

**PROPOSED OFFICE FIT-OUT AND RENOVATION WORKS AT
USHURU PENSION TOWERS BUILDING, ELGON ROAD,
UPPER HILL, NAIROBI**

FOR

KENYA REVENUE AUTHORITY



**BILL OF QUANTITIES
VOLUME 2**

APPENDIX 1

SIGNATURE PAGE AND NOTES

BILLS OF QUANTITIES

SUPPLIED AS PART OF THE PROPOSED OFFICE FIT-OUT AND RENOVATION WORKS AT CORPORATE BUSINESS CENTRE (CBC) BUILDING, ELGON ROAD, UPPER HILL, NAIROBI

FOR

Kenya Revenue Authority
P.O. Box 48240 - 00100,
Nairobi, Kenya

THE CONTRACT FOR THE ABOVE MENTIONED WORK ENTERED INTO ON THEDAY OF 2020 BY THE UNDERSIGNED PARTIES REFERS TO THESE BILLS OF QUANTITIES PAGES NUMBERED AS PER THE FOLLOWING INDEX; ANNEXURES FROM "A" TO "B"

WHICH TOGETHER WITH THE AGREEMENT & SCHEDULE OF CONDITIONS OF BUILDING CONTRACT AND CONTRACT DRAWINGS SHALL BE READ AND CONSTRUED AS PART OF THE SAID CONTRACT.

THESE CONTRACT DOCUMENTS SUPERCEDE ALL ENQUIRIES, PROPOSALS, AGREEMENTS, NEGOTIATIONS AND COMMITMENTS WHETHER WRITTEN OR VERBAL, PRIOR TO THE DATE OF THE EXECUTION OF THE CONTRACT.

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CONTRACTOR

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EMPLOYER

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DATE

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DATE

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WITNESS

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WITNESS

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DATE

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DATE

Signature Page & Notes

Signature Page

Proposed Office Interior Fit out for KRA - Phase 2

BILL OF QUANTITIES

Bill of Quantities

Proposed Office Interior Fit out for KRA - Phase 2

NOTES FOR PREPARING BILL OF QUANTITIES

1.0 The objectives of the Bills of Quantities are;

- (a) to provide sufficient information on the quantities of Works to be performed to enable tenders to be prepared efficiently and accurately; and
- (b) when a Contract has been entered into, to provide a priced Bill of Quantities for use in the periodic valuation of Works executed.
- (c) In order to attain these objectives, Works should be itemized in the Bill of Quantities in sufficient detail to distinguish between the different classes of Works, or between Works of the same nature carried out in different locations or in other circumstances which may give rise to different considerations of cost. Consistent with these requirements, the layout and content of the Bill of Quantities should be as simple and brief as possible.

2.0 The Bills of Quantities should be divided generally into the following sections:

(a) Preliminaries.

The preliminaries should indicate the inclusiveness of the unit prices, and should state the methods of measurement which have been adopted in the preparation of the Bill of Quantities and which are to be used for the measurement of any part of the Works.

The number of preliminary items to be priced by the tenderer should be limited to tangible items such as site office and other temporary works, otherwise items such as security for the Works which are primarily part of the Contractor's obligations should be included in the Contractor's rates.

(b) Work Items

- (i) The items in the Bills of Quantities should be grouped into sections to distinguish between those parts of the Works which by nature, location, access, timing, or any other special characteristics may give rise to different methods of construction, or phasing of the Works, or considerations of cost. General items common to all parts of the Works may be grouped as a separate section in the Bill of Quantities.
- (ii) Quantities should be computed net from the Drawings, unless directed otherwise in the Contract, and no allowance should be made for bulking, shrinkage or waste. Quantities should be rounded up or down where appropriate.
- (iii) The following units of measurement and abbreviations are recommended for use.

Bill of Quantities

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Bill of Quantities

<i>Unit</i>	<i>Abbreviation</i>	<i>Unit</i>	<i>Abbreviation</i>
cubic meter	m ³ or cm	millimeter	mm
hectare	ha	month	mon
hour	ha	number	no. or nr
kilogram	kg	square meter	m ² or sq m
lump sum	sum	square millimeter	mm ² or sq mm
meter	m	week	wk
metric ton (1,000kg)	t		

- (iv) The commencing surface should be identified in the description of each item for Work involving excavation, boring or drilling, for which the commencing surface is not also the original surface. The excavated surface should be identified in the description of each item for Work involving excavation for which the excavated surface is not also the final surface. The depths of Work should be measured from the commencing surface to the excavated surface, as defined.

(c) Daywork Schedule

A Daywork Schedule should be included if the probability of unforeseen work, outside the items included in the Bill of Quantities, is relatively high. To facilitate checking by the Employer of the realism of rates quoted by the tenderers, the Daywork Schedule should normally comprise:

- (i) a list of the various classes of labour, and materials for which basic Day work rates or prices are to be inserted by the tenderer, together with a statement of the conditions under which the Contractor will be paid for Work executed on a Day work basis; and
- (ii) a percentage to be entered by the tenderer against each basic Day work Subtotal amount for labour, materials and plant representing the Contractor's profit, overheads, supervision and other charges.

(d) Provisional Quantities and Sums

- (i) Provision for quantity contingencies in any particular item or class of Work with a high expectation of quantity overrun should be made by entering specific "Provisional Quantities" or "Provisional Items" in the Bill of Quantities, and *not* by increasing the quantities for that item or class of Work beyond those of the Work normally expected to be required. To the extent not covered above, a general provision for physical contingencies (quantity overruns) should be made by including a "Provisional Sum" in the Summary of the Bill of Quantities. Similarly, a contingency allowance for possible price increases should be provided as a "Provisional Sum" in the

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Bill of Quantities

Summary of the Bill of Quantities. The inclusion of such provisional sums often facilitates budgetary approval by avoiding the need to request periodic supplementary approvals as the future need arises.

- (ii) Provisional sums to cover specialized works normally carried out by Nominated Sub Contractors should be avoided and instead Bills of Quantities of the specialised Works should be included as a section of the main Bills of Quantities to be priced by the Main Contractor. The Main Contractor should be required to indicate the name (s) of the specialised firms he proposes to engage to carry out the specialized Works as his approved domestic sub-contractors. Only provisional sums to cover specialized Works by statutory authorities should be included in the Bills of Quantities.

(e) Summary

The Summary should contain a tabulation of the separate parts of the Bills of Quantities carried forward, with provisional sums for Daywork, for physical (quantity) contingencies, and for price contingencies (upward price adjustment) where applicable.

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PRELIMINARIES

Preliminaries

Proposed Office Interior Fit out for KRA - Phase 2

Item	Description	Amount	
	<u>SECTION NO.1</u>		
	PRELIMINARIES		
	BILL NO. 1		
	PARTICULAR PRELIMINARIES		
A	EMPLOYER The "Employer" is Deputy Commissioner - Supply Chain Management P.O. Box 48240 - 00100, NAIROBI The term "Employer" and "Government" wherever used in the contract document shall be synonymous		
B	DESCRIPTION OF THE WORKS The works to be carried out under this contract comprise Fit-Out and Renovations Works.		
C	NOTES ON PRICING OF ITEMS OF PRELIMINARIES Items described in this section cover the minimum requirements and conditions necessary for the full proper execution of the contract. The tenderer is required to read and fully understand his obligations under each item and this assess his cost for complying with the same for the duration of the contract. Should no price be inserted against any item, it shall be assumed that the tenderer has covered any cost associated with that item elsewhere in the Bill of Quantities and shall nevertheless be required to comply with such and all items of preliminaries.		
	Carried to Collections		
	Preliminaries Particular Matters <i>Proposed Office Interior Fit out for KRA - Phase 2</i>		

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Bill of Quantities

Item	Description	Amount	
	x. Contract: The term "Contract" wherever used hereinafter and in all contract documents shall mean the letter of award of Contract, Agreement and Conditions of Contract for Building Works, Drawings, priced and signed Bills of Quantities, the schedules and other documents forming part of the contract. xi. Contract Drawings: The term "Contract Drawings" wherever used hereinafter and in all contract documents shall be deemed to imply the drawing referred to in these Bill of Quantities xii. Site: Means the place or places where the permanent Works are to be carried out and to which materials and goods are to be delivered and includes workshops or other places where materials, goods or work are being prepared for incorporation in the Works either by the Contractor, or sub-contractor or by others. xiii. Approved, Directed and Selected: The terms "Approved", "Directed" and "Selected" wherever used hereinafter and in all contract documents shall mean the approval, direction and selection of or by the Architect. xiv. Singular and Plural words importing the singular only wherever used hereinafter and in all contract documents shall also include the plural and vice versa where the context requires. Persons shall include bodies corporate		
A	FIRM PRICE CONTRACT Unless otherwise specifically stated, this is a firm contract and the Contractor must allow in his tender rates for any increase in the cost of labour and/or materials during the currency of contract		
B	SCOPE OF CONTRACT The works generally consist of demolition works of the walls, columns and steel deck in the main warehouse; construction of a suspended concrete slab and a concrete plinth; Wall finishes include plaster and paint works. Floor finishes are epoxy to the floor area and screed to the suspended slab. Repair works to also include repairs on the roof cover and repair to the gutters. Services include plumbing, drainage and electrical installation.		
C	FLOOR AREA Total floor area is 1,254 square meters and this is given for guidance only and without any warranty		
		Carried to Collections	
	Preliminaries Particular Matters <i>Proposed Office Interior Fit out for KRA - Phase 2</i>		

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Section No. 1		
Bill No. 1		
Particular Matters		
<u>COLLECTION</u>		
	Page No	Amount Kshs
Total Brought Forward from Page No.	7	
	8	
	9	
	10	
	11	
	12	
	</	

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Item	Description	Amount	
A	SAMPLES The Contractor shall furnish at his own cost any samples of materials or workmanship including concrete test cubes required for the works that may be called for by the PROJECT MANAGER for his approval until such samples are approved by the PROJECT MANAGER and the PROJECT ARCHITECT, may reject any materials or workmanship not in his opinion to be up to approved samples. The PROJECT MANAGER shall arrange for the testing of such materials as he may at his discretion deem desirable, but the testing shall be made at the expense of the Contractor and not at the expense of the PROJECT MANAGER. The Contractor shall pay for the testing in accordance with the current scale of testing charges laid down by the Directorate of Public Works. The procedure for submitting samples of materials for testing and the method of marking for identification shall be as laid down by the PROJECT MANAGER.		
B	GOVERNMENT ACTS REGARDING WORKS PEOPLE, E.T.O Allow for complying with all Government Acts, Orders and Regulations in connection with the employment of Labour and other matters related to the execution of the works. In particular the Contractor's attention is drawn to the provisions of the Factory Act 1950 and his tender must include for all costs arising or resulting from compliance with any Act, Order or Regulation relating to Insurances, pensions and holidays for workpeople or so the safety, health and welfare of the workpeople. The Contractor must make himself fully acquainted with current Acts and Regulations, including Police Regulations regarding the movement, housing, security and control of labour, labour camps , passes for transport, etc. It is most important that the Contractor, before tendering, shall obtain from the relevant Authority the fullest information regarding all such regulations and/or restrictions which may affect the information regarding all such regulations and/or restrictions which may affect the organization of the works, supply and control of labour, etc., and allow accordingly in his tender. No claim in respect of want of knowledge in this connection will be entertained.		
C	SECURITY OF WORKS, E.T.C The Contractor shall be entirely responsible for the security of all the works stores, materials, plant, personnel, etc., both his own and sub-contractors' and must provide all necessary watching, lighting and other precautions as necessary to ensure security against theft, loss or damage and the protection of the public.		
D	PUBLIC AND PRIVATE ROADS Maintain as required throughout the execution of the works and make good any damage to public or private roads arising from or consequent upon the execution of the works to the satisfaction of the local and other competent authority and the PROJECT MANAGER		
	Carried to Collections		
	Preliminaries General Matters Proposed Office Interior Fit out for KRA - Phase 2		

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Item	Description	Amount	
A	GUARANTEES AND MAINTENANCE INSTRUCTIONS/MANUALS The Contractor shall obtain and hand over to the Architect on Practical Completion all relevant guarantees, any operating and maintenance instruction manuals, data or instructions required by the Architect or provided by manufacturers, suppliers or Sub-Contractors. The Contractor shall ensure that all warranties and guarantees received fully ceded to the Employer on Final Completion, failing which the release of Surety Bond will be withheld until this is satisfactorily completed. The guarantees shall state that workmanship, materials and installations are guaranteed for a specified reckoned from the date of Practical Completion of the Works and that any defects in the workmanship, materials and installation that may arise during that period shall be made good at the expense of the firm doing the work upon written notice from the Architect or the Employer to do so.		
B	REMOVAL OF RUBBISH, E.T.C. Removal of rubbish and debris from the Buildings and site as it accumulates and at the completion of the works and remove all plant, scaffolding and unused materials at completion.		
C	WORK TO BE DELIVERED UP CLEAN Clean and flush all gutters, rainwater and waste pipes, manholes and drains, wash (except where such treatment might cause damage) and clean all floors, sanitary fittings, glass inside and outside and any other parts of the works and remove all marks, blemishes, stains and defects from joinery, fittings and decorated surfaces generally, polish door furniture and bright parts of metalwork and leave the whole of the buildings watertight, clean, perfect and fit for occupation to the approval of the PROJECT MANAGER.		
D	GENERAL SPECIFICATIONS For the full description of materials and workmanship, method of execution of the work and notes for pricing, the Contractor is referred to the Ministry of Roads and Public Works and Housing General Specification dated 1976 or any subsequent revision thereof which is issued as a separate document, and which shall be allowed in all respects unless it conflicts with the General Preliminaries, Trade Preambles or other items in these Bills of Quantities.		
		Carried to Collections	
	Preliminaries General Matters <i>Proposed Office Interior Fit out for KRA - Phase 2</i>		

Carried to Collections 16

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SPECIFICATIONS

Specification of Materials and Workmanship

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GENERAL DESCRIPTION OF MATERIALS AND WORKMANSHIP

Notes for preparing Specifications

- 1.0 Specifications must be drafted to present a clear and precise statement of the required standards of materials, and workmanship for tenderers to respond realistically and competitively to the requirements of the Employer and ensure responsiveness of tenders. The Specifications should require that all materials, plant, and other supplies to be permanently incorporated in the Works be new, unused, of the most recent or current models, and incorporating all recent improvements in design and materials unless provided otherwise in the Contract. Where the Contractor is responsible for the design of any part of the permanent Works, the extent of his obligations must be stated.
- 2.0 Specifications from previous similar projects are useful and may not be necessary to re-write specifications for every Works Contract.
- 3.0 There are considerable advantages in standardizing General Specifications for repetitive Works in recognized public sectors, such as highways, urban housing, irrigation and water supply. The General Specifications should cover all classes of workmanship, materials and equipment commonly involved in constructions, although not necessarily to be used in a particular works contract. Deletions or addenda should then adapt the General Specifications to the particular Works.
- 4.0 Care must be taken in drafting Specifications to ensure they are not restrictive. In the Specifications of standards for materials, plant and workmanship, existing Kenya Standards should be used as much as possible, otherwise recognized international standards may also be used.
- 5.0 The Employer should decide whether technical solutions to specified parts of the Works are to be permitted. Alternatives are appropriate in cases where obvious (and potentially less costly) alternatives are possible to the technical solutions indicated in tender documents for certain elements of the Works, taking into consideration the comparative specialized advantage of potential tenderers.

The Employer should provide a description of the selected parts of the Works with appropriate reference to Drawings, Specifications, Bills of Quantities, and Design or Performance criteria, stating that the alternative solutions shall be at least structurally and functionally equivalent to the basic design parameters and Specifications.

Specification of Materials and Workmanship Specifications

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Such alternative solutions shall be accompanied by all information necessary for a complete evaluation by the Employer, including drawings, design calculations, technical specifications, breakdown of prices, proposed construction methodology, and other relevant details. Technical alternatives permitted in this manner shall be considered by the Employer each on its own merits and independently of whether the tenderer has priced the item as described in the Employer's design included with the tender documents.

Specification of Materials and Workmanship

Specifications

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The following apply to all sections hereafter

ALTERATIONS, ADDITIONS AND EXTENSIONS

In alterations or extensions to existing buildings and/ or external works, new work is to match up in all respects to the existing work unless otherwise specified, shown on the Drawings or approved before - hand by the Architect.

QUALITY, SAMPLES, TESTING AND APPROVAL

MATERIALS

Materials, commodities, components and equipment are to be new and unused unless otherwise specified. Handle, store, fix and protect all commodities with care to ensure that they are in perfect condition when incorporated into the work and handed over on completion.

MANUFACTURER'S RECOMMENDATIONS

Handle, store and fix every commodity strictly in accordance with the printed or written recommendations of the manufacturers'

STANDARDS

Where commodities or workmanship are specified by reference to British Standards (B.S) or Codes of Practice (C.P) or International (I.S.O) or other standards, such standards are deemed to be the latest published at the time of tendering. The contractor will be deemed to have read and understood the standards specified, and no claim for want of knowledge will be allowed. The substitution of commodities or standards of workmanship complying with other standards may be allowed at the discretion of the Architect, but application for permission for such substitution must be made in writing in sufficient time to allow adequate investigation. Obtain Certificates of Compliance with standards and supply to the Architect on request.

LOCAL CONDITIONS

All materials, conditions, components and equipment must be suitable for use in tropical climates

SAMPLES

Where samples of conditions or specimens of finished work are specified, submit samples or specimens to the Architect and obtain his approval before confirming orders or carrying out the work. Retain approved samples and specimens on Site for Comparison with the finished work. Finished work must conform in all respects with the samples or specimens approved. Remove samples and specimens no longer required. The cost of supplying samples and specimens must be borne by the Contractor, but specimens may form part of the finished work where approved by the Architect

Specification of Materials and Workmanship

Specifications

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Tender No.: KRA/HQS/NCB-011/2020-2021

Bill of Quantities

Specification of Materials and Workmanship
Specifications

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DEMOLITIONS AND ALTERATIONS

GENERALLY

The contractor is required to visit the existing buildings and ascertain for himself the nature of the works and no claim arising from lack of knowledge in this respect will be entertained. The dimensions and quantities given in this section are approximate and the Contractor is referred to the site to ascertain the exact nature and extent of the works.

The items of pulling down and alterations are to include for both labour and materials and for any shoring, needling and strutting and temporary works in connection therewith. The contractor must allow in his pricing for making good all works disturbed in all trades and for carting away all rubbish.

The contractor must give all the necessary notices and must exercise due care in the demolitions. He must not collapse large sections of walls, floors e.t.c, and must provide all necessary shoring and supports during the demolitions

During demolition works the contractor shall keep the debris constantly watered to minimize the dust arising and this shall be included in his prices.

All materials arising from demolitions, unless specifically stated otherwise, are to become the property of the Contractor and any credit allowed for the value of such materials shall be shown in the space provided.

All materials, including rubbish, shall be removed from the site as soon as possible.

The contractor is to erect dust-proof screens to the approval of the Architect where deemed necessary and to remove them on completion of the work, all to the Architect's satisfaction.

INTERPRETATIONS OF TERMS

"Demolish" shall be deemed to mean cutting away, breaking up, demolishing, pulling down, taking down, removing, etc., as the context requires and shall include in all cases temporarily strutting and supporting and making good remaining work as necessary, and clearing away and removing from site all debris, etc.

"Remove" shall mean taking down, hacking up, breaking down, removing etc. and clearing away from site and all other expenses thereby entailed

"Make good" shall be deemed to mean all making good, fitting facing up, plastering, paving, repairing and painting to match and jointing to remaining existing work.

To "match" shall mean to be equal to relevant existing work in design, workmanship and all other respects.

"Re-fix" shall apply to existing materials arising from the Works and shall mean take from store and fix in new position, including making good, repairing and adjusting as necessary.

Specification of Materials and Workmanship

Specifications

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UNDERPINNING

FOUNDATIONS

The following sequence of construction will be followed for any underpinning work to foundations:

- a) Excavate under foundation footing to a length of 1000 mm by 500 mm wide by 500 mm deep, 2000 mm centers.
- b) Fill the excavated cavity with concrete mix 1:3:6
- c) Allow the concrete to set for two days.
- d) Repeat the above operation for the next panels until the whole foundation is underpinned.
- e) Break off the projecting foundation and leave flush with mass concrete surface.

SUPPORT TO EXISTING SLAB

- a) Prop up the first floor slab next to the wall to be demolished until new walling or column is built to carry universal beam.
- b) Erect in position universal beam to support existing slab as designed.
- c) Remove props seven days after erection of the beam.

Specification of Materials and Workmanship

Specifications

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EXCAVATIONS

EXAMINE THE SITE

The Contractor is assumed to have examined the site carefully and ascertained, for himself its nature and the kind of materials to be excavated.

EXCAVATIONS

Excavations shall be to the widths and depths indicated on the Drawings or to such lesser or greater depths as the Architect may deem necessary and so instruct the Contractor in order to obtain satisfactory foundations.

Any difference in the quantity of work actually executed under such instruction and that provided in the Bills of Quantities shall be measured and valued by the Surveyor as a Variation under the relevant Conditions to Contract.

If, however, the Contractor excavates to any greater depths and widths than are shown on the Drawings or directed, then the Contractor shall, at his own expenses, satisfactorily fill in such extra depth and width with concrete similar to that described for foundations.

BOTTOMS OF EXCAVATIONS TO RECEIVE FOUNDATIONS

The contractor shall report to the Architect when secure bottoms to the excavations have been obtained. Any concrete or other work executed

SIDES OF EXCAVATIONS

Sides of excavations shall be maintained vertical by means approved by the Architect, and the Contractor shall also allow for keeping same free from fallen materials in his rates for excavations.

The Contractor shall also allow for keeping excavations free from, water and mud by baling, pumping or otherwise, in his rates for excavations

Specification of Materials and Workmanship

Specifications

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ROCK

Excavation in rock shall conclude all material, which can be removed by hand and does not necessarily require the use of compressors or other mechanical equipment although the Contractor may use such equipment to loosen the material for ease of its removal. All topsoils, black cotton and other clay soils, murrum and other fill and all similar materials will not be classified as rock.

Rock has been measured hereafter as extra over excavation for excavating in soft or hard rock.

Soft rock shall be deemed to mean any material which cannot reasonably be removed without the use of mechanical plant such as rippers, compressors, traxcavators, but which does not require drilling, wedging or blasting. Local tuffs, magadi highly consolidated laterite, weathered lavas, boulders or outcrops of harder rock not exceeding one cubic meter in volume, Nairobi building stone and similar material shall be classified as soft rock.

Hard rock shall be classified as material which is massive and geologically homogeneous and which requires the use of drilling, wedging geologically homogeneous or blasting for its removal such as black trap or similar material.

The Engineer's decision shall be final with regard to the classification of excavated materials.

STARTING LEVEL

Unless otherwise described the starting level of all excavations has been measured from the level remaining after completion of reduced level excavation. However, the Contractor's prices should include for carrying out the excavation work in any alternative sequence that he may require

BLASTING

No blasting will be permitted without the prior approval of Local Authorities and the Architect.

CART AWAY

All surplus excavated materials where so directed and all rubbish are to be removed from the site and the Contractor is to find his own dump and shall pay all charges

BORROW PITS

No borrow pits will be allowed to be opened on the site.

Specification of Materials and Workmanship

Specifications

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FILLING OBTAINED FROM THE EXCAVATIONS

Filling obtained from surplus excavated materials will only be incorporated if suitable material arises and is to be free from all weeds, roots, vegetable soil or other unstable materials and is to be filled in layers each of not more than 250 mm finished thickness. Each layer to be well wetted and consolidated as described hereafter.

HARDCORE FILLING

Hardcore for filling under floors, etc., shall be good hard stone ballast or quarry waste to the approval of the Architect broken to pass not greater than a 150 mm ring or to be 75% of the finished thickness of the layers being compacted, whichever is the lesser. Hardcore shall be free from all weeds, roots, vegetable soil, clay, black cotton soil or other unstable materials.

It shall be well graded with smaller stones and fine materials to give a dense compact mass after consolidation. Sufficient fine material shall be added to each layer to give gradation of material as necessary to obtain a solid compact mass after rolling. Hardcore filling is to be laid in layers each of a consolidated thickness not exceeding 250 mm. Each layer shall be compacted at least 8 passes of a 10 tonne smooth-wheeled roller or a 2 tonne vibrating roller until all movement ceases. Sufficient water is to be added to obtain maximum compaction to the Architect's approval. To each layer a 25 mm thick layer of sand complying with the specification for fine aggregate for concrete shall be spread over the surface and forced into the hardcore by the use of a vibrating roller weighing not less than 2 tonnes; this operation should be carried out when the materials are dry and repeated whilst the sand is well watered. Should all the sand be absorbed the Architect may require a further layer to be applied and the process repeated.

The top surface of the hardcore shall be leveled or graded to fall as required, and shall be blinded with a layer of similar material broken to 25 mm gauge and finished with a 10 ton smooth-wheeled roller.

The surface so obtained shall be to the Architect's approval

MATERIALS FOUND IN EXCAVATIONS

No, sand, aggregate, murram or other material found in the excavations is to be used in the Works without the written permission of the Architect.

Specification of Materials and Workmanship

Specifications

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RATES FOR EXCAVATIONS

The rates for excavation, including excavation in rock, **MUST INCLUDE** for trimming, leveling and preparing bottoms and all faces to receive concrete, etc., and for any extra excavation required for planking and strutting.

Prices shall, include for excavating in any material encountered unless specifically otherwise described, handling etc., of extra bulk after excavating, or before consolidating, any extra excavation required for formwork or planking and strutting, circular work, grubbing up any old drains, roots, etc., that may be encountered, for trimming sides and leveling and ramming bottoms, forming steepplings and trimming excavation or filling to embankments and batters as required.

In his prices for the item “Allow for keeping the whole of the excavations “free from water” the Contractor shall allow and make provisions for keeping the whole of the Works thoroughly drained and clear of water below the lowest level of any part of them so long as may be required and if considered necessary by the Architect, continuously day and night by petrol or hand pumps or other mechanical appliances, pipes, chutes, dams, manholes, sumps, diversions or any other means necessary for that purpose. Water pumped from the trenches shall not be allowed to run down the road channels but shall be conveyed to the nearest surface water sewer, ditch or river through troughs, chutes or pipes

RATES FOR DISPOSAL

Rates for disposal of excavated material are to include for the selection of spoil as it arises and for all double handling and re-excavation from spoil heaps not specifically ordered by the Architect.

DIOTHENE SHEETING

Diothene sheeting shall be 500 gauge or 1000 gauge as shown, and as produced by Plastics Africa Limited, or other equal and approved. Joints in sheeting shall be treble folded with 150 mm fold and taped at 300 mm intervals with 50 mm wide black plastic adhesive tape as manufactured by Cellotape Limited. The sheeting shall not be stretched but shall be laid loose with sufficient wrinkles to permit shrinkage up to 15%.

CUTTING DOWN TREES

The Contractor must consult the Architect before cutting down or pruning any trees or shrubs encountered on the site.

Specification of Materials and Workmanship

Specifications

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CONCRETE WORK

ARCHITECT/ENGINEER

For the purposes of the concrete structure the Structural Engineer, hereafter referred to as “the Engineer” shall be deemed invested with the duties and be the representative of the Architect.

CODE OF PRACTICE

All workmanship, materials, tests and performances in connection with the reinforced concrete work are to be in conformity with the latest edition of the British Standard Code of Practice (C.P. 8110 for “The Structural use of concrete”) where not inconsistent with these Preambles.

SUPERVISION

A competent person approved by the Engineer shall be employed by the Contractor whose duty it will be to supervise all stages in the preparation and placing of the concrete. All cubes shall be made and site tests carried out under his direct supervision, in consultation with the Engineer.

CONTRACTOR’S PLANT, EQUIPMENT AND CONSTRUCTION PROCEDURES

Not less than 30 days prior to the installation of the Contractor’s plant and equipment for processing, handling transporting, storing and proportioning ingredients, and for mixing, transporting and placing concrete, the Contractor shall submit drawings for approval by the Engineer, showing proposed general plant arrangements, together with a general description of the equipment he proposes to use.

After completion of installation, the operation of the plant and equipment shall be subject to the approval of the Engineer.

Where these preambles, the Bills of Quantities or the Drawings require specific procedures to be followed, such requirements are not to be construed as prohibiting use by the Contractor of alternative procedures if it can be demonstrated to the satisfaction of the Engineer that equal results will be obtained by the use of such alternatives.

Approval of plant and equipment or their operation, or of any construction procedure, shall not operate to waive or modify any provision or requirements contained in these Preambles governing the quality of the materials or of the finished work.

Where suspended floor slabs are to be constructed without expansion joints, concreting is to be in panels of size and positions to the approval of the Engineer. To permit setting shrinkages to occur, some panels will be left unconcreted until 7 days or more after main areas have been concreted. The contractor must include for this method of construction in his pricing.

Specification of Materials and Workmanship

Specifications

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TOLERANCES

On all setting out dimensions of 5 metres and over a maximum non-accumulative tolerance of plus or minus 5 millimeters will be allowed. On all setting out dimensions under 5 meters a maximum non-accumulative tolerance of plus or minus 3 millimeters will be allowed. On the cross-sectional dimensions of structural members, unless otherwise required by the Drawings, a maximum tolerance of plus or minus 3 millimeters will be permitted.

The top surface of concrete floor slabs and beams shall be within 6 millimetres of the normal level and line shown on the Drawings. Columns shall be truly plumb and non-accumulative tolerance of 3 millimetres each storey and not more than 15 millimetres out of plumb in their full height will be permitted. The Contractor shall be responsible for the cost of all corrective measures required by the Engineer to rectify work, which is not constructed within the tolerances set out above

MATERIALS GENERALLY

All materials which have been damaged, contaminated or have deteriorated or do not comply in any way with the requirements of these Preambles shall be rejected and shall be removed immediately from the site at the Contractor's expense. No materials shall be stored or stacked on floors without the Engineers' prior approval.

The sources of supply for all materials used for concrete work shall be approved by the Engineer before these materials are delivered on the site. All materials shall comply with the requirements of the latest whose approval shall be obtained in writing.

The suppliers of materials shall give the Engineer access to their premises when directed for the purpose of obtaining samples of the materials for testing

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SAMPLES

Samples of materials shall be submitted as soon as possible after the contract is let. No deliveries in bulk shall be made until the samples are approved by the Engineer. All condemned materials shall be removed from the site within 24 hours.

Every facility shall be provided to enable the Engineer to obtain samples and carry out tests on the materials and construction. If these tests show that any of the materials or construction do not comply with the requirements of this specification, the contractor will be responsible for the costs of the tests and the replacement of defective materials and/or construction.

Samples of all materials proposed to be used shall be submitted to the Engineer and shall be tested, where required, by the materials branch of the Ministry of Works or other approved testing place, and receive his approval prior to being delivered in bulk upon the Works.

The contractors' attention is drawn to the fact that the testing of samples of aggregate, sand and cement by the materials branch, M.O.W, takes time and it is of the utmost importance that the samples should be submitted for testing as soon as possible after the letting of the Contract. The ministry will not accept any responsibility whatsoever for delay in the commencement of the Contract due to delay on the part of the Contractor in submitting samples

CEMENT

Cement, unless otherwise specified, shall be Portland cement of a brand approved by the Engineer and shall comply with the requirements of B.S. 12 with the expectation that it may contain reactive volcanic ash (of not more than 10% of the total weight) and the quantity of insoluble residue permitted in B.S. 12 may be exceeded. A manufacturers' certificate of Test in accordance with B.S 12 shall be supplied for each consignment delivered to site.

Should the contractor require to use cement of the rapid hardening variety, he shall obtain the approval

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AGGREGATES

The aggregates shall conform with the requirements of B.S. 882 and the sources and types of all aggregates are to be approved in all respects by the Engineer before work commences.

The grading of aggregates shall be one within the limits set out in B.S. 882 and as later specified and the grading, once approved, shall be adhered to throughout the Works and not varied without the approval of the Engineer. Fine aggregate shall be clean, coarse, siliceous sand of loam, dust, salt, organic matter and any other deleterious substances. It shall be graded within the limits of Zone 1 or 2 of Table 2 of B.S. 882

Course aggregate shall be good, hard, clean approved black trap or similar stone, free from dust, decomposed stone, clay and earthy matter foreign substances or friable thin elongated or laminated pieces. It shall be graded within the limits of Table 1 of B.S. 882 for its respective nominal size.

If in the opinion of the Engineer the aggregate meets with the above requirements but is dirty or adulterated in any manner it shall be screened and/ or washed with clean water if he so directs at the Contractor's expenses.

Aggregates shall be delivered to the site in their prescribed sizes or grading and shall be stockpiled on paved areas or boarded platforms in separate units to avoid intermixing. On no account shall aggregates be stockpiled on the ground

WATER

The water used for mixing concrete shall be from an approved source, clean, fresh and free from harmful matter and comply with the requirements of B.S. 3148

READY-MIXED CONCRETE

Ready-mixed concrete may only be used with the prior permission of the Engineer, subject to special additional conditions laid down by the Engineer

CONCRETE MIXES

Concrete mixes have been described either by the volumetric proportions or by the 28-day cube strength.

CONCRETE STRENGTHS

Concrete mixes shall have the following minimum strengths as given by Works Cube Tests: -
Minimum Crushing Strength at 28 days

	N/mm ²
Grade A	33
Grade B	28
Grade C	22.5
Grade D	22.5

The average strength obtained from cube tests shall be 10% higher than the minimum strengths shown above.

Works Cube Tests will not be required for Grade E blinding concrete which shall comprise 1:4:8 by volume.

Volumetric mixes shall comprise the following: -

	Cement/Kg	Fine Aggregate/CM	Coarse Aggregate/CM
1:1:2	50	0.03	0.07
1:1:5:3	50	0.05	0.10
1:2:4	50	0.07	0.14
1:3:6	50	0.10	0.20
1:4:	50	0.13	0.26

MEASURED PROPORTIONS OF CONCRETE

Cement

The quantity of cement shall be measured by weight. Where delivered in bags, each batch of concrete is to use one or more whole bags of cement.

Aggregates

Concrete aggregates shall be measured by weight in a weigh-batching machine.

Weigh batching machines shall be of an approved type and shall be properly maintained and checked for accuracy at regular intervals

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CONCRETE GRADES A, B, C & D

The weights of fine and coarse aggregate to be used in concrete Grades A to D shall be limited in accordance with the table below. The proportions of fine to coarse aggregate and cement which the Contractor proposes to use for each of the mixes specified shall first be approved by the Engineer. The Contractor will then be required to prepare Preliminary Test Cubes and have these cubes tested as described for Work Cube Tests. The test results should be submitted to the Engineer in sufficient time for further tests to be carried out should they prove unsatisfactory. Cube strengths in the Preliminary tests must show Crushing Strengths at least 25% higher than the strengths specified for Works Cube Tests. If the Contractor is unable to produce specified cube strengths, he will be required at his own cost to increase the cement content of the mix until satisfactory results are produced.

The Engineer may require at any time during the Contract the proportions of fine to coarse aggregate to be altered in order to produce a mix of greater strength or improved workability and providing that the total proportions of aggregate to cement remain unchanged, no claim for additional cost will be considered

MINIMUM CEMENT CONTENT

Concrete Grade	Minimum Cement Content by weight to combined Total weight of aggregate
Grade A	1 to 4.5
Grade B	1 to 5.5
Grade C	1 to 7
Grade D	1 to 7

WATER PROOF CONCRETE

Where water proof concrete is specified, “ Sealopruf Integral Water-proofing Compound” and “Sealoplaz Concrete Plasticiser” as manufactured by Sealocrete Group Sales Ltd, Atlantic Works, Hythe Road, London NW10 5RD, England, are to be added to the mixing water strictly in accordance with the Manufacturer’s instructions and at the rate of 0.50 litres and 0.25 litres respectively to each 50 kg. Bag of cement are to be used unless otherwise approved by the Engineer

EXPANSION JOINTING

Expansion joint filler shall be “ Flexcell” as manufactured by Expandite Ltd., or “Resilex” as manufactured by Evomastics Ltd., or other equal and approved

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JOINT SEALER

Sealers shall be either hot or cold applied. Hot applied sealers shall comply with B.S. 2499. Cold mastics shall be applied by gun and where more than 12 mm deep shall include filling with loose packing yarn to within 2 mm from the outer face. All joint sealers are to be approved by the Engineer prior to their use

WATERBAR

Waterbar shall be RVC water bar as manufactured by Expandite Ltd., or other approved type and shall be provided in the positions indicated on the Drawings.

Joints shall be heat welded in accordance with the manufacturers' instructions and where the waterbar is to be fixed vertically, metal clips as manufactured by the supplier of the waterbar or of other approved design shall be provided to suspend the waterbar from the reinforcement.

Where waterproof concrete is used the Contractor shall adhere strictly to the position and type of construction joints as detailed on the Drawings. Any deviation from this procedure or the provision of additional construction joints will require the prior approval of the Engineer and any additional waterbar so required will be at the Contractor's expense.

Formwork shall be designed with sufficient timber formers and blocking pieces to support the waterbar and to ensure that it is not displaced during concreting. In the case of horizontal joints in vertical walling and similar members the formwork shall be so constructed as to permit the starter or upstand of concrete surrounding the lower half of the waterbar to be poured in the same operation as the slab or other concrete from which it springs. Formwork to walls or similar members where the waterbar is positioned at the base of the lift shall have sufficient openings not less than 300 mm square at approximately 200 mm above the level of the waterbar to permit checking that the waterbar is correctly positioned and not displaced during concreting.

No concreting will be permitted to portions where upstand starters form an integral part until the formwork to the starter has been fixed and approved

TESTING EQUIPMENT

The Contractor shall provide the following equipment for carrying out control tests on site:

- (a) Straight edges 3 metres and 1 metre long for testing the accuracy of the finished concrete;
- (b) A glass graduated cylinder for use in the silt test for organic impurities in the sand;
- (c) Slump test apparatus;
- (d) Four 150 mm steel cube moulds with base plates and tamping rods to B.S. 1881

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WORK CUBES TESTS

Work Cubes are to be made at intervals as required by the Engineer in accordance with C.P. 114, and the Contractor shall provide a continuous record of the concrete work. The cubes shall be made in approved 150 mm moulds in strict accordance with the Code of Practice.

Three cubes shall be made on each occasion.

Each cube shall be marked with a distinguishing number (numbers) to run consecutively and the date, and a record shall be kept on site giving the following particulars: -

- (a) Cube No.
- (b) Date made.
- (c) Location in Work
- (d) 7-day Test; Date; Strength
- (e) 28-day Test; Date; Strength

Cubes shall be forwarded, carriage paid, to an approved Testing Authority, in time to be tested two at 7 days and the remaining one at the discretion of the Engineer. No cube shall be dispatched within 3 days of casting.

Copies of all Works Cube Tests shall be forwarded to the Engineer and one shall be retained on the site.

If the strengths required above are not attained, and maintained throughout the carrying out of the Contract, the Contractor will be required to increase the proportion of cement and /or substitute better aggregates so as to give concrete which does comply with the requirements of the contract. The Contractor may be required to remove and replace at his own cost any concrete which fails to attain the required strength ascertained by Works Cube Tests.

MIXING AND PLACING OF CONCRETE

The concrete shall be mixed only in approval power-driven mixtures of a type and capacity suitable for the work, and in any event not smaller than 0.40/0.28 cu.m. Capacity.

The mixer shall be equipped with an accurate water-measuring device. All materials shall be thoroughly mixed dry before the water is added and the mixing of each batch shall continue for a period of not less than two minutes after the water has been added and until there is a uniform distribution of the materials and the mass in uniform in colour.

The entire contents of the mixed drum shall be discharged before recharging. The volume of mixed materials shall not exceed the rated capacity of the mixer. Whenever the mixer is started, 10% extra cement shall be added to the first batch and no extra payment will be made on this account.

As a check on concrete consistency slump tests may be carried out and shall be in accordance with B.S. 1881. The Contractor shall provide the necessary apparatus and carry out such tests as are required. The slump of the concrete made with the specified water content, using dry materials, shall be determined and the water to be added under wet conditions shall be so reduced as to give approximately the same slump.

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The concrete shall be mixed as near to the place where it is required as is practicable, and only as much as is required for a specified section of the work shall be mixed one time, such sections being commenced and finished in one operation without delay. All concrete must be efficiently handled and used in the Works within twenty (20) minutes of mixing. It shall be discharged from the mixer direct either into receptacles or barrows and shall be distributed by approved means, which do not cause separation or otherwise impair the quality of the concrete. Approved mechanical means of handling will be encouraged, but the use of chutes for placing concrete is subject to prior approval of the Engineer.

Concrete shall be placed from a height not exceeding 1,500 mm directly into its permanent position and shall not be worked along the shutters to that position. Unless otherwise approved, concrete shall be placed in a single operation to the full thickness of slabs, beams, and similar members, and shall be placed in horizontal layers not exceeding 1,500mm deep in walls and similar members.

Concrete in columns may be placed to a height of 4 metres with careful placing and vibration and satisfactory results. Where the height of the column exceeds 4 metres suitable openings must be left in the shutters so that this maximum lift is not exceeded.

Concrete shall be placed continuously until completion of the part of the work between construction joints as specified hereinafter or of a part of approved extent. At the completion of a specified or approved part construction joint of the form and in the positions hereinafter specified shall be made. If stopping of concreting be unavoidable elsewhere, a construction joint shall be made where the work is stopped. A record of all such joints must be made by the Contractor and a copy supplied to the Engineer.

Any accumulation of set concrete on the reinforcement shall be removed by wire brushing before further concrete is placed.

The Contractor shall provide runways for concreting to the satisfaction of the Engineer. Under no circumstances will the runways be allowed to rest on the reinforcement.

Care shall be taken that the concrete is not disturbed or subjected to vibrations and shocks during the setting period.

Mixing machines, platforms and barrows shall be clean before commencing mixing and be cleaned on every cessation of work.

Where concrete is laid on hardcore or other absorbent materials, the base shall be suitable and sufficiently wetted before the concrete is deposited.

COMPACTION

At all times during which concrete is being placed the Contractor shall provide adequate trained and experienced labour to ensure that the concrete is compacted in the forms to the satisfaction of the Engineer.

Concrete shall not be placed at a rate greater than will permit satisfactory compaction nor to a depth

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greater than 400 mm before it is compacted.

During and immediately after placing, the concrete shall be thoroughly compacted by means of continuous tamping, spading, slicing and vibration. Vibration is required for all concrete of Classes 40, 35, 25 and 20.

Care shall be taken to fill every part of the forms, to work the concrete under and around the reinforcement without displacing it and to avoid disturbing recently placed concrete, which has begun to set.

Any water accumulating on the surface of newly placed concrete shall be removed and no further concrete shall be placed thereon until such water is removed.

Internal vibrators shall be a frequency of not less than 7,000 cycles per minute and shall have a rotating eccentric weight of at least 0.50 kg., with eccentricity of not more than 12 mm. Such vibrators shall visibly affect the concrete within a radius of 250 mm from the vibrator.

Internal vibrators shall not be inserted between layers of reinforcement less than one and one half times the diameter of the vibrators apart. Contact between vibrators and reinforcement and vibrators and formwork shall be avoided.

Internal vibrators shall be inserted vertically into the concrete wherever possible at not more than 500 mm centers and shall constantly be moved from place to place. No internal vibrator shall be permitted to remain in any one position for more than ten seconds and it shall be withdrawn very slowly from the concrete.

In consolidating each layer of concrete the vibrating head shall be allowed to penetrate and re-vibrate the concrete in the upper portion of the underlying layer. In the area where newly placed concrete in each layer joins previously placed concrete more than usual vibration shall be performed, the vibrator penetrating deeply at close intervals along these contacts. Layers of concrete shall not be placed until layers previously placed have been vibrated thoroughly as specified.

Vibrators shall not be used to move concrete from place to place in the formwork.

At least one internal vibrator shall be operated for every 1.5 cubic metres of concrete placed per hour and at least one spare vibrator shall be maintained on site in case of breakdown during concreting operations.

External formwork vibrators shall be of the high frequency low amplitude type applied with the principal direction of vibration in the horizontal plane. They shall be attached directly to the forms at not more than 1,200 mm centers.

In addition to internal and external vibration the upper surface of suspended floor slabs shall be leveled by tamping or vibrating to receive finishes. Vibrating elements shall be of the low frequency high amplitude type operating at a speed of not less than 3,000 r.p.m

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CONSTRUCTION JOINTS

Construction joints shall be permitted only at the positions pre-determined on the Drawings or as instructed on the site by the Engineer. In general they shall be perpendicular to the lines of principal stress and shall be located at points of minimum shear, viz., vertically at, or near, mid-spans of slabs, ribs and beams.

Suspended concrete slabs are generally to be cast using alternate bay construction in bays not exceeding 20 metres in length. No two adjacement bays are to be cast within a minimum period of 48 hours of each other. The joints between adjacent bays are to be in positions agreed with the Engineer.

Under no circumstances shall concrete be allowed to tail off, but it shall be deposited against stopping-off boards.

Before placing new concrete against concrete already hardened, the face of the old concrete shall be thoroughly hacked roughened and cleaned, and laitance and loose material removed there from, and immediately before placing the new concrete the surface shall be saturated with water and covered with a coat of mortar at least 25 mm in thickness composed of cement and fine aggregate in the proportions used in the concrete.

CURING AND PROTECTION

Care must be taken that no concrete is allowed to become prematurely dry and the fresh concrete must be carefully protected within two hours of placing from rain, sun and wind by means of Hessian sacking, polythene sheeting, or other approved means. This protective layer and the concrete itself must be kept continuously wet for at least seven days after the concrete has been place. The Contractor will be required to provide complete coverage of all fresh concrete for a period of 7 days. Hessian or polythene sheeting shall be in the maximum widths obtainable and shall be secured against wind. The Contractor will not be permitted and shall be secured against wind. The Contractor will not be permitted to use old cement bags, hessian or other material in small places.

Concrete in foundations and other underground work shall be protected from admixture with falling earth during and after placing.

Traffic or loading must not be allowed on the concrete until the concrete is sufficiently matured, and in no case shall traffic or loading be of such magnitude as to cause deflection or other movement in the formwork or damage to the concrete members. Where directed by the Engineer props may be required to be left in position under slabs and other members for greater periods than those specified hereafter.

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FAULTY CONCRETE

Any concrete which fails to comply with these preambles, or which shows signs of setting before it is placed shall be taken out and removed from the site. Where concrete is found to be defective after it has set, the concrete shall be cut out and replaced in accordance with the Engineer's instructions. On no account shall any faulty, honeycombed, or otherwise defective concrete be repaired or patched until the Engineer has made an inspection and issued instructions for the repair. The whole of the cost whatsoever, which may be occasioned by the need to remove faulty concrete, shall be borne by the Contractor

ROD REINFORCEMENT

The steel reinforcement shall comply with the latest requirements of the following British Standards: -

Hot rolled bars for the
reinforcement of concrete to B.S. 4449 (metric units)

Cold worked steel for the
reinforcement of concrete to B.S. 4461 (metric units)

The Contractor will be required to submit a test certificate of the rolling. Reinforcement shall be stored on racks above ground level. All reinforcement shall be free from loose mill scale or rust, grease, paint or other substances likely to reduce the bond between the steel and concrete

FABRIC REINFORCEMENT

To be electrically cross-welded steel wire mesh reinforcement to B.S. 4483, 1969 and of the size and weight specified

FIBREMESH REINFORCEMENT

Where fibremesh reinforcement is specified it shall be Fibremesh "FIBERMIX 7025" and Fibermix "HARBOURITE 6927" as manufactured by Fibremesh Europe Ltd., Smeckley wood close, Sheepbridge Chesterfield, S41 9PZ England and shall comply with British Board of Agreement (BBA) Certificate No. 92/2857 and shall be added the concrete mix in accordance with the manufacturer's instructions

FIXING ROD REINFORCEMENT

Reinforcement shall be accurately placed in position as shown on the Drawings, and before and during concreting, shall be secured against displacement by using No. 18 S.W.G. annealed binding wire or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers or metal hangers to ensure the correct position and cover.

No concreting shall be commenced until the Engineer has inspected the reinforcement in position and until his approval has been obtained and the Contractor shall give two clear days' notice of his intention to concrete.

The Contractor is responsible for maintaining the reinforcement in its correct position, according to the Drawings, before and during concreting. During concreting a competent steel fixer must be in attendance to adjust and correct the position of any reinforcement in its correct position of any reinforcement, which may be displaced. The vibrators are not to come into contact with reinforcement.

POSITION AND CORRECTNESS OF REINFORCEMENT

Irrespective of whether any Inspection and/or approval of the fixing of the reinforcement has been carried out as above, it shall be the Contractor's sole responsibility to ensure that the reinforcement complies with the details on the Drawings or Schedules and is fixed exactly in the positions shown therein and the positions to give the prescribed cover. The Contractor will be held entirely responsible for any failure or defect in any portion of the reinforced concrete structure and including any consequent delay, claims, third party claims, etc., where it is shown that the reinforcement has been incorrectly positioned or is incorrect in size or quantity with respect to the detailed Drawings or Schedules.

SPACER BLOCKS

Spacer blocks of approved size and shape made of concrete similar to that used in the surrounding construction and fixed to the reinforcement or formwork by No. 18 S.W.G. wires set into the spacer blocks or other approved means shall be provided where necessary to ensure that the requisite cover is obtained. Where hollow concrete block construction is used, spacer blocks are to be provided as shown on the Drawings. These will consist of concrete blocks as described above made to fit the width of the rib less 3mm tolerance and with single or double grooves (depending on the number of reinforcement bars used per rib) in the top surface with wire ties at each groove

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CONCRETE COVER TO REINFORCEMENT

Unless otherwise directed the concrete cover to rod reinforcement over main bars in any face shall be: -

Foundations against each face	75 mm
Foundations against blinding	50 mm
Columns	40 mm
Beams	25 mm
Slabs	15 mm

FIXING FABRIC REINFORCEMENT

The fabric shall be free from scale, rust, grease or other substance likely to reduce the bond between the steel and the concrete and shall be laid with minimum 300 mm laps and bound with No. 18 S.W.G. annealed iron wire.

FIXTURES

No openings, chases, holes or other voids shall be formed in the concrete without the prior approval of the Engineer. Details of any fixtures to be permanently built into the concrete including the proposed position of all electrical conduits 25 mm and over in diameter shall be submitted to the Engineer for his approval before being placed.

CHASES, HOLES, ETC. IN CONCRETE

The Contractor shall be responsible for the co-ordination with the Electrical and other Sub-Contractors for incorporating electrical conduit, pipes, fixing blocks, chases, holes and the like in concrete members as required and must ensure that adequate notice is given to such sub-contractors informing them when concrete members incorporating the above are to be poured. The Contractor shall submit full details of these items to the Engineer for approval before the work is put in hand. All fixing blocks, chases, holes, etc., to be left in the concrete shall be accurately set out and cast with the concrete

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POSITION OF ELECTRICAL CONDUIT

Unless otherwise instructed by the Engineer all electrical conduits to be positioned within the reinforced concrete shall be fixed inside the steel cages of beams and columns and between the top and bottom steel layers in slabs and similar members.

The proposed position is all electrical conduits 25 mm and over in diameter which are to be enclosed in the concrete shall be shown accurately on a plan to be submitted to the Engineer, whose approval shall be obtained before any such conduit is placed.

FORMWORK

The method and system of formwork, which the Contractor proposes to use, shall be approved by the Engineer before construction commences. Formwork shall be substantially and rigidly constructed of timber or steel or precast concrete or other approved material.

All timber for formwork shall be good, sound, clean, sawn well-seasoned timber, free from warps and loose knots and of scantlings sufficiently strong for their purpose

CONSTRUCTION OF FORMWORK

All formwork shall be of sufficient thickness and with joints close enough to prevent undue leakage of liquid from the concrete and fixed to proper alignment, level and plumb and supported on sufficiently strong bearers, shores, braces, plates, etc., properly held together by bolts or other fastenings to prevent displacement, vibration or movement by the weight of materials, men and plant on same and so wedged and clamped as to permit of easing and removal of the formwork without jarring the concrete. Where formwork is supported on previously constructed portions of the reinforced concrete structural frame, the Contractor shall by consultation with the Engineer ensure that the supporting concrete structure is capable of carrying the load and/or sufficiently propped from lower floors or portions of the frame to permit the load to be temporarily carried during construction.

Soffits shall be erected with an upward camber of 5 mm for each 5 metres of horizontal span or as directed by the Engineer.

Great care shall be taken to make and maintain all joints in the formwork as tight as possible, to prevent the leakage of grout during vibration. All faulty joints shall be caulked to the Engineers' approval before concreting.

The formwork shall be sufficiently rigid to ensure that no distortion or bulging occurs under the effects of vibration. If at any time the formwork is insufficiently rigid or in any way defective the Contractor shall strengthen or improve such formwork as the Engineer may direct.

The Contractors' attention is drawn to the various surface textures and applied finishes required and the faces of formwork next to the concrete must be of such material and construction and be sufficiently true to provide a concrete surface which will in each particular case permit the specified surface treatment or applied finish.

All surfaces which will be in contact with concrete shall be oiled or greased to prevent

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adhesion of mortar. Oil or grease shall be of a non-staining mineral type applied as a thin film before the reinforcement is placed. Surplus moisture shall be removed from the forms to placing of the concrete.

Temporary openings shall be provided at the bases of columns, wall and beam forms and at any other points where necessary to facilitate cleaning and inspection immediately before the pouring of concrete. Before the concrete is placed the shuttering shall be trued - up and any water accumulated therein shall be removed. All sawdust, chips, nails and other debris shall be washed out or otherwise removed within the formwork. The reinforcement shall then be inspected for accuracy of fixing. Immediately before placing the concrete the formwork shall be well wetted and inspection openings shall be closed. The erection, easing, striking and removing of all formwork must be done under the personal supervision of a competent foreman, and any damage occurring through faulty formwork or its incorrect removal shall be made good by the Contractor at his own expense.

After removal of formwork, all projections, fins, etc., on the concrete surface shall be chipped off, and made good to the requirements of the Engineer. Any or honeycombing shall be treated as described in "Faulty Concrete".

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STRIPPING FORMWORK

All formwork shall be removed without undue vibration or shock and without damage to the concrete. No formwork shall be removed without the prior consent of the Engineer and the minimum periods that shall elapse between the placing of the concrete and the striking of the formwork will be as follows: -

Beam sides, wall and columns (unloaded)	2 days
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Slab soffits (props left under)	3 days
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Beam soffits (props left under)	7 days
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Removal of props (partly subject to 7 days concrete cube strength being satisfactory) to: -

Slabs	10 days
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Beams	14 days
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Cantilevered beams and slabs	28 days
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If the contractor wishes to take advantage of the shorter stripping times permitted for beam and slab soffits when props are left in place, he must so design his formwork that sufficient props as agreed with the Engineer can remain in their original positions without being moved in any way until expiry of the minimum time for removal of props. Stripping and re-propping will not be permitted.

The above times may be reduced in certain circumstances, at the discretion of the Engineer, provided an approved method is adopted at the Contractor's expense to ensure that the required concrete strength is attained before the forms are stripped.

Solid strips in composite slabs shall be considered as beams. The tops of retaining walls shall be adequately supported with stout raking props at intervals required by the Engineer. These props are not to be removed until 7 days after casting of the floor slab over.

SUPPORTING PROPS TO WALL AND BEAM SOFFITS

Where directed by the Engineer supporting props to wall and beam soffits are to be left in position until completion of the whole of the reinforced concrete structure.

The props are to be to the approval of the Engineer and the Contractor must submit the suggested method of propping to the Engineer prior to removal of formwork to the relevant surfaces.

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EXPOSED CONCRETE FINISHES

GENERAL

Contractors will be required at an early stage in the Contract, to prepare samples for the approval of the Architect of the various concrete finishes specified hereafter. Samples are to be prepared using the same materials and the same methods of Construction, compaction, curing, etc., as the Contractor proposes to use for executing the full quantity of the work.

A record of the mix, water content, method of compaction, any additives used, etc., is to be kept for each sample prepared. When the Architect has approved a sample it will be kept on site in an approved location. The finishes in construction will be expected to be up to a standard equal to the approved sample. The Contractor is to include for all costs in preparing samples in his rates for that respective finish.

Consistency in cement colour and colour, grading and quality of aggregates must be maintained in all finished concrete work.

TAMPED FINISH

Areas so specified shall be finished at the time of casting with a tamped finish to Architect's approval, produced by an edge board. Board marks are to be made to a true pattern and will generally be at right angles to the traffic flow. Haphazard or diagonal tamping will not be accepted

CHAMBERS AND REBATES TO EXPOSED CONCRETE

Wherever concrete surfaces are to remain exposed and otherwise where specified or shown on the Drawings, rebates and chamfers are to be provided at junctions, corners, and changes in direction of concrete members.

Rebates and chamfers are to have a fair face finish.

Unless otherwise instructed concrete pours to columns and to other members where applicable are to terminate only at the pre-determined rebate positions.

FAIR FACE

Fair face surfaces shall be clean, smooth, even, true to form, line and level, and free from all board marks, joint marks, honeycombing, pitting, and other blemishes. Forms are to be provided with a smooth lining of plywood, steel, or other approved material, which will achieve the required finish without any general rubbing down. Rubbing down will only be permitted to remove any projecting fins at corners or joints

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FINE FACE

Fine face surfaces shall be as above but to a higher standard obtained from forms provided with an impervious sheet lining of metal or plastics faced plywood in large panels arranged in an approved pattern. Rubbing down shall only be permitted after inspection by the Engineer. The finished surface shall be capable of receiving a painted finish

BRUSHED CONCRETE FINISH

Brushed concrete finish shall be provided to precast concrete members where specified or shown on the Drawings.

The surface is to be sprayed with water and brushed within 2 hours of casting to expose the aggregate to an extent to be approved by the Architect.

The brushed face will generally be contained within a surround of fair face concrete and the Contractor is to allow for retaining the fair face forms or otherwise protecting the surround whilst achieving the brushed finish

BOARD-MARKED FINISH

The required finish is to be a board-marked pattern and the boards are to be arranged vertically or horizontally to the patterns shown on the Drawings or as otherwise agreed by the Architect.

Formwork shall be made from timber of sufficiently strong grain to the Architect's approval in matching widths with straight sawn staggered joints. Short make-up lengths will not be permitted and boards shall generally be in the longest lengths practical. Construction joints shall be at predetermined positions and at recesses where so detailed

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CHISEL-DRESSED FINISH

Chisel-dressed finish is to be carried out on any grade of concrete but not until it is at least 30 days old.

The surfaces are to be fully chisel-dressed to remove a maximum of 12 mm (average 9 mm) of the surface by shearing and exposing the aggregate without excessive cracking of the surrounding matrix.

Arises of columns, beams, etc., are pre-formed fair face with timber fillets (which have been measured separately) set in the formwork and care must be taken in working up these to preserve a clean line.

For vertical surfaces of walls and columns particular care must be taken to remove all sharp projections. For beam soffits this requirement is not necessary.

All surfaces requiring this treatment are to have the margins chisel-dressed by hand for a minimum width of 75 mm commencing from the fillet edge. Thereafter mechanical chisel-dressing may be used but the Contractor must ensure that a uniform texture and even plane surface is achieved.

The use of sharply pointed steel tools for both hand and mechanical chisel-dressing is essential.

Upon completion the surfaces are to be thoroughly wire brushed and washed down.

PROTECTION OF FINISHES

Wherever possible, in-situ exposed concrete finishes should be commenced at the highest level and worked progressively down the building.

Precaution shall be taken to avoid staining or discolouration of previously finished concrete faces by leakage of grout from newly place concrete. The Contractor shall during all stages of construction adequately protect all concrete finishes from damage by leaking grout, knocking, paint stains, falling plaster, etc. In case of balustrade walls to staircases and members where damage is otherwise likely, concrete finishes shall be protected by cladding with timber, celotex, or other approved sheeting. All Sub-contractors shall be informed accordingly on the precautions to be taken

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PRECAST CONCRETE

PRECAST CONCRETE

The maximum size of coarse aggregate in precast concrete shall not exceed 20 mm except for thickness less than 75 mm where it shall not exceed 10 mm.

The compaction of precast concrete shall conform with requirements given elsewhere in these preambles except for thin slabs where use of immersion type vibrators is not practicable. The concrete in these slabs may be consolidated on a vibrating table or by any other methods approved by the Engineer.

Steam curing of precast concrete will be permitted. The procedure for steam curing is used these times may be reduced subject to the approval of the Engineer.

Precast concrete units shall be constructed in individual forms. The method of handling the precast concrete units after casting, during curing and during transport and erection shall be subject to the approval of the Engineer, providing that such approval shall not relieve the Contractor of responsibility for damage to precast concrete units resulting from careless handling.

Repair of damage to the precast concrete units, except for minor abrasions of the edges, which will not impair the installation, and/or appearance of the units will not be permitted and the damage units shall be replaced by the Contractor at his own expense

Except where precast work is described as “fair face” the moulds shall be made of suitably strong sawn timber true in form to the shapes required. Unless otherwise described faces are to be left rough from the sawn moulds.

Where precast work is described as “fair face” the moulds are to be made of metal or are to have metal or plywood linings or are to be other approved moulds which will produce a smooth dense fairface to the finished concrete suitable to receive a painted finish direct and free from all shutter marks, holes, pinnacles, etc.

The precast units shall be installed to the lines, gradients and dimensions shown on the Drawings or as directed by the Engineer

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CONCRETE SURFACE BEDS

The Concrete shall be placed as soon as possible after being mixed. In transporting the concrete adequate precautions shall be taken to avoid damage to the prepared base. The concrete shall be spread to such a thickness that when compacted it shall have the finished thickness as specified or shown on the Drawings. A layer of concrete 50 mm less than the finished thickness shall first be spread or struck off at the correct level to receive the top fabric reinforcement. The top layer shall be added. Not more than 30 minutes shall elapse between spreading the bottom layer and the start of the compaction of the top layer. The Contractor shall be responsible for maintaining the reinforcement in its correct position during the placing and compaction of the concrete.

The compacting and finishing of the concrete shall be effected by immersion vibrators and a hand or mechanical tamper weighing not less than 10 kg per linear metre and having a tamping edge shod with a steel strip 75 mm wide fixed to the tamper by countersunk screws. Immersion vibrators with "spade" attachments will be permitted. Compaction shall be continued until a dense, scaled surface finish is achieved. Over-compaction causing an excessive amount of fines to be brought to the surface shall be avoided.

The surfaces of the concrete shall be finished with a wood float finish to the levels, falls and crossfalls, as directed or shown on the Drawings shall be subject to the following tolerances: -

1. The level shall be within + or - 6 mm of the levels directed.
2. The falls shall be within 10% of the falls directed.
3. The smoothness shall be such that departures from a 3 metre straight edge in any direction shall not exceed 3 mm.

Minor irregularities shall be made good by the use of a steel float but in no circumstances shall mortar be used to make good the surface. Before the concrete has finally set and after completion of the floating the concrete shall be brushed with a strong-headed broom to produce a grooved finish in parallel lines to the satisfaction of the Engineer.

As soon as the surface has been finished it shall be protected against too-rapid drying by means of damp Hessian, polythene sheeting or other approved means placed carefully on the surface and kept damp and in position for 7 days and the concrete shall be kept wet for a further 21 days. The most critical period is the first 24 hours after placing and curing during that time shall be very thorough. The Contractor is to obtain the Engineer's approval to the material and method he proposes to use for curing and no concreting will be permitted until sufficient such materials on site.

Forms shall not be removed from freshly placed concrete until it is at least 24 hours old. Care shall be taken that in their removal no damage is done to the concrete, but should any damage occur the Contractor should be responsible for making it good

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HOLLOW CLAY POTS

The hollow clay pots for suspended floor shall be manufactured by messrs. Clay works Ltd., P.O Box 48202, Nairobi and shall be suspended floor units size 350 mm x 300 mm x 230 mm deep. Care shall be taken in unloading, stacking and placing hollow pots in position. Damaged units shall not be incorporated in the works and shall be removed from site.

HOLLOW BLOCK SUSPENDED FLOORS

The hollow blocks shall be set out to the dimensions shown on the drawings. Slip tiles will not be required. Care shall be taken when placing and vibrating the concrete to avoid damage to or displacement of the pots

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NOTES CONCERNING PRICING

The Contractor must allow for all costs incurred during the progress of the contract for complying with the provisions concerning the preparation and use of graded mixes.

Prices for plain or reinforced concrete shall include for mixing, hoisting, depositing, compacting, curing and protection at the various levels required throughout the building, and shall also include for forming or hacking a satisfactory key for all faces receiving asphalt and plaster work. Prices for slabs shall include for forming construction joints at bay edges, including all necessary temporary formwork and supplying records of such joints to the Engineer.

Prices for steel rod reinforcement shall include for cutting to lengths and all labour in bending and cranking, forming hooked ends, handling, hoisting and fixing in position and for providing all necessary tying wire, spacer blocks and supports. Prices for fabric reinforcement shall include for all straight cutting and waste, handling, hoisting and fixing in position, providing all necessary tying wire, and supports and all extra material in laps

The prices for formwork shall include for extra material at joints, extra labour and waste for narrow widths, small quantities, overlaps, passings at angles, straight cutting and waste, splayed edges, notchings, etc., and for fixing at the various levels including battens, struts, and supports and for bolting, wedging, easing, striking and removal. Prices for linear items such as boxing shall include for angles and ends.

Prices of all precast concrete shall include for all moulds, finishing as described, handling, reinforcement, hoisting and fixing at the required levels and for casting or cutting to the exact lengths required and any waste resulting from such cutting.

Prices for expansion joints shall include for cutting to size and all temporary supports and prices for expansions joint sealers shall include for all temporary battens or fillets required to form the necessary grooves.

Prices for hollow concrete block suspended construction must be “ tall inclusive” to include for concrete hollow tiles, in-situ concrete ribs, concrete topping, concrete filling to open ends of hollow concrete tiles and solid concrete bearings and beams.

The Contractor is to allow in his prices for carrying out all tests as specified in this section apart from work cube tests for which a provisional item is included in the preliminaries section of these Bills of Quantities.

The prices for wrought formwork shall include for fair face finish either by rubbing down or by smooth lining, all as described in these Preambles.

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WALLING

STONE

Stone for walling shall be hard, dense, stone from an approved quarry with accurately dressed faces on all sides.

Stonewalling described as load bearing shall have a minimum crushing strength of 14.00 Newton per square millimeters and shall comply with C.P. 111: Part 2.

CONCRETE BLOCKS

All hollow or solid concrete blocks for general use shall comply with B.S. 2028, Type A and with C.P. III: Part 2, of minimum crushing strength of 3.5 Newtons per square millimetre, and must be obtained from any approved manufacturer, equal to samples deposited with and approved by the Architect.

Concrete block walling described, as load bearing shall have a minimum crushing strength of 7.0 Newtons per square millimetre.

All concrete blocks must be cured for a minimum period of four weeks before use and all testing of blocks is to be carried out by the Ministry of Works Materials Testing Laboratory

WALL REINFORCEMENT

All walling of thickness 150mm and less shall be reinforced with hoop iron 25mm wide or similar reinforcement centrally in every alternate joint (vertically for the full length of the walls, lapped and crimped 300 mm at running joints and full width of wall at angles and intersections).

WALL TILES

20 Gauge hoop iron ties 25 mm wide x 450 mm long to be provided for every alternate course at all connections between block walls and reinforced concrete columns or walls. One end to be cast into concrete and other end bent and built into mortar joint of walling

CHASING

Chasing in load-bearing walling of electrical conduit, pipes, etc., is to be kept to a minimum size of cut and positions and runs of chases are to be approved by the Architect before any cutting is commenced. Horizontal runs will not be permitted

CEMENT

The Cement shall be as described in "Concrete Work".

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SAND

The sand for mortars shall be described in “Concrete Work” except that it shall be fine sand.

LIME

The lime for plastering shall comply with B.S. 890, Class ‘A’ for non-hydraulic lime and shall be as rich as obtainable and to approval. It must be freshly burnt and shall be slaked at least one month before being used by drenching with water, well broken-up and mixed and the wet mixture shall be passed through a sieve of sixty four meshes to the square inch. Lime putty shall consist of freshly slaked lime as above described, saturated with water until semi-fluid and passed through a fine sieve; it shall then be allowed to stand until superfluous water has evaporated and it has become of the consistency of thick paste, in no case for a shorter period than one month before being used, during which it must be kept damp and clean and no portion of it allowed to become dry.

Alternatively, hydrated lime with 70% average calcium oxide content may be used and it must be protected from damp until required for use. It shall be soaked to putty at least 24 hours before use.

MORTARS

Cement mortar shall consist of one part of Portland cement, to three parts of sand by volume.

The cement/lime mortar shall consist of one part of Portland cement, one part of lime and six parts of sand by volume.

The ingredients of mortar shall be measured in proper gauge boxes on a boarded platform, the ingredients being thoroughly mixed dry, and again whilst adding water. In the case of cement/lime mortar the sand and lime shall be mixed first and then the cement added.

All mortar is to be thoroughly mixed to a uniform consistency with only sufficient water to obtain a plastic condition suitable for trowelling. No mortar that has commenced to set is to be used or remixed for use.

SETTING OUT

The Contractor shall provide proper setting out rods and set out on the same all work showing openings, heights, sills and lintels and shall build the various walls and piers to the thickness, widths and heights shown upon drawings. No part of the walling shall be carried up more than one metre higher at one time than any other part and in such cases the jointing shall be made in long steps so as to prevent cracks arising and all walls shall be leveled round at floor and wall heads

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BONDING WALLING

All blocks shall be properly bonded together and in such a manner that no vertical joint in any one course shall be within 100 mm of a similar joint in the courses immediately above and below. Alternative courses of walling at all angles and intersections shall be carried through the full thickness of the adjoining walls.

All perpend, reveals, quoins and other angles and joints of the walls, etc., shall be built strictly true and square.

LAYING AND JOINTING

All bricks and blocks are to be well wetted before laying and tops of walls where left off shall be well wetted before commencing building. All joints are to be 10 mm thick and flush up and grouted in solid as the work proceeds.

All exposed faces of walls for plastering are to be left rough and the joints raked out while mortar is green to form adequate key.

All other faces shall be cleaned down on completion with a wire brush or as necessary and mortar droppings, smear marks, etc., removed and rates must include for this

PUTLOG HOLES

All putlog holes shall be carefully, properly and completely filled up on completion of walling and before plastering is commenced

FAIR FACE

Walling described as fair-faced shall be built with selected blocks and pointed with neat flush joints. Stone walling shall be fine chisel dressed

BRICKS

All bricks shall be obtained from Clayworks Limited, P.O Box 45154, Nairobi, of all sizes as required and shall be hard, sound, square, well-burnt, uniform in shape and free from cracks, stones and other defects.

Samples of bricks shall be deposited and be approved by the Architect before being used and all subsequent bricks used in the Works shall be equal to the approved sample

DAMP-PROOF COURSES

Damp-proof courses shall be bituminous felt to B.S. 743 weighing 7 lbs. per square yard, free from tears and holes, and be laid with 150 mm minimum laps on and including a leveling screed of cement mortar

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PRICES TO INCLUDE

The rates for walling shall include for all reinforcement, all straight cutting, bonding, plumbing angles, forming reveals, pinning up to underside of concrete soffits and cutting up to sides of columns and building in ends of lintels and sills

BRICK WORK

Brickwork shall be built to a gauge of 4 courses to 340 mm of wall height including 10 mm bed joints.

Facing walls shall be built in stretcher bond and be tied to the block works or concrete-backing walls with 10 gauge galvanized wire wall ties, 500 mm girth, formed to a figure 8 and twisted together at the lap.

Three wall ties per square metre are to be used, wall ties for concrete backing walls shall be cast into the concrete including all temporary fixing to formwork.

Facing walls shall be pointed as the work proceeds. External walls shall have recessed joints and internal walls shall have flush joints. Facing walls shall be kept perfectly clean and no rubbing down of blockwork will be allowed

FAIR FACE

Walling described as fair faced shall be built with selected bricks and pointed with neat recessed joints.

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ROOFING

PREPARATION OF SURFACES

All surfaces to receive roofing shall be clean, dry, free from fins or projections and loose materials, and with cracks or voids filled with cement mortar.

LIGHTWEIGHT ROOF SCREEDS

Roof screeds will be executed to the approval of the Specialist Roofing Sub-Contractor and will consist of cement, sand and pumice (1:3:7) finished with 6 mm layer of cement and sand (1:4) topping. Screeds shall not be laid in areas exceeding ten square metres during any period of 24 hours. As bays are formed batten strips must be used to retain the exposed edge of the screed. Screeds shall be finished to falls and currents to receive roofing.

ASPHALT ROOFING

Asphalt roofing will be executed by an approved Specialist Roofing sub-contractor. Before any application of roofing, the Contractor is to ensure that all roof surfaces are thoroughly cleaned by sweeping.

Roofing asphalt to be B.S. 988/1966 Table 3, Column III, Tropical Mastic asphalt laid in two coats to a total thickness of 20 mm on and including black sheathing felt and finished with two coats aluminum paint to horizontal and vertical surfaces

GALVANISED CORRUGATED STEEL SHEETING

The roof sheathing shall be of the gauge specified and comply with B.S. 3083. The roof sheeting shall be laid and fixed with steel work hook bolts and nuts, steel roofing bolts and clips or steel roofing screws to B.S. 1494: Part 1.

GALVANISED LT5 LONG TROUGH STEEL SHEETS

Where specified the roof sheeting and fittings shall be 24 gauge LT5 galvanized steel long trough roofing as manufactured by MABATI LTD, P.O Box 46934, NAIROBI or other equal and approved manufacturer. The roof sheeting shall be laid and fixed with approved purpose made hook, bolts, washers, etc., to 'Z' purlins. Where so specified the roofing shall be pre-painted with a RESINCOT FINISH

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GALVANISED LT4 LONG TROUGH STEEL SHEETS

Where specified, the roof sheeting and fittings shall be 24 gauge IT4 roofing as manufactured by GALSHEET KENYA LTD, P.O Box 78162, NAIROBI OR other equal and approved manufacturer. The roof sheeting shall be laid and fixed with approved purpose made hook bolts, washers, etc. to 'Z' purlins. The ridge flashing sheets shall be IT4 profiled sheeting curved to the radii shown on the drawings. Where so specified the roofing shall be prepainted with a RESINCOT FINISH.

CORRUGATED ASBESTOS CEMENT ROOFING SHEETS

Where specified, the roof sheeting shall be as manufactured by Simbarite Ltd., P.O Box 90662, Mombasa. The roof sheeting shall be laid and fixed with approved hook bolts or roofing screws, complete with washers and caps

CONCRETE TILE ROOFING

Concrete single lap tiles and fittings shall be to B.S. 473 & 550 Part 2, Group B of the colour, finish, type size and manufacturer approved by the Architect. A full range of fittings must be available to match the tiles. Tiles shall be 380 x 230 mm nominal unless otherwise specified. Tiles and fittings must be true to shape and of uniform structure. Surface coatings shall be firmly bonded.

MANGALORE TILE ROOFING

Mangalore clay tiles shall be "best" or selected quality as manufactured by the Miritini Brick and Tile works.

Tiles shall be well wetted before use and all dropped or broken tiles shall be rejected before carrying.

Cutting of tiles, where necessary at hips or valleys, shall be carefully and neatly carried out with properly sharpened tools.

Tilling shall be executed to the Architects' satisfaction and roofs left watertight.

PROTECTION

All roof surfaces shall be kept clean and protected and handed over watertight at completion.

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CARPENTRY, JOINERY AND IRONMONGERY

ALL TIMBER

All timber shall be in accordance with the latest approved Grading Rules issued by the Government of Kenya (Legal Notice No. 35B). Timber for carpentry shall be SECOND (OR SELECT) GRADE and timber for Joinery shall be FIRST (OR PRIME) GRADE

GENERALLY

All timber as it arrives on the site shall be inspected by the Contractor, and any timber brought on the site and not complying with the Specification or not approved, must be removed forthwith from the site and only timber as approved shall be used in the works.

The Contractor shall upon signing the Contract purchase sufficient supplies of specified hardwoods to avoid possible shortages at a later date

SPECIES OF TIMBER

The following timber shall be use.

Standard Common Name	Botanical Name
Cypress	Cypress spp.
Podocarpus	Podocarpus spp.
Cedar	Juniperus procera
E.A. Camphor wood	Ocotea usambarensis
African Mahogany (Munyama)	Khaya anthotheca
Mninga	Pterocarpus Angolensis
Mvule	Chlorophora excelsa
Elgon Olive	Olea welwitschii

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TOLERANCES IN THICKNESS

Shall conform with the following extracts of Government of Kenya Grading Rules: -

(1) Hardwood Grading: (First and Second Grades)

- (a) 15 mm oversize on pieces up to 25 mm in thickness.
- (b) 3 mm oversize on pieces over 25 mm and up to 50 mm in thickness.
- (c) 6 mm oversize on pieces over 50 mm in thickness.

Undersize will not be permitted.

(2) Softwood Grading: Strength Grades (for Carpentry): First and Second Grades

Undersize not allowed.

Oversize: All timber to be sawn oversize by 1.5 mm for 25 mm thickness and width. Not more than 3 mm in thickness and not more than 6 mm in width.

(3) Soft wood Grading: Appearance Grades (for joinery)

First and Second Grades

All as for strength Grades above.

INSECT DAMAGE

All timber shall be free of live borer beetle or other insect attack when brought upon the site. The Contractor shall be responsible up to the end of the maintenance period for executing at his own cost of all work necessary to eradicate insect attack of timber which becomes evident, including the replacement of timber attacked or suspected of being attacked, notwithstanding that the timber concerned may have already been inspected and passed as fit for use.

SEASONING OF TIMBER

All timber shall be seasoned to moisture content of not more than 22% for carpentry and 15% for Joinery.

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PRESSURE IMPREGNATION PRESERVATIVE TREATMENT

All carpentry timbers, sawn joinery and timber grounds for fixing joinery shall be treated with pressure impregnated "Celcure" or "Tanalith" solution with a minimum nett retention of 0.35 lbs. of dry salt per cubic foot. If so required "charge sheets" issued after treatment with celcure B" or "Wolmanol" solution brushed on.

The Contractor's prices for such timber hereinafter must allow for the above treatment.

INSPECTION AND TESTING

The Architect shall be given facilities for inspection of all works in progress whether in workshop or on site. The Contractor is to allow for testing of prototypes of special construction units and the Architect shall be at liberty to select any samples he may require for the purpose of testing, i.e. for moisture content, or identification, species, strength, etc.; such tests will be carried out by the Forestry Department

CLEARING UP

The Contractor is to clear out and destroy or remove all cut ends, shavings and other wood waste from all parts of the buildings and the site generally as the work progresses and at the conclusion of the work.

This is to prevent accidental borer infestation and to discourage termites and decay

WORKMANSHIP

All carpenters' work shall be accurately set out in strict accordance with the Drawings and shall be framed together and securely fixed in the best possible manner with properly made joints; all brads, nails and screws, etc., shall be provided as necessary, directed and approved and the Contractors' prices shall allow for all the foregoing.

All workmanship shall be of the best quality.

All Carpenters' work shall be left with sawn surfaces except where particularly specified to be wrought.

DIMENSIONS

Dimensions of timber for Carpentry left with sawn faces shall comply with previous Clause specifying tolerances in thickness. Dimensions for wrought members shall be as described in "Joinery".

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JOINTING

All timber shall be as long as possible and practicable to eliminate joints. Where joints are unavoidable surfaces shall be in contact over the whole area of the joint before fastenings are applied.

No nails, screws, or bolts are to be fixed in any split end. If splitting is likely, or is encountered in the course of any work, holes for nails are to be prebored at diameter not exceeding $4/5^{\text{th}}$ of the diameter of nails. Clenched nails must be bent at right angles to the grain.

Lead holes are to be bored for all screws. When the use of bolts is specified the holes are to be bored from both sides of the timber and are to be of the diameter $D + D/16$, where D is the Diameter of the bolt. Nuts must be brought up tight but care is to be taken to avoid crushing of the timber under the washers

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JOINERY

GENERALLY

All Joiner's work shall be accurately set out on boards to full size for the information and guidance of the artisans before commencing the respective works, with all joints, iron work and other works connected therewith fully delineated. Such setting out must be submitted to the Architect and approved before such respective works are commenced.

All joiners work shall be cut out and framed together as soon after the commencement of the building as is practicable but not to be wedged up or glued until the building is ready for fixing same. Any portions that warp, wind or develop shakes or other defects within six months after completion of all other work which may be affected thereby, all at the Contractors' own expense.

All work shall be properly mortised, tenoned, housed, shouldered, dovetailed, notched, pinned, bradded, etc., as directed and to the satisfaction of the Architect and all properly glued up with the best quality glue. All horns to be cut off neat and square with back of jambs before incorporating into the walls. The feet of all door jambs are to be cut off square with the floor finish and are to be dowelled to the structure with steel dowels.

Joints in joinery must be specified or detailed, and so designed and secured as to resist or compensate for any stresses to which they may be subjected. All nails, sprigs, etc., are to be punched and puttied. Loose joints are to be made where provision must be made for shrinkage, glued joints where shrinkage need not be considered and where sealed joints are required. Glue for load-bearing joints or where conditions may be damp must be of the resin type. For non-load bearing joints or where dry conditions may be guaranteed case in organic glues may be used.

All exposed surfaces of joinery work shall be wrought and all arises "eased off" by planning and sandpapering to an approved finish suitable to the specified treatment.

DIMENSIONS

All joinery has been described by nominal sizes and a 3 mm reduction off specified sizes will be allowed for each wrought face except where described as finished sizes in which case joinery shall hold up full dimensions

FIXING JOINERY

All beads, fillets and small members shall be fixed with round or oval brads or nails well punched in and stopped. All larger members shall be fixed with screws. Brass screws shall be used for fixing of all hardwoods, the heads let in and pelleted over with wood pellets to match the grain.

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BEDDING FRAMES, ETC.

The Contractor's rates must include for bedding frames, sills, etc., in mortar or dressing surfaces of walls, etc., in lieu

PLUGGING CONCRETE AND WALLS

Round wood plugs shall not be used. All work described as plugged shall be fixed with screws to plugs formed by drilling concrete, walls, etc., with a proper tool of suitable size at 750mm spacing and filling the holes completely with "Philplug" rawl plastic or "Rawlplugs" in accordance with the manufacturer's instructions. Alternatively, and where so agreed the Architect, hardwood dovetailed fixing clips, dipped in "Wolmanol" or "Celcure B" solution cut and pinned or bedded in cement mortar (1:3) may be used.

FIBREBOARD

Fireboard shall be 12 mm "Celotex", or other equal and approved termite-proofed softboard, cut to panels with V-edges

PLYWOOD

Plywood shall be manufactured to comply with B.S. 1455 (Grades 1 or 2, Type INT for "Interior work", type WBP for " exterior work"). Marine plywood shall comply with B.S. 1088.

Plywood shall be manufactured to comply with B.S. 1455 (Grades 1 or 2, Type INT for "Interior work", type WBP for " exterior work"). Marine plywood shall comply with B.S. 1088.

BLOCKBOARD

Blockboard shall be laminated board to approval, and exposed edges shall be lipped with 20 mm hardwood.

CHIPBOARD

Chipboard shall be manufactured to comply with B.S. 5669.

PLASTIC SHEETING

Plastic sheeting shall be "Formica" sheeting 1.5 mm thick and securely fixed with approved type waterproof adhesive, and in the colours approved by the Architect

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SELECTED FOR CLEAR FINISH

All timber and joinery work described as selected for clear finish shall be executed by a specialized joinery firm. The name of the firm shall be submitted to the Architect before any works commence

PROTECT JOINERY

Any fixed joinery which in the opinion of the Architect is liable to become bruised or damaged in any way, shall be completely cased and protected by the contractor until the completion of the works. The casing shall "consist of two layers of polythene sheeting or plywood coverings

FLUSH DOORS

Semi-solid flush doors shall be manufactured to the thickness specified and consist of 100 mm wide framing all round with minimum 25 mm thick horizontal core battens at not more than 75 mm centres, pressure impregnated as described and bored with 15 mm diameter ventilation holes at 300 mm centres. Doors shall have two lock blocks and be faced both sides with 6 mm plywood and have 25 mm mahogany twice rebated lipping all round and otherwise be equal to the requirements of B.S. 459 Part 2A, and equal to an approved sample.

BOTTOM EDGES

Bottom edges of doors shall be painted with one coat of approved primer before fixing.

IRONMONGERY

All locks and ironmongery shall be fixed with screws, etc., to match. Before the woodwork is painted, handles shall be removed, carefully stored and refixed after completion of painting and locks oiled and left in perfect working order. All keys shall be labeled with the door reference marked on labels before handing to the Architect on completion.

PRICES TO INCLUDE

Prices of items hereafter shall include for the foregoing labours, etc., and in addition the prices for linear items are to include all internal and external angles, either mitred or tongued, all fair, fitted, stopped, notched or returned ends, all similar incidental labours and all short lengths.

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METAL WORK

ALL MATERIALS

All materials shall be of the best quality, free from defects. The materials in all stages of transportation, handling and piling shall be kept clean and damage from breaking, bending and distortion prevented

STRUCTURAL STEELWORK

Materials and workmanship shall conform with the requirements of B.S. 449. Steel frames, trusses and purlins shall be carried out by a Nominated Sub-contractor.

NAILS, SCREWS AND BOLTS

Nails, screws and bolts shall be of best quality mild steel of lengths and weights approved by the Architect. Nails shall be to B.S 1202 and bolts to B.S. 916.

Bolts shall project at least two threads through nuts and all bolts passing through timber shall have washers under heads and nuts

WORKMANSHIP

All work shall be carried out in the most workmanlike manner and strictly as directed by the Architect.

Welding shall be neatly cleaned off and units shall be prefabricated in the workshop wherever possible, the minimum of site welding being employed.

All screwed work shall have full internal and external threads and holes shall have been cleaned off. Countersinking must be concentric.

RAINWATER GOODS

Prices shall include for building in, casting in or cutting mortices for fastenings, all making good, jointing, short lengths and all extra joints in the case of fittings

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METAL WINDOWS AND DOORS

Metal windows and doors shall be manufactured to B.S. 990 from hot rolled mild steel sections produced by reputable mills and to be of dimensions and weights laid down in B.S. 990. Where specified all casements and doors are to be made from heavy sections. Corners of frames are to be mitred and welded, and glazing bars, etc., either tenon riveted or welded into frames. Top-hung casements are to be hung on steel hinges and fitted with Bronze peg stays. Side -hung casements are to be hung on projecting hinges and fitted with bronze single point handle and cabin hook with concealed sliding stays.

FIXING METAL WINDOWS, DOORS, ETC.

The Contractor's prices for fixing metal windows, doors, etc., shall include for assembling and fixing, including screwing to wood frames or cutting mortices for lugs in concrete or walling and running with cement mortar (1:4), bedding frames in similar mortar and pointing in mastic, bedding sills, transoms and mullions in mastic, making good plaster around both sides, and fixing, oiling and adjusting all fittings and frames

QUALITY OF MATERIALS AND WORKMANSHIP

The quality and workmanship of materials used in this contract shall conform to the requirements of the following British Standards:-

B.S. 15	Mild steel for general structural purposes
B.S. 449	The use of structural steel in building
B.S. 4 p.2	Hot rolled steel sections
B.S. 994	Cold Rolled Steel Sections
B.S. 938 tubes	General requirements for the metal Arc welding of structural Steel to B.S. 1775
B.S. 1856	General requirements for the metal Arc welding of mild steel.
B.S. 639	Covered Electrodes for the Metal Arc Welding of Mild steel.

Materials may be required at any time to be tested in accordance with the British Standards listed above.

The cost of successful tests will be borne by the client, but the Sub-Contractor shall supply at his own expense test specimens when required. The cost of tests, which do not comply with the Standard, will be borne by the Sub-contractor.

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STRUCTURAL HOLLOW SECTIONS

All hollow sections are to be connected by electric welding.

For butt welds the fusion surface of each member must be properly aligned and prepared

ELECTRIC WELDING

All welding is to be in accordance with the requirements of B.S. 1856 and 938 and the electrodes shall comply with B.S. 639.

Fusion faces shall be free from irregularities, which could interfere with the welding material. These faces shall also be free from any deleterious material such as rust, grease or paint.

All welds shall be of the specified finished sizes and the sequence of the welding shall be carried out in a manner that will give minimum distortion to the welded parts.

Edges for welding shall be prepared by planning or machine flame cutting.

During welding all parts will be maintained in their correct position.

Welds shall be carried out with each run closely following the one prior with sufficient time between to allow for removal of slag.

Each run of weld is to be inspected and the Sub-contractor shall ensure that unsatisfactory welds are cut out or remade to the required standard.

The minimum size of fillet weld shall be 6 mm.

All completed welds shall have a regular and smooth surface. The weld material shall be solid with complete fusion throughout the weld and to the farecut metals.

Any defects shall be cut out or made good to approval.

External faces of butt welds to be ground smooth.

PAINTING

All steel is to be wire brushed and any loose scale, dirt or grease shall be removed before any painting is commenced. One coat of red oxide primer Type A to B.S. 2523 shall be applied at the shop.

Any damage to the priming paint shall be made good to the Architect's satisfaction

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PLASTERWORK AND OTHER FINISHING MATERIALS

CEMENT

The cement shall be as previously described in “Concrete Work”.

SAND

The sand shall be as described for fine aggregate but that for plastering shall be light in colour and well graded to a suitable fineness in accordance with the nature of the work in order to obtain the finish directed

LIME

The lime for plastering shall comply with B.S. 890 Class “A” for non-hydraulic lime and shall be as rich as obtainable and to approval. It must be freshly burnt and shall be slaked at least one month before being used by drenching with water, well broken up and mixed and the wet mixture shall be passed through a sieve of sixty -four meshes to the square inch. Lime putty shall consist of freshly slaked lime as above described, saturated with water until semi-fluid passed through a fine sieve; it shall then be allowed to stand until superfluous water has evaporated and it has become of the consistency of thick paste, in no case for a shorter period than one month before being used, during which it must be kept damp and clean and no portion of it allowed to become dry.

Alternatively, hydrated lime with 70% average calcium oxide content may be used and it must be protected from damp until required for use. It shall be soaked to a putty at least 24 hours before use.

LIME PLASTER

Lime plaster shall consist of a backing coat in cement, lime and sand (1:2:9) and a finishing coat of lime putty skim with 10% cement added

POLISHED GRANOLITHIC

Polished granolithic shall consist of one part cement (by volume) coloured light brown with an approved dye, to two parts (by volume) of metamorphic coral chippings graded from 6 mm down to 3 mm with not more than 15% to pass a No. 40 B.S. sieve

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POLISHED TERRAZO

All terrazzo work shall be carried out by an approved Sub-contractor. Polished terrazzo shall consist of a first coat of cement and sand (1:3) and a 12 finishing coat of “Snowcrete” and marble chippings (1:2), coloured with cement stone No.1” colouring compound six in proportions of 1:10, compound to cement. The overall thickness will as specified in the measured work.

Where terrazzo paving is specified as incorporating especially selected large aggregate the thickness of the finishing coat shall be increased as required

VINYL ASBESTOS TILES

The vinyl asbestos floor tiles shall be 300 x 300 x 2 mm thick and shall comply with B.S. 3260. They shall be of selected pattern and colour from the “Marleyflex” Tile range or equal and approved.

GLAZED WALL TILES

White glazed wall tiles shall be size 150 x 150 x 6 mm thick, manufactured to comply with B.S. 1281.

QUARRY TILES

Quarry tiles shall be manufactured to B.S. 1286 type A and shall be chosen from the manufacturer’s standard colour range

PRECAST TERRAZO TILES

Precast terrazzo tiles are to be as manufactured by the Linotic Flooring Company Ltd., P.O Box 42290, Nairobi, or equal and approved.

ASBESTOS CEMENT PROMENADE TILES

Shall be as manufactured by Eternit Building Products Ltd

MARBLE GLOMERATE TILES

Marble glomerate tiles shall be as manufactured by the Linotic Flooring Company Ltd. All edges shall be square and faces polished, or equal and approved

BEDS AND BACKINGS

Beds and backings shall be composed of cement and sand in the volumetric proportions stated in the measured work.

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WORKMANSHIP

GENERALLY

All screeds and pavings shall be finished smooth, even and truly level unless otherwise specified and paving shall be steel trowelled.

Rendering and plastering shall be finished plumb, square, smooth, hard and even, and junctions between surfaces shall be perfectly true, straight and square.

At the junction of all concrete work and block walling a 150 mm wide strip of expanded metal lathing must be included to avoid plaster cracks.

All surfaces to be paved or plastered must be brushed clean and well wetted before each coat is applied. All cement paving and plaster shall be kept continually damp in an interval between application of coats for seven days after the application of the final coat.

Where dubbing out is required, shall be composed of one part cement to six parts of sand.

Partially or wholly set materials will not be allowed to be used or remixed. The plaster, etc., mixes must be used within two hours of being combined with water

SAMPLES

The Contractor shall prepare samples minimum one square metre of each of the screeds, pavings and plastering for the approval of the Architect, after which all work executed shall conform with the approved samples

LIME PLASTERING

Lime plastering shall be carried out in two coats having a total thickness of not less than 15 mm to walls and 10 mm to ceilings.

The first coat shall be trowelled to a perfectly true and even surface and finished with a wood float, the surface being sprinkled with water from a brush during the process and before it has set thoroughly scratched to form a key. The finishing coat shall not be less than 1.5 mm thick, thoroughly worked with a steel trowel, sprinkled with water as before and be brought to a uniform smooth and hard surface

TYROLEAN RENDERING

Tyrolean rendering shall consist of trowelled backing coat in cement and sand mortar (1:4) gauged with 10% lime, to a thickness of 10 mm and a finishing coat of cement sand mortar (1:4) applied with an approved machine to a thickness of between 5 and 10 mm, to provide an even and uniform texture. Coloured cement or pigment is to be used if so directed by the Architect.

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GRANOLITHIC AND TERRAZO PAVING

Granolithic and terrazzo paving shall be spread and well compacted and given only sufficient trowelling to produce a perfectly level surface immediately after laying. When the granolithic or terrazzo has stiffened sufficiently so that a hard surface can be obtained without laitance, then the surface shall be machine ground to a perfectly even and smooth surface. On no account will dusting with neat cement to the surface be permitted

VINYL TILLING

Vinyl asbestos floor tiles shall be stored and laid in accordance with the manufacturer's written recommendations using a bitumen-based adhesive. The tiles shall be laid with butt joints straight both ways. Tilling shall start from centre of a room or area

QUARRY TILING

Quarry tiles shall be bedded in 10 mm thick cement mortar (1:3) with 10 mm joint laid straight both ways. The joints shall be filled with cement mortar neatly flush pointed. The tiles are to be soaked in water before laying

MARBLE TILES AND TERRAZO TILES

The tiles are to be bedded in 10 mm thick cement mortar (1:3) with fine butt joints. The surface is to be washed and polished on completion.

CERAMIC WALL TILES

Wall tiles shall be fixed with a cement-based adhesive with 3 mm wide joints straight both ways. When an area of tile is complete the joints should be grouted with white cement.

BEDS AND BACKINGS

Floor screeds shall not be laid in areas exceeding ten square metres during any period of 24 hours. As bays are formed steel edge strips must be used to retain the exposed edge of screed.

The thickness and mixes of the screeds shall be adjusted to suit the various top dressings and the contractor must first ascertain what finish is intended to each specified area before the work of laying screeds is put in hand.

Screeds shall be finished with a wood float for wood blocks and steel trowel for thermoplastic and similar tiles.

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MAKING GOOD

All making good shall be cut out to a rectangular shape, the edges undercut to form a dovetail key and finished flush with the face of surrounding paving or plaster. Cut out and make good all cracks, blisters, and other defects and leave the whole of the work perfect on completion.

PRICES GENERALLY

In addition to the foregoing, prices of superficial items are to include for work in narrow widths, all linear labours, angles and arrises, all fair edges, for making good up or stopping to a line at the required level at top of skirting or dados where directed and for making good up to windows, door frames and similar.

The prices for all linear items unless otherwise measured are to include for all short lengths, angles and arrises, mitres, and ends of every description.

Prices for paving are to include for adequate covering and protection during the progress of the works to ensure that the floors are handed over in perfect condition on completion.

Prices for all pavings and plastering, etc., shall include for hacking concrete surfaces and for raking out joints of walls 12 mm deep for cross-scoring undercoats to form a proper key.

Plastering on walls, generally shall be taken to include flush faces of lintels, beams, etc., in same.

PROTECTION

The Contractor's rates for all finishings shall allow for adequate protection against damage by all following trades or any other causes, to the satisfaction of the Architect

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GLAZING

GLASS

All glass shall be manufactured complying with B.S. 952, free from flaws, bubbles, specks and other imperfections.

Glass panes shall be cut to sizes to fit the openings with not more than 1.5 mm play all round and where puttied shall be sprigged to wood or clipped to metal frames.

Clear sheet glass shall be ordinary glazing (O.Q) quality. Polished plate glass shall be (G.G.) quality.

Anti-bandit glass shall be 9 mm thick laminated glass of approved type.

PUTTY

Putty for glazing in wood frames shall be composed of pure linseed oil and powdered whiting free for grittiness in accordance with B.S. 544 Type 1 in putty.

Putty for glazing in metal frames shall be quick hard-setting tropical putty specially manufactured for use with steel windows.

Rebates of metal frames receiving glass shall be prepared and treated with primer for putty prior to glazing and putty shall be primed ten days after glazing

BEDDING STRIPS

Bedding strips shall be of plastic or washleather approved by the Architect and shall be cut to fit exactly the line of frame and beads

ON COMPLETION

Remove all broken, scratched or cracked panes and replace with new to the satisfaction of the Architect. Clean inside and out with an approved cleaner. On no account shall windows be cleaned by scraping with glass

PLUMBING

EXECUTION OF THE WORKS

The works shall be carried out strictly in accordance with: -

- a) By-laws of the Local Authority
- b) British Standard Code of Practice C.P. 301: 1971, Building Drainage
- c) British Standard Code of Practice C.P. 310: 1965, Water Supply.
- d) British Standard Code of Practice C.P. 304: 1968, Sanitary pipework
- e) British Standard Code of Practice C.P. 305:1974, Sanitary
- f) British Standard Code of Practice C.P. 342: 1970, Centralised Hot Water Supply.
- g) All other relevant British Standard Specifications and Codes of Practice(hereinafter referred to as B.S. and C.P. respectively)
- h) The working Drawings.
- i) The Architects' instructions.

EXTENT OF WORKS

The works include, unless otherwise specified, the supply, installation, testing and commissioning, and delivery up clean and in working order of the installations shown on the drawings and specified in the Specifications, including all details such as:-

Cold and hot water pipes, discharge pipes, (the term discharge pipe is used as a comprehensive all-embracing description in place of the traditional soil and waste terms), drain and ventilating pipes, valves, fire fighting installations and equipment, thermal insulation, etc., and all labour, materials, tools, instruments and scaffolding necessary to execute the work in a first-class manner.

The Contractor shall undertake all modifications demanded by the Authorities in order to comply with the current regulations and produce all certificates, if any from the Authorities without extra charge.

EXTENT OF THE CONTRACTOR'S DUTIES

At the commencement of the work, the Contractor shall investigate and report to the Architect the availability of all materials and equipment to be used in the work. If not available, the Contractor shall at this stage place orders for the materials in question and copy the orders to the Architect. Failure to do so shall in no way relieve the Contractor from supplying the specified materials and equipment in time.

The Contractor shall be responsible for verifying all dimensions relative to his work by actual measurements taken on the site

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RECORD DRAWINGS

During the execution of the works on the site the Contractor shall, in a manner approved by the Architect, record on working drawings and Contract Drawings all information necessary for preparing Record Drawings of the Installed Contract Works. Marked-up Drawings and other documents shall be made available to the Architect as he may require for inspection and checking.

Record Drawings may, subject to the approval of the Architect, include approved Working Drawings adjusted as a correct record of the installation of the Contract Works.

Record Drawings shall be prepared on approved translucent linen or plastic material suitable for reproduction by the Dyeline process or similar

MATERIALS AND WORKMANSHIP GENERALLY

All materials, equipment and accessories are to be new in accordance with the requirements of the current rules and regulations where such exist, or in their absence with the relevant B.S.

Uniformity of type and manufacture of equipment or accessories is to be preserved as far as practicable throughout the whole work.

The Contractor shall, if required by the Architect, submit samples of materials to the Architect for his approval before placing an order.

Where particular item is specified as a particular firm's product "or similar" it is to be clearly understood that this is to indicate the type and quality of the equipment required. No attempt is being made to give preference to the equipment supplied by the firm whose name or products are quoted.

Where particular manufactures are specified herein, no alternative make will be considered, and the Architect shall be allowed to reject any other makes.

The Contractor will be entirely responsible for all materials, apparatus, equipment, etc., furnished by him in connection with his work, and shall take all special care to protect all parts of finished work from damage until handed over to the Employer.

The work shall be carried out by competent workmen under skilled supervision. The Architect shall have the authority to have any of the work taken down or changed, which is executed in an unsatisfactory manner.

TUBING GENERALLY

All tubing exposed on faces of walls shall, unless otherwise specified, be fixed at least 25 mm clear of adjacent surfaces with approved holderbats built into walls, cut and pinned to walls in cement mortar; where fixed to woodwork, suitable clips shall be used.

All tubing specified as fixed to ceilings, roofs or roof structures shall be fixed with approved mild steel hangers cut and pinned to ceilings, roofs or roof structures. Where three or more tubes are fixed to

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ceilings, roofs or roof structures close to each other, they shall be fixed in positions, which leave the lower surfaces at the same horizontal level, unless otherwise specified.

Where insulated, tubing shall be fixed with the insulation at least 25 mm clear of adjacent surfaces and with at least the same clearance between insulated pipes.

Tube fixings and supports shall, if nothing else is specified, be arranged at intervals not greater than those given in the following tables: -

Mild Steel Tubing

<u>Diameter of Pipe</u> in mm	<u>Maximum Spacing of Fixing in mm</u>	
	<u>Horizontal Runs</u>	<u>Vertical Runs</u>
15	1,800	2,400
20	2,400	3,000
25	2,400	3,000
32	2,700	3,000
40	3,000	3,600
50	3,000	3,600
65	3,600	4,600
80	3,600	4,600
100	4,000	4,600

Unplasticised P.V.C. Pipes

<u>Diameter of Pipe</u> in mm	<u>Maximum Spacing of Fixing in mm</u>	
	<u>Horizontal Runs</u>	<u>Vertical Runs</u>
12	300	900
19	400	900
25	400	900
32-152	500	1,200

Each support shall take its due proportion of the weight of the tube or pipe and shall allow free movement for expansion and contraction.

Full allowance shall be made for the expansion and contraction of pipework, precautions being taken to ensure that any forces produced by pipe movements are not transmitted to valves, equipment or plant.

All tubing specified as chased into walls shall have the wall face neatly cut and chased, the tubing wedged and fixed and plastered over.

Where tubing is laid in trenches care shall be taken to ensure that fittings are not strained.

All water systems shall be provided with sufficient drain points to enable them to function correctly. Valves and other user equipment shall be installed with adequate access for operation and maintenance. Where valves and other operational equipment are unavoidably installed beyond normal

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reach or in such a position as to be difficult to reach from a short stepladder, extension spindles with floor or wall pedestals shall be provided.

Before any joint is made, the pipes shall be hung in their supports and adjusted to ensure that the joining faces are parallel and any falls, which shall be required, are achieved without springing the pipe.

All formed bends shall be made so as to retain the full diameter of the pipe.

Sleeves shall be provided where tubes pass through walls and solid floors to allow movement of the tubes without damage to the structure. The overall length of the sleeve shall be such that it projects at least 2 mm beyond the finished thickness of the wall or partition.

Tubing shall be cut by hacksaw or other method, which does not reduce the diameter of the tube or form a bead or feather, which might restrict the flow.

GALVANISED MILD STEEL TUBING

Galvanized mild steel tubing shall be in accordance with B.S. 1387: 1967 with screwed and socketed joints; medium-duty for pipes above ground, heavy-duty for pipes underground, cast into concrete or chased into walls.

Fittings for the same shall be galvanized malleable iron to B.S. 1940 : 1965, with threads to B.S. 21: 1957

Joints shall be made with fine hemp and an approved jointing compound or tape. Compound containing red lead must not be used.

Long screw connectors and flat-faced unions shall not be used, unless otherwise specified.

Where laid underground or cast in concrete, galvanized mild steel tubing shall be protected by "Densotape" or similar, wound on at least two layers thick, or given two coats of approved bitumen. Minimum earth cover to underground tubing shall be 450 mm.

Where chased into walls or cast in concrete, galvanized mild steel tubing carrying hot water shall be wrapped with hair felt secured by copper wire.

The fixing of galvanized mild steel tubing shall use: -

- a) Malleable iron "schoolboard" pattern brackets for building in or for screwing to structure, OR.
- b) Malleable iron pipe rings, with either back plate, plugs or girder clips; OR
- c) Purpose-made straps to the Architects' approval.

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UNPLASTICISED P.V.C. PIPES

Unplasticised p.v.c. Discharge and ventilating pipes and fittings shall be to B.S. 4514: 1964, Grade 2.

U.P.V.C ventilating pipes passing through roofs shall terminate at least 300 mm above the roof level and shall be protected against insect penetration by a copper wire mosquito-proof balloon grating securely bound on the top of the pipe with stout copper wire.

Joints of U.P.V.C discharge and ventilating pipes shall be spigot and socket joints which incorporate synthetic rubber rings or they shall be closely fitting spigots and sockets jointed together by means of a solvent solution provided by the pipe maker.

Joints of U.P.V.C. discharge and ventilating pipes to cast iron drain pipes shall be by means of purpose-made cast iron sleeves jointed with tarred yarn and fibrous lead yarn properly caulked into the wetted sockets. Joints to pitch fibre drainpipes shall be made with approved adaptors.

The fixing of U.P.V.C. pipes shall use holderbats of metal, or plastic-coated metal, care being taken that they do not damage the pipe when tightened. Where anchor points are specified to control thermal movement, the holderbats fitted to the pipe barrel shall be such as to allow thermal movement to take place.

At the foot of all U.P.V.C. Ventilating stacks and where shown on the Drawings and in other positions as directed or necessary for cleaning, inspection pipes with door shall be provided, with a bolted oval recess door, shaped internally to bore of pipe.

VALVES, COCKS, TAPS, ETC.

Draw-off taps and stop valves shall comply with B.S. 1010: 1959.

Brass ball valves shall comply with B.S. 1212: 1953 and copper floats for ball valves shall comply with B.S. 1968: 1953, and plastic floats for some shall comply with B.S. 2456: 1954

Sluice valves shall comply with B.S. 1218 : 1946

Gate valves on main supply shall comply with B.S. 3465

Manually operated mixing valves for ablutionary and domestic purposes shall comply with B.S. 1415:1955

Drain taps shall comply with B.S. 2879: 1957

Safety valves, stop valves and other safety fittings for air receivers and compressed air installations shall comply with B.S. 1123: 1961

Safety valves for thermal storage water heaters shall comply with B.S. 959: 1967

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THERMAL INSULATION

Thermal insulating material for hot and cold water supply installation shall conform to B.S. 1334: 1966, unless otherwise specified. The Contractor shall ensure that the thermal insulating materials used conform to the requirements of the Local Fire Authority.

All thermal-insulating materials shall be delivered to the site in a dry condition and housed in a store until drawn upon for use.

All surfaces to be insulated shall be cleaned carefully before fixing the insulating material.

The installation of insulating materials shall be entrusted only to operatives skilled in the work. All insulating material, however fixed, shall be in close contact with the surface to which it is applied and all joints shall be sealed after ensuring that edges or ends of any section are built up close to one another. Edges or ends shall be cut or sharpened on site as necessary. Supporting bands shall be either non-corrodible material or adequately protected against rust.

Each pipe or item shall be insulated separately.

Fixing of insulating material shall suit the progress of other installation works in the building.

Insulation, where pipes are fixed exposed, shall be pre-formed rigid sections with approved finish. Where pipes are fixed in close ducts, above false ceilings, etc., matts cut in suitable sections on the site shall be used, well secured with copper or galvanize wire, finally covered with asphalt roofing paper.

Where subject to outside weather or other potentially damp or wet conditions, the insulation shall be adequately protected against moisture pick-up.

If nothing else is specified, the minimum thickness of insulating material for cold and hot water pipes shall be as specified in B.S. 1588: Table 1.

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SANITARY APPLIANCES

The installation of sanitary appliances shall be in accordance with C.P. 305: 1952 and B.S. 3202: 1959

The appliances shall be fixed in the positions shown on the Drawings or as directed by the Architect.

For all sanitary appliances, the necessary number of supports, brackets, plugs, screws, washers, jointing materials, etc., shall be provided.

Where supports, brackets etc., are screwed to wall or structures, "Rawplugs" or similar shall be used.

No traps for any appliance whatsoever shall have a seal less than 75 mm.

Fixing shall, if required by the Architect, include for temporarily erecting appliances in the required position of service and discharge pipes, taking down, storing and permanently fixing after completion of wall finishing and connecting to service and discharge pipes.

Care shall be taken at all times and particularly after fixing, to protect appliances from damage.

Upon completion of the work, all appliances shall be cleaned of plaster, paint, etc., and carefully examined for defects.

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FIRE FIGHTING EQUIPMENT

The specified fire fighting equipment shall be supplied and installed by the Contractor in the position shown on the Drawings.

Portable fire extinguishers shall comply with the following B.S.:

- a) Water type (Soda acid) - B.S. 138: 1948
- b) Foam type (Chemical) - B.S. 740 : Part 1:1948
- c) Foam type (gas pressure) - B.S. 740: Part 2: 1952
- d) Water type (gas pressure) - B.S. 1382 : 1948
- e) Halogenated hydrocarbon type
(Carbon tetrachloride and
Chlorobromomethane) - B.S. 1721: 1968
- f) Carbon dioxide type - B.S. 3326: 1960
- g) Dry powder type - B.S. 3465: 1962
- h) Water type (stored pressure) - B.S. 3709: 1964

Fire hose couplings and ancillary equipment shall comply with B.S. 336: 1965

Hose reels : Hoses to be 20 mm reinforced red rubber canvas double braided, to comply with B.S. 3169: 1970. Waterway pressure castings machined throughout. Hose plates 560 mm diameter steel. Inlet valve with inlet screwed $\frac{3}{4}$ " B.S.P. Controllable plastic jet spray pattern and shut-off. Test pressure: 2.5 kg/Square Centimetre. Finish fire red.

The installation of fire extinguishers shall be in accordance with C.P. 402: Part 3 :1964

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TESTING

The whole of the water and discharge installation shall be tested to the satisfaction of the Architect and the Local Authority. The Contractor shall provide all necessary testing apparatus and facilities for testing the installations and any defective work shall be replaced immediately and shall be the subject of re-testing until found satisfactory.

Where pipes are to be lagged, chased into walls or otherwise concealed, the work shall be tested prior to lagging, making good chases, etc.

All hot and cold water installations shall, if nothing else is specified, be tested to 1.5 times normal working pressure, minimum 4 kg/cm squared, and compressed air systems tested with minimum 10 kg/cm squared.

The test pressure shall be applied by means of a manually-operated test pump or in case of long mains or mains of large diameter, by a power-driven test pump. Pressure gauges shall be recalibrated before the test.

The test pressure shall be maintained by the pump for about one hour and a leak as specified in C.P. 310, Section 502 J, shall be approved, but any visible individual leak shall be repaired.

Valves, cocks and taps shall be absolutely tight under the test pressure for the corresponding pipes as well as under a small pressure.

Testing of discharge pipes shall be carried out in accordance with C.P. 301: 1950

Tests shall, if necessary be done in sections as work proceeds without extra payment.

All tests shall be carried out in the presence of a representative of the Local Authority and/or the Architect or his representative.

Upon completion of the work, including re-testing if necessary, the installation shall be thoroughly flushed out.

STERILISATION OF WATER SUPPLY PIPES

Sterilization shall be carried out strictly in accordance with C.P. 310: 1965. The sterilization will not be approved unless the final test for residual chlorine mentioned in the above C.P. proved positive.

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COMMISSIONING

Before handing over, the Contractor shall confirm the Installation has been examined, tested, is ready for use, that it will operate and can be maintained efficiently.

When handing over, the Contractor shall demonstrate to the Employer the methods of operation, limitations, and the maintenance requirements and safety precautions to be observed; and shall also hand over any tools for operating, cleaning, testing and maintenance of the installation.

MEASUREMENT

Prices for tubing shall include for all short lengths and sockets. Connectors, elbows, bends, formed bends, tees, reducing pieces and other fittings are measured separately and are to include for any extra joints and other extra labour required. The prices for the reducing tees shall include for any extra reducing pieces which may be required, if the correct reducing tee is not available.

All pipes have been measured over all bends, tees and other fittings and the Contractor shall include in his prices for all cutting and waste

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DRAINAGE

SETTING OUT

Lines of drains shall be accurately set out and trenches excavated and bottoms trimmed to accurate gradients to approval before pipe laying commences.

DRAIN TRENCHES

Excavation shall be made to such depths and dimensions as may be required by the Architect to obtain proper falls and firm foundations. No permanent construction shall be commenced on any bottom until the excavation has been examined and approved by the Architect. Should the Contractor in error, or without the instructions of the Architect, make any excavation below the required level of the drain or bed, as the case may be, he will be required to refill such excavation to the correct levels with class 15 concrete at his own expense.

Prices for excavation must include for excavating in all materials met with and for trimming bottoms to the necessary falls and for any extra excavation required for planking and strutting and working space, all as described under "Excavation". Excavation in hard rock requiring the use of the compressors or wedging is measured separately

KEEP EXCAVATION DRY

The Contractor shall keep the whole of the trenches or other excavations free from water, and he shall execute such works and install such pumps as may be required to keep the excavations dry at all times. No sub-soil water shall be discharged into the sewers without the written permission of the Architect

UPVC DRAIN PIPES AND FITTINGS

UPVC drain pipes and fittings shall comply in all respects with B.S. 4660, golden brown in colour and with jointing by lip seal socketted fittings. The natural rubber for lip seal joints shall be to B.S. 2494.

Laying and jointing shall be carried out strictly in accordance with the manufacturer's instructions. Pipe barrels shall be continuous contact with the trench bed when laid.

All materials for bed and side fill to UPVC drain pipes shall be hard granular material passing 20 mm sieve containing not more than 5% fines passing 3 mm sieve, composed of crushed stone, quarry waste, ballast or gravel with a compaction factor of 0.3 or less

CAST IRON DRAIN PIPES

Cast iron drainpipes shall be coated cast iron spigot and socket pipes conforming to B.S. 437 in all respects and with fittings to B.S. 1130. Pipes shall be jointed with asbestos yarn and caulked with molten lead or jointed with special jointing compound, all to approval.

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SPUN CONCRETE CYLINDRICAL DRAIN PIPES AND FITTINGS

Spun concrete drainpipes shall be to B.S. 556, Part 2, of approved manufacture.

Flexibly jointed pipes shall have spigot and socket joints made with rubber joint rings to B.S. 2494, Part 2.

Rigidly jointed pipes shall have spigot and socket joints made with proprietary rubber gasket or three turns of tarred gaskin or tallowed yarn caulked to not more than one quarter of the socket joint and cement mortar 1:2 struck off at 45 degrees.

UPVC DRAIN PIPES AND FITTINGS

UPVC drain and fittings shall be to B.S. 4660 of approved manufacturer, with leap seal socketed joints, laid strictly in accordance with the manufacturer's instructions

BACKFILLING

The first backfilling of pipe trenches is to be of soft material free from stones and shall be watered and carefully tamped over and around the pipes in 300 mm layers until they are covered to a depth of 600 mm. Subsequent filling is to be in 150 mm layers, watered and rammed. Only materials approved by the Architect are to be used as backfilling.

Where hardcore is used for backfilling it is not to exceed 150 mm gauge and all interstices shall be properly filled with small pieces and fine binder. Surplus excavated materials are to be removed from the site.

If, in the opinion of the Architect, care has not been exercised in refilling trenches, he may order a fresh test to be made on the drain. In the event of the drain failing to pass the test of the Contractor will be required to remedy the fault at his own expense

CONCRETE BEDS AND SURROUNDS

Concrete beds and surrounds shall be Class 25 concrete to the thickness and widths specified.

Where pipes are specified to be haunched, the concrete shall be carried up from the outside edge of the bed to meet the pipe barrel tangentially.

Where pipes are specified to be surrounded, the concrete shall be carried up from the bed in a square section with a minimum of 150 mm in thickness over the barrel of the pipe.

Rates for beds and surrounds shall include for forming recesses and filling with concrete, for mortar layer, etc., and for any necessary formwork

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LAYING PIPES

Each pipe shall be carefully examined on arrival; any defective pipes shall be removed immediately from the site and not used in the works. Minor damage to the protective coating of cast iron pipes shall be made good by painting with hot tar; if major defects in the coating exist, such pipes shall be rejected and removed from site.

Drains shall be laid in straight lines and to even gradients as required and to the satisfaction of the Architect.

Great care shall be exercised in setting out and determining the levels of the pipes and the Contractor shall provide suitable instruments and set up and maintain all straight rails, boning rods and bench marks, etc.,

All drains shall be kept free from earth, debris, superfluous cement and other obstructions or water during laying until completion of the contract when they shall be handed over in a clean condition.

Pipes shall be laid with sockets leading uphill and shall rest on solid and even foundations for the full length of the barrel. Socket recesses shall be formed in the foundation, as short as practicable but sufficiently deep to allow the pipe jointer room to work right round the pipe. Such recesses shall be filled with cement mortar (1:4) on completion of laying.

INSPECTION CHAMBERS

Inspection chambers shall be constructed in the positions indicated on the Drawings or as required by the Architect. Such chambers shall be to the depths required to obtain even gradients in the drain and of sufficient size to contain the requisite main channel and any branches thereto and all to the entire satisfaction of the Architect and the Local Authority.

Rendering shall be trowelled smooth, coved at all internal angles and rounded on arrises.

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TESTING

Each length of drain and manhole shall be tested as described hereinafter and approved by the Engineer before any backfilling of the trench takes place.

Testing shall not be carried out until at least 12 hours have elapsed after the jointing of the last pipe.

The test shall be as follows: -

- (i) The lower end of the pipe and all junctions shall be securely stoppered and the whole length under test filled with water.
- (ii) When full, a further stopper shall be inserted at the top leaving a pipe attached to the drain plug. This pipe shall be bent through 90 degrees and shall terminate in a header tank 225 mm square. The vertical distance between the centre line of the drain plug and the top of the header tank shall be not less than 900 mm.
- (iii) Water shall then be poured into the header tank, which shall be kept full for a minimum period of 3 hours to allow absorption to take place. At the expiration of this period the header tank shall be topped up and the testing of the drain commenced. If, after a further period of 30 minutes, the water level in the header tank has not fallen by more than 2 mm the test will be considered satisfactory.
- (iv) In the event of a pipe failing to withstand the test, the point of failure shall be completely surrounded, at the Contractors' expense, with Class 25 concrete 19 mm maximum aggregate, so that there is a minimum cover of 150 mm in all directions. The length shall then be re-tested.
- (v) Immediately a length of drain has been approved the trench shall be backfilled for a depth of at least 300 mm above the top of the pipes.

GULLEYS

Gulleys shall be approved 100 mm salt glazed stoneware or cast iron trapped gulleys with 150 x 150 mm cast iron gratings to receive the wastes from waste fittings. Bed the gulleys on and surround with Class 25 concrete 100 mm thickness, carried up to form a 75 x 75 mm kerb with all exposed surfaces finished in cement and sand (1:2) trowelled hard and smooth and all angles rounded. Make good cement joint to drain pipe and run drain to adjacent manhole.

MEASUREMENT

Drain pipes have been measured over all bends, junctions and other fittings, and the Contractor shall include in his prices for all joints, short lengths, cutting and waste. Prices for bends, junctions, etc., shall include for the extra joints, cutting and waste and any extra labour required.

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PAINTING AND DECORATING

APPROVED SPECIALIST

An approved Specialist must execute all work under this trade.

GENERALLY

The Contractor shall so arrange his programme of work that all other trades are completed and away from the area to be painted, when painting begins. Before painting the Contractor must remove all concrete and mortar droppings and the like from all work to be decorated and remove all stains from and obtain uniform colour to work to be oiled and polished.

All plaster, metal, wood or other surfaces that are to receive finishes of paint, stain, polish, distemper or paintwork of any description are to be carefully inspected by the Contractor before he allows any of his painters to commence work. The Contractor will be held solely responsible for all defective work condemned as a result of his Painters' failure to insist on receiving from the other trades surfaces in the proper condition to allow first-class finishes of the various kinds specified being applied to them.

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PAINTING GENERALLY

All materials are to be of the best quality and shall be of an approved proprietary brand selected from the latest Schedule of Approved Paints issued by the Ministry of Works.

All materials to be applied externally shall be of exterior quality and/or recommended by the manufacturers for external use.

All materials shall be delivered on Site intact in the original sealed drums or tins and shall be mixed and applied strictly in accordance with the manufacturers' instructions and to the approval of the Architect.

Unless specially instructed or approved by the Architect, no paints, distemper, etc., are to be thinned, or otherwise adulterated, but are to be used as supplied by the manufacturers and direct from the tins.

If required by the Architect the Contractor is to provide at his own expense samples of paints, etc., with containers and cases to be forwarded carriage paid by the Contractor for analysis to a laboratory.

The priming, undercoats and finishing coats shall each be of differing tints and the priming and undercoat shall be the correct brands and tints to suit the respective finishing coats, in accordance with the manufacturer's instructions. All finishing coats shall be of colours and tints selected by the Architect. Each coat must be approved by the Architect before the next coat is applied.

Each coat shall be properly dry and in the case of oil or enamel paints shall be well rubbed down with fine glass paper before the next coat is applied. The paintwork shall be finished smooth and free from brush marks.

Colour cards of all paints, etc., shall be submitted to, and samples prepared for approval of the Architect before laying on, and such samples, when approved, shall become the standard for work.

All paints, emulsion paints, and distempers shall be applied by means of a brush or spray gun or rollers of an approved type, where so agreed by the Architect.

No painting is to be done in wet weather or on surfaces, which are not thoroughly dry.

Prices of paint, distemper, etc., shall include for preparation of surfaces, rubbing down between each coat, stopping, knotting, etc., and all other work in connection and as described and as necessary to obtain a first-class and proper finish to approval.

Emulsion paint on ceilings and all undercoats of emulsion paint and complete oil painting on walls shall be completed before thermoplastic flooring laid. Final coats of emulsion paints on walls shall be applied after such flooring has been laid complete.

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SAMPLES

The Contractor shall furnish at the earliest possible opportunity before work commences and at his own cost, samples of painting for the Architects' approval and any further samples in case of rejection until such samples are approved by the Architect and such samples, when approved, shall be the minimum standard for the work to which they apply.

The Architect may reject any materials or workmanship not in his opinion up to the approved sample, and these must be removed from the site without delay.

WOOD PRESERVATIVER

All woodwork in contact with waling of plaster shall be treated after cutting and preparation but before assembly or fixing with one coat of "TIMCIDE" wood preservative manufactured by Timsales Ltd., P.O Box 18080, Nairobi. The solution is to be brushed on all faces of all timbers, unless exposed to view and painted.

The Contractor shall note that this solution is POISONOUS and shall take all necessary precautions and instruct his workmen accordingly

WAX POLISH

Wax polish shall be furniture polish of an approved brand and wood surfaces shall be clean, smooth, and free from oil or grease or any other blemishes. A minimum of two coats shall be applied to approval.

PREPARATION AND PRIMING OF PLASTER, ETC., SURFACES

Plaster surfaces shall be perfectly smooth, free from defects and ready for decoration. All such surfaces shall be allowed to dry for a minimum period of six weeks, stopped with approved plaster compound stopping and rubbed down flush, as necessary, and then be thoroughly brushed down and left free from all efflorescence, dirt and dust immediately prior to decorating.

Plaster surfaces which are to be finished with emulsion, oil or enamel paint, shall be primed with an alkali resisting primer complying with the particular paint manufacturer's specification and applied in accordance with their instructions.

Fibreboard or similar surfaces shall be lightly brushed down to remove all dirt, dust and loose particles and have all nail holes or other defects stopped with an approved plaster compound stopping rubbed down flush and left with a texture to match surrounding material and shall receive on coat petrifying liquid as last

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PREPARATION AND PRIMING OF METAL, ETC

All surfaces shall be thoroughly brushed down with wire brushes and scrapped where necessary to remove all scale, rust, etc., immediately prior decorating. Where severe rust exists and if approved by the Architect a proprietary de-rusting solution may be used in accordance with the manufacturer's instructions.

Shop-primed and unprimed surfaces shall be given one coat of metal chromate primer.

Galvanized surfaces already treated with bituminous solution shall be scraped to remove soft parts and then receive two isolating coats of aluminum primer or other approved anti-tar primer.

PREPARATION AND PRIMING OF WOODWORK

All woodwork shall be rubbed down, all knots covered with a thick coat of good shellac or aluminum knotting; primed with one coat of approved ready-mixed proprietary wood primer and all cracks, nail holes, defects and uneven surfaces, etc., stopped and faced with hard stopping rubbed down flush

PREPARATION OF PREVIOUSLY PAINTED METAL SURFACES

Thoroughly wash down with water containing an approved cleansing agent and rinse with clean water. Wire brush to remove all rust and loose paint and touch up bare patches with Zinc-rich primer

PREPARATION OF PREVIOUSLY PAINTED WOODWORK

Thoroughly wash down with water containing an approved cleansing agent and rinse with clean water. Lightly rub down with glass paper and prime and bring forward all bare patches for decoration

PREPARATION OF PREVIOUSLY PAINTED PLASTER, ETC., SURFACES

Thoroughly wash down with water containing an approved cleansing agent and rinse with clean water. Cut out small cracks and other blemishes and fill with an approved plaster compound stopping rubbed down flush. Bring forward all bare patches for decoration

EMULSION PAINT

After preparation as specified above a minimum of THREE coats, unless otherwise specified, shall be applied using a thinning medium of water only if and as recommended by the manufacturer.

An approved plaster primer tinted to match may be substituted for the first coat in three-coat work.

ENAMEL PAINT

Apply two undercoats and one finishing coat, after preparation and priming as specified above

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CLEAR POLYURETHANE VARNISH

Surfaces are to be treated with “Ronseal” or other equal and approved, in three coats. The first coat is to be applied with a linen pad and well rubbed in and second and successive coats are to be applied by brush. The first and second coats are to be lightly rubbed with Grade ‘O’ and Grade ‘OO’ wire wool respectively

POLYURETHANE CLEAR LACQUER

To be applied strictly as per the manufacturer’s instructions.

IRONMONGERY

All ironmongery shall be removed from joinery, steel windows and louvers before painting is commenced, and shall be cleaned and renovated if necessary and refixed after completion of painting

PAINTING ITEMS

Painting items, as billed hereafter shall include for preparing all priming surfaces as above described.

COVER UP

Cover up all floors, fittings, etc., with dust sheets when executing all painting and decorating work

CLEAN AND TOUCH UP

Paint splashes; spots and stains shall be removed from floors, woodwork, etc., any damaged surfaces touched up and the whole of the work left clean and perfect upon completion.

EXTERNAL WORKS

DRIVEWAY AND PARKING AREAS

EXCAVATIONS

Excavations to areas to receive bitumen macadam or other road or paved finish shall be carried out in a manner ensuring that excavation plant and vehicles do not cause shear failure more than 250 mm in the sub-grade. Wheel loads or tyre pressures shall be limited and work shall be interrupted to let the sub-grade dry out as necessary to avoid such sub-grade failure

COMPACTION

The Sub-grade shall be compacted by a smooth-wheeled roller of 8 to 10 tons weight or vibrating roller of minimum 1,300 kg., or other approved plant. The number of coverages shall be at least 10 and there shall be a 50% overlap of successive coverage's. If so instructed by the Engineer, water shall be added during compaction to obtain optimum water content. Filling shall be compacted as above but in maximum 200 mm deep layers

SUB-GRADE SURFACE FINISH

The surfaces of the sub-grade shall be finished to the levels, falls and cross falls shown on the Drawings within the following tolerances: -

- (i) The level shall not be above and not more than 50 mm below the level shown on the drawings.
- (ii) The falls shall be within 10% of the falls shown on the Drawings.
- (iii) The smoothness shall be such that departures from a 3 metre straight edge laid in any direction shall not exceed 50 mm and there shall be no ponding of water.

COARSE AGGREGATE

Coarse aggregate for the base shall be crushed stone or rock conforming to the following requirements: -

- (i) It shall be from sound, hard, igneous rock, limestone, quartzite or hard coral, and shall be free from weathered or disintegrated stone, clay, organic or other foreign matter.
- (ii) The shape shall be roughly cubical and the grading shall conform to: -

Passing 75 mm standard sieve:	100%
Passing 38 mm standard sieve:	20-80%
Passing 19 mm standard sieve:	0-20%

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CRUSHER DUST

Crusher dust shall mean material in accordance with the table for 5 mm nominal maximum size below.

B.S. Sieve Size		Percentage Passing	
5 mm		100	
No. 7	80	-	100
No. 14	50	-	80
No. 25	30	-	60
No. 52	20	-	45
No. 200	10	-	25

Notes: -

- (i) Not less than 10% shall be retained between each pair of successive sieves specified for use, excepting the larger pair.
- (ii) The material passing the No. 36 sieve shall have the following characteristics (B.S. 1377):-
 - Liquid limit not exceeding 25%
 - Plasticity index not exceeding 8%

CRUSHER FINES

All materials in crusher fines shall pass the 13 mm B.S. sieve and be retained on the No. 25 B.S. sieve, evenly graded with no excess of any size

SUB-BASE

The material for use in the sub-base shall consist of crusher dust as described, or other approved material. It shall be placed in one layer of such thickness that when compacted it shall attain the finished thickness shown on the Drawings. The material shall be watered as necessary and compacted as described. The sub-base material shall have a CBR value (unsoaked) of not less than 25

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BASE

The materials for use in the basecourse shall consist of one layer of coarse aggregate as described of which the interstices are filled with fine material consisting either of crusher dust or a mixture of crusher fines. The proportions of crusher dust and crusher fines in the fine material shall be such as to obtain the maximum density of basecourse when compacted.

The procedure for construction shall be as follows: The coarse aggregate shall be placed in a layer of such thickness so as to obtain the required thickness after compaction. It shall then be compacted lightly until the Engineer is satisfied that a layer true to shape and level has been obtained. The fine material shall then be spread over the layer by hand or by mechanical means. The application of fine materials shall be made gradually in successive layers not exceeding 25 mm in thickness and each layer shall be worked into the voids in the coarse aggregate before the application of the succeeding layer. The fine material shall be laid as described and brushed into the coarse aggregate and rolled and consolidated by an approved vibrating roller to feed fines to the bottom of the layer.

Additional blinding material shall be applied as above until the surface will accept no more. In no case shall the blinding material be applied so thickly that it cakes or bridges on the surface in such a manner as to prevent the direct bearing of the roller or other compacting plant on the stones.

Final compaction shall be an 8 - 10 tonnes smooth wheeled roller until there is no visible movement under the action of the roller and until the required tolerances are achieved. Water may be applied during final compaction subject to the Engineer's approval.

Compaction shall in any case achieve 100% maximum dry density in accordance with B.S. 1377.

QUARRY WASTE

Quarry waste shall mean material to the same specification as crusher dust, except as follows: -

- (i) The plasticity index taken on material passing the No. 36 sieve shall not exceed 16%.
- (ii) The material may have up to 35% of stones not larger than 38 mm, provided that the material passing the 5 mm sieve is within the limits specified.

Quarry waste shall be clean and completely free from earth, organic or other foreign matter.

BASECOURSE FINISH

The surface of the basecourse shall be finished to the levels, falls and crossfalls shown on the Drawings subject to the following tolerances: -

- (i) The level shall be within + 0r - 12 mm of the levels shown on the Drawings.
- (ii) The falls shall be within 10% of the falls shown on the Drawings.
- (iii) The smoothness shall be such that departures from a 3 metre straight edge laid in any direction shall not exceed 12 mm.

The surface of the basecourse shall be inspected and approved by the Engineer before bitumen paving is commenced.

BITUMEN PRIMING COAT

Immediately before applying the priming coat, the surface of the basecourse shall be brushed free from dust and loose stones. The material for the priming coat shall be cutback bitumen of M.C.O. grade or other approved.

Approximately 30 minutes before applying the priming coat the surface of the basecourse should be made slightly damp by use of a water spray. The priming coat shall be applied at a temperature of 100 - 150 degrees Fahrenheit and at a rate of 0.60 litres per square metre.

After application of the primer, a period of at least two days shall elapse before the road surfacing is applied. During this period all traffic shall be kept off the treated surface

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BITUMEN MACADAM SURFACING

A single course open graded premix of 30 mm to 40 mm compacted thickness shall be used with a seal coat.

Course aggregate shall be crushed blacktrap with particles having a cubicle shape to the Engineer's approval and shall be washed free from dust.

The course aggregate grading shall be: -

: Sieve Size	: Percentage Passing	:
: 19 mm	: 100	:
: 13mm	: 60 - 100	:
: 10 mm	: 45 - 70	:
: 6 mm	: 30 - 50	:
: 4 mesh	: 25 - 40	:
: 8 mesh	: 15 - 25	:
: 200 mesh	: 2 - 5	:

The binder shall be shellmac MC/RC2 or other approved. The percentage by weight of binder shall be 4.5%. Mixing shall be in an approved mixer and mixing shall proceed until the stone is evenly coated with binder. The temperature (at mixing) shall be within the following range: -

	Aggregate	Binder
Mixing Temperature	50o - 95 F°	125 ° - 150 F°

The laying temperature shall be not less than 20 F below the mixing temperature.

The mix shall be spread evenly over the primed surface and shall be thoroughly compacted by rolling with a minimum of 6 passes. A smooth wheeled roller of not less than 5 tonnes weight and with rear wheel loading of 0.25 Kg. Per square millimeter width shall be used.

ROLLING

Any longitudinal joints shall be rolled first, after which rolling shall start longitudinally at the side and proceed towards the centre of the carpet. Each pass of the roller shall overlap the preceeding one by at least one half width of the rear wheel. Alternate passes of the roller shall be of varying length. Immediately following initial compaction, the surface shall be checked with a straight edge to ensure that it meets the surface finish requirements. Minor variations shall be corrected by rolling, but major imperfections shall be compacted by adding or taking away mix while it is still workable

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SURFACE FINISH

The surface of the bitumen macadam shall be finished to the levels, contours and slopes shown on the Drawings with the following tolerances:-

- (i) The level shall be within + or - 6 mm of the level shown on the Drawings.
- (ii) The gradient shall be within 10% of the gradient shown on the Drawings.
- (iii) The smoothness shall be such that departures from a 3 metre straight edge laid in any direction shall not exceed 6mm.

SEAL COAT

The seal coat shall consist of precoated fines consisting of crushed blackstrap stone graded from 3 mm to dust, or coarse sand. The binder shall consist of 4.5% by weight of MC/RC2. The seal coat shall be spread and brushed into the macadam surface at the rate of 180 square metres per tonne and compacted by rolling as for the macadam.

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FENCING

CONCRETE POSTS AND STRUTS, GENERALLY

Concrete posts and struts shall be manufactured to B.S. 1722: Part 1, Appendix A by an approved manufacturer, using concrete Class 20 (10 mm) and reinforced in accordance with the following table:

-

Intermediate post not exceeding 2450 mm long	4 No. 6mm bars
Intermediate posts exceeding 2450 mm long	4 No. 8mm bars
Straining posts not exceeding 2450 mm long	4 No. 8mm bars
Straining posts exceeding 2450 mm long	4 No. 10mm bars
Struts not exceeding 2450 mm long	4 No. 6mm bars
Struts exceeding 2450 mm long	4 No. 8mm bars

Bars shall be made up into cages with 12 swg stirrups at centres not exceeding 380mm. Bars shall extend to 25 mm from the end of the post or strut and have minimum cover of 16 mm.

CONCRETE POSTS AND STRUTS FOR CHAINLINK FENCES

Concrete posts and struts for chainlink fences shall be to B.S. 1722: Part 1, Table 3

CONCRETE POSTS AND STRUTS FOR STRAINED WIRE FENCES

Concrete posts and struts for strained wire fences shall be to B.S. 1722: Part 1, Table 2.

STEEL, ANGLE POSTS AND STRUTS GENERALLY

Steel angle posts and struts shall be to B.S. 1722: Part 1 & 3. Angles shall be to B.S. 4 : Part 1 and B.S. 4360 with ends ragged for casting in and supplied primed with one coat of red oxide to B.S. 2524.

STEEL HOLLOW SECTION POSTS AND STRUTS

Steel hollow section posts and struts shall be to B.S. 1722: Part 1 & 3. Sections shall be to B.S. 4: Part 2 and B.S. 4360 with ragged ends for casting in and supplied primed with one coat of red oxide to B.S. 2524.

STEEL TUBE POSTS AND STRUTS

Steel tubes for posts and struts shall be to B.S. 1775, with ragged ends for casting in and supplied primed with one coat of red oxide to B.S. 2524

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STEEL ANGLE, HOLLOW SECTION AND TUBE POSTS AND STRUTS FOR CHAINLINK FENCING

Steel angle, hollow section and tube posts and struts for chainlink fencing shall be to B.S. 1722: Part 1, Tables 4A and 4B.

TIMBER POSTS AND STRUTS FOR STRAINED WIRE FENCING

Timber posts and struts for strained wire fencing shall be cedar of diameters specified, reasonably straight and free from bark and excessive sapwood with tops cut at a slight angle to shed water. Straining posts shall be notched for struts

GALVANIZED LINE WIRE

Galvanized line wire for chainlink fencing shall be to B.S. 4102 of the following diameters:-

Medium Pattern chain link	3 mm
Heavy pattern chain link	3.55 mm
Extra heavy pattern chain link	4 mm

Galvanized line wire for strained wire fencing shall be to B.S. 4102 and 4 mm diameter

GALVANIZED TYING WIRE

Galvanized tying shall be to B.S. 4102 and 2 mm diameter.

GALVANIZED BARBED WIRE

Galvanized barbed wire shall be to B.S. 4102 of two strands of 2.5 mm line wire with barbs of 2 mm point wire at centres not exceeding 90 mm

GALVANISED CHAINLINK

Galvanized chainlink shall be to B.S. 4102: Table 6 of the pattern specified, of 50 mm mesh and of the following wire diameters: -

Medium pattern chain link	2.5 mm
Heavy pattern chain link	3 mm
Extra heavy pattern chain link	3 mm

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EXTENSION ARMS

Extension arms for barbed wire shall be of mild steel to B.S. 1722: Part 1, cranked at 45 degrees and slotted for three strands of barbed wire at centres not exceeding 150 mm.

Arms for concrete steel and, steel and timber intermediate posts shall be of 35 x 6 mm mild steel flat. Arms for concrete and timber straining posts shall be of 50 x 50 x 6 mm mild steel angle. Arms for steel training posts shall be of similar section to the post

SUNDRIES

Galvanised steel eyebolt strainers and winding brackets shall be to B.S. 1722.

Bolts, nuts and washers shall be ISO metric to B.S. 4190.

Galvanised wire staples shall be to B.S. 1494: Part 2: - 9 s.w.g. x 32 mm.

Black bitumen coating solution shall be to B.S. 3416: Type 1.

PREPARING POSTS

Timber posts shall be drilled for line wire at the height specified, notched for struts in the top third of the exposed pole, and coated at the bottom end with bitumen to a height 300 mm above ground level.

Steel posts and struts shall be drilled for connection by two 10 mm diameter bolts at a point in the top third of the exposed post.

FIXING POSTS

Straining posts shall be provided at all ends and changes of direction or level and in straight runs at intervals not exceeding 50 metres.

Struts shall be fitted to straining post in the direction of each line of fencing. Intermediate posts shall be provided at intervals not exceeding 3 metres.

Post and strut holes shall be excavated not less than 450 x 450 mm on plan: 600 mm deep for fences not exceeding 1400 mm high and 750 mm deep for fences exceeding 1400 mm high.

Concrete bases shall be as specified and not less than half the depth of the postholes.

Wires and fencing shall not exert strain until at least seven days after posts are fixed in bases.

Specification of Materials and Workmanship

Specifications

Proposed Office Interior Fit out for KRA - Phase 2

FIXING LINE WIRES

Lines wires shall be threaded through posts, connected to eyebolt strainers at ends and angles and strained taut to approval

FIXING BARBED WIRE

Barbed wire shall be slotted into steel extension arms, stapled to timber posts or wired firmly to concrete posts as specified and strained taut to approval

FIXING CHAIN LINK

Chain link fencing shall be wired firmly to each line wire at horizontal centres not exceeding 600 mm

Specification of Materials and Workmanship

Specifications

Proposed Office Interior Fit out for KRA - Phase 2

LANDSCAPING

GENERAL PLANTING PREPARATION

- a) All imported red soil and manure must be free of roots, weeds and debris. Manure is to be dry and well rotted. It must be horse, cow or chicken manure.
- b) Remove all stones, branches and debris, etc., from planting areas.
- c) All lawn areas should be 15 mm higher than adjacent shrub beds and paved areas.
- d) Where possible, all planted areas must slope gently (1% slope) away from built structures unless specified.
- e) Grass seedlings/root cuttings must be free of weeds and any other species of grass.
- f) Trees and shrubs must be in a healthy condition and free from pests and diseases, with a well-developed root-ball.

LAWN INSTALLATION

- a) Remove all natural debris and rocks larger than 40 mm in diameter.
- b) Cultivate to a depth of 250 mm to break up large lumps of soil. Mix the imported red soil with black cotton soil in 1:1 ratio (where necessary).
- c) Add 15 mm of very dry rotted manure to the surface of the soil and cultivate into the soil to a depth of 150 mm. Add 10gm of general fertilizer DAP per square metre and work into the soil.
- d) Grade and rake the surface of the soil to a smooth surface.
- e) Plant grass seedlings at a depth of 50 mm, exposing only a small amount of leaf, 100 mm apart.
- f) Water thoroughly.
- g) Water as required and remove weeds as soon as they appear.

Specification of Materials and Workmanship

Specifications

Proposed Office Interior Fit out for KRA - Phase 2

TREE, SHRUB

- a) Excavate a hole not less than 750 mm deep and 900 mm wide for each shrub and 1000 mm deep and 1500 mm wide for each tree. (Where there are several shrubs planted together in a shrub bed, the entire area of the shrub bed is to be excavated). For groundcover, a depth of 300 mm is adequate.
- b) Remove soil and prepare a planting mixture as follows: -
 - 6 parts good red topsoil
 - 1 part dry well rotted manure
 - 250g general fertilizer (20:20:20) for shrubs and 500g for trees.
- c) Water the hole prior to backfilling.
- d) Return two-thirds of the soil mixture to the hole and make sure there are no air pockets.
- e) Remove plant from Container and place in hole so that the soil mark around the stem of the plant is level with the top of the hole.
- f) Add rest of the soil mixture, firming gently.
- g) Raise the surface around the rim of the original hole to create a saucer for watering.
- h) Water the plant thoroughly.
- j) Stake the trees on windward side where necessary.

Specification of Materials and Workmanship

Specifications

Proposed Office Interior Fit out for KRA - Phase 2

THIRD FLOOR

Third Floor

Proposed Office Interior Fit out for KRA - Phase 2

Item	Description	Unit	Quantity	Rate	Amount	
	<u>SECTION NO. 2</u> <u>THIRD FLOOR</u> BILL NO. 1 DEMOLITION WORKS Notes: All useable materials arising from the demolitions shall remain the property of the Employer but the Contractor may take away any materials not so required by the Employer and shall allow a credit for the same in the credit column indicating value for all such materials that are reusable. All debris arising therefrom shall be carried away and dumped where directed by the Employer while all reusable materials shall be delivered where directed The works shall be executed in such order and sequence as the Architect may direct and as little disruption and inconvenience as possible shall be caused to the client, staff and other users of existing facilities.					
A	Existing MDF on aluminium framing partitions	m2	100			
B	Existing ceramic tile floor finish	m2	459			
C	Allow for any other demolition as directed by the Architect		Item			
	Carried Forward to Summary of Section No. 2			Kshs		
	Third Floor Demolition Works Proposed Office Interior Fit out for KRA - Phase 2					

Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 2</u>					
	<u>THIRD FLOOR</u>					
	BILL NO. 2					
	PARTITIONS					
	Glazed partitions					
A	Supply and install 12mm thick heat treated and toughened laminated Sunergy® extra clear glass or other equal and approved, partially sand-blasted and comprising silicone adhesive jointing on appropriately primed surfaces, joining to concrete and masonry surfaces by plugged 100mm x 75mm PVDF aluminium sections in corporate colours	126	m2			
	Gypsum Partitions					
	Gyproc standard dry wall partition system consisting of 50mm steel drywall studs spaced at 450mm centres, clad both sides with one layer of 12mm tapered edge gypsum board with staggered joints between boards, in-filled with 50mm thick rockwool insulation; to be fitted into cavity and fixed with drywall screws spaced at 220mm centres in accordance with the manufacturer's instructions					
B	12.5 mm thick gypsum board as Rhinoboard® firestop including connectors, tapes, pastes, adhesives, beads, gaskets, screws and metal studs and all other associated accessories complete with tapering to joints to receive skimming and paint (m/s)	216	m2			
C	Supply and install 50mm thick glass wool as Rockwool AFB® or other approved infill sound insulation solution	108	m2			
	MDF Partitions					
D	Supply and fix 2 No. 12mm thick MDF partitioning complete with brandering/framing to install in place and prepare surface to receive paint (m/s)	85	m2			
	Carried to Collection			Kshs		
	Third Floor Partitions <i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 2</u> <u>THIRD FLOOR</u> BILL NO. 3 DOORS Aluminium Doors Frameless Aluminium Doors glazed with 12 mm thick toughened clear approved glass complete with all necessary ironmongery and fixing lugs built into walling and pointing in mastic. All to Architects details					
A	Aluminium single leaf frameless door, size 900 x 2400mm high	6	No			
	Carried Forward to Summary of Section No. 2 Third Floor Doors Proposed Office Interior Fit out for KRA - Phase 2			Kshs		

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 2</u>					
	<u>THIRD FLOOR</u>					
	BILL NO. 5					
	FINISHES					
	WALL FINISHES					
	Glass Tint Film					
A	Approved profile decorative film as "Llumar" or equal and approved fixed to glass partitions in patterns as described by project architect	42	m2			
B	Ditto to glass doors	6	m2			
	Supply and fix textured wall paper with special prints as directed by the Architect complete with adhesive and all associated accessories to:-					
C	Gypsum board surfaces	216	m2			
	Mazeras stone slate cut and fitted to regular pattern bedded and jointed in cement and sand (1:1) and recessed pointing complete with machine sanding and polishing					
D	To walls - 20mm	13	m2			
	FLOOR FINISHES					
	Cement and sand (1:3) beds and backing					
E	Beds to receive granito tiles.etc thickness 20 mm	354	m2			
F	Ditto to 100mm high skirting	98	m			
	Carried to Collection			Kshs		
	Third Floor Finishes Proposed Office Interior Fit out for KRA - Phase 2					

Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
	Granito floor tiles and fittings					
A	Provide a prime cost rate of [Kshs 4,000.00/sm] for supply of granito floor tiles (tenderer to add the cost of collection, delivery, grouting, adhesive, spaces and all other materials and laying to completion) as selected by the Architect: Supply and fix 600 x 600 x 10mm granito tiles to floor on prepared bed (m.s) with proprietary adhesive; jointed and pointed in matching coloured proprietary grouting: including pvc spacers and expansion joint as necessary: all to Architect's approval	354	m2			
B	Ditto to 100mm high skirting	98	m			
	Floor carpet					
C	Provide a prime cost rate of [Kshs 8,500/sm] for supply and fix heavy commercial tufted carpet tiles or sheets/rolls as Miliken® soundproofed or other equal and approved including WellBAC™ underlay and protective finish in appropriate backing/adhesive, pile height over 42mm and overall thickness over 8mm (Sample to be provided upon Contract award)	105	m2			
	Wrot Cypress Skirting					
D	100 x 25mm thick cypress skirting	114	m			
	CEILING FINISHES					
	Accoustic tiles					
E	600 x 600 x 16 mm "Armstrong® Lyra®" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To open plan	233	m2			
F	600 x 600 x 16 mm "Armstrong® Ultima®" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To breakout area	16	m2			
	Carried to Collection			Kshs		
	Third Floor Finishes Proposed Office Interior Fit out for KRA - Phase 2					

Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
A	600 x 600 x 16 mm "Armstrong® MetalWorks" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To reception Gypsum Board to BS 1230 or other equal and approved	26	m2			
B	12mm decorative moulded suspended gypsum ceiling fixed with and including metal hangers and recessed bulkhead light enclosure	184	m2			
C	150 x 25 mm moulded gypsum cornice primed before fixing Butt Insulation	154	m			
D	Supply and install 10mm thick padded and reflective backed polyvinyl insulation material as supplied by Jumbochem® Kenya or other equal and approved, laid in accordance with manufacturer's guidelines and specification PAINTING AND DECORATION Skimming and surface preparation	184	m2			
E	Carefully apply approved cement plaster-based surface skimming agent from BASF® or other equal and approved manufacturer in two coats complete with manual sanding blowing and laser leveling to achieve prime quality finish all to the manufacturer's instructions. The completed surface to be approved by the Architect prior to receiving surface finish	343	m2			
F	Prepare and apply two coats of skimming paste using steel trowel or other approved smooth finish technology complete with sealing joints, sanding and blowing to remove particles and granules before final coat; prime as required by manufacturer and prepare surface to receive surface application finish (m/s)	216	m2			
	Carried to Collection			Kshs		
	Third Floor Finishes <i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 2</u>					
	<u>THIRD FLOOR</u>					
	BILL NO. 6					
	FITTINGS (ALL PROVISIONAL)					
	Art Work					
A	Provide a Sum of Kenya Shillings Two Million Only (Kshs 2,000,000.00) for the supply and installation of Art Work and Decorations as per Architects direction	Item			2,000,000.00	
	Joinery Fittings and Loose Furniture					
B	Provide a Sum of Kenya Shillings Four Million, Three Hundred and Eighty Thousands Only (Ksh. 4,380,000.00) for the supply and installation of a Joinery Fittings and Loose Furniture as per Architects Instructions and details	Item			4,380,000.00	
	Carried Forward to Summary of Section No. 2			Kshs		
	Third Floor Fittings					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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FIFTH FLOOR

Fifth Floor

Proposed Office Interior Fit out for KRA - Phase 2

Item	Description	Unit	Quantity	Rate	Amount	
	<u>SECTION NO. 3</u> <u>FIFTH FLOOR</u> BILL NO. 1 DEMOLITION WORKS Notes: All useable materials arising from the demolitions shall remain the property of the Employer but the Contractor may take away any materials not so required by the Employer and shall allow a credit for the same in the credit column indicating value for all such materials that are reusable. All debris arising therefrom shall be carried away and dumped where directed by the Employer while all reusable materials shall be delivered where directed The works shall be executed in such order and sequence as the Architect may direct and as little disruption and inconvenience as possible shall be caused to the client, staff and other users of existing facilities.					
A	Existing MDF on aluminium framing partitions	m2	159			
B	Existing ceramic tile floor finish	m2	459			
C	Allow for any other demolition as directed by the Architect		Item			
	Carried Forward to Summary of Section No. 3 Fifth Floor Demolition Works Proposed Office Interior Fit out for KRA - Phase 2			Kshs		

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Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
	150mm thick machine cut stone walling bedded in cement and sand (1:3) mortar including tying to adjacent reinforced concrete works with strip irons at every course; with 10mm thick MS Plate and 12mm thick gypsum Cladding					
A	To strong room	22	m2			
	MDF Partitions					
B	Supply and fix 2 No. 12mm thick MDF partitioning complete with brandering/framing to install in place and prepare surface to receive paint (m/s)	56	m2			
C	Ditto to planters	21	m2			
	Division Strips					
D	Stainless steel strip at junction of wall finishes, 15mm x 6mm laid flat to MDF Joints, 1200mm high	175	m			
E	Red Plastic Strip all round MDF Partitions	80	m			
	MDF Paneling					
F	Supply and fix 12mm thick MDF column cladding complete with brandering/framing to install in place and prepare surface to receive paint (m/s)	24	m2			
	Planters					
G	Supply and install 400mm x 400mm x 300mm high indoor planters as <i>Lechuze</i> or other equal and approved brand complete with miniature plants and all associated treatment accessories	8	No			
	Carried to Collection			Kshs		
	Fifth Floor Partitions					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 3</u>					
	<u>FIFTH FLOOR</u>					
	BILL NO. 3					
	DOORS					
	Aluminium Doors					
	Frameless Aluminium Doors glazed with 12 mm thick toughened clear approved glass complete with all necessary ironmongery and fixing lugs built into walling and pointing in mastic. All to Architects details					
A	Aluminium single leaf frameless door, size 900 x 2400mm high	9	No			
	MDF Post-formed Doors					
	50mm thick Medium Density Fibre (MDF) Single Leaf Post-formed doors; all inclusive of 150 x 50mm matching door frame and iron mongery; as instructed by architect					
B	Door overall Size 900 x 2400mm high	1	No			
	Volt Door					
	45mm thick ARMoured panel door infilled with 600mm wide hardwood panels fixed all round with 25 x 25mm grooved h.w. beading complete and including 6mm mild solid steel panel infill, 200mm x 300mm high viewing panel in georgian wire glass and all associated brass ironmongery					
C	Door overall size 900 x 2400mm high	1	No			
	Carried Forward to Summary of Section No. 3			Kshs		
	Fifth Floor Doors					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

SECTION NO. 3

FIFTH FLOOR

BILL NO. 4

WINDOWS

Vertical Blinds

A	Supply and fix VENETIAN WindowBlinds complete with all accessories as per Manufacturer's printed specifications and instructions to Architect/Client's approval
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m2

Carried Forward to Summary of Section No. 3

Kshs

Fifth Floor Windows

Proposed Office Interior Fit out for KRA - Phase 2

Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 3</u>					
	<u>FIFTH FLOOR</u>					
	BILL NO. 5					
	FINISHES					
	WALL FINISHES					
	Glass Tint Film					
A	Approved profile decorative film as "Llumar" or equal and approved fixed to glass partitions in patterns as described by project architect	47	m2			
B	Ditto to glass doors	10	m2			
	Supply and fix textured wall paper with special prints as directed by the Architect complete with adhesive and all associated accessories to:-					
C	Gypsum board surfaces	314	m2			
	Mazeras stone slate cut and fitted to regular pattern bedded and jointed in cement and sand (1:1) and recessed pointing complete with machine sanding and polishing					
D	To walls - 20mm	30	m2			
	FLOOR FINISHES					
	Cement and sand (1:3) beds and backing					
E	Beds to receive granito tiles.etc thickness 20 mm	315	m2			
F	Ditto to 100mm high skirting	109	m			
	Carried to Collection			Kshs		
	Fifth Floor Finishes Proposed Office Interior Fit out for KRA - Phase 2					

Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
	Granito floor tiles and fittings					
A	Provide a prime cost rate of [Kshs 4,000.00/sm] for supply of granito floor tiles (tenderer to add the cost of collection, delivery, grouting, adhesive, spaces and all other materials and laying to completion) as selected by the Architect: Supply and fix 600 x 600 x 10mm granito tiles to floor on prepared bed (m.s) with proprietary adhesive; jointed and pointed in matching coloured proprietary grouting: including pvc spacers and expansion joint as necessary: all to Architect's approval	315	m2			
B	Ditto to 100mm high skirting	109	m			
	Floor carpet					
C	Provide a prime cost rate of [Kshs 8,500/sm] for supply and fix heavy commercial tufted carpet tiles or sheets/rolls as Miliken® soundproofed or other equal and approved including WellBAC™ underlay and protective finish in appropriate backing/adhesive, pile height over 42mm and overall thickness over 8mm (Sample to be provided upon Contract award)	144	m2			
	Wrot Cypress Skirting					
D	100 x 25mm thick cypress skirting	142	m			
	CEILING FINISHES					
	Accoustic tiles					
E	600 x 600 x 16 mm "Armstrong® Lyra®" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To open plan	261	m2			
F	600 x 600 x 16 mm "Armstrong® Ultima®" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To breakout area	14	m2			
	Carried to Collection			Kshs		
	Fifth Floor Finishes					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
	Gypsum Board to BS 1230 or other equal and approved					
A	12mm decorative moulded suspended gypsum ceiling fixed with and including metal hangers and recessed bulkhead light enclosure	184	m2			
B	150 x 25 mm moulded gypsum cornice primed before fixing	154	m			
	Butt Insulation					
C	Supply and install 10mm thick padded and reflective backed polyvinyl insulation material as supplied by Jumbochem® Kenya or other equal and approved, laid in accordance with manufacturer's guidelines and specification	184	m2			
	PAINTING AND DECORATION					
	Skimming and surface preparation					
D	Carefully apply approved cement plaster-based surface skimming agent from BASF® or other equal and approved manufacturer in two coats complete with manual sanding blowing and laser leveling to achieve prime quality finish all to the manufacturer's instructions. The completed surface to be approved by the Architect prior to receiving surface finish	44	m2			
E	Prepare and apply two coats of skimming paste using steel trowel or other approved smooth finish technology complete with sealing joints, sanding and blowing to remove particles and granules before final coat; prime as required by manufacturer and prepare surface to receive surface application finish (m/s)	314	m2			
	Prepare surfaces and apply undercoat, and two finishing coats silk vinyl emulsion paint as "Crown Paints" or other approved to;					
F	Gypsum board partitions	296	m2			
G	To 150mm thick masonry walling	44	m2			
	Carried to Collection			Kshs		
	Fifth Floor Finishes					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 3</u>					
	<u>FIFTH FLOOR</u>					
	BILL NO. 6					
	FITTINGS (ALL PROVISIONAL)					
	Art Work					
A	Provide a Sum of Kenya Shillings Two Million Only (Kshs 2,000,000.00) for the supply and installation of Art Work and Decorations as per Architects direction	Item			2,000,000.00	
	Joinery Fittings and Loose Furniture					
B	Provide a Sum of Kenya Shillings Three Million, Nine Hundred and Forty Thousands Only (Ksh. 3,940,000.00) for the supply and installation of a Joinery Fittings and Loose Furniture as per Architects Instructions and details	Item			3,940,000.00	
	Carried Forward to Summary of Section No. 3			Kshs		
	Fifth Floor Fittings					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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SEVENTH FLOOR

Seventh Floor

Proposed Office Interior Fit out for KRA - Phase 2

Item	Description	Unit	Quantity	Rate	Amount	
	<u>SECTION NO. 4</u> <u>SEVENTH FLOOR</u> BILL NO. 1 DEMOLITION WORKS Notes: All useable materials arising from the demolitions shall remain the property of the Employer but the Contractor may take away any materials not so required by the Employer and shall allow a credit for the same in the credit column indicating value for all such materials that are reusable. All debris arising therefrom shall be carried away and dumped where directed by the Employer while all reusable materials shall be delivered where directed The works shall be executed in such order and sequence as the Architect may direct and as little disruption and inconvenience as possible shall be caused to the client, staff and other users of existing facilities.					
A	Existing MDF on aluminium framing partitions	m2	140			
B	Existing ceramic tile floor finish	m2	336			
C	Allow for any other demolition as directed by the Architect		Item			
	Carried Forward to Summary of Section No. 4 Seventh Floor Demolition Works <i>Proposed Office Interior Fit out for KRA - Phase 2</i>			Kshs		

Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 4</u>					
	<u>SEVENTH FLOOR</u>					
	BILL NO. 2					
	PARTITIONS					
	Glazed partitions					
A	Supply and install 12mm thick heat treated and toughened laminated Sunergy® extra clear glass or other equal and approved, partially sand-blasted and comprising silicone adhesive jointing on appropriately primed surfaces, joining to concrete and masonry surfaces by plugged 100mm x 75mm PVDF aluminium sections in corporate colours	95	m2			
	Gypsum Partitions					
	Gyproc standard dry wall partition system consisting of 50mm steel drywall studs spaced at 450mm centres, clad both sides with one layer of 12mm tapered edge gypsum board with staggered joints between boards, in-filled with 50mm thick rockwool insulation; to be fitted into cavity and fixed with drywall screws spaced at 220mm centres in accordance with the manufacturer's instructions					
B	12.5 mm thick gypsum board as Rhinoboard® firestop including connectors, tapes, pastes, adhesives, beads, gaskets, screws and metal studs and all other associated accessories complete with tapering to joints to receive skimming and paint (m/s)	248	m2			
C	Supply and install 50mm thick glass wool as Rockwool AFB® or other approved infill sound insulation solution	124	m2			
	MDF Partitions					
D	Supply and fix 2 No. 12mm thick MDF partitioning complete with brandering/framing to install in place and prepare surface to receive paint (m/s)	13	m2			
	Carried to Collection			Kshs		
	Seventh Floor Partitions <i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

Seventh Floor
Partitions
Proposed Office Interior Fit out for KRA - Phase 2

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 4</u> <u>SEVENTH FLOOR</u> BILL NO. 3 DOORS Aluminium Doors Frameless Aluminium Doors glazed with 12 mm thick toughened clear approved glass complete with all necessary ironmongery and fixing lugs built into walling and pointing in mastic. All to Architects details					
A	Aluminium single leaf frameless door, size 900 x 2400mm high	6	No			
	Carried Forward to Summary of Section No. 4 Seventh Floor Doors Proposed Office Interior Fit out for KRA - Phase 2			Kshs		

Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 4</u> <u>SEVENTH FLOOR</u> BILL NO. 4 WINDOWS Vertical Blinds A Supply and fix VENETIAN WindowBlinds complete with all accessories as per Manufacturer's printed specifications and instructions to Architect/Client's approval	90	m2			
	Carried Forward to Summary of Section No. 4 Seventh Floor Windows Proposed Office Interior Fit out for KRA - Phase 2			Kshs		

Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 4</u>					
	<u>SEVENTH FLOOR</u>					
	BILL NO. 5					
	FINISHES					
	WALL FINISHES					
	Glass Tint Film					
A	Approved profile decorative film as "Llumar" or equal and approved fixed to glass partitions in patterns as described by project architect	27	m2			
B	Ditto to glass doors	6	m2			
	Supply and fix textured wall paper with special prints as directed by the Architect complete with adhesive and all associated accessories to:-					
C	Gypsum board surfaces	248	m2			
	Mazeras stone slate cut and fitted to regular pattern bedded and jointed in cement and sand (1:1) and recessed pointing complete with machine sanding and polishing					
D	To walls - 20mm	36	m2			
	FLOOR FINISHES					
	Cement and sand (1:3) beds and backing					
E	Beds to receive granito tiles.etc thickness 20 mm	235	m2			
F	Ditto to 100mm high skirting	73	m			
	Carried to Collection			Kshs		
	Seventh Floor Finishes <i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
	Granito floor tiles and fittings					
A	Provide a prime cost rate of [Kshs 3,500.00/sm] for supply of granito floor tiles (tenderer to add the cost of collection, delivery, grouting, adhesive, spaces and all other materials and laying to completion) as selected by the Architect: Supply and fix 600 x 600 x 10mm granito tiles to floor on prepared bed (m.s) with proprietary adhesive; jointed and pointed in matching coloured proprietary grouting: including pvc spacers and expansion joint as necessary: all to Architect's approval	235	m2			
B	Ditto to 100mm high skirting	73	m			
	Floor carpet					
C	Supply and fix heavy commercial tufted carpet tiles or sheets/rolls as Miliken® soundproofed or other equal and approved including WellBAC™ underlay and protective finish in appropriate backing/adhesive, pile height over 42mm and overall thickness over 8mm (Sample to be provided upon award)	101	m2			
	Wrot Cypress Skirting					
D	100 x 25mm thick cypress skirting	115	m			
	CEILING FINISHES					
	Accoustic tiles					
E	600 x 600 x 16 mm "Armstrong® Lyra®" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To open plan	184	m2			
F	600 x 600 x 16 mm "Armstrong® Ultima®" or other equal and approved acoustic tiles fixed with metal suspended hangers as specified by manufacturers - To breakout area	17	m2			
	Carried to Collection			Kshs		
	Seventh Floor Finishes Proposed Office Interior Fit out for KRA - Phase 2					

Bill of Quantities

Item	Description	Quantity	Unit	Rate	Amount	
	Gypsum Board to BS 1230 or other equal and approved					
A	12mm decorative moulded suspended gypsum ceiling fixed with and including metal hangers and recessed bulkhead light enclosure	134	m2			
B	150 x 25 mm moulded gypsum cornice primed before fixing	114	m			
	Butt Insulation					
C	Supply and install 10mm thick padded and reflective backed polyvinyl insulation material as supplied by Jumbochem® Kenya or other equal and approved, laid in accordance with manufacturer's guidelines and specification	134	m2			
	PAINTING AND DECORATION					
	Skimming and surface preparation					
D	Carefully apply approved cement plaster-based surface skimming agent from BASF® or other equal and approved manufacturer in two coats complete with manual sanding blowing and laser leveling to achieve prime quality finish all to the manufacturer's instructions. The completed surface to be approved by the Architect prior to receiving surface finish	309	m2			
E	Prepare and apply two coats of skimming paste using steel trowel or other approved smooth finish technology complete with sealing joints, sanding and blowing to remove particles and granules before final coat; prime as required by manufacturer and prepare surface to receive surface application finish (m/s)	248	m2			
	Prepare surfaces and apply undercoat, and two finishing coats silk vinyl emulsion paint as "Crown Paints" or other approved to;					
F	Gypsum board partitions	99	m2			
G	Gypsum ceiling	134	m2			
	Carried to Collection			Kshs		
	Seventh Floor Finishes					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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Item	Description	Quantity	Unit	Rate	Amount	
	<u>SECTION NO. 4</u>					
	<u>SEVENTH FLOOR</u>					
	BILL NO. 6					
	FITTINGS (ALL PROVISIONAL)					
	Art Work					
A	Provide a Sum of Kenya Shillings Two Million Only (Kshs 2,000,000.00) for the supply and installation of Art Work and Decorations as per Architects direction	Item			2,000,000.00	
	Joinery Fittings and Loose Furniture					
B	Provide a Sum of Kenya Shillings Two Million, Nine Hundred and Fifty Thousands Only (Ksh. 2,950,000.00) for the supply and installation of a Joinery Fittings and Loose Furniture as per Architects Instructions and details	Item			2,950,000.00	
	Carried Forward to Summary of Section No. 4			Kshs		
	Seventh Floor Fittings					
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>					

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Section No	<u>FINAL SUMMARY</u>	Page No		Amount Kshs	
1	Preliminaries	26			
2	Third Floor	129			
3	Fifth Floor	143			
4	Seventh Floor	157			
	TOTAL SUMMARY		Kshs		
	<i>Proposed Office Interior Fit out for KRA - Phase 2</i>				

PLUMBING & DRAINAGE INSTALLATIONS

Plumbing & Drainage Installations

Proposed Office Interior Fit out for KRA - Phase 2

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
	BILL No.1: LEVEL 03				
1.00	SANITARY FITTINGS				
	SUPPLY AND INSTALL the following Sanitary appliances including their support brackets, screws, mastic, silicon etc. and all other necessary accessories to make the appliances operational. All final connections to water supply, waste/soil drainage and electrical power supply (whether measured or not) are to be the responsibility of the contractor and must be priced for. Exceptions are items indicated as supply & Install.				
	NOTE: TRADE NAMES Where Trade Names are mentioned below, the contractor shall supply as specified. Alternatives will only be accepted on approval.				
	Kitchen Sink & accessories				
A	ASL Single bowl single drainer kitchen sink made out of stainless steel sheet with bright machine polish finish.	No.	1		
B	"Hansgrohe Metropol " chrome plated single lever kitchen mixer tap Ref No. 14842000	No.	1		
C	Chrome plated heavy cast 1½" sink waste, 70 mm diameter flange, 45 mm long shank, unslotted with plug, chain and backnut.	No.	1		
D	"Cobra Watertech" or approved equivalent, Ref. No. 360 chrome plated 1½" bottle trap with 75 mm deep seal and 200 mm long tail pipe, cap-nut, wall flange, plug, chain and angle regulating valves.	No.	1		
E	"Ariston" 10 litre Undersink heater complete with; - 3kW, 240V rated heating element - Thermostat externally adjustable from 5°C- 75°C - Dry start cut out - Fixing brackets & screws - pressure-venting accessories - Electrical connection & wiring to local isolator	No.	1		
	Cleaner's Sink & accessories				
F	Cleaner's sink, Size:465 x 400mm, sink with grating.complete with Legs and support. Cantilever brackets, painted, pair	No.	0		
G	15mm diameter chrome plated back inlet bib tap as "Docol" Ref no. 106-15 complete with a chrome plated extension pipe 150mm long	No.	0		
H	Chrome plated heavy cast 1½" sink waste, 70 mm diameter flange, 45 mm long shank, unslotted with plug, chain and backnut.	No.	0		
I	Schlosser Germany: Angle Valve : 1/2x3/8in: CP #1710	No.	2		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE				

Proposed Office Interior Fit out for KRA - Phase 2

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
3.00	FOUL WATER DRAINAGE <u>Tenderers must allow in their pipework prices for all the couplings, connectors, joints etc as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holderbats plugged and screwed .</u> <u>The installation must comply with BS EN 12056 - 2:2000</u> <u>MuPVC Waste System Heavy Gauge Pipework Class 41.</u>				
A	32 mm diameter waste pipe	LM	0		
B	40 mm diameter waste pipe	LM	10		
C	50 mm diameter Waste pipe	LM	0		
	Extra Over MuPVC Waste Pipework for the following:-				
D	32 mm diameter 90° /135° Sweep Bend	No.	0		
E	40 mm ditto	No.	0		
F	32 mm diameter 90° /135° Sweep Tee	No.	0		
G	40mm ditto	No.	3		
H	32 mm diameter Access Plug	No.	0		
I	40 mm ditto	No.	2		
TOTAL CARRIED FORWARD TO NEXT PAGE					

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
1.00	Sanitary fittings				
A	Total Brought Forward				
2.00	Internal Plumbing				
B	Total Brought Forward				
3.00	Foul drainage				
C	Total Brought Forward				
TOTAL FOR LEVEL 03 CARRIED FORWARD TO GRAND SUMMARY PAGE					

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
	BILL No.2: LEVEL 05				
1.00	SANITARY FITTINGS				
	SUPPLY AND INSTALL the following Sanitary appliances including their support brackets, screws, mastic, silicon etc. and all other necessary accessories to make the appliances operational. All final connections to water supply, waste/soil drainage and electrical power supply (whether measured or not) are to be the responsibility of the contractor and must be priced for. Exceptions are items indicated as supply & Install.				
	NOTE: TRADE NAMES Where Trade Names are mentioned below, the contractor shall supply as specified. Alternatives will only be accepted on approval.				
A	"Duravit D Code" Ref No. 211109 in white vitreous china, washdown action with open flushing rim WC pan with horizontal outlet, fixing screws, mastic.WC to be complete with: White single seat and cover Ref No. 006739 Close coupled cistern & fittings Ref No. 092710	No.	1		
B	WC "S" or "turned P" connector to drain pipe for horizontal outlet WC Pan.	No.	1		
C	Chrome Plated Toilet Roll Holder with flap :	No.	1		
D	Chrome plated Double Robe/Coat Hook	No.	1		
E	Wash Basin				
F	Duravit-D-Code" Ref No. 033754 counter top wash hand basin (545mm x 435mm) with overflow and tap platform	No.	1		
	Wash Hand Basins Accessories				
G	"Twyford Bathrooms Ltd's ½" Sola non-concussive push tap tap Ref. No. SF 2101CP	No.	1		
H	Chrome plated 1¼" basin waste complete with flange, shank, chain , plug & Angle regulating valves.	No.	1		
I	Chrome Plated Bottle Trap 1.25in	No.	1		
J	900mm long chrome plated towel rail complete with fixing screws	No.	1		
K	"Insta-office Safco" Ref. No. SAF 4166 robe hook.	No.	1		
L	Twyford's Bathroom Ltd. Ref VC 9808 WH recessed in wall soap tray into white Vitreous China.	No.	1		
M	600 x 750mm, 6 mm, thick plate rectangular shaped glass mirror with frosted bevelled edge decorative boundary and concealed screws for installation.	No.	1		

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
	Shower, Bath & accessories				
N	stiebel instant water heaterwith pump IP 45 E #222367, #292595, #282027; - 5 metres long power cable and electrical connection to local isolator - 20mm diameter shower stopcock as Cobra or equal and approved	No.	1		
O	100 mm diameter Trapped Floor Gully with 1 No. 50 mm diameter inlets and 50 mm diameter outlet and shower drain inlet.	No	1		
P	85mm diameter Shower head complete with overhead shower arm as "Cobra-Classic jet 070CP"	No.	0		
Q	½" shower stop cock as Cobra Watertech or approved.	No.	1		
	Kitchen Sink & accessories				
R	ASL Single bowl single drainer kitchen sink made out of stainless steel sheet with bright machine polish finish.	No.	1		
S	"Hansgrohe Metropol " chrome plated single lever kitchen mixer tap Ref No. 14842000	No.	1		
T	Chrome plated heavy cast 1½" sink waste, 70 mm diameter flange, 45 mm long shank, unslotted with plug, chain and backnut.	No.	1		
U	"Cobra Watertech" or approved equivalent, Ref. No. 360 chrome plated 1½" bottle trap with 75 mm deep seal and 200 mm long tail pipe, cap-nut, wall flange, plug, chain and angle regulating valves.	No.	1		
V	"Ariston" 10 litre Undersink heater complete with; - 3kW, 240V rated heating element - Thermostat externally adjustable from 5°C- 75°C - Dry start cut out - Fixing brackets & screws - pressure-venting accessories - Electrical connection & wiring to local isolator	No.	1		
W	Schlosser Germany: Angle Valve : 1/2x3/8in: CP #1710	No.	2		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE				

Proposed Office Interior Fit out for KRA - Phase 2

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
3.00	FOUL WATER DRAINAGE <u>Tenderers must allow in their pipework prices for all the couplings, connectors, joints etc as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holderbats plugged and screwed .</u> <u>The installation must comply with BS EN 12056 - 2:2000</u> <u>MuPVC Waste System Heavy Gauge Pipework Class 41.</u>				
A	32 mm diameter waste pipe	LM	0		
B	40 mm diameter waste pipe	LM	20		
C	50 mm diameter Waste pipe	LM	10		
	Extra Over MuPVC Waste Pipework for the following:-				
D	32 mm diameter 90° /135° Sweep Bend	No.	0		
E	40 mm ditto	No.	0		
F	32 mm diameter 90° /135° Sweep Tee	No.	0		
G	40mm ditto	No.	3		
H	32 mm diameter Access Plug	No.	0		
I	40 mm ditto	No.	2		
	uPVC Soil System Heavy Gauge Class 41 Pipework				
J	100 mm diameter Light Grey Soil Pipe	LM	15		
	Extra Over uPVC Soil Pipework for the following: -				
K	100 x 32 mm diameter Light Grey Single Boss Connector.	No.	0		
L	100 x 40 mm ditto	No.	1		
M	100 x 50 mm ditto	No.	1		
N	100mm diameter Light Grey Tee Single Branch	No.	0		
O	100mm diameter Light Grey Short Radius bend	No.	3		
P	100 mm diameter Trapped Floor Gully with 1 No. 32 mm diameter inlet and 50 mm diameter outlet and floor gully inlet.	No.	0		
TOTAL CARRIED FORWARD TO NEXT PAGE					

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
<u>COLLECTION PAGE</u>					
1.00	Sanitary fittings				
A	Total Brought Forward				
2.00	Internal Plumbing				
B	Total Brought Forward				
3.00	Foul drainage				
C	Total Brought Forward				
TOTAL FOR LEVEL 05 CARRIED FORWARD TO GRAND SUMMARY PAGE					

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
	BILL No.3: LEVEL 07				
1.00	SANITARY FITTINGS				
	SUPPLY AND INSTALL the following Sanitary appliances including their support brackets, screws, mastic, silicon etc. and all other necessary accessories to make the appliances operational. All final connections to water supply, waste/soil drainage and electrical power supply (whether measured or not) are to be the responsibility of the contractor and must be priced for. Exceptions are items indicated as supply & Install.				
	NOTE: TRADE NAMES Where Trade Names are mentioned below, the contractor shall supply as specified. Alternatives will only be accepted on approval.				
	Kitchen Sink & accessories				
A	ASL Single bowl single drainer kitchen sink made out of stainless steel sheet with bright machine polish finish.	No.	2		
B	"Hansgrohe Metropol " chrome plated single lever kitchen mixer tap Ref No. 14842000	No.	2		
C	Chrome plated heavy cast 1½" sink waste, 70 mm diameter flange, 45 mm long shank, unslotted with plug, chain and backnut.	No.	2		
D	"Cobra Watertech" or approved equivalent, Ref. No. 360 chrome plated 1½" bottle trap with 75 mm deep seal and 200 mm long tail pipe, cap-nut, wall flange, plug, chain and angle regulating valves.	No.	2		
F	"Ariston" 10 litre Undersink heater complete with; - 3kW, 240V rated heating element - Thermostat externally adjustable from 5°C- 75°C - Dry start cut out - Fixing brackets & screws - pressure-venting accessories - Electrical connection & wiring to local isolator	No.	2		
	Cleaner's Sink & accessories				
E	Cleaner's sink, Size:465 x 400mm, sink with grating.complete with Legs and support. Cantilever brackets, painted, pair	No.	0		
F	15mm diameter chrome plated back inlet bib tap as "Docol" Ref no. 106-15 complete with a chrome plated extension pipe 150mm long	No.	0		
G	Chrome plated heavy cast 1½" sink waste, 70 mm diameter flange, 45 mm long shank, unslotted with plug, chain and backnut.	No.	0		
H	Schlosser Germany: Angle Valve : 1/2x3/8in: CP #1710	No.	4		
	TOTAL CARRIED FORWARD TO COLLECTION PAGE				

Proposed Office Interior Fit out for KRA - Phase 2

ITEM	DESCRIPTION	UNIT	QTY	UNIT RATES - KSHS	TENDER AMOUNT- KSHS
3.00	FOUL WATER DRAINAGE <u>Tenderers must allow in their pipework prices for all the couplings, connectors, joints etc as required in the running lengths of pipework and also where necessary, for pipe fixing clips, holderbats plugged and screwed .</u> <u>The installation must comply with BS EN 12056 - 2:2000 MuPVC Waste System Heavy Gauge Pipework Class 41.</u>				
A	32 mm diameter waste pipe	LM	0		
B	40 mm diameter waste pipe	LM	20		
C	50 mm diameter Waste pipe	LM	0		
	Extra Over MuPVC Waste Pipework for the following:-				
D	32 mm diameter 90° /135° Sweep Bend	No.	0		
E	40 mm ditto	No.	0		
F	32 mm diameter 90° /135° Sweep Tee	No.	0		
G	40mm ditto	No.	6		
H	32 mm diameter Access Plug	No.	0		
I	40 mm ditto	No.	4		
TOTAL CARRIED FORWARD TO NEXT PAGE					

[illegible]

ITEM	DESCRIPTION	TOTAL TENDER AMOUNT
		KSHS.
	MAIN SUMMARY	
	BILL No. 1: Total brought forward from Level 03	
A	Total Brought Forward From Collection Page	
	BILL No. 2: Total brought forward from Level 05	
B	Total Brought Forward From Collection Page	
	BILL No. 3: Total brought forward from Level 07	
C	Total Brought Forward From Collection Page	
	Testing & Commissioning	
D	Test, sterilise (where applicable) entire plumbing system set to work & commission to specification prior to use to the approval of the Engineer	
F	Allow for All pipe connections to existing services	
	TOTAL CARRIED FORWARD TO FORM OF TENDER	

AMOUNT IN WORDS: KENYA SHILLINGS

SIGNED

CONTRACTOR'S OFFICIAL STAMP

DATE

GRAND SUMMARY

Grand Summary

Proposed Office Interior Fit out for KRA - Phase 2

Section No.	Description	Amount
	Grand Summary	
1	Total for Builders' Works Brought Forward from Page 158	
3	Total for Plumbing & Drainage Service Installations Brought Forward from Page 173	
3	Contingencies	12,900,000.00
Total Carried to Form of Tender		

Contractor's Signature:

Address:

Date

Witness' Signature:

Address:

Date