible loads in relation to casting times.
- C. Supplementary Information to be Provided:
- 1) Kind and quality of materials and propping requirements for permanent formwork.
 - 2) Basic finish.
- D. Coverage of items: Concrete formwork items shall be deemed to include:
- 1) Adaptation to accommodate projecting to pipes, reinforcing bars and the like.
 - 2) All cutting, splayed edges and the like.
 - 3) Details of formed finishes (as required).
- E. Measurement:
- 1) Formwork shall be measured on the surface of the finished structure which requires to be temporarily supported during the deposition of concrete.
 - 2) Curved work shall be described stating the radii.
 - 3) No deduction shall be made for voids not exceeding 0.25 m² on face area.
 - 4) Formwork left in shall be so described.
 - 5) Formwork shall be measured separate in square meters for each element except specified.
 - 6) Formwork to edges of slabs, risers of steps and edges of staircase flights shall be measured in meters stating depth.
 - 7) Formwork to form mortice or holes shall be enumerated stating the sizes.

2. STEEL CONCRETE REINFORCEMENT

- A. Item Descriptions:
- 1) Plain reinforcement bar.
 - 2) Deformed reinforcement bar.
- B. Information to be Provided:
- 1) The following information shall be indicated on Drawings and described in the bill of quantities.
 - a. The relative positions of concrete members.
 - b. The size of members.
 - c. The thickness of slabs.
 - d. The permissible loads in relation to casting times.
 - e. The normal size and grade of reinforcement.

- C. Supplementary Information to be Provided:
- 1) Kind and quality of materials.
 - 2) Details of tests.
 - 3) Bending restrictions.
 - 4) Minimum laps (if required).
 - 5) Dimensioned description of spacers.
- D. Coverage of items: Concrete reinforcement items shall be deemed to include:
- 1) Bends, hooks, cutting, placement, tying wires, distance blocks and spacers.
- E. Measurement:
- 1) Bar reinforcement shall be measured in kilograms or metric tons. Different diameters shall be stated separate if cost is likely to vary.
 - 2) Fabric reinforcement may be measured by area stating weight of fabric per meter square.
 - 3) No allowance in calculating the weight of reinforcement shall be made for tying wires and ordinary spacers.
 - 4) Allowance shall be made for overlaps only if indicated on drawing and schedules or at overlaps of bars where the length of the bar reaches the maximum standard limit.
 - 5) The weight of reinforcement bars shall be the official limit weight issued by the appropriate Ethiopian Authority.

3. CAST-IN-PLACE CONCRETE

- A. Item Descriptions:
- 1) Foundations
 - 2) Columns
 - 3) Ground and suspended beams and lintels
 - 4) Ground and suspended slabs.
 - 5) Steps, staircases and landings
 - 6) Pile
 - 7) Machine bases
 - 8) Walls.
- B. Information to be Provided:
- 1) Particulars of the following shall be indicated on Drawings and described in the bill of quantities.
 - a. The relative positions of concrete members.
 - b. The size of members.
 - c. The thickness of slabs.
 - d. Class of concrete and whether plain or reinforced.
 - e. Minimum cement content in the mixture.
- C. Supplementary Information to be Provided:
- 1) Kind and quality of materials and mix details.
 - 2) Tests of materials and finished work.
 - 3) Measures to achieve water-tightness.
 - 4) Limitations on method, sequence, speed or size of pouring.
 - 5) Method of compaction and curing.
- D. Coverage of items: Cast-in-place concrete items shall be deemed to include:
- 1) Finishing as struck from basic finish formwork or with a non-mechanical tamped finish unless otherwise required by the Contract Documents to other finishes.

E. Measurement:

- 1) Concrete shall be measured net and in cubic meters, except for those specified, with no deduction made for the following:
 - a. Reinforcement.
 - b. Voids due to boxed or tubular steel work not exceeding 0.25 m² in sectional area.
 - c. Cast in accessories.
- 2) Coffered or trough slabs shall be described, stating the overall thickness and measured in square meters.
- 3) Filling to pockets shall be enumerated stating sizes irrespective of sizes.
- 4) Concrete in piles shall be measured by length of pile stating diameter. Statement shall be given whether steel reinforcement is included or measured separate.
- 5) Working concrete around pipe or cables if exceeding 0.05 m² in cross sectional area shall be measured extra over concrete work, giving cross section area of pipe or cable in length or enumerated.
- 6) Grinding, sand blasting, hammering and similar treatment to the faces of concrete shall be each be given separate in square meters.
- 7) Mortices, pockets and holes in concrete which are required to be cut shall be enumerated and described by stating sizes. Any subsequent grouting shall be included in the description stating the mix of the grout.

4. STRUCTURAL PRECAST CONCRETE

A. Item Descriptions:

- 1) Structural precast concrete.
- 2) Precast pre-stressed concrete.

B. Information to be Provided:

- 1) Particulars of the following shall be indicated on Drawings and described in the bill of quantities.
 - a. Details of precast concrete members showing stressing arrangements.
 - b. Kind and quality of concrete.
 - c. Full details of anchorages, ducts, sheathing and vents.
 - d. The relative positions of concrete members.
 - e. Size, number, diameter and center to center distance of reinforcement.
 - f. Jointing and bedding materials.
 - g. The size of members.
 - h. The thickness of slabs.
 - i. The permissible load.

C. Coverage of items:

1. Formwork for molds, reinforcement, placing in position and finishing face for precast concrete units shall be deemed to be included with the item.

D. Measurement:

1. Precast concrete units including floors shall be given under appropriate heading and shall, unless otherwise required, be enumerated or measured in length stating sizes.
2. Coping, Kerbs and similar units end jointed to form continuous runs shall each be given separately in meters stating sizes.

5. CONCRETE ANCILLARIES

- 1) Expansion materials, water stops, block outs, etc. shall be measured in area, length or enumerated stating sizes and shall be deemed to include removal of materials if placed as temporary measure only.

DIVISION 04 - MASONRY

1. UNIT MASONRY

1.1 GENERAL

- A. Item Descriptions: Masonry work shall consist of stone, brick or block worked to a given dimensions and laid in mortar with fine joints.
- B. Information to be Provided:
- 1) In addition to the information stated in each masonry units herein under, the following particulars shall be indicated on Drawings and described in the bill of quantities.
 - a. Kind, quality and size of masonry unit.
 - b. Composition and mix of mortar for bedding, jointing and pointing.
 - c. Dimensions descriptions.
 - d. Plans of each floor level and principal sections showing the position of and the materials used in the walls.
 - e. External elevations showing the materials used.
- C. Coverage of items: In addition to the coverage stated in each masonry units herein under, the masonry work shall be deemed to include:
- 1) Shaping, cutting, placing, bonding, tying, wedge placement, building to ends of other materials and preparation of surface for further finish.
 - 2) Preparing tops of existing walls and the like for raising.
 - 3) Plumbing to angles.
 - 4) Leaving holes to pipes, etc.

1.2 STONE WORK

- A. Item Descriptions:
- 1) Cut stone.
 - 2) Roughly dressed stone.
 - 3) Dressed stone.
- B. Additional information to be Provided:
- 1) Particulars of the following shall be indicated on Drawings and described in the bill of quantities.
 - a. Any particular requirements of the stone and quarry.
 - b. Texture and finish of exposed faces.
 - c. Straight or tapering surface.
- C. Supplementary Information to be Provided:
- 1) Cleaning on completion.
 - 2) Coatings to surface of finished work.
 - 3) Type of pointing.
 - 4) Method of jointing together and fixing.
- D. Measurement:
- 1) Unless otherwise stated, stonework shall be measured in cubic meters and no deduction shall be made for voids not exceeding 0.25 m² in sectional area.
 - 2) Stone wall with thickness of wall less or equal to 300 mm shall be measured by area in square meters.

- 3) Copings, sills and the like shall each be given separate in meters stating sizes. Stone coping to column shall be enumerated stating sizes.
- 4) Stone paving shall be measured in square meters stating the thickness.

1.3 BRICKWORK

A. Additional information to be Provided:

- 1) The following particulars of brick work shall be indicated on Drawings and described in the bill of quantities.
 - a. Type of bond.
 - b. Surface finish of bricks.

B. Measurement:

- 1) Brickwork in each of the following classes shall be given separate in square meters stating thickness. No deduction shall be made for voids not exceeding 0.25m^2 in sectional area.
 - a. Wall, straight or tapering surface.
 - b. Filling openings.
 - c. Brickwork used as formwork.
 - d. Brick damp-proof course lining.
 - e. Firebricks.
- 2) Sills, thresholds, copings and steps built of brickwork shall each be given separate in meters stating sizes.

1.4 BLOCK WORK

A. Additional information to be Provided:

- 1) The following particulars of block work shall be indicated on Drawings and described in the bill of quantities.
 - a. Class and size of blocks.
 - b. Type of bond.
 - c. Surface finish of blocks.

B. Measurement:

- 1) Block work in each of the following classes shall be given separate in square meters stating thickness. No deduction shall be made for voids not exceeding 0.25m^2 in sectional area.
 - a. Walls straight or tapering surface.
 - b. Filling openings.
 - c. Block work used as formwork.
 - d. Block damp-proof course lining.
- 2) Block work in eaves filling shall be included in the general block work.
- 3) Reinforcement in walls shall be given in meters stating size. No allowance in measurement shall be made for laps.

DIVISION 05 – METAL WORK

1. STRUCTURAL METAL FRAMING

A. Item Descriptions:

- 1) Items for structural steelwork of independent structures shall be given separately under appropriate headings.
- 2) Curved, cambered or cranked members shall each be so described.
- 3) The sizes of members and component shall be designated as follows:
 - a. By actual size and thickness of angles and hollow sections.
 - b. By dimensions and thickness for other section and flat plates. In the case of plates having raised pattern the thickness shall be given net, excluding the thickness of the pattern.
 - c. Each member differently described shall be given separately.
- 4) The items of works are classified in terms of:
 - a. Columns.
 - b. Beams.
 - c. Bracings.
 - d. Purlins and cladding rails.
 - e. Trusses and built up girders.

B. Information to be Provided:

- 1) Particulars of the following shall be indicated on drawings and described in the bill of quantities.
 - a. The position of the work in relation to other parts of the work and of the proposed buildings.
 - b. The types and sizes of structural members and their positions in relation to each other.
 - c. Details of connections or of the reactions, moments and axial loads at connection points.
 - d. Types and grades of materials.

C. Supplementary Information to be Provided:

- 1) Details of welding tests.
- 2) Details of performance tests.

D. Coverage of items: Items for fabrication measured by weight are deemed to include:

- 1) Shop and site black bolts, nuts and washers for structural framing to structural framing connections.
- 2) Priming, surface treatment, spacers, wedges, block outs and grouting.
- 3) Fittings, which shall be deemed to include caps, bases, haunches, gussets, end plates, spliced distance pieces and the like.

E. Measurement:

- 1) The unit of measurement shall be the Kilograms or Metric ton except where stated otherwise.
- 2) In computing the weight of steelwork of a member or component, no deduction shall be made for splay cuts, miters, notches, holes and slots and no allowance shall be made for rolling margin or for weight of weld metal. The weight of irregular shaped plates shall be computed based on the net area of the plate.
- 3) The length of members and components shall be overall length with no deduction for splay cuts mitred ends.

- 4) Fittings, which shall be deemed to include caps, bases, haunches, gussets, end plates, spliced distance pieces and the like shall be given by weight or enumerated stating the dimension and kness.
- 5) Bolts and others fasteners shall be given separate and enumerated stating the size and length. mately bolts and nuts may be measured by weight in kilograms stating range of diameters.

1.1 DECKING

- A. Information to be Provided:
- 1) Particulars of the following shall be indicated on drawings and described in the bill of quantities.
 - a. The extent of the work and its height above ground level.
 - b. The size of units.
 - c. Kind and quality of materials.
- B. Supplementary Information to be Provided:
- 1) Method of fixing and hoisting.
 - 2) Method of joining or form of construction.
 - 3) Surface treatments applied as part of the production process.
- C. Coverage of items: Items shall be deemed to include:
- 1) Removal of lifting devices and consequent making good and making good of handling holes and the like.
- D. Measurement:
- 1) The unit of measurement shall be in square meters except where stated otherwise.

1.2 COMPOSITE ITEMS

- A. Coverage of items:
- 1) Composite items, which shall be deemed to mean all items which may be fabricated off site, and shall be described in the form they are likely to be delivered to the site. Unless otherwise stated, their incorporation in the works shall be deemed to be included in the items. Fabrication in suitable sections for easy handling purposes, subsequent to final assembly and adjustment to enable the item to be incorporated into the works shall be deemed to be included in the item. Except where otherwise stated, composite items shall be enumerated.
 - 2) Bolts, screws and all labor in fabrication and jointing together shall be deemed to be included in the item.
 - 3) Chiseling, cutting, welding, riveting, protective treatment, decorative paint and hardware unless otherwise measured separately, and preparation of shop and erection drawing shall be deemed to be included in the item.

1.3 ROOF LIGHTS

- A. Measurement:
- 1) Roof lights complete with frames, mullions, ridges, hips, hinges and fastenings shall be enumerated stating the size and type.
- B. Coverage of items:
- 1) Glazing shall not be deemed to be included except where supplied with the component.

1.4 BALUSTRADES AND STAIRCASE RAILS

A. Measurement:

- 1) Balustrades and railings shall be measured in meters stating the height.

1.5 SUNDRIES

A. Measurement:

- 1) Duct-covers complete with frames shall be given in meters stating the width, the thickness and type.
- 2) Gates, collapsible gates and roller shutters complete with frames, guides, tracks and fastenings shall each be enumerated separately stating the size and type.
- 3) Grilles and gratings complete with frames shall each be given in square meters separately as extra over the item stating the size, type and approximate weight.
- 4) Inspection covers complete with frames shall be enumerated stating the size and type.
- 5) Arris cover, suspension profile and ladders shall each be given separately in meters stating the size.
- 6) Floor plates shall be measured in square meters stating the thickness and average size and whether plain, chequered or perforated. Irregular-shaped floor plates shall be enumerated and described.
- 7) Plaster lath and other perforated or meshed metal over 300 mm wide shall be measured in square meters. The size of mesh in wire mesh and expanded coverings shall be given. Coverings not exceeding 300mm wide shall be measured in meters stating the width. No allowance shall be made for laps and no deduction shall be made for voids not exceeding 0.50m² in area.

B. Coverage of items:

- 1) Holes, countersunk holes and slots, where shown on component detail shall be deemed to be included in the items.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 06 – WOOD, PLASTIC AND COMPOSITES

1. CARPENTRY IN GENERAL

A. Item Descriptions:

- 1) Trusses.
- 2) Trussed rafters.
- 3) Trussed beams.
- 4) Purlins.
- 5) Wall or partition panels.
- 6) Floor members.
- 7) Wall or partition members.
- 8) Framed supports.
- 9) Fascia boards.
- 10) Eaves or verge soffit boards.
- 11) Cupboards.
- 12) Lockers.
- 13) Benches.
- 14) Cabinets, etc.

B. Information to be Provided:

- 1) Particulars of the following shall be given.
 - a. The scope and location of the work.
 - b. Kind and quality of material.
 - c. Dimensioned descriptions.
 - d. Surface treatment to be applied.
 - e. Preliminary treatment of material.
 - f. Curved items shall be so described stating if conical or spherical, whether concave or convex.

A. Additional Information to be Provided for Ceilings:

- 1) Particulars of the following shall be given.
 - a. The scope and location of the work including integral fittings.
 - b. The services to be located with the suspended ceiling void including any additional support for same.
 - c. Kind and quality of material.
 - d. Size of panels and strips.
 - e. Thickness of lining.

B. Supplementary Information to be Provided for ceilings:

- 1) Insulation materials.
- 2) Construction of framing and suspension systems.
- 3) Method of fixings.
- 4) Pattern.

C. Coverage of items in general: Items shall be deemed to include:

- 1) Fabrication, assembly, mounting, fixing and finishing.
- 2) All ends, angles, miters, intersections and the like.
- 3) Unless specified and measured separately, treatment to carpentry and joinery timber and decorative and finish hardware shall be understood as included.

D. Coverage of items for ceilings: Items are deemed to include:

- 1) Working over and around obstructions.

- 2) Fabrication, assembly, mounting, fixing and finishing.
- 3) Support work and accessories for fittings.
- 4) Patterned work.

E. Definitions:

- 1) Floor members include joists and beams.
- 2) Partition members include struts and noggings.
- 3) Fascia boards include barge boards.
- 4) Supports include grounds, battens, fillets, drips, rolls, up-stands, kerbs or the like.

F. Measurements:

- 1) Floorings and wall panels:
 - a. Floorings and walls panels shall be described stating the thickness and measured in m². Classifications shall be as follows:
 - a) Floors.
 - b) Walls stating whether internal or external.
 - b. No addition shall be made for joints or laps and no deduction shall be made for voids not exceeding 0.50 m² area.
 - c. Areas not exceeding 1.0 m² shall be enumerated.
- 2) Unframed second fixings:
 - a. Unless otherwise stated or included as part of composite item unframed second fixings shall be given in meters stating the cross-section dimensions. Classification shall be as follows:
 - a) Skirting.
 - b) Balusters and hand rails.
 - c) Shelves, Worktops and the like
 - b. Built up members shall be so described and enumerated stating size.
 - c. Skirting is deemed to include edges, drips, internal angle fillets, dressing over tilting fillets, turning nips into grooves, angles, stopped ends, fair ends, etc.
- 3) Fascia board:
 - a. Fascia board and the like shall be measured in meters stating width and thickness.
- 4) Composite items:
 - a. Composite items which shall be deemed to mean all items which may be fabricated off site and shall be described in the form they are likely to be delivered to the site. All metal work, ironmongery and the like included in the description of a composite item is deemed to be included. Composite items shall be enumerated, measured in area or length as appropriate.
- 5) Trussed, rafters and purlins:
 - a. Rafters, purlins and the like shall be given in meters stating the size.
 - b. Roof trusses shall be enumerated stating type and reference to detail drawing.
 - c. Termite treatment, carpentry ties and the like shall be deemed to be included in the item.
- 6) Cupboards, Lockers, Cabinet, Benches, etc.:
 - a. Cupboards, lockers and the like shall be described and enumerated by stating the sizes. Fitting, ironmongery, priming, finishing, polishing and the like shall be understood as included.

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

1. ROOF WATERPROOFING

- A. Information to be Provided:
- 1) Particulars of the following shall be indicated on drawings and described in the bill of quantities.
 - a. Kind and quality of water proofing material.
 - b. Number of layers and extent of laps.
 - c. Nature of base on which the felt work is laid.
 - d. Finished surface treatment.
 - e. Method of bonding or securing to base and lap jointing.
- B. Supplementary Information to be Provided:
- 1) Spacing of structural supports.
- C. Coverage of items: Waterproofing item is deemed to include:
- 1) Cutting and fair edges.
 - 2) Notching, bending, extra felt for laps and turning into grooves, trimming and jointing felt work to finishing and the like labors.
 - 3) Boundary work is deemed to include cutting, ends, angles, intersections, notching, bending, turning into grooves, wedging, dressing, trimming and jointing covering to flashings, working into channels and the like and filler pieces.
- D. Measurement:
- 1) Roof covering over 300mm wide shall be measured in square meters. Work not exceeding 300mm wide shall be measured in meters stating the width or girth.
 - 2) Decorative (reflective) coat to roof coverings shall be given separate and shall be measured in square meters. Decorative coating not succeeding 300mm shall be measured in meters stating girth.
 - 3) Coverings in isolated areas not exceeding 1 .00m² each shall be enumerated irrespective of size and the associated labor.

2. DAMPPROOF COURSE

- A. Particulars of the following shall be given.
- 1) Kind of material
 - 2) Numbers of layers.
- B. Measurement:
- 1) Damp proof course over 300mm wide shall be measured in square meters. Work not exceeding 300mm wide shall be measured in meters stating width or girth.

3. ROOFING AND WALL CLADDING

- A. Item Descriptions: Work shall be classified according to the kind of material and each classification with its associated labors shall be given under appropriate heading.
- 1) Galvanized corrugated sheets
 - 2) Galvanized plain sheets
 - 3) Galvanized ribbed sheets
 - 4) Aluminum corrugated sheets
 - 5) Aluminum flat sheets

- 6) Clay roof tiles
 - 7) Cement roof tiles
 - 8) Natural fiber reinforced mortar roofing tile.
- A. Information to be Provided: Particulars of the following shall be given.
- 1) Kind of sheeting/tiles stating thickness/gauge
 - 2) Spacing of support if not given elsewhere.
- B. Measurement:
- 1) Roof coverings shall be measured in square meters along the roof pitch. No allowance shall be made, laps and seams.
 - 2) Wall cladding shall be measured in square meters. No allowance shall be made for laps.
 - 3) Ridge caps, flashings, trims and copings shall be measured in meters stating girth. No allowance shall be made Or laps, passing, angles, ends and the like.
 - 4) Gutters and downpipes shall be measured in meters stating girth or diameter. No allowance shall be made for laps, passing, angles, ends and the like. Hangers and brackets shall be deemed to be included.
- C. Coverage of items:
- 1) Perforating and sealing roof around pipe, stands, nailing, bolting, screwing, battens, joists and runners, supports, cutting, waste, trimming and the like shall be deemed to be included in the items.

DIVISION 08 – OPENINGS

1. WOODEN, METAL AND PLASTIC DOORS

- A. Information to be Provided:
- 1) Particulars of the following shall be indicated on drawings and described in the bill of quantities.
 - a. Kind and quality of materials and if timber whether sawn or wrot.
 - b. Dimensioned diagrams (schedules).
 - c. Approximate weight of metal doors and their associated frames.
 - d. Dimensioned overall cross-section descriptions of frames and linings.
- B. Supplementary Information to be Provided:
- 1) Preservatives treatment to be applied as part of the production process.
 - 2) Surface treatments to be applied as part of the production process.
 - 3) Matching grain or color.
- C. Coverage of items: Window items are deemed to include:
- 1) Fitting, hanging frame, fillets, ironmongery, priming, finishing, polishing, and the like.
 - 2) Finish hardware if not indicated on schedule shall be measured separate or included as provisional sum.
 - 3) Fixings and fastenings.
 - 4) Glazing where supplied with the component unless excluded in the Contract Documents otherwise.
 - 5) The work is deemed to include notching around obstructions.
- D. Measurement:
- 1) Doors shall be described and enumerated (where multi-leafed, being counted as one door).
 - 2) Doors, complete with frames, mullions, transoms, hinges, beads, linings and fastenings shall be enumerated separately stating the overall sizes. The shape shall also be stated where not rectangular.
 - 3) Fireproof doors, cold room doors and security room doors and windows complete with frames, hinges fastenings and the like shall each be enumerated stating the size and type.
 - 4) Louvre frames shall be enumerated in pairs stating number of blades.

2. GLAZED ALUMINUM CURTAIN WALLS

- A. Measurement:
- 1) Curtain walls shall be measured in square meters. Alternately, curtain walls may be enumerated stating sizes.
- B. Coverage of items:
- 1) Glazing shall not be deemed to be included.

3. WOODEN, METAL AND PLASTIC WINDOWS

- A. Information to be Provided:
- 1) Particulars of the following shall be indicated on drawings and described in the bill of quantities.
 - a. Kind and quality of materials and if timber whether sawn or wrot.
 - b. Dimensioned diagrams (schedules).

- B. Supplementary Information to be Provided:
 - 1) Preservatives treatment to be applied as part of the production process.
 - 2) Surface treatments to be applied as part of the production process.
 - 3) Matching grain or color.

- C. Coverage of items: Window items are deemed to include:
 - 1) Fitting, sub-frames, fillets, ironmongery, priming, finishing, polishing, and the like.
 - 2) Finish hardware if not indicated on schedule shall be measured separate or included as provisional sum.
 - 3) Fixings and fastenings.
 - 4) Glazing where supplied with the component unless excluded otherwise.
 - 5) The work is deemed to include notching around obstructions

- D. Measurement:
 - 1) Windows shall be described and enumerated.

4. IRONMONGERY (FINISH HARDWARE)

- A. Units (or sets) of ironmongery shall each be enumerated separately. Fixing with screws or otherwise to match shall be deemed to be included with the items. Specialized door closer shall be enumerated separate.

- B. Master key system shall be given separate.

- C. Particulars of the following shall be given:
 - 1) Kind and quality,
 - 2) Surface finish,
 - 3) Constituent parts of a unit,
 - 4) Nature of the background to which items are to be fixed,
 - 5) Details of any constraints in respect of fixing.

- D. Preparing timber and metal to receive ironmongery shall be deemed to be included with the item.

5. GLASS AND GLAZING

- A. Item Descriptions:
 - 1) Clear glass.
 - 2) Figured glass.
 - 3) Panes of wired, patterned or decorated glass shall be so described.

- B. Information to be Provided:
 - 1) Particulars of the following shall be given:
 - a. Kind, quality and nominal thickness of glass.
 - b. Kind and quality of glazing compound.
 - c. Dimensioned descriptions.

- C. Supplementary Information to be Provided:
 - 1) Method of glazing.
 - 2) Nature of frame or surround.

- D. Coverage of items: Glazing items are deemed to include:

- 1) Bedding, mastic, fixing beads, cleaning before and after fixing.
- 2) Raking and curved cutting.

E. Measurement:

- 1) Glass shall be grouped as in above and measured in square meters.
- 2) Glass louvers shall be described and enumerated or measured in meters stating size.
- 3) Glass panes of special shape and decoration shall be enumerated stating size.
- 4) Mirrors shall be enumerated stating type, size and method of fixing.
- 5) Dome lights shall be enumerated stating type, overall size, shape and method of fixing.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 09 – FINISHES

1. GENERAL

A. Item Descriptions:

- 1) Plastering.
- 2) Tiling.
- 3) Ceilings.
- 4) Painting.

B. Information to be Provided:

- 1) Particulars of the following shall be given:
 - a. Work shall be identified for internal and external.
 - b. Kind, quality and size of materials.
 - c. Number of coats of in-situ works.
 - d. Types of underlays or linings.
 - e. Bedding or other methods of fixing.
 - f. Type of pointing.
 - g. Laps.
 - h. Layout and width of joints and bays.
 - i. Patterns.
 - j. Spacing of battens.
 - k. Composition and mix of mortars.
 - l. Bonding to other work.
 - m. Radius of curved work.
 - n. Nature of base.
 - o. Applied finishes/sealers/polishes.

C. Measurements:

- 1) The nature of the base on which finishing are to be applied shall be described. Work on different bases shall be measured separately. Work on existing surface shall be so described.
- 2) Preparation of existing work shall be so described.
- 3) Curved work shall be given separately and measured along the surfaces stating radius.
- 4) Repair work and work to isolated areas not exceeding 1.0 m² shall each be measured separate.
- 5) No deduction from the areas of finishing shall be made for grounds.
- 6) Finishing work shall be measured flat without addition for laps, seams, edges and returns.
- 7) Finishing on corrugated or ribbed surface shall be measured flat.

1.1 PLASTERING

A. Information to be Provided:

- 1) Particulars of the following additional information shall be given:
 - a. Type of finish.
 - b. Number of coats and thickness of each coat.

B. Measurements:

- 1) Work shall be given in square meters measured over the area in contact with the base but no deduction shall be made for voids not exceeding 0.50 m².
- 2) Work to walls and ceilings shall each be given separate. Ceilings shall be deemed to include sloping ceilings.

- 3) Works to sides soffits of beams and sides of columns shall be given in square meters and grouped together.
- 4) Beams and columns where finishing are different from abutting ceiling or walls respectively shall be isolated.
- 5) All work to staircase areas shall be given separately.
- 6) Works to treads, riser and landing shall each be measured separately in square meters.
- 7) Work to floors shall be given in square meters.
- 8) Skirting's, sills and copings shall each be given separate in meters stating height or width as appropriate, where girth is up to 100 mm and in square meters thereafter.
- 9) Dividing strips shall be given in meters stating size.
- 10) Beds and backings to receive different types of finishes shall each be given separately stating whether screed, floated or trowelled, alternately bedding and backing may be included in finish item if so described.

C. Coverage of Items:

- 1) Preparing background like hacking, raking out joints, grouting and the like, all works in narrow width, corners, angles, openings, recessing in joints and the like shall be deemed to be included in the item.

1.2 TILING

A. Particulars of the following additional information shall be given.

- 1) Kind and quality of tile, slab or block unit.
- 2) Size and thickness.
- 3) Bedding or other method of fixing.
- 4) Treatment of joints.

B. Measurements:

- 1) Work shall be measured on the exposed face. No deduction shall be made for voids not exceeding 0.50 m² in area.
- 2) Mosaic and ceramic work shall be measured in square meters stating size and thickness, and shall be understood to include adhesive and/or paste.
- 3) Stone paving shall be measured in square meters specifying dressing and joint finishing.
- 4) Concrete paving shall be measured in square meters stating thickness.
- 5) Carpet floor shall be measured in square meters stating kind and grade or quality, method of fixing and nature of base. No deduction shall be made for voids not exceeding 0.5 m². Carpet shall be measured over the area in contact with the base.

1.3 CEILINGS

G. Measurements:

- 1) Ceilings shall be described stating the thickness and measured in m².
- 2) No addition shall be made for joints or laps and no deduction shall be made for voids not exceeding 0.50 m² area.
- 3) Areas not exceeding 1.0 m² shall be enumerated.

1.4 PAINTING

A. Item Descriptions:

- 1) Painting shall be classified into the following categories.
 - a. Walls, columns and beams.
 - b. Ceiling including soffit and sides of beams.
 - c. Floors.

- d. Balustrades and rails.
 - e. Doors, windows, curtain walls and partitions.
 - f. Metal surfaces.
 - g. Joinery.
 - h. Other general surfaces (grouped together).
- 2) Work shall be grouped as follows:
- a. New internal work.
 - b. New external work.
 - c. Internal repainting work.
 - d. External repainting work.
- B. Particulars of the following additional information shall be given:
- 1) Nature of base.
 - 2) Number of coats.
 - 3) Method of application.
- C. Measurements:
- 1) Work shall be measured over the area covered and no deduction shall be made for voids not exceeding 0.50m² in area.
 - 2) Work on surface over 300 mm girth shall be measured in square meters. Work on surfaces not exceeding 300mm girth and application to edges shall be measured in meters stating the girth.
 - 3) Work on isolated surfaces not exceeding 0.50 m² shall be enumerated irrespective of size.
 - 4) Work on corrugated and curved surfaces shall each be described.
- D. Coverage of Items:
- 1) Trimming, cutting, matching pattern and the like, cleaning after decorating, priming and back- ground application, working at heights and in different columns and protecting the work from damage by other trades shall be deemed to be included in the item.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 10 – SPECIALTIES

A. Item Descriptions:

- 1) Bath/shower curtain rails, screens and the like.
- 2) Towel rails and holders.
- 3) Hand dryers.
- 4) Paper towel dispensers, toilet paper holders, waste bins, soap dispensers and holders.
- 5) Etc.

B. Information to be Provided:

- 1) Details for each component shall be stated.

C. Measurement:

- 1) Where components are to be enumerated, the number of components shall be stated.

D. Coverage of items:

- 1) Hand dryers shall be deemed to include final connection to services.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 22 – PLUMBING

1. GENERAL

A. Item Descriptions:

- 1) Work together with its anchors, supports and the like (unless associated with more than one installation) shall be classified as follows and given under an appropriate heading.
 - a. Sanitary installation
 - b. Cold and hot water installation
 - c. Firefighting installation
 - d. Refuse disposal installation
 - e. Compressed air installation
 - f. Ventilation, heating and air conditioning installation
- 2) Work shall be identified in respect of location as follows:
 - a. Internal work
 - b. External work
 - c. In plant rooms

B. Information to be Provided:

- 1) A general description of the installation shall be given where it is not evident from the drawings, schedules and specifications.
- 2) Detailed specifications of plumbing and sanitary installations shall be provided together with drawings indicating the scope of work.
- 3) Where not included in the technical specification, particulars of the following shall be given:
 - a. Any regulations, rules, byelaws and the like with which the installation is required to comply.
 - b. Kind and quality of material.
 - c. Gauge, and or thickness of material.
 - d. Any test with which materials, plant and equipment are required to comply.

A. Measurement:

- 1) Pipes (measured over all pipe fittings, short running lengths and branches) shall be measured in meters stating the type and the nominal size.
- 2) Pipe fittings over 50mm diameter shall be enumerated.
- 3) Valves of all diameters shall be enumerated.
- 4) Connections to public main, making goods public highways and any other work which may only be carried out by a public undertaking or local Authority shall be given as a provisional sum.
- 5) Ducting (measured over all ducting fittings, short running length and branches) shall be measured in meters stating the type and size.
- 6) Insulation to ducts and pipes shall be measured in meters stating thickness & type of insulation and size of pipe and duct.
- 7) Unless otherwise stated, equipment and fixtures shall be enumerated. Any limiting dimensions on the size of equipment shall be given.
- 8) Purpose made pipes and purpose made fittings shall be so described. Curved pipe shall be so described stating the mean radius.
- 9) Pipe work required to be temporarily fixed in position, dismantled for special and subsequently re-fixed shall be so described.

A. Coverage of items:

- 1) Assembling and jointing of the component parts of composite units and providing any

- necessary connecting flanges and jointing materials shall be deemed to be included with the items concerned. Where composite unit are supplied by the Employer, particulars shall be given of the assembly work involved.
- 2) Patterns, molds, templates and the like shall be deemed to be included with the items.
 - 3) Connections to existing services shall be so described. Breaking into existing services shall be so described. Breaking into existing pipes shall be measured as an item describing the nature of the work required. Breaking shall be understood as including making good.
 - 4) Testing and commissioning shall be deemed to be included.
 - 5) Materials such as bolts, nuts, washers and other accessories for making joints in ducting shall be deemed to be included with the item.
 - 6) Unless provided otherwise, excavation, bedding, surround, fill, and related concrete. & masonry work and anchor blocks shall be understood as included.
 - 7) Unless provided otherwise pipe fittings up to 50 mm diameter, cutting and jointing the pipes to fittings shall be deemed to be included in pipe work.
 - 8) Unless otherwise stated, equipment and fixtures shall be understood to include all associated fixing accessories

1.1 INSPECTION CHAMBERS, MANHOLES, SOAKAWAYS, CESSPITS AND SEPTIC TANKS

A. Measurement:

- 1) Inspection chambers, manholes, soak ways shall be enumerated stating type and size, if detailed drawing and site profiles are given. Detailed bill of quantities shall be given measured by the methods in the respective trades if the given information is not adequate to enable accurate offers to be given.

DIVISION 23 – HEATING, VENTILATING AND AIR CONDITIONING

1. GENERAL

A. Item Descriptions:

- 1) Installations shall be classified by function and given separately under an appropriate heading.

B. Measurement:

- 1) Installations shall be measured in accordance with the relevant clauses in this section; alternatively, they may be enumerated on a locational basis (for example, cold water installation to ground floor).

1.1 PIPEWORK AND GUTTERWORK

A. Measurement:

- 1) Pipes and gutters shall be measured by length, taken along the center line over all fittings.
- 2) Fittings to small pipes (that is, pipes with an internal diameter of 60mm or less) shall be understood to be included. Fittings (except joints in the running length) to large pipes (that is, pipes with an internal diameter exceeding 60mm) and to gutters shall be enumerated, grouped together for each size of pipe or gutter and described as 'fittings'.
- 3) Valves, traps, expansion compensators or the like shall be enumerated; sleeve~, cover-plates or the like shall be understood to be included.

1.2 DUCTWORK

A. Measurement:

- 1) Rectangular ductwork shall be measured by weight, based upon the area calculated as the length, taken along the center line over all fittings, times the net girth of nominal dimensions. Blank ends shall be added to the area for weighting but no deduction shall be made for intersections or openings; extra weight for seams, stiffeners, supports, fixings or the like shall be understood to be included.
- 2) Circular, oval and flexible ductwork shall be measured by length, taken along the center line over all fittings.
- 3) Fittings to circular and oval ductwork (excluding test holes and covers) shall be enumerated, grouped together for each size of duct and described as 'fittings'.
- 4) Dampers, grilles, flexible connectors or the like shall be enumerated.

B. Coverage of items:

- 1) Fittings to rectangular ductwork shall be understood to be included.

1.3 EQUIPMENT

A. Measurement:

- 1) Sanitary fittings, tanks, fans, pumps, hoods, air-handling units or the like shall be enumerated.
- 2) Continuous convectors or the like shall be measured by length.
- 3) Heated or ventilated ceilings or the like shall be measured by area.

1.4 AUTOMATIC CONTROLS

- A. Measurement:
- 1) Sensing or activating devices (for example, thermostats, humidistats, and motorized valves), control panels, air compressors and receivers or the like shall be enumerated.
 - 2) Alternatively, automatic control systems shall be given as an item for each installation but equipment common to more than one system shall be enumerated.
- B. Coverage of items:
- 1) Wiring, pneumatic tubing, isolators, starters, relays or the like associated with automatic controls shall be understood to be included.

1.5 INSULATION, INCLUDING LININGS AND PROTECTIVE COVERINGS

- A. Measurement:
- 1) Insulation to pipework shall be measured by length, taken along the center line over all fittings.
 - 2) Insulation to rectangular ductwork shall be measured by area, calculated as described in 1.2 (Ductwork).
 - 3) Insulation to circular, oval and flexible ductwork shall be measured by length, taken along the center line over all fittings.
 - 4) Insulation boxes around accessories shall be enumerated.
 - 5) Insulation to equipment shall be enumerated.
- B. Coverage of items:
- 1) Additional insulation to flanges or the like shall be understood to be included.

DIVISION 26 – ELECTRICAL

1. GENERAL

A. Item descriptions:

- 1) Low-voltage electrical power conductors & cables.
- 2) Grounding and bonding for electrical systems.
- 3) Raceway and boxes for electrical systems.
- 4) Switchboards.
- 5) Wiring devices.
- 6) Engine generators.
- 7) Facility lightning protection.
- 8) Lighting.

B. Information to be Provided:

- 1) Where not included in the technical specification, particular of the following shall be given:
 - a. Specification of electrical installation shall be provided together with the Drawings.
 - b. Drawings that must accompany this section of measurement:
 - Floor and site plans detailing layout of systems.
 - System schematics.
 - Cross section and elevations.
 - Equipment schedules.
 - c. Kind and quality of material.
 - d. Gauge, thickness or substance of material.
 - e. Location of installation.
 - f. Test required.
 - g. Type, frequency and voltage of main electricity supply stating the location of the main supply point.

C. Coverage of Items:

- 1) Assembling and jointing together the component parts of units and providing any necessary jointing materials shall be deemed to be included with the item concerned. Where composite units are supplied by the Employer, particulars shall be given.
- 2) Any necessary work like cutting, forming holes, mortises, chases bedding and making good of finish shall be deemed to be included with the item concerned.
- 3) Protecting work from damage by other trades shall be deemed to be included.
- 4) Testing and commissioning shall be deemed to be included.
- 5) Unless measured separate all earthwork in connection with electrical installation shall be deemed to be included.

1.1 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS & CABLES

1.1.1 CABLES

A. Item Descriptions:

- 1) Drawn in conduits or ducts.
- 2) Laid or drawn into trunking.
- 3) Fixed to surface.
- 4) Laid in trench.
- 5) Fixed to insulators in overhead lines.
- 6) Suspended for catenary cables.

B. Measurements:

- 1) Cables required to be color coded or otherwise marked for identification shall be so described.
- 2) Except for final sub-circuits, cable in conduits or trunking and cables fixed to trays shall be measured as the net length of the conduit, trunking or tray. Other cables shall be measured as fixed (but without any allowance for sag) between boxes, equipment, fittings, accessories and the like.
- 3) Cables shall be given in meters stating the type and the size.
- 4) Cables drawn in existing conduits, ducts, and trunking shall each be so described.

C. Coverage of Items:

- 1) Determining circuits and providing draw-wire and the like shall be deemed to be included.
- 2) Removing and replacing existing covers, existing inspection lids and the like shall be deemed to be included with the item.
- 3) Components for supporting cable shall be given in the description of the item and shall be deemed to be included.

1.1.2 EARTHING CONDUCTORS

A. Information to be provided:

- 1) The following information shall be indicated on the Drawings and described in the Bill of Quantities:
 - a. Installation location.
 - b. Materials type and size.
 - c. Method of jointing.

B. Measurements:

- 1) Cable for earthing shall be measured in accordance with the "Cables" section above.
- 2) Tapes for earthing shall be given in meters stating the type and size.
- 3) Air-termination points shall be enumerated stating the type and size.

C. Coverage of Items:

- 1) Conductor connections shall be deemed to be included.
- 2) Earth-electrodes shall be enumerated stating the type and size. Connection electrode to conductors shall be deemed to be included.

1.2 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

1.2.1 CONDUITS AND FITTINGS

A. Item Descriptions:

- 1) Conduits fixed to surfaces.
- 2) Conduits fixed to chases.
- 3) Conduits embedded in concrete and masonry.

B. Measurement:

- 1) Except for final sub-circuits, conduits (measured overall conduit fittings, short running length and branches) shall be given in meters stating type and external size.

C. Coverage of Items:

- 1) Bending, cutting screwing, jointing and providing all conduit fitting shall be deemed to

be included with the conduit.

1.2.2 TRUNKING AND FITTINGS

- A. Measurement:
- 1) Trunking (measured over all trunking fitting short running lengths and branches) shall be given in meters stating the type and external size.
 - 2) Fitting shall each be described and enumerated as extra over the trunking in which they occur.
 - 3) Bus bar trunking shall be given in accordance with the above trunking measurement stating the type, number and rated capacity of the bus bars.
- B. Coverage of Items:
- 1) Cutting and jointing trunking with the fittings shall be deemed to be included.

1.2.3 CABLE TRAYS AND FITTINGS

- A. Measurements:
- 1) Cable trays shall be given in meters stating the type and width and the method of jointing.
 - 2) Fittings shall be described and enumerated as extra over the trays in which they occur.
- B. Coverage of Items:
- 1) Stools shall be deemed to be included.

1.3 SWITCHBOARDS

1.3.1 EQUIPMENT AND CONTROL GEAR (D.B)

- A. Measurement:
- 1) Unless otherwise stated equipment and control gear shall be described and enumerated.
 - 2) Packaged items and control gear shall be described.
 - 3) Any limiting dimensions on size of equipment shall be given.
 - 4) Miniature circuit breakers (MCB), H.R. fuses, main switches and magnitude circuit breaker shall be enumerated stating phases and amperage.
- B. Coverage of Items:
- 1) Connecting cable ends of cable tails shall be deemed to be included with the item.

1.3.2 BUSBAR TRUNKING

- A. Item Descriptions:
- 1) Busbar Trunking including fittings.
 - 2) Item Descriptions: Bus-bar trunking fittings (joints, flanges, bends, tees, junctions, feeder units, tap-off boxes, fire barriers, reducers, spigots, test holes and the like.
- B. Information to be provided:
- 1) The following information shall be indicated on the drawings and described in the Bill of Quantities:
 - a. Busbar trunking location.

- C. Supplementary information to be provided:
 - 1) Type, rating, material, number of bars, finish, shape, dimensions, method of jointing.
- D. Measurement:
 - 1) Busbar Trunking Fittings shall be measured in numbers.
- E. Coverage of Items:
 - 1) Opennings.
 - 2) Support frames , anchors , other fixings and background for fixing.

1.4 WIRING DEVICES

1.4.1 FITTINGS AND ACCESSORIES

- A. Item Descriptions:
 - 1) Switches.
 - 2) Sockets.
- B. Measurement:
 - 1) Unless otherwise stated fittings and accessories shall be enumerated.
- C. Coverage of Items: Unless otherwise stated comply with the following:
 - 1) Conduits, conductors, connectors and the like shall be deemed to be included with the item.
 - 2) Bushes, nipples, locks, nuts and connecting the cable tails shall be deemed to be included with item.

1.5 LIGHTING

1.5.1 LIGHTING FITTINGS

- A. Measurement:
 - 1) Pendant fittings shall be enumerated stating the wattage and length of pendant drop.
 - 2) Other fittings shall be enumerated by stating type and wattage.
 - 3) Fittings provided by the Employer shall be so stated and shall be enumerated by stating type and wattage.

1.5.2 CONNECTIONS

- A. Measurements:
 - 1) Connections to public mains, making good public highways and any other work which may only be carried out by a public undertaking or local authority shall be given as provisional sums.

1.5.3 FINAL SUB-CIRCUITS

- A. Item Descriptions:
 - 1) Light points (one point being counted for each outlet irrespective of the number of lamps or of the switching).
 - 2) Switch points.
 - 3) Socket points.

- 4) Power points.
- B. Information to be provided:
 - 1) The following information shall be indicated on the Drawings and described in the Bill of Quantities:
 - a. Outlet location.
 - b. Mode of installation (surface, embedded, chased).
- C. Supplementary information to be provided:
 - 1) Containment material, containment size.
 - 2) Cable material type and size, cable number of cores, cable type of sheath, cable type of armour.
- D. Measurements:
 - 1) Final sub-circuits from distribution boards shall each be enumerated stating the number of points and whether cable conductors or cable and conductor or cable and conduit installation.
- E. Coverage of Items:
 - 1) Cables, conduit, outlet boxes, junction boxes, universal boxes, accessories, all fixing, bending, cutting, screwing and jointing shall be deemed to be included.

1.6 BUILDERS WORK

- A. Measurements:
 - 1) Unless otherwise stated all items of builders work shall be measured in accordance with the applicable Section of work.
 - 2) Cable-covers in trenches shall be measured in meters starting the type and size.
 - 3) Inspections chambers shall be measured in accordance with the relevant method of measurement in the "Plumbing and Sanitary Installation" Section of this Methods of Measurement.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 27 – COMMUNICATIONS

1. GENERAL

A. Information to be Provided:

- 1) Details of each type of system for telecommunication systems, data transmission systems, paging and emergency call systems, public address and conference audio systems, etc.

B. Coverage of items:

- 1) Telecommunication systems is deemed to include wiring, handsets and equipment, telex equipment, facsimile equipment, combined systems (e.g. PAX, PAXB and PNBX systems), and the like.
- 2) Data transmission is deemed to include wiring, computer networking, modems, multiplexers, data terminals and data-bus systems.
- 3) Paging and emergency call systems is deemed to include emergency call buttons, pull cords and the like (including aerials, radio paging equipment, microphones, amplifiers and speakers), induction loops, personal receivers and indicator boards).
- 4) Public address and conference audio facilities is deemed to include public address systems, hospital radio, conference audio facilities, audio frequency induction loop systems, background noise systems (including microphones).

C. Definitions:

- 1) Communication systems are systems for communicating, including visual, audio and data installations.

D. Measurement:

- 1) Where components are to be enumerated, the number of components shall be stated.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

1) GENERAL

A. Information to be Provided:

- 1) Details of each type of system for fire detection and alarm systems, burglar and security alarms, door entry systems, access control systems, security lights and lighting systems, surveillance equipment, security detection equipment, security alarm equipment and other security systems.

B. Coverage of items:

- 1) Fire detection and alarm systems is deemed to include manual call points, automatic detection equipment, sounders, controls and indicator panels.

C. Definitions:

- 1) Security systems:
 - a. Observation and access control installations and the like.

E. Measurement:

- 1) Where components are to be enumerated, the number of components shall be stated.

[THIS PAGE IS LEFT BLANK INTENTIONALLY]

DIVISION 31 – EARTHWORK

A. GENERAL

A. Information to be Provided:

- 1) Particulars of the following shall be given:
 - a. Any information available concerning the nature of the ground and strata shall be shown on Drawings and provided with the bills of quantities.
 - b. Original and proposed ground levels.
 - c. Kind and quality of filling materials.
 - d. Method of filling and compacting in layers.
 - e. Minimum distance for materials to be disposed.
 - f. Any item(s) that must remain on site during the works and be protected from damage.
 - g. Any item(s) adjacent to site that may impact on the works.
 - h. Details of trial pits or boreholes including their location.
 - i. Details of live over or underground services including their location.

B. Supplementary Information to be Provided:

- 1) Type and quality of filling material in voids of removed trees, bushes, etc.
- 2) Nature of special requirement.
- 3) Details of backfilling with special materials.
- 4) Method of excavation.
- 5) Location for materials to be disposed.

C. Coverage of items:

- 1) Unless specified otherwise Earthwork shall be deemed to include the following:
 - a. Disposal of all surface water.
 - b. Support to faces of excavation unless not at the discretion of the contractor.
 - c. Working space.
 - d. Excavation and filling for temporary works unless not at the discretion of the contractor.
 - e. Leveling, grading, trimming and compacting surfaces exposed by the excavations.
 - f. Curved work.
 - g. Multiple handling of excavated materials on site unless specified.

D. Definitions:

- 1) Site vegetation is bushes, scrub, undergrowth, hedges and trees and tree slumps < 600 mm girth.
- 2) Preparatory work required to clean existing site vegetation, trees and the like including the applications of herbicides over the site before commencement of excavation works.
- 3) Preparatory earthworks to form new contours.

1.1 SITE CLEARING

A. Information to be Provided:

- 1) The following additional information shall be given:
 - a. Details for clearing vegetation, taking down of trees, removing tree slumps and roots, tree protection, minor demolition, applying herbicides, forming new site contours and adjusting existing site levels, etc.

B. Measurement:

- 1) Removal site vegetation: Clearing site of bushes, scrub, undergrowth and cutting of trees under 600mm girth measured at a height of 1 m above ground and grubbing up their roots, which shall be deemed to include their disposal, shall be measured in square meters.
- 2) Felling of trees: Cutting down of trees above 600mm girth measured at a height of 1 m above ground and grubbing up their roots, which shall be deemed to include their disposal or cutting to size and stock piling shall be enumerated identified by girth.
- 3) Removal of termite hills: Termite hill shall be removed and disposed and shall be measured in cubic meters.

C. Coverage of items:

- 1) Clearing existing site vegetation (e.g. shrubs and undergrowth), including disposing of arising.
- 2) Taking down trees, including grubbing up tree stumps and roots and disposing of arising.
- 3) Protection of protected trees.
- 4) Minor demolition works (e.g. outbuildings and the like).
- 5) Applying herbicides before commencement of excavation works.
- 6) Excavation and earthworks to form new site contours and adjust existing site levels.
- 7) Any other sundry items.

1.2 EXCAVATION AND GATEOUT

A. Item Descriptions:

- 1) Excavation shall be classified by depth in accordance the following as a single item for each of the type of excavation:
- 2) Maximum depth not exceeding 300mm
- 3) Maximum depth not exceeding 1000mm
- 4) Maximum depth not exceeding 2000mm
- 5) And thereafter in 2000mm stages.

B. Measurement:

- 1) The quantities given for excavation and subsequent disposal shall be measured in cubic meters and shall be the net volume before excavating. No allowance shall be made for any subsequent variation in bulk.
- 2) Disposal of excavated material and filling of excavations shall be measured separate.
- 3) Excavation (boring) for piles shall be measured in linear meter stating the diameter of the hole and stating type of soil/rock.
- 4) Excavation in rock shall be so described stating whether hard rock, soft rock or boulders. Only boulder of isolated volume not exceeding one cubic meter may be enumerated.
- 5) Excavation for pits and trenches shall be classified for soil type, giving correct soil characteristic where possible.
- 6) Breaking up concrete, reinforced concrete, brick or stone paving, asphalt and the like shall each be given separate.
- 7) Working space, if clearly indicated in the Contract Documents, (which shall not be subject to adjustment if more or less space is actually required) shall be measured from face of the finished work.

1.3 FILL

A. Measurement:

- 1) Filling shall be measured as equal to the void to be filled. Any thickness stated shall be deemed to be after compaction.

- 2) Filling to excavations shall be measured in cubic meter.
- 3) Filling to make up levels over 250 mm thick shall be given in cubic meter. Filling not exceeding 250 mm thick may be given in square meter stating the average thickness.
- 4) Filling shall be classified for type of material to be used.
- 5) Unless stated otherwise filling shall be understood as including hauling.
- 6) Hauling may be measured separate in ton per kilometer or cubic meter per kilometer, without allowance for increase in bulk. The tonnage or volume to be measured shall be the same as the void to be filled.

1.4 DISPOSAL OF EXCAVATED MATERIAL

A. Measurement:

- 1) Excavated material to be disposed shall be measured in cubic meter.
- 2) The volume of disposed material shall be the same as the void formed and the excavated volume.

B. Coverage of Items:

- 1) Multiple handling of excavated material shall be deemed to be included with the item of final disposal.

1.5 SURFACE TREATMENT

A. Measurement:

- 1) Treating surfaces of the ground shall be described and measured in square meter.

B. Coverage of Items:

- 1) Treating surfaces of the ground shall be deemed to include the total volume of material required to be sprayed to attain the specified level of treatment.

1.6 SUBBASE

A. Measurement:

- 1) Gravel surface and the like shall be measured in square meter stating thickness.

1.7 HARDCORE AND STONE FILLER

A. Measurement:

- 1) Hardcore up to 300mm finished thickness shall be measured in square meter.
- 2) Hardcore and stone fill exceeding 300mm thickness shall be measured in cubic meters.

1.8 BLINDING

A. Measurement:

- 1) Blinding with sand or similar fine material shall be measured in square meters.

1.9 SLOPES TO EMBANKMENT

A. Measurement:

- 1) Trimming of sides of embankment to slopes shall be measured in square meters. Curved work shall be so described.

1.10 LANDSCAPING

A. Measurement:

- 1) Soiling, cultivating, seeding, treating top surface, fertilizing and turf to surface shall be given separately in square meters stating the thickness of soil. Any requirements for watering, weeding, cutting, settlement and the like shall be stated. If the foreign soil is required for land preparation and the depth of fill exceeds 300mm such additional import material shall be treated as fill and measured as described in the Fill section of this Method of Measurement.

DIVISION 32 – EXTERIOR IMPROVEMENTS

1. GENERAL

- A. Item Descriptions:
- 1) Concrete paving.
 - 2) Stone paving.
 - 3) Gravel surfacing.
 - 4) Concrete curbs.
 - 5) Asphalt concrete paving.
 - 6) Fences and gates.
 - 7) Planting.
- B. Information to be Provided:
- 1) Particular of the following shall be given:
 - a. Site plans and sections.
 - b. Component details.
 - c. Scope and location of the work.
 - d. Kind, quality, shape and size of materials and components.
 - e. Treatment and layout of joints.
 - f. Nature of base.
 - g. Preparatory work.
 - h. Bedding and/or methods of fixing.
- C. Measurement:
- 1) Unless stated hereunder, the works in this division shall be measured in accordance with the methods of measurement given in the applicable Division of this Methods of Measurement.
- D. Coverage of items:
- 1) Unless indicated in the Contract Documents or stated hereunder the work of exterior improvements shall be deemed to include the following:
 - a. Formwork and all other temporary support.
 - b. Fair joints.
 - c. Fair edges.
 - d. Working over and around obstructions and into recesses and shaped inserts.
 - e. Forming shallow channels.
 - f. Cutting.
 - g. Disposal of surplus excavated material off site.

2.1 BASES BALLASTS AND PAVING

- A. Item Descriptions:
- 1) Concrete paving.
 - 2) Stone paving.
 - 3) Gravel surfacing.
 - 4) Concrete curbs.
- A. Measurement:
- 1) Concrete paving, stone paving and gravel surfacing shall be measured in square meters stating the thickness and in accordance with applicable Division of this Methods of Measurement.

- 2) Concrete curbs shall be given in meters stating sizes and in accordance with applicable Division of this Methods of Measurement.

2.2 ASPHALT CONCRETE PAVING

- A. Information to be Provided:
 - 1) Where not included in the technical specification particular of the following additional information shall be given:
 - a. Kind and quality of asphalt.
 - b. Thickness and number of coats.
 - c. Nature of base on which asphalt is applied.
- A. Measurement:
 - 1) Asphalt work shall be measured in square meters.

2.3 FENCES AND GATES

- A. Additional Information to be Provided:
 - 1) The scope and location of the work.
 - 2) Type and quality of materials.
 - a. Height of fencing, spacing, height and depth of support.
- B. Supplementary Information to be Provided:
 - 1) Surface treatments to be applied as part of production process or to be applied before delivery to site.
 - 2) Size and nature of backfilling.
- C. Coverage of items:
 - 1) Unless specified otherwise work is deemed to include:
 - a. Excavating holes for supports, special supports and independent gate post.
 - b. Backfilling and disposal of surplus materials.
 - c. Earthwork supports.
 - 2) Gate posts are deemed to include slamming stops and hanging filets.
- D. Definitions:
 - 1) Supports are posts, struts or the like occurring at regular interval.
- E. Measurement:
 - 1) Fence posts and strains shall be enumerated stating sizes, and shall unless measured separately, be deemed to include related concrete, stone or other filler works.
 - 2) Fence mesh, tie and strainer wire shall be measured in meters, stating size, number of tie, strainer and barbed wires.
 - 3) Gates, barriers or the like shall be enumerated.

2.4 PLANTING

- A. Measurement:
 - 1) Planting of grass shall be measured in square meters and shall be deemed to include land preparation.
 - 2) Tress, bushes, etc. shall be enumerated.

MINISTRY OF CONSTRUCTION

Effective Date

This Standard Methods of Measurement shall enter into force as of July 2016.

Dr. Ambachew Mekonnen, Minister

Ministry of Construction