

## *Method of Measurement*

When services by local wardens, traffic control / enforcement officers, or the police are required liaison with such officers and their offices shall be the responsibility of the Contractor. The expense of services of local wardens, transport control / enforcement officers will be borne by the Contracting Authority, and deducted from monies due to the Contractor on presentation of the appropriate invoices and receipts.

In the light of requirements set out in Subsidiary Legislation 499.57 of the Laws of Malta (New Roads and Road Works Regulations) and especially of the penalties applicable therein.

- a) Remuneration for "Extraordinary Traffic Management & Site Safety" to cater for these works shall be as per section 0.000 of the bills of quantities

**Should the Contractor fail to set up the Traffic Management as indicated in the Traffic Management Plans, and persist in this breach following a written warning from the Contracting Authority, the Contractor shall immediately forfeit the remuneration otherwise due for traffic management services and be liable to an equivalent penalty. Furthermore, the contractor will be liable to compensate the Contracting Authority for any compensatory measure it has to take due to his failure to meet his obligations. Such penalties and expenses will be wholly deducted from monies due to the Contractor.**

This Method of Measurement lays down the method and criteria for the measurement of civil engineering / road works undertaken for the Contracting Authority under this contract and should be read in relation to the Bill of Quantities - of this document. This method of measurement supersedes the method of measurement stipulated within LN29/2010, however, should it be the case that any items are not covered with this method of measurement, the method of measurement as stipulated in legal notice 29/10 shall be applied.

This method of measurement is compatible with the "General Conditions of Contract", "Special Conditions of Contract", "Specifications" and "Bill of Quantities".

Discrepancy between the units of measurement given in the Method of Measurement and the Schedule of Rates: Where there is discrepancy between the unit in the Method of Measurement and the unit for an item of work in the Schedule of Rates, the unit in the bill shall prevail, unless, by reference to the quantity in the bills and the nature of the item of work as identified by the Specification, Drawings, measurement rules, item description and item coverage in the Method of Measurement, the Engineer determines otherwise.

### **PART 1 : Definitions**

Words and expressions to which meanings are assigned in the Conditions of Contract have the same meanings in the Method of Measurement. Words and expressions to which meanings are assigned in the Specification and Drawings referred to in the Conditions of Contract have the same meanings in the Method of Measurement.

### **PART 2 : Quantities**

The following unit abbreviations shall be used :

mm	means	millimetre
m	means	metre
mm <sup>2</sup>	means	square millimetre
sq m	means	square metre
cu.m	means	cubic metre
kg	means	kilogram
to	means	tonne (1000 kg)
pcs	means	pieces
no.	means	number
hr	means	hour
wk	means	week
sum	means	Lump sum
km	means	kilometre
l	means	litre
%	means	per cent
N.d	means	nominal diameter

m run means metre run

If it is intended that an item of work is to be paid as a lump sum, "no." or "number" shall be used as the unit of measurement for such an item of work.

Work shall be measured net as fixed in position except where otherwise stated.

Dimensions used in calculating quantities shall be taken to the nearest 10mm (i.e. 5mm and over shall be regarded as 10mm and less than 5mm shall be disregarded).

Quantities measured in tonnes shall be given to two places of decimals.

Unless otherwise stated, where minimum deductions for voids are dealt with in this document they shall refer only to openings which are within the boundaries of measured areas. Openings or which are at the boundaries of measured areas shall always be the subject of deduction irrespective of size.

The rate inserted against an item of work in the bills within the Schedule of Rates shall be deemed to be the full inclusive value of executing, completing, maintaining and/or supplying such item of work including any incidental work thereto, unless expressly stated otherwise elsewhere in the same Schedules. The rates inserted against the items of work in the Schedule of Rates shall include, but are not limited to, the following:

- (i) provision of labour and costs in connection therewith;
- (ii) provision of plant and costs in connection therewith;
- (iii) the supply, transportation, handling and storage of materials and goods;
- (iv) multiple handling of any kind;
- (v) sampling and testing and costs in connection therewith;
- (vi) assembling, fixing, erecting, installing or placing of materials and goods in position;
- (vii) preparation of surfaces and other preparatory work for follow-on activities;
- (viii) wastage, bulking, shrinkage and the disposal of surplus material;
- (ix) temporary protection and its subsequent removal;
- (x) temporary Works, including design, where necessary;
- (xi) taking precautions and measures as far as is reasonable and practical to prevent interference with or damage to existing structures and utilities, roads, footpaths and paved areas, watercourses and drainage systems, public and private vehicular and pedestrian accesses, trees and including the provision of alternative access, if necessary;
- (xii) keeping the Works where necessary, and as near as may be practical, free of water and protected from damage due to water and from weather conditions which may adversely affect the Works, and taking measures to prevent flotation of new or existing structures;
- (xiii) taking all measures required to execute the work as affected by non tidal open water or tidal water;
- (xiv) provision of working space and upholding the sides of excavations;
- (xv) carrying out trial mixes, trial runs and all other trials, demonstrations and mock-ups;
- (xvi) completion of formation and earthwork final surfaces;
- (xvii) recording, taking readings, measurements and observations, and submitting to the Engineer all drawings, details of procedures and methods of construction to be used, technical literature, test certificates and any other documents or information required to be submitted under the Contract;

(xviii) in the case of materials supplied by the Contracting Authority, return of the surplus;

(xix) in the case of plant and equipment supplied by the Contracting Authority, protection, maintenance and repair of such plant and equipment while it is on the Site, costs in connection with operating such plant and equipment, and return of plant and equipment to the Employer or replacement of such plant and equipment if it is damaged beyond repair or lost;

(xx) notifying, making arrangements and liaising with all relevant Government Departments, authorities or other interested parties to obtain and maintain all licences and permits necessary for the execution of the Works, and costs in connection therewith including the costs of complying with the terms and conditions of the licences and permits;

(xxi) liabilities, obligations and risks involved in the execution of the Works set forth or reasonably implied in the Contract;

(xxii) establishment charges, overheads and profit.

The measurement of work shall be computed from site measurements. If any item coverage includes reference to work which is the subject of item coverages elsewhere in the Method of Measurement, then the combined item coverages shall apply.

General Attendance in connection with Nominated Sub-contractors shall include for affording the use of existing work space, access, temporary roads, erected scaffolding, working shelters, staging, ladders, hoists, storage, latrines, messing, welfare and other facilities existing on Site and the provision of protection, water, telephone, electricity for lighting, and clearing away rubbish and debris arising from the work.

Except for those tests provided for as separate items of work in the Bill of Quantities as Applicable, the rates submitted in the Bills of Quantity shall be deemed to include for the cost of carrying out all tests on materials and workmanship specified in this Contract, including but not limited to, the cost of packing and transport required for delivering samples to and collecting from the place of testing.

### **PART 3 : Units and Method of Measurement**

#### **1.0 Traffic Management (including signboards)**

This shall not be measured but rates quoted are to included in the relevant items in the Bill of for all traffic management and safety measures required.

#### **2.0 Hoarding & Temporary Fences**

This shall not be measured but rates quoted are to include for all traffic management and safety measures required.

#### **3.0 NOT USED**

#### **4.0 General Site Clearance**

4.1 The units of measurement shall be :

- (i) general site clearance of the Site .....number.
- (ii) removal of disused sewers, drains or ducts .....metre run.

4.2 The removal of disused sewers, drains or ducts below existing ground surface shall be measured only where the disused sewers, drains or ducts will not be removed as part of the excavation measured elsewhere.

4.3 The items for general site clearance of the Site shall, include for :

- (a) demolition, breaking up and removal of signs, lamp standards, fences, walls and disused ducts, pipes, sewers or drains above ground level and superficial obstructions affected by the Works;
- (b) pruning of trees, grubbing up stumps and roots, filling stump and root holes with fine fill material and compacting;
- (c) uprooting of trees, shrubs and plants;
- (d) disposal of surplus material;

- (e) disconnecting and sealing utilities, and recording the position of sealed utilities;
  - (f) making good of severed ends of existing fences, walls, utilities and other items, including fixing posts at ends of strained fences and restraining fences;
  - (g) making good of damage to buildings and other surfaces caused by the removal of signs, fences, lamp standards and the like.
- 4.4 The items for the removal of disused sewers, drains or ducts shall, include for :
- (a) excavation in any material;
  - (b) removal of associated manholes, catchpits, gullies, drawpits and the like;
  - (c) preliminary site trials of blasting;
  - (d) loosening or breaking up by blasting or other means sewer, drain or duct of whatever type of construction, together with any bed, haunch or surround;
  - (e) cutting through reinforcement;
  - (f) trimming the bottom and sides of excavation and clearing away loose rock;
  - (g) backfilling with suitable material from any source and compaction;
  - (h) disposal of surplus material;
  - (i) sealing the ends of sewers or drains.
- 5.0 NOT USED
- 6.0 Drilling and Boring
- 6.1 The unit of measurement shall be :
- (i) drilling, boring .....metre run.
- 6.2 The measurement of drilling and boring shall be the drilled or bored length of the hole.
- 6.3 The items for drilling, boring and probing shall, include for :
- (a) water, compressed air or other drilling fluid;
  - (b) casing to hole;
  - (c) backfilling the hole, reinstating and marking position;
  - (d) taking readings, measurements and observations, and recording and supplying the logs of each drillhole or borehole to the Engineer.
- 7.0 Trial Holes
- 7.1 The unit of measurement shall be :
- (i) trial hole, inspection pit, in any material .....number.
- 7.2 Measurement shall only be made for trial pits and inspection pits excavated on the specific instruction of the Engineer, and not for pits excavated in meeting the Contractor's obligations to establish the locations of existing utilities and underground features.
- 7.3 The items for trial holes and inspection pits shall, include for :
- (a) access;
  - (b) excavation in any material;
  - (c) saw-cutting and cutting through reinforcement;
  - (d) disposal of surplus excavated material;
  - (e) temporary fencing;
  - (f) backfilling, compaction and reinstatement;
  - (g) taking readings, measurements and observations, and recording and supplying the log of each trial hole to the Engineer;
  - (h) taking photographs and submitting to the Engineer.
- 8.0 Sewers, Drains, Piped Culverts, ducts and trench drains
- 8.1 The units of measurement shall be :
- (i) sewers, drains, piped culverts, ducts, trench drains .....metre run.
  - (ii) connections to existing sewers, drains, ducts, trench drains, culverts, watercourses, manholes, other chambers and drawpits .....number.
- 8.2 The measurement of sewers, drains, piped culverts, ducts and trench drains shall be the summed lengths of the categories described within each depth range.

- 8.3 Length shall be measured along the centreline between the following terminations:
- (i) the external face of manhole or other chamber, gully or headwall;
  - (ii) the intersection of the centreline of the pipes at pipe junctions;
  - (iii) the position of the termination shown on the Drawings;
  - (iv) the point at which the depth range changes.
- 8.4 Depths of sewers, drains, piped culverts and ducts in trenches and trench drains shall be the vertical measurement between the invert of the pipe or duct and the following :
- (i) where the invert level is below the existing ground surface - the existing ground surface, except that where the earthworks final surface is below the existing ground surface the measurement shall be taken to the earthworks final surface;
  - (ii) where the invert is at or above the existing ground surface - the earthworks final surface;
  - (iii) where a length of pipeline in or beneath areas of fill is not permitted to be constructed until a specified minimum level of cover is obtained then notwithstanding paragraphs 8.4 (i) and (ii) above - to the specified minimum level of cover or the earthworks final surface whichever is the lower.
- 8.5 The items for sewers, drains, piped culverts, ducts and trench drains shall, include for :
- (a) ascertaining nature, location and size of existing utilities prior to commencement of excavation;
  - (b) inspecting pipes, joints and fittings immediately before and immediately after installation and repairing damage;
  - (c) thrust pits and thrust blocks for pipe jacking, including additional excavation and removal and reinstatement;
  - (d) mastic filler and anticorrosion tape when directed;
  - (e) fixings, hangers, stools and other supports;
  - (f) formwork;
  - (g) cleaning and checking bore, linearity and joints;
  - (h) draw wires, plugs, marker blocks and identification tapes;
  - (i) movement joints to concrete beds, haunches and surrounds and compressible padding between pipes and supports;
  - (j) in the case of pipes not being jointed, sealing the ends of pipes.
- 8.6 The items for connections to existing sewers, drains, ducts, trench drains, culverts, watercourses, manholes, other chambers and drawpits shall, include for :
- (a) locating existing sewers, drains, ducts or trench drains;
  - (b) breaking into existing sewers, drains, ducts or trench drains and dealing with the existing flow;
- 9.0 Manholes, Gullies, Catchpits, Other Chambers and Drawpits
- 9.1 The unit of measurement shall be :
- (i) manholes, gullies, catchpits, other chambers, drawpits .....number.
- 9.2 The measurement shall be of the complete manhole, gully, catchpit, other chamber and drawpit.
- 9.3 Depths of manholes shall be the distance between the top surface of the cover and the invert of the main channel. Depths of catchpits, drawpits and other chambers shall be the distance between the top surface of the cover or grating and the uppermost surface of the base slab.
- 9.4 The items for manholes, catchpits, gullies, other chambers and drawpits shall include for :
- (a) ascertaining nature, location and size of existing utilities prior to commencement of excavation;
  - (b) excavation in any material except rock and artificial hard material;
  - (c) forming channels and benchings, and building in pipe connections, including fittings and pipes;
  - (d) backdrops;
  - (e) footholes, step irons, access ladders and safety chains;
  - (f) covers, frames, gratings, overflow weirs and lifting keys (unless otherwise stated in the specific item within the schedule of rates);
  - (g) surround;
  - (h) blinding layer;
  - (i) formwork and moulds;

- (j) reinforcement as per drawings;
  - (k) disposal of surplus excavated material;
  - (l) completion of formation.
- 10.0 Excavation
- 10.1 The unit of measurement shall be :  
 (i) excavation in any material .....cubic metre.
- 10.1 The measurement shall be the volume of the voids formed by the removal of the material within the widths, lengths and depths required for sewers, drains, piped culverts, ducts, trench drains, headings, manholes, gullies, catchpits, other chambers, drawpits, drainage channels and the like.
- 10.2 The items for excavation in any material shall, include for :  
 (a) saw-cutting and cutting through reinforcement;  
 (b) trimming;  
 (c) making good overbreak;  
 (d) supports of excavation;  
 (e) working around supports during backfilling.
- 10.3 Blasting is not permitted.
- 11.0 Adjustment of Level of Covers to existing Manhole and other Chambers
- 11.1 The unit of measurement shall be :  
 (i) raise existing cover, lower existing cover .....number
- 11.2 The items for the adjustment of the level of covers to existing manholes and other chambers shall, include for :  
 (a) taking up and storing covers and frames;  
 (b) excavation in any material, breaking out, the provision of materials and construction of the manhole or other chamber to new level, including extending or cutting steel bar reinforcement, step irons and ladders;  
 (c) taking covers and frames from store, and reinstallation;  
 (d) backfilling and compaction;  
 (e) disposal of surplus excavated material;  
 (f) making good surrounding surfaces;  
 (g) maintaining existing flow.
- 12.0 Geotextile filter
- 12.1 The unit of measurement shall be :  
 (i) geotextile filter .....square metre.
- 12.2 The measurement shall be the area of the surface to which the geotextile filter is applied.
- 12.3 The items for geotextile filter shall, include for :  
 (a) preparation of the surface to receive the geotextile filter;  
 (b) cutting, lapping and jointing.
- 13.0 Pipes
- 13.1 The unit of measurement shall be :  
 (i) pipes .....metre run  
 (ii) joints and connections .....number  
 (iii) valves, bends, junctions, tees, tapers, special fittings and other stated fittings .....number
- 13.2 The measurement of pipes shall be the summed lengths of the categories described within each depth range. Length shall be measured along the centreline through pipe fittings, valves and joints, with tapers included under the diameter of the larger pipe, between the following terminations :  
 (i) the external face of manhole or other chamber or headwall;

- (ii) the intersection of the centreline of the pipes at pipe junctions;
  - (iii) the position of the termination indicated on the Drawings (when available);
  - (iv) the point at which the depth range changes;
  - (iv) for pipes within chambers, the external faces of the chambers.
- 13.3 For pipes in trenches, depths shall be the vertical measurement between the invert level of the pipe and the following :
- (i) where the invert level is below the existing ground surface - the existing ground surface, except that where the earthworks final surface is below the existing ground surface the measurement shall be taken to the earthworks final surface;
  - (ii) where the invert is at or above the existing ground surface - the earthworks final surface;
  - (iii) where a length of pipeline in or beneath areas of fill is not permitted to be constructed until a specified minimum level of cover is obtained, then notwithstanding paragraphs
- 13.3 (i) and (ii) above - to the specified minimum level of cover or the earthworks final surface, whichever is the lower.
- 13.4 The items for pipes shall, include for :
- (a) ascertaining nature, location and size of existing utilities prior to commencement of excavation;
  - (b) excavation in any material;
  - (c) access shafts to headings and their subsequent reinstatement;
  - (d) cutting and laying;
  - (e) inspecting pipes and joints immediately before and immediately after pipelaying and repairing damage;
  - (f) recording, staking and labelling of junctions and terminations, chainages and levels;
  - (g) internal and external protection, including repairing internal and external protection at joints and damaged areas;
  - (h) temporary stoppers to ends of pipes already laid;
- 14.0 Excavation
- 14.1 The unit of measurement shall be :
- (i) excavation .....cubic metre.
- 14.2 The measurement of general excavation shall be the volume of the void formed by the excavation to the lines and levels shown on the Drawings or indicated by the officer in charge. Fill material is measured separate.
- 14.3 The measurement of excavation for structures and foundations shall be the volume which is to be occupied by the structure or foundation, plus any additional volume vertically above any part of the structure or foundation measured up to existing ground surface or earthworks final surface, whichever is the lower. In the case of structures or foundations constructed in fill material, no measurement will be made.
- 14.4 The items for excavation in any type of ground shall, include for :
- (a) loosening or breaking up material before or in the process of excavation;
  - (b) disposal of resulting material;
  - (c) multiple handling of excavated material;
  - (d) loading into transport;
  - (e) forming and trimming side slopes, benching, or in the case of structures or foundations, trimming the bottom and sides of excavation.
- 15.0 Fill material
- 15.1 The unit of measurement shall be :
- (i) fill material .....cubic metre
- 15.2 The measurement of each type fill material shall be the volume of each type of compacted fill material. Excavation is measured separate.
- 15.3 The items for fill material shall, include for :
- (a) haulage;

- (b) layering or depositing in locations indicated on the Drawings or as directed by the officer in charge;
- (e) adjustment and control of moisture content;
- (f) overfilling of areas of fill and subsequent removal;
- (g) trimming and shaping to required levels and contours;
- (h) compaction in layers as specified;
- (i) making good or replacing material which is allowed to become unsuitable for use in the permanent works;
- (j) taking delivery of fill material;
- (k) completion of earthworks final surfaces any trials by the Contractor to demonstrate compaction methods different from those directed by officer in charge.
- (l) compaction of overfilling of areas of fill;
- (m) compaction of additional fill material to replace fill material lost by settlement of, or penetration into, the underlying material;
- (n) protection of formations;

16.0 Sub-Base, Road Base and Regulating Course

16.1 The units of measurement shall be :

- (i) sub-base .....cubic metre
- (ii) granular fill .....cubic metre
- (iii) regulating course .....tonne

16.2 The measurement of sub-base shall be the volume measured to the outlines shown on the Drawings or established on site.

16.3 The area of sub bases and granular fill shall be measured at the top surface. No deduction shall be made for openings each not exceeding one square metre.

16.4 The items for sub-base, granular fill and regulating course shall, include for:

- (a) preliminary trial areas not accepted as part of the permanent works;
- (b) trials by the Contractor to demonstrate compaction methods different from those stated in the officer in charge;
- (c) materials and attendance for sampling and testing carried out by the Engineer;
- (d) grading, measuring, mixing and deposition of materials;
- (e) spreading and compaction of deposited material in layers;
- (f) making joints;
- (g) curing cement treated materials;
- (h) edge supports;
- (i) protection and maintenance of surfaces;
- (j) shaping to cambers, falls and crowns;

17.0 Flexible Surfacing

17.1 The unit of measurement shall be :

- (i) base course, binder course, wearing course, base/wearing (combined mix) course .....square metre.

17.2 The area of flexible surfacing shall be measured at the top surface. No deduction shall be made for openings each not exceeding one square metre.

17.3 The items for flexible surfacing shall, include for :

- (a) preliminary trial areas not accepted as part of the permanent works;
- (b) trial mixes;
- (c) preparation and cleaning of surfaces to receive bituminous materials;
- (d) grading, measuring, mixing and deposition of materials;
- (e) spreading and compaction of deposited material in layers;
- (f) making joints;
- (g) edge support;
- (h) protection of kerbs, masking and unmasking of drainage channels, manhole and catchpit covers, gully gratings, expansion joints, road studs and road markings, and obtaining clean lines;
- (i) finishing up to abutting surfaces;
- (j) filling core holes and compacting;
- (k) protection and maintenance of surface;

- (l) shaping to cambers, falls and crowns;
  - (m) cleaning and sweeping.
- 18.0 Scarifying and Milling
- 18.1 The unit of measurement shall be :  
(i) scarifying, milling .....cubic metre.
- 18.2 The area of scarifying and milling shall be measured at the top surface. No deduction shall be made for openings each not exceeding one cubic metre.
- 18.3 The items for scarifying and milling shall, include for :  
(a) protecting kerbs, channels, manhole and catch pit covers, gully gratings and expansion joints;  
(b) loading into transport;  
(c) sweeping of area to take tack coat and flexible layers  
(d) finishing up to abutting surfaces.
- 19.0 Concrete Pavement
- 19.1 The unit of measurement shall be :  
(i) any paved concrete areas .....square metre.
- 19.2 The area of concrete pavement shall be measured at the top surface. No deduction shall be made for openings each not exceeding one square metre.
- 19.3 Items for concrete pavement shall include for :  
(a) preliminary trial lengths not accepted as part of the permanent works;  
(b) trial mixes;  
(c) longitudinal, expansion, contraction, warping, construction and isolation joints;  
(d) mixing, depositing, spreading, compaction and finishing;  
(e) concrete in infill slabs at covers, frames and other hardware;  
(f) forming or sawing grooves and cleaning;  
(g) surface texturing, curing and protection;  
(h) forming recesses, openings and bays;  
(i) shaping to falls;  
(j) finishing up to abutting surfaces;  
(k) preparing surfaces including removing existing concrete and joints;  
(l) protection of completed pavement.
- 20.0 Paving (any type)
- 20.1 The unit of measurement shall be :  
(i) paving (any type) .....square metre.
- 20.2 The area of paving (any type) shall be measured at the top surface. No deduction shall be made for openings each not exceeding one square metre.
- 20.3 The items for paving (any type) shall, include for :-  
(a) laying and compacting sand bed;  
(b) laying, bedding and compacting slabs or blocks, including all cutting;  
(c) filling and compacting joints;  
(d) mortar or concrete seal against abutting surfaces;  
(e) removing and replacing damaged units;  
(f) taking measures to prevent the ingress of water during laying, bedding and compaction;  
(g) protection of formation.
- 21.0 Footways
- 21.1 The unit of measurement shall be :  
(i) footways .....square metre.
- 21.2 The area of footways shall be measured at the top surface. No deduction shall be made for openings each not exceeding one square metre.

- 21.3 The items for footways shall, include for :
- (a) laying and compaction of sub-base;
  - (b) grading, measuring, mixing, deposition, spreading and compaction;
  - (c) protection of kerbs, masking and unmasking of drainage channels, manholes and catchpit covers, gully gratings and expansion joints;
  - (d) making, filling and sealing joints;
  - (e) finishing up to abutting surfaces;
  - (f) surface texturing, curing and protection.
- 22.0 Kerbs
- 22.1 The units of measurement shall be :
- (i) kerb .....metre run.
- 22.2 The items for kerbs shall, include for :
- (a) trial mixes;
  - (b) excavation / cutting in any material;
  - (c) disposal of surplus excavated material;
  - (d) formwork;
  - (e) foundation and backing;
  - (f) bedding, jointing, pointing and cutting;
  - (g) making, filling and sealing joints;
  - (h) surface texturing, curing and protection;
  - (i) building in gully grating and frames and overflow weirs;
  - (j) reinstating and finishing to abutting surfaces.
- 23.0 Formwork
- 23.1 The units of measurement shall be :
- (i) formwork .....square metre.
- 23.2 The measurement of formwork shall, subject to the qualifications stated below, be the area of formwork which is in contact with the finished concrete together with the area of the openings in such finished concrete provided that the size of the openings does not exceed one square metre each.
- 23.3 Formwork shall not be measured :
- (a) to construction joints;
  - (b) to holes, ducts, pockets, sockets, mortices and the like not exceeding 0.15 cubic metres each in volume;
  - (c) to individual fillets, chamfers, splays, drips, rebates, recesses, grooves and the like not exceeding 100 millimetres total girth measured on the faces in contact with the concrete;
  - (d) to edge of concrete in blinding layers;
  - (e) to upper surfaces of concrete inclined at an angle of 15° or less to the horizontal
  - (f) no extra over shall be taken into consideration for curved forwork.
- 23.4 Where concrete other than blinding concrete is placed in structural foundations, formwork shall be measured to the sides of such concrete foundations regardless of whether any formwork is used, except where it is expressly stated that the concrete is to be cast against the soil face.
- 23.5 The items for formwork shall, include for :
- (a) falsework, fabrication, erection, centering, levelling and fixing in position, and taking all measures necessary to produce the required shapes of concrete;
  - (b) forming cambers and falls;
  - (c) ties and components;
  - (d) linings, release agents, surface retarders or other measures necessary to produce the required finish to the surfaces of the concrete;
  - (e) cutting and fitting around projecting members, pipes, reinforcement and the like;
  - (f) individual fillets, chamfers, splays, drips, rebates, recesses, grooves and the like, not exceeding 100 millimetres total girth measured on the faces in contact with the concrete;
  - (g) sealing joints between formwork panels and adjoining surfaces and components;
  - (h) striking, taking down and removing;
  - (i) protection of concrete surfaces;
  - (j) any additional concrete provided in lieu of formwork to fill overbreak or working space.

- 24.0 NOT USED
- 25.0 In - Situ Concrete
- 25.1 The unit of measurement shall be :  
(i) concrete .....cubic metre.
- 25.2 No deduction shall be made for :  
(a) built-in items, holes, ducts, pockets, sockets, mortices and the like each not exceeding 0.15 cubic metres in volume;  
(b) reinforcement;  
(c) individual fillets, chamfers, splays, drips, rebates, recesses, grooves and the like not exceeding 100 millimetres in girth measured on the faces in contact with the formwork;  
(d) admixtures.
- 25.3 The items for concrete shall, include for :  
(a) trial mixes and plant trials;  
(b) mixing, placing in or against any surface, including soil faces where required, compaction and finishes to unformed surfaces;  
(c) curing and protection;  
(e) falls, cambers and shaped profiles;  
(f) weep pipes, pipe sleeves and the like;  
(g) construction joints (whether shown or not on the Drawings), skewbacks, stunt ends, steppings, bonding chases and the like, including formwork, waterbars and waterstops;  
(h) holes, pockets, mortices casting in items and the like, each not exceeding 0.15 cubic metres in volume, including formwork;  
(i) ducts and sockets;  
(k) concrete to fill over-break and working space;  
(l) filling of tie bar holes;  
(m) underlay and sliding layers;  
(p) in the case of concrete placed in water, use of tremie or placing concrete in bags;
- 26.0 Pre - Cast Concrete
- 26.1 The term "precast" applies to any concrete unit cast on Site but not in its final position and to concrete units manufactured off the Site.
- 26.2 The units of measurement shall be :  
(i) precast copings and the like of uniform cross section .....metre run.  
(ii) precast members, slabs, units and specially moulded blocks .....number.
- 26.3 The items for precast concrete shall, include for :  
(a) trial mixes and plant trials;  
(b) formwork;  
(c) reinforcement;  
(d) surface finishing, curing and protection;  
(e) treatment to concrete faces;  
(f) fillets, chamfers, splays, drips, rebates, recesses, grooves and the like;  
(g) forming holes, ducts, pockets, sockets, mortices and the like, and casting-in items as required, including formwork;  
(h) matching members as required for side by side construction;  
(i) marking members for identification, date of casting and lifting points and delivery in matching sequence;  
(j) lifting devices, bearing plates and removal;  
(k) erection and fixing in final position;  
(l) temporary supports and connections to prevent displacement;  
(m) bedding, jointing and pointing, including cramps, dowels or other fixing devices;  
(n) sealing between and under units and members, including formwork;  
(o) cutting and trimming;  
(p) in the case of the precast prestressed members and the like, ducts, tendons and stressing (including partially stressing) and grouting internal tendons;  
(q) in the case of precast and precast prestressed members and the like, for incorporation in in-situ post tensioned prestressed construction, forming and installing tendon ducts to profile

and sealing, forming recesses in the concrete for anchorages and jack seatings, bearing plates, reinforcing helices, grout inlets, vents and other components, including casting in.  
(r) grouting key.

27.0 Waterproofing

27.1 The unit of measurement shall be :

(i) waterproofing .....square metre.

27.2 The measurement shall be the area of the surface covered. No deduction shall be made for openings each not exceeding one square metre.

27.3 The items for waterproofing shall, include for :

(a) preparation, cleaning and drying surfaces, including levelling courses;

(b) priming including protecting primed surfaces, adhesive coats, undercoats and all intermediate coats;

(c) laying to cambers and falls;

(d) forming nibs, angle fillets, drips, chases, external angles, mitres, stops, flashings and the like;

(e) forming joints and overlaps;

(f) sealing at edges and around interruptions and projections;

(g) temporary protection measures and subsequent removal;

(h) temporary measures to provide for drainage of surface water;

(i) curved work.

28.0 Masonry

28.1 The unit of measurement shall be :

(i) blockwork .....square metre.

(ii) rubble structures .....cubic metre.

(iii) mass masonry .....cubic metre.

(ii) masonry facing, masonry walls .....square metre.

(iii) coping, specially shaped and dressed string courses, arches and the like .....metre run.

28.2 Measurement for blockwork shall be the length along the centreline multiplied by the vertical height stating the thickness. No deduction shall be made for openings each not exceeding 0.10 square metres.

28.3 For mass masonry no deduction shall be made from the measurement for voids each not exceeding 0.15 cubic metres.

28.3 Items for blockwork and masonry shall, include for:

(a) jointing, pointing and fair-faced work, including rough and fair cutting;

(b) brick copings, bands, plinths, corbels, sills, bull-noses and the like;

(c) forming chases, rebates, recesses, angles, quoins and the like;

(d) ties, dowels, cramps, joggles and the like;

(e) centering and temporary supports;

(f) bonding into existing work;

(g) filling the cavity between the brickwork and the backing;

(h) construction and subsequent demolition of trial panels.

29.0 Planting Works

29.1 The units of measurement shall be :

(i) trees, shrubs and other stated plants .....number.

29.2 The items for trees, shrubs and other stated plants shall, include for:

(a) excavation, backfill and disposal off Site of all surplus and unsuitable material;

(b) fertilising, soil conditioning, mulching and top dressing as necessary;

(c) watering, weeding and pruning;

(d) stakes, ties, guys, sleeves and adjusters;

(e) reinstatement of soil.

30.0 NOT USED

#### 4.2.4 Pricing

The prices and rates inserted in the bills of Quantities for award of "Contract Allocation" are to be the full inclusive values of the works described under the items, including all costs and expenses which may be required in and for the construction of the works described together with any temporary works and installations which may be necessary, and all general risks, liabilities and obligations set forth or implied in the documents on which the Tender is based. It will be assumed that establishment charges, profit and allowances for all obligations are spread evenly over all the unit rates.

The Contractor's attention is particularly drawn to the fact that the Bills of Quantities in this Contract contains no separate section for General/ Preliminary Items and therefore the rates submitted in the Bills of Quantities shall be deemed to include for all General/ Preliminary Items that although not mentioned shall be required for the execution of the Contract and shall be the full rates for the finished work described under each item and in the Specification, inclusive of but not limited to:-

- (a) Work being carried out at any time of the year on a seven (7) day week basis;
- (b) Labour, mobilization and provision of plant and consumables, tools and instruments;
- (c) Expenses by the Contractor to cover quality assurance provisions;
- (d) The provision and placing, at all road works sites, display boards indicating information about the project, Contractor's name, address and 24 hour contact telephone number.

The Contractor will be deemed to have taken full account of all requirements and obligations, whether expressed or implied, covered by all parts of this agreement and to have priced the items in the Bill of Quantities accordingly. Amounts must therefore include for all incidental and contingent expenses and risks of every kind necessary to construct, complete and maintain the whole of the works in accordance with the conditions of the. Unless separate items are provided in the Bill of Quantities, rates and sums will include for all costs involved in the execution/ construction of the various items in the schedules.

The amounts entered by the Contractor against all items in the schedule of works must accurately reflect the cost of carrying out the work described. All costs, commissions and other charges (unless separately itemised) applicable to the Contract of works as a whole must be spread across all amounts in the schedules, whereas those applicable to specific sections of the Contract of works are to be spread only over the items to which those sections refer.

The amounts entered in the schedule of works for the award of a Contract will be used for calculating payments and interim payments.