Camden Power Station

ESKOM GENERATION

2024

CONSTRUCTION OF A NEW CHLORINE DOSING SYSTEM AND PLANT SAFETY UPGRADE PROJECT FOR CAMDEN POWER STATION

CONTRACT NUMBER :

CONTRACTOR :

CONTRACT AMOUNT (Excluding VAT) :

CONTRACT AMOUNT (Incld VAT) :

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NOTES TO TENDERERS

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1. BILLS OF QUANTITIES

This document comprises Notes to Tenderers and Bills of Quantities and is hereafter referred to as "the Bills of Quantities".

The Tenderers are to note that this is a Contract with a Bills of Quantities.

2.1 CONTRACT DOCUMENTS

The contract documents will consist of:

2.1.1 The NEC3 Engineering and Construction Short Contract 2013 together with all amendments.

2.1.2 These Bills of Quantities, including all annexures and supplementary documentation referred to therein.

2.1.3 Documents to be provided by the Contractor in terms of the requirements of these Bills of Quantities.

2.1.4 Construction Regulations 2014

2.1.5 Occupational Health and Safety Act of 1993

2.1.6 SANS 1200G Standardized specification for Civil Engineering Construction

2.1.7 SANS 1200 A General

2.1.8 SANS 1200 C Site Clearance

2.1.9 SANS 1200 D Earthworks

2.1.10 SANS 10298:2009

2.1.11 Camden Power Station Design of New Chlorine Dosing Systems and Plant Safety Upgrade Project –Works Information

3 DRAWINGS

The Contractor is referred to the drawings which form part of this tender with Drawing No:

1. 36.36/20340 - Sewage Plant Chlorination Dosing System Process and Instrumentation Diagram

2. 36.36/20329 - Sewage Plant Chlorination Dosing System Process and Instrumentation Diagram

3. Eskom-WTP-SWR-20333 - Chlorine Contact Tank Sections

4. Eskom-WTP-SWR-00012 - Foundations

The Contractor is also referred to the following Reports for comprehensive design details: **1. Detailed Design Report** and **Detailed Design Report for Foundations - WTP and SWR**

4 VALUE ADDED TAX

Tenderers should compute their rates from the net costs (excluding Value Added Tax). Value Added Tax at the current rate of 15% is to be added to the net sub-total on the final summary page by means of a single sum calculation to establish the tender price.

5 SCOPE OF WORK

As a guide only, the work comprises as follows:-

Construction of a new Chlorine Dosing System and plant safety upgrade project for Camden Power Station

6 ADDRESS WHERE DOCUMENTS CAN BE OBTAINED

Tender documents will be made available Electronically on an online portal to be provided by Eskom

7 POSSESSION OF SITE

The date of which possession of the Site shall be given to the Contractor shall be within 7 **working days** of the acceptance of this tender.

8 CONSTRUCTION PERIOD - DATES FOR PRACTICAL COMPLETION

The intended date for practical completion and penalty for each calendar day for non-completion shall be:

Practical Completion: _12__Month from the date of Site Handover

Tenderers are to note that the Contract will be delivered as a whole and NOT to be phased.

9 COMMON LAW OR BY-LAW REQUIREMENTS

No liability for not specifically mentioning any normal contractual, Common Law or By-Law requirements will be accepted by the Employer, or Contracts Manager.

10 AREA OF WORKS

The Tenderer shall ascertain by personal viewing of the site any restrictions to the area that may be occupied by the contractor including any restrictions imposed by any buildings, etc. and any limitations or restrictions that may be imposed by Eskom Engineers.

Access to the site shall be logically planned and enclosed to ensure minimum disruption to existing user operations.

The contractor is deemed to have allowed for all necessary temporary fencing, screening, hoardings, etc.

Space for the storage of Materials must be arranged with the Contracts Manager

The Contractor shall make all necessary provisions in all rates to take into account these requirements as no claims for extras arising from these matters will be subsequently entertained as admitted. Tenderers will be held responsible for any misunderstanding of incorrect information, however obtained, except information which may have been given in writing over the signature of the Contracts Manager.

11 MANAGEMENT OF WORKS

The Contractor shall, to the satisfaction of the Contracts Manager, provide, in addition to the Contractor's Site Representative, the services of an experienced and competent Construction Manager.

The names and CV's of the Contractor's proposed Management Team shall be submitted to the Contracts Manager prior to commencement on site and, after the Contracts Manager's agreement on the composition and competence thereof has been obtained, no changes shall be made nor shall any member of the said team be removed from the project while remaining in the employ of the Contractor without the Contracts Manager's prior written approval.

The Contractor shall make necessary provisions in all rates to take into account these requirements as no claims for extras arising from these matters will be subsequently entertained or admitted.

12 INSPECTION OF WORK

The Contractor shall obtain all local authority approvals if required and shall ensure that all work is also approved by the Contracts Manager prior to covering up. The fact that the work will be inspected periodically in no way absolves the Contractor from total responsibility for the quality of his workmanship and for compliance with the specification. He shall timeously notify the Contracts Manager so that inspections can be arranged.

13 SITE CLEANLINESS

The Contractor shall clear away all dirt, rubbish and superfluous material as they accumulate and leave the whole of the site clean and tidy on completion to the satisfaction of the Contracts Manager. The Contractor is advised that the adjacent site is functional at all times and that the incumbents should not be unduly inconvenienced.

14 ORDERING OF MATERIALS

No claims will be entertained due to non-availability of materials or labour. The Tenderer is therefore required to investigate and ensure that the specific materials and components required for the works will be available at the relevant estimated construction times, at the time of tendering.

15 PROGRAMME

The Contractor will be required to submit an outline programme of work to completion of the contract with the issue of the Form of Offer and Acceptance.

16 CONTRACT PRICE ADJUSTMENT

The Contract Sum shall NOT be subject to CPAP.

17. PRICED BILLS OF QUANTITIES:

Tenderers must submit to the Contracts Manager a copy of the Bills of Quantities fully priced and extended, with his tender. After the Bills have been checked, and when called upon, each page of the Bills of Quantities shall be initialed and the Index page and the Final Summary page signed in full by the Tenderer.

18. PAYMENT OF PRELIMINARIES:

Tenderers are to note that the Payment of Preliminaries & Generals shall be on the NEC3 Short Contract [Prorated to the Value of Work Executed]

19. ADJUSTMENT OF PRELIMINARIES:

Tenderers are to note that the Adjustment of Preliminaries & Generals shall be on NEC3 Short Contract [Fixed - 10%, Value - 15% and Time - 75%]

20 DIFFERENCE AND DISCREPANCIES:

Should there be any difference or discrepancy between the prices or particulars contained in the official Tender Form and those contained in any covering letter from the Tenderer, the prices contained in the official Tender Form shall prevail.

Every Tenderer shall be deemed to have waived, renounced and abandoned any conditions printed or written upon any stationery used by him for the purpose of or in connection with the submission of his Tender, which are in conflict with the Conditions of Tender or Special and General Conditions of Contract.

Tenderers are warned that any material divergence from the official conditions or specifications may render their Tenders liable to disqualification.

The Tenderers are to note that if there are any arithmetical errors in the Tenderers' form of tender in calculation of the Tender Sum, the Contracts Manager will correct the calculation accordingly.

21 COMMUNICATION WITH MEMBERS OF THE CLIENT COMPANY OR PROFESSIONAL TEAM

A Tenderer shall not in any way communicate with a member of the Client Company or Professional Team or with any officer on a question affecting any contract or the supply of goods or for any work, undertaking or service which is the subject of a Tender during the period between the closing date for receipt of Tenders and the dispatch of the written notification of the Employer's decision on the award of the contract; provided that a Tenderer shall not hereby be precluded from obtaining from the Employer or his authorised representative information as to the date upon which the award of the contract is likely to be made or, after the decision upon the award has been made by the Contracts Manager to which the Employer had delegated its powers, information as to the nature of the decision or such information as was publicly disclosed at the opening of Tenders.

22 IMPORT PERMITS:

Tenderers must apply direct for any import permit and/or currency required, however the Contracts Manager will furnish successful Tenderers with a supporting statement if required.

23 BILLS OF QUANTITIES:

No alteration, erasure, omission or addition is to be made to the text and conditions of these Bills of Quantities and should any such alteration, amendment, note or addition be made, the same will not be recognised, but the reading of the Bills of Quantities as prepared by the Contracts Manager will be adhered to.

It should be understood that the system of measurement herein adopted is the only system of measurement which will be recognised in connection with this contract. Before the signing of the contract, the Contracts Manager will be entitled to call for adjustments of individual rates and rectify discrepancies, as he considers necessary without alterations to the Tender amount.

24 TRAFFIC AUTHORITIES AND REGULATIONS (N/A)

The Contractor shall comply with all requirements of the Authorities in connection with traffic control, gaining access to the site, prevention or disruption of the flow of traffic, transporting of materials and equipment to and from the site and he shall make all necessary arrangements, pay all deposits, fees and charges in connection therewith.

25 PROTECTION OF PERSONS AND PROPERTY

The Contractor shall adopt all safety measures in compliance with all statutes, regulations, etc., and shall take all measures to protect all property and to secure the safety and freedom from injury of all persons.

The Contractor shall in addition take all necessary steps to prevent nuisance from dust and the like and shall use every endeavor to minimize noise emanating from the Contract Works. The Contractor is referred to the various forms that require his attention prior to commencing work on site - All forms duly completed and signed must be forwarded to the Contracts Manager.

Tenderers are to note that the building will remain occupied for the duration of the Works except for the sections of the Works under construction in terms of the requirements of the Sectional Completion.

26 EXISTING AND ADJOINING PROPERTIES, PAVINGS ETC.

The Contractor shall execute the whole of the Contract Works with the minimum of disturbance to the existing and adjoining premises and occupants thereof. He shall keep the Site dust free and clean, and shall keep pavements, surrounding roads etc., free of builder's rubble and clean to the entire satisfaction of the Contracts Manager and the Authorities.

The Contractor shall leave such buildings, structures, fences, paving, roadways, Kerbs, gardens, municipal pavements, streets, etc., in the same condition at completion as they were at the commencement of the Contract. Before commencing work, the Contractor shall arrange with the owners of the existing and adjoining buildings and/or the Authorities for an inspection to be made jointly with themselves, the Contractor and the Contracts Manager in order to make written notes of any defects, etc. which may later be claimed to have been caused by the operations under this Contract. Should defects be disclosed, the Contractor shall submit same in writing to the Contracts Manager before commencing the Contract, failing which it shall be understood that no such defects existed and the Contractor shall be liable for all claims in this connection.

27 PROCEDURE OF WORKS

The Contractor shall be solely responsible for ensuring that the procedure of works is kept to and no deviations will be entertained.

Should this, however not be possible then the Contractor shall timeously notify the Contracts Manager

The Contractor shall make any and all necessary allowances in his pricing for the disruption and costs that will be required to comply with any such restrictions.

SPECIAL CLAUSES

28 TRADE NAMES, ETC.

All materials, fittings, finishes, etc. specified under a "Trade Name", catalogue number or reference shall be either exactly as described or of equal quality, specification and weight to those described.

The Contracts Manager's written approval must be obtained for any departure from the specification before the submission of tenders, failing which specified materials, fittings, finishings, etc. shall be deemed to have been allowed for in the tenders.

Where articles other than what the manufacturer specified are used, an adjustment of the prices will be made and Variation Orders issued to cover these adjustments.

The Contractor must take delivery of, handle, store, use, apply and/or fix all proprietary branded products in strict accordance with the manufacturer's instructions after consultation with the manufacturer's authorised representative.

All references in these Bills of Quantities to Specifications of the Bureau of Standards shall be deemed to be reference to the latest issues of such Specifications, and any subsequent amendments thereto. All articles, materials or items described as to conform to the SABS Specifications must bear the SABS mark.

29 CONTRACTOR'S RESPONSIBILITY

The Contracts Manager and the other Professional Consultants shall not be responsible for any act or omission on the part of the Contractor, which may result in any patent or latent defects, in materials or workmanship, breach or neglect of any local regulations. The Contractor shall at all times be responsible for any such neglect, deviation or wrong act, whether the same is discovered before or after the final certificate, or any other Certificate, has been approved.

30 SITE INSTRUCTIONS AND RECORDS

The Contractor shall supply and have available at the site of the works at all times, the following site books:-

a) Site Instruction Book

Receiving and recording instructions in a suitable A4 size triplicate book kept on site. Instructions issued shall be recorded by the Contracts Manager or other Employer's Agents to whom the Contracts Manager has delegated Authority in the book.

Only site instructions issued in such a book shall be recognised.

b) Daily Record Book

The Contractor shall record in a suitable A4 size triplicate book kept at the site, a daily record of work done, all site visits by the Contracts Manager and other professional personnel and all events affecting the Works, such as progress, issue of plans, breakdown of machinery, etc. The labour, plant and material on site shall be recorded as well as work performed. Entries must be made by the Contractor and must be signed and forwarded to the Contracts Manager for his counter signature on a daily basis. Copies of these records shall be for the Contracts Manager, Employer and Contractor.

31 LOCATION OF TEMPORARY BUILDING AND TEMPORARY SERVICES

The Contractor shall provide all necessary temporary works, including temporary roads, tracks, crossings, hard standing and services, etc. required for his own and Sub-Contractor's use during the construction and maintenance period.

There is no guarantee given or implied that Site Conditions will be such that the Contractor will be able to erect such offices, stores and temporary accommodation within the site boundaries and it shall be the Contractor's responsibility to adopt whatever measures he deems necessary in this regard and to obtain permission and pay all cost in connection therewith.

By the submission of a tender, any Tenderer will, if awarded the contract to which this tender document relates, be deemed to be the mandatory as envisaged by Section 37 (2) of the Act. As a mandatory the successful Tenderer will be deemed to be the " Contractor" and an Employer in his/her/their own right with duties as prescribed in the Act and accordingly will be deemed to have agreed to be solely responsible for ensuring that in connection with the service to which this tender document relates, all work will be performed and machinery and plant used in accordance with the Act. Should the Contractor, for whatever reason be unable to perform as required by the Act, the Contractor undertakes to inform the Employer accordingly.

The Contractor (mandatory) will be required to:-

1 Provide the Employer with a Health and Safety programme and plan specifically related to the Works and ensure that the programme and plan are implemented and maintained, with the programme being subject to audit, at least once a month, by the Contracts Manager;

2 Exercise discretion and appoint a Full-time Safety Officer (in writing) to assist in the control of all safety related aspects, and to give input into the health and safety plan;

3 Appoint (in writing) a full time competent Supervisor (as defined in the Regulation in terms of the Act) to supervise the project;

4 Provide the Employer and any Sub-Contractors that may be engaged by the Contractor and/or Nominated Sub-Contractors with a programme of construction for the Works as well as a method statement with the necessary details and procedures for execution;

5 Provide the Employer both before commencing and during construction work with a copy of a risk assessment performed by a competent person who has been appointed in writing by the Contractor, and the risk assessment must form part of the health and safety plan;

6 Ensure that every employee or person (including visitors) who enters the site of the Works undergoes health and safety induction training pertaining to hazards identified on the site of the Works and upon such training having been successfully completed, the Contractor must issue written confirmation by a competent person to the trained employees or persons who shall be further instructed to carry such confirmation with them at all times whilst on the site of the Works;

7 Issue, on loan, the necessary personal protective equipment to visitors to the site of the Works; and

8 Be in good standing with the Compensation Commissioner at all times during the duration of the Contract.

9 The Contractor is to sign a Non-Disclosure Agreement prior to collecting or receiving any proprietary information from Eskom, drawings, documentation, reports and photographs

The Contractor will be deemed to have satisfied himself with his obligations in terms of the Act and to have allowed for all costs arising from compliance with the Act as no claim for extra costs arising from compliance with, and obligations in terms of the Act will be entertained.

32 CONTRACTORS TO VISIT SITE PRIOR TO SUBMISSION OF TENDER

The contractors are urged to visit the site that has been identified to get an overview of the nature of works and the location of the building prior to pricing this document.

33 PRICING OF THESE GENERAL NOTES

The Contractor must allow in his pricing for any additional costs arising from these "General Notes" as no later claims for additional costs will be considered.

34 TAX COMPLIANCE

Failure to provide mandatory information required in this Bid will result in the submissions being deemed null and void and shall be considered non-responsive. An Electronic Tax Compliance Status (TCS) System will be used to verify the bidder's tax compliance status so bidders must request a unique security personal identification number (PIN) from SARS which must be submitted with the bid

No alternative tender offers will be considered.

These Bills are not to be used for the purpose of ordering materials.

All Bill rates are to include for material, labour, plant, wastage, transport and profit.

MODEL PREAMBLES

MODEL PREAMBLES FOR TRADES 2008

forming part of the bills of quantities

Project:

Contract Reference Number:

Effective date November 2008 **ISBN 978-0-620-1663-4**

EXPLANATORY NOTES AND INSTRUCTIONS ON THE USE OF THESE MODEL PREAMBLES

1. The document

1.1 This document is published by and is available from the Association of South African Quantity Surveyors, P.O. Box 3527, Halfway House, 1685. Telephone (011) 315 4140. E-mail: administration@asaqs.co.za

1.2 The contents of this document are intended to cover workmanship and materials encountered in a significant majority of projects. If a material is not encountered in a significant majority of projects, its preamble will in all likelihood not be included in this document

1.3 By its very nature, this document is a “Model” document and one that is designed to act as a basis upon which to build. It is anticipated that it will be supplemented by a “Supplementary Preambles” document included in the text of the bills of quantities that will include, inter alia, the following:

1.3.1 supplementary clauses of a general nature that practitioners may deem necessary to cover their own individual requirements,

1.3.2 additional clauses pertaining to specific materials incorporated in a project and not covered by the Model Preambles,

1.3.3 amendments to anything contained in the Model Preambles. A clause has been incorporated in the “General” section of the document stipulating that anything contained in the “Supplementary Preambles” which is at variance to that which is contained in the Model Preambles, will take precedence over the Model Preambles and apply to the works in hand

1.4 It is intended that this document will be used by reference only in the text of the bills of quantities and will NOT be bound or reproduced therein

2. The basic philosophy

2.1 Wherever possible, reference has been made throughout the preambles to South African National Standards (SANS) to describe materials and methods respectively. It is therefore incumbent on the users of these preambles to have ready access to the relevant Specifications and Codes. Where such Specifications or Codes do not exist, suitable preambles have been compiled

2.2 These preambles have been designed to assist in abbreviating descriptions in the text of the bills of quantities and practitioners are encouraged to make use of this facility. e.g. The description of a stormwater catchpit would read:

“Brick stormwater catchpit size internally 600 x 400 x 1 200mm deep to invert fitted with and including a 450 x 300mm x 59kg cast iron grating and frame”

2.3 Wherever alternatives exist in respect of materials or workmanship, specific choices have been made in these preambles. Should users require different choices to specific items, these should be referred to in the Supplementary Preambles as outlined in clause 1.3

3. Additional notes in the use of these Model Preambles

3.1 Concrete, Formwork and Reinforcement

The Project Specification embodied in these preambles was compiled in collaboration with the Authors of SANS 1200G, which forms the basis for the Concrete, Formwork and Reinforcement model preambles

Users of these preambles are advised to submit a copy of the Model Preambles to the Engineers involved in a project for their scrutiny. Any amplifications, amendments, etc required by individual Engineers would then be incorporated in the Supplementary Preambles referred to in item 1.3

3.2 Roof Coverings

The roof coverings included in these Model Preambles are limited in their content and therefore any roofing material not included in these Preambles will need to have its full preamble included in the Supplementary Preambles

3.3 Structural Steelwork

The comments made under item 3.1 apply equally to Structural Steelwork

Note that the protective treatment of the structural steel covers only the treatment up to and including the primer (and patching after erection). The finishing coats of paint must be fully described and included either in the “Structural Steelwork” or in the “Paintwork” trade, as the practitioner wishes

MODEL PREAMBLES FOR TRADES

CONTENTS

A. GENERAL

A.1 APPLICATION OF CLAUSES

These Model Preambles for Trades, and any Supplementary Preambles, shall be read in conjunction with and shall form part of the descriptions of items in the bills of quantities

Where descriptions or Supplementary Preambles in the bills of quantities differ from these Model Preambles for Trades, the descriptions or Supplementary Preambles in the bills of quantities shall take precedence. Where supplementary preambles differ from descriptions in the bills of quantities, the descriptions in the bills of quantities shall take precedence

Except where otherwise stated, all preambles contained in any individual Trade Preamble shall apply equally to any work of a similar nature in all other trades

A.2 ABBREVIATIONS

The following abbreviations shall apply:

AASHTO – American Association of State Highway and Transportation Officials

AISI – American Institute of Steel Industries

BS – British Standard

CKS – Coordinating Specifications issued by the Central Coordinating Committee under the auspices of the South African Bureau of Standards

CSIR – Council for Scientific and Industrial Research

SANS – South African National Standards and the number following shall refer to the relevant specification or code of practice as the case may be

A.3 MATERIALS AND WORKMANSHIP

Materials and workmanship shall be the best of their respective kinds. Only new and undamaged materials shall be used in the Works. Materials to be permanently installed into the works shall not be used for any temporary purposes on site. Work shall be to the approval of the Contracts Manager and shall be executed in accordance with the relevant manufacturer's written recommendations and instructions where applicable

A.4 PROPRIETARY PRODUCTS

For the purposes of submission of tenders, rates for items described in the bills of quantities by trade names, catalogue references, etc shall be for the particular type and manufacture specified

The approval of the Contracts Manager shall be obtained prior to any substitution and where products or materials etc other than those specified are used, adjustments in the rates will be made if necessary

A.5 ASSEMBLING

Rates for manufactured items shall include assembling complete and handing over in proper working order

A.6 REFERENCES IN DESCRIPTIONS

Any references given in brackets at the end of certain descriptions shall refer to the relevant references on the drawings or schedules

A.7 WATER

Water shall be clean and free from injurious amounts of acids, alkalis, organic matter and other substances and shall be suitable for its intended use

A.8 APPLICATION OF THE NATIONAL BUILDING REGULATIONS

All work shall be executed in accordance with the requirements of SANS 10400

A.9 ACCURACY IN BUILDINGS

The dimensional and positional accuracy of the buildings and their component parts shall comply with Grade II requirements of SANS 10155 unless otherwise stated

A.10 REFERENCES TO OTHER DOCUMENTS

References in these “Model Preambles for Trades” to other documents, including SANS, CKS and BS, shall pertain to the latest edition thereof including all amendments thereto at the date for submission of the tender

B. ALTERATIONS

B.1 ALTERATIONS

In taking down and removing existing work the utmost care shall be observed to prevent any structural or other damage to remaining portions of the building. The Contractor shall ensure the stability of all structures during alteration work

Special care shall be exercised during the progress of the work to ensure that any electrical installations, water supply pipes, telephone and other services which may be encountered are not interfered with and notice shall be given to the Contracts Manager if any disconnection or alterations become necessary

The Contractor shall take all precautions necessary to prevent any nuisance from dust whilst carrying out the work

B.2 MATERIALS FROM THE ALTERATIONS, CREDIT, ETC

Materials recovered from the alterations (except where described as to be re-used or to be handed over to the Employer) will become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials shall not be re-used in new work without written permission from the Contracts Manager

Materials described as “removed” shall be removed from the site immediately.

Materials described as “handed over to the Employer” shall be carefully dismantled where necessary, neatly stored under cover on the site where directed and protected from damage, until required

Materials described as “set aside for re-use” shall be carefully dismantled where necessary, cleaned, neatly stored under cover and protected from damage until required for re-use. Any damage caused to such materials during removal, storage or refixing shall be made good at the Contractor’s expense

B.3 DISPOSAL OF DEBRIS ETC

The Contractor shall be responsible for the removal from the site of all materials, debris and rubbish resulting from the alterations

B.4 MAKING GOOD DAMAGED WORK

The Contractor shall make good in all trades to existing work where damaged or disturbed through the alterations with all necessary new materials to match the existing

B.5 FORMING NEW OPENINGS OR ALTERING OPENINGS IN EXISTING WALLS

Where new openings are formed or openings altered in existing walls, the wall above the opening shall be broken out and a new brick, in situ concrete or prestressed concrete lintel inserted, complete with all necessary reinforcement, formwork, turning piece, etc, the jambs and portions of openings as described shall be built up with new brickwork or blockwork properly toothed and bonded to existing, cavities of hollow walls shall be closed where necessary and finishes shall be made good all round and into reveals

B.6 BUILDING UP OPENINGS

Where existing openings are given in number as built up, the existing surfaces all round shall be prepared as necessary, brickwork or blockwork properly toothed and bonded to existing, wedged up to underside of existing lintel and finishes shall be made good on both sides

C. EARTHWORKS

C.1 DEMOLITIONS

C.1.1 Nature and extent

Descriptions of demolitions give a rough guide only as to the scope of the work. Tenderers are therefore advised to visit the site before submitting a tender and to acquaint themselves with the nature and extent of the work to be done and the value of recoverable materials which are not to be re-used or handed over to the Employer. Unless otherwise stated, loose furniture, kitchen and other equipment, apparatus, machinery, etc shall remain the property of the Employer and the removal thereof does not fall within the scope of this Contract

The Contractor shall completely demolish the buildings etc in a careful, skilful, practical and safe manner down to 150mm below ground level

Demolitions shall include breaking up and removing:

all floors and surface beds;

all external screen walls, steps, ramps, aprons, surface water channels, rainwater sumps, gulleys, etc attached to the building to be demolished;

all services, manholes, etc in ground to a point not less than 1m beyond the perimeter of the building including plugging off ends of all remaining pipes, drains, etc, filling in holes where necessary and ramming and levelling to ground level

Where only a portion of a building is to be demolished, it shall be done without damage to the remaining portion of the building. Any such damage shall be made good by the Contractor at his own expense

C.1.2 Notices etc

The Contractor shall, before commencing work, obtain all necessary authorisation for carrying out the work, by whatever means including the use of pneumatic equipment or blasting, give all necessary notices and pay all charges and fees in connection therewith. He shall also comply with all regulations pertaining to rodent extermination and he shall obtain the requisite Rodent Extermination Clearance Certificate and pay all necessary fees. All receipts and certificates shall be left in the safekeeping of the Contracts Manager. All the abovementioned charges and fees shall be paid by the Contractor and included in his prices

The Contractor shall give ample notice to the Contracts Manager and Local Authorities regarding any disconnections necessary prior to the removal or interruption of electrical or telephone cables, water and sanitary services etc

C.1.3 Loss

After the handing over of the site to the Contractor, the full risk of any loss or damage to buildings to be demolished shall be the responsibility of the Contractor and he shall take such precautions as he deems necessary against such loss or damage

C.1.4 Materials from the demolitions, credit, etc

Materials recovered from the demolitions will become the property of the Contractor, who may allow credit in respect thereof where provided for in the bills of quantities. Such materials shall not be re-used in any new work without written permission from the Contracts Manager

C.1.5 Disposal of debris etc

The Contractor shall be responsible for the removal from the site of all materials, rubble, debris and rubbish resulting from the demolitions

C.2 SOIL INSECTICIDES

The application of soil insecticides shall be carried out in accordance with “The application of soil insecticides for the protection of buildings” - SANS 10124 4

C.3 FILLING ETC

C.3.1 Filling generally

Filling over site shall be spread, levelled, watered and consolidated in layers not exceeding 300mm

Filling under floors and backfilling to excavations shall be suitable inert material, free from clay, vegetable matter, large stones, etc, having a maximum plasticity index of 10, spread, levelled and compacted to a density of at least 90% Mod. AASHTO

C.3.2 Hardcore

Hardcore shall be broken stone or other approved hard material graded from 25mm to 75mm with the finer material on top and shall be spread, levelled and consolidated

C.4 EXCAVATIONS

C.4.1 Classification of excavated material

“Hard rock” shall mean granite, quartzitic sandstone or other rock of similar hardness, the removal of which requires drilling, wedging and splitting or the use of explosives

“Soft rock” shall mean hard material the removal of which warrants the use of pneumatic tools and includes hard shale, ferricite, compact ouklip and material of similar hardness

“Earth” shall mean all ground other than that classified as “hard rock” or “soft rock” and shall include made-up ground and any loose stones or pieces of concrete not exceeding 0,03m3 in volume

D. CONCRETE, FORMWORK AND REINFORCEMENT

D.1 SPECIFICATION FOR CONCRETE WORK GENERALLY

All in situ concrete work (plain and reinforced) shall comply with SANS 1200G supplemented by the following Project Specification. Where SANS 1200G and the Project Specification are in conflict, the Project Specification shall take precedence

Wherever the term “Engineer” appears in SANS 1200G or in the following Project Specification this shall be deemed to mean the Contracts Manager’s representative responsible for this section of the Works

PROJECT SPECIFICATION

The following amplifications, additions and amendments to SANS 1200G shall constitute the Project Specification. Clause numbers refer to either the existing clauses in SANS 1200G or to new clauses, which are related to the existing clauses

1. SCOPE

This clause is amended to include:

1.1 This specification does not cover the methods by which the finished structure is to be measured for the purpose of payment and the “Standard System of Measuring Building Work” shall apply

2. INTERPRETATIONS

2.1 SUPPORTING SPECIFICATIONS
Clause 2.1(b) shall not apply

2.2 APPLICATION
This clause shall not apply

4. PLANT

4.5 FORMWORK

4.5.2 Finish

Unless otherwise stated the quality of all formwork shall be such that the finished surface of the concrete is “Rough” in terms of clause 5.2.1(a)

5. CONSTRUCTON

5.2 FORMWORK

5.2.1 Classification of Finishes

(a) Rough. No treatment of the surface of the concrete will be required after the striking of the formwork. The finish of the concrete need not be more accurate than Degree of Accuracy III

(b) Smooth. Imperfections such as small fins, bulges, irregularities, surface honeycombing and surface discolorations shall be made good and repaired by approved methods. The finish of the concrete shall be accurate to Degree of Accuracy II

(c) Special

(i) Smooth and fair

This class of finish requires the highest standard of concrete work, formwork, accuracy and technique

Concrete placed in any one structure to give this finish shall be made from cement and aggregates from the same source. The grading of the aggregate shall be kept constant

Formwork shall be metal, wrot timber or other approved material in new condition designed and constructed to suit the particular job in hand and with shutter bolts and joints between panels in a regular pattern approved by the Contracts Manager. Joints between panels shall be watertight, but the use of sealing tape which will mark the concrete shall not be permitted

Designated joints shall be in the position and of the details shown upon the working drawings. Should the Contractor wish to incorporate further construction joints or amend the position of those shown to suit his own requirements or technique, this may be allowed provided that all design considerations are met, that the prior approval of the Engineer is obtained and that any extra costs are borne by the Contractor

In the case of horizontal construction joints, the top edge of the concrete on the smooth and fair finished side shall be struck true and level with a trowel

Special care shall be taken to ensure that forms are clean and free of all pieces of tying wire, nails and other debris at the time of concreting

The standard of finish shall be such that upon removal of the formwork, no further treatment, other than treatment of bolt holes if required, shall be found necessary to provide a straight, smooth and uniform finish of good quality and consistent colour and texture, free of all honeycombing etc. Any defect shall be made good by either removing and replacing the defective concrete or, in certain instances only, by patching

5.5 CONCRETE

5.5.1.6 Prescribed mix concrete

Where prescribed mix concrete is specified the proportions of constituents, the maximum size of coarse aggregate and the estimated minimum compressive strength shall be as specified in the following table:

Cement shall comply with SANS 50917-1 of strength 32,5N or higher
Should cement and aggregates be mixed by volume, the contents of a 50kg sack of cement shall be taken to be 0,033m3

Notwithstanding the requirements contained in SANS 1200G, the Contracts Manager may permit certain items of non-structural concrete to be mixed by hand

If the concrete is mixed by hand, it shall first be mixed in a dry state on a clean non-absorbent surface until it is of uniform colour and consistency. Just enough water shall then be added to permit mixing and working, at which stage the concrete shall continue to be mixed until it is of uniform colour and consistency

5.5.1.7 Strength concrete

Where strength concrete is specified it shall be designated by its specified strength followed by the size of stone used in its manufacture, eg 30 MPa/19mm

The water/cement ratio shall be as Table 5 of clause 5.5.1.5 for moderate exposure conditions

5.5.1.8 "No-Fines" concrete

"No-fines" concrete shall consist of one part cement to eight parts aggregate graded from minimum 6mm to maximum 13mm size

The quantity of water used shall be just sufficient to form a smooth grout which shall completely coat every particle of aggregate and also to ensure that the grout is just wet enough to form a small fillet at each point of contact between the stones. "No-fines" concrete mixed with excessive water, which results in a thin grout, which drops off the aggregate, will be rejected

"No-fines" concrete shall be placed in its final position within 20 minutes of mixing and shall be placed in continuous horizontal layers. Concrete shall be spade worked sufficiently to ensure that it fills the forms but vibrating, tamping or ramming will not be permitted

5.5.3.2 Ready-mixed concrete

The use of ready-mixed concrete and the acceptability of test results from a central concrete production facility shall be subject to the written approval of the Engineer

6. TOLERANCES

Degree of Accuracy II shall apply for all work unless otherwise stated

7. TESTS

7.1 FACILITIES AND FREQUENCY OF SAMPLING

7.1.2 Frequency of sampling

7.1.2.5 The frequency of sampling shall be as directed by the Engineer, but not less than one set of cubes from every 50m³ cast

8. MEASUREMENT AND PAYMENT

This clause shall not apply

D.2 AGGREGATES OF LOW DENSITY

Aggregates of low density shall comply with SANS 794

D.3 HOLLOW BLOCKS, PREFABRICATED BLOCK BEAMS AND PLANKS, ETC

Blocks, block beams, planks, etc shall be fixed and supported in such a manner that no movement can take place before or during the casting of concrete. No broken components shall be used

D.4 SUPERVISION

A competent and experienced foreman shall superintend personally the whole of the concrete construction and pay special attention to:

(a) The quality, testing and mixing of materials,
(b) The placing and compaction of concrete,
(c) The construction and removal of formwork and
(d) The sizes and position of reinforcement

The Contractor shall obtain the permission of the Contracts Manager before commencing concreting of foundations or reinforced structure

No inspection, approval, authorisation to proceed, comment or instructions following from such an inspection, or failure of the Contracts Manager to comment on any particular aspect of the work, shall be deemed to relieve the Contractor in any way from his obligation to ensure through his own supervision that the work is constructed in every way in accordance with the Drawings, Specification and Conditions of Contract, nor relieve him from his obligations to make good any fault or defect, nor shall it be deemed that there is any obligation on the Contracts Manager to inspect all or any part of the Works or that such inspection is necessarily complete in every respect

D.5 GENERAL

Concrete

Rates for concrete work shall include all “construction joints” other than “designated joints” as defined in SANS 1200G clause 2.4.3 which are measured separately, and for the design of strength concrete mixes and all testing of concrete and materials other than compressive strength testing of concrete samples taken from concrete being placed in the Works. The Contractor shall only be entitled to payment for those samples and compressive strength tests called for by the Engineer and which pass the test requirements

Surface beds cast in panels shall be cast in panels approximately 9m2

Formwork

Formwork to slabs and beams shall be cambered where required

Rates for formwork to soffits shall include propping not exceeding 3,5m high unless otherwise described. Formwork to walls and columns is not exceeding 3,5m high above bearing level unless otherwise described

Reinforcement

Standard welded steel fabric reinforcement shall be as included in Table 1 of SANS 1024 and shall have 300mm wide laps.

The mass of binding wire is not included in the mass of the reinforcement and the cost thereof shall be included in the rates for the reinforcement

E. PRECAST CONCRETE

E.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Precast concrete paving slabs SANS 541

Cement, water, aggregates and reinforcement shall be as described under D. CONCRETE, FORMWORK AND REINFORCEMENT

E.2 CONCRETE

Concrete shall be as described under D. CONCRETE, FORMWORK AND REINFORCEMENT and unless otherwise stated shall be prescribed mix concrete Class C but with coarse aggregate of an appropriate size

E.3 MOULDS

Before each casting, moulds shall be coated with a suitable release agent which will not in any way discolour the surface of the finished product or impair its strength. Where items are described as “finished smooth from the mould” or as “precast terrazzo”, moulds shall be made to a high degree of accuracy and shall be such as to leave even and smooth surfaces

E.4 FINISHES TO BLOCKS

Where described as “precast terrazzo”, such surfaces shall have a facing of terrazzo described under O. PLASTERING. The facing shall be poured into the moulds in a wet state (not dry pressed) and thoroughly worked up against finished faces to ensure that it finishes smooth from the mould

Projections shall be rubbed off and faces shall be of even colour and free from blemishes, cracks and other imperfections. Salient angles shall be arris rounded

E.5 CASTING ETC

Items shall be suitably cured, shall not be handled whilst still green and shall not be built in within 21 days of casting

E.6 REINFORCEMENT

Unspecified reinforcement required for manufacturing, handling and erection purposes and for reinforcing projecting and other unwieldy portions of blocks shall be provided by the Contractor at his discretion

E.7 BEDDING, JOINTING AND POINTING

Blocks shall be bedded and jointed solidly in Class I mortar as described under F. MASONRY and shall be pointed with slightly keyed joints

Blocks finished with “precast terrazzo” shall have joints raked out and pointed with slightly keyed joints in tinted waterproofed mortar composed of one part cement and three parts sand to match terrazzo facing

E.8 GENERAL

Precast concrete work shall include reinforcement required for manufacturing, handling and erection purposes, steel rod or wire hooks and/or mortices for lewis bolts required for handling and transporting, any necessary temporary propping and strutting and bedding, jointing and pointing

F. MASONRY

F.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Burnt clay masonry units	SANS 227
Limes for use in building	SANS 523 {Slaked (hydrated) limes}
Aggregates from natural sources – fine aggregates for plaster and mortar	SANS 1090
Concrete masonry units	SANS 1215
Prestressed concrete lintels	SANS 1504
Burnt clay paving units	SANS 1575
Metal ties for cavity walls	SANS 28
Common cement	SANS 50197-1 (Class 32,5N)
Masonry cement	SANS 50413-1 (Class 22,5X)
Concrete masonry construction	SANS 10145
The structural use of masonry	SANS 10164-1
Masonry walling	SANS 10249
Concrete floors	SANS 10109-1&2

F.2 SAND

Sand shall be washed where necessary and screened through a 2,4mm mesh sieve

F.3 BURNT CLAY BRICKS

Burnt clay bricks shall be of nominal size 222 x 106 x 73mm unless otherwise stated

Common bricks shall be General Purpose bricks

Extra hard burnt bricks shall be General Purpose (Special) bricks

Facing bricks shall exhibit a liability to efflorescence not in excess of “Slight” and water absorption when tested in conformity with the requirements of SANS 227 shall not exceed 14%

Particular care shall be taken to preserve arrisses and faces of facing and paving bricks during transit and handling

F.4 CONCRETE BRICKS

Concrete bricks shall have a nominal compressive strength of 8 MPa

F.5 QUARRY TILES ETC

Quarry, cement and similar tiles shall be of approved manufacture, even in shape and size, free from cracks, twists or blemishes and uniform in colour

F.6 WIRE TIES

Wire ties shall be of galvanized steel of the single wire type for solid walls and either the “Butterfly” or Modified PWD type for hollow walls. Ties shall be of sufficient length to allow not less than 75mm of each end to be built into brickwork or embedded in concrete

F.7 BRICKWORK REINFORCEMENT

Brickwork reinforcement shall be manufactured from hard drawn steel wire conforming to BS 785 and shall consist of two 2,8mm diameter main wires with 2,5mm diameter cross wires at 300mm centres welded at intersections

Brickwork reinforcement shall be lapped not less than 300mm at end joints and for a length equal to the width of the widest reinforcement at intersections

F.8 MORTAR

Mortar shall comply with the following table:

Mortar shall be Class II unless otherwise specified

Mortar plasticizers may only be used with the approval of the Contracts Manager

The materials shall be mixed dry until of uniform colour, water added and the mixture turned over until the ingredients are thoroughly incorporated

Mortar shall be produced in such quantities as can be used before commencement of set and no mortar that has set shall be used

F.9 COMPO MORTAR

Compo mortar shall be Class III mortar in accordance with clause F.8 but with a lime content of 80 litres

The lime and sand shall be mixed dry until of uniform colour, water added and the mixture turned over until the ingredients are thoroughly incorporated. Immediately before use, the cement shall be mixed in and the requisite amount of water added. Compo mortar shall be produced in such quantities as can be used before commencement of set and no compo mortar that has set shall be used

F.10 BRICKWORK

Wherever practicable, brickwork shall be built in stretcher bond. Unless legitimately required to form bond, no false headers shall be used. English bond shall only be used where specifically so indicated or where stretcher bond is not practicable

Brickwork, unless otherwise described, shall be built in Class II mortar

Bricks shall be laid on a solid bed of mortar and all joints shall be grouted up solid

The brickwork shall be carried up in a uniform manner, no part being raised more than 1,2m above adjoining work

Where necessary, bricks shall be wetted before being laid and the course of bricks last laid shall be well wetted before laying a fresh course upon it

Walls in thicknesses of more than one skin shall have at least five wire ties per square metre. Linings to concrete, unless otherwise specified, shall be tied to the concrete with at least five wire ties per square metre

Hollow walls, unless otherwise specified, shall be built of two half brick skins with cavity between, tied together with at least five wire ties per square metre. The cavities shall be kept free of all rubbish, mortar droppings and projecting mortar. Mortar joints to brickwork shall be not less than 8mm or more than 12mm thick

F.11 BLOCKWORK

Unless otherwise described, all blockwork shall be built in stretcher bond. Whole blocks shall be used except where bats or closers are required to form bond. Blockwork, unless otherwise described, shall be built in Class II mortar

Solid blocks shall be laid on a solid bed of mortar and all joints shall be grouted up solid

Hollow blocks shall be laid in shell bedding, ie only the inner and outer shells of the blocks shall be covered with mortar. Vertical joints shall be similarly formed

The blockwork shall be carried up in a uniform manner, no part being raised more than 1,2m above adjoining work

Clay blocks shall be wetted before being laid and the course of blocks last laid shall be well wetted before laying a fresh course upon it

F.12 CENTRES AND TURNING PIECES

Centres and turning pieces to soffits of arches and lintels shall be left in position for not less than 14 days

F.13 FACE BRICKWORK

Face brickwork shall be built in stretcher bond, unless otherwise specified, to a true and fair face. Perpends shall be vertically aligned

Facing bricks shall be mixed to ensure that the proper blending of bricks within the colour range of each facing brick being used is obtained

F.14 PAVINGS, SILLS, COPINGS, ETC

Clay bricks and tiles shall be wetted before fixing and shall be solidly bedded and jointed in Class I mortar and pointed with slightly keyed joints

G. WATERPROOFING

G.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Bituminous damp-proof courses	SANS 248 (Type FV)
Polyolefin film for damp- and waterproofing in buildings (walls, sills, etc)	SANS 952 (Type B)
Polyolefin film for damp- and waterproofing in buildings (floors and basements)	SANS 952 (Type C)

Mastic asphalt for roofing	SANS 297
Mastic asphalt for damp-proof courses and tanking	SANS 298
Bituminous roofing felt	SANS 92 (Type 60)
Polyolefin film for damp- and waterproofing in buildings (flat roofs)	SANS 952 (Type A)
Chloroprene rubber sheet (for waterproofing)	SANS 580
Sealing compounds for the building industry, two-component, polysulphide base	SANS 110 (Type 2 - Gun Grade)
Sealing compounds for the building and construction industry, two- component, polyurethane base	SANS 1077
The waterproofing of buildings (including damp-proofing and vapour barrier installation)	SANS 10021

G.2 WATERPROOFING TO ROOFS, BASEMENTS, ETC

Waterproofing to roofs, basements, etc shall be carried out by workmen who are experienced in this type of work

G.3 DAMP-PROOF COURSE TO WALLS

All joints in damp-proof course to walls shall be lapped a minimum of 150mm except at junctions and corners where the lap shall equal the full thickness of the wall

H. ROOF COVERINGS ETC

H.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Concrete roofing tiles	SANS 542
Clay roofing tiles	SANS 632
Sawn softwood timber battens	SANS 1783-4
Fibre-cement sheets (flat and profiled)	SANS 685
Aluminium alloy corrugated and troughed sheets	SANS 903
Continuous hot-dip zinc-coated carbon steel sheet of commercial, lock-forming and drawing qualities	SANS 3575
Continuous hot-dip zinc-coated carbon steel sheet of structural quality	SANS 4998
Polyolefin film for damp- and waterproofing in buildings	SANS 952
Metal roofing tiles	SANS 1022
Glass-reinforced polyester (GRP) laminated sheets (profiled or flat)	SANS 1150

Fasteners for roof and wall coverings in the form of sheeting	SANS 1273
Materials for thermal insulation of buildings	SANS 1381-1&4
Expanded polystyrene thermal insulation boards	SANS 1508
Fixing of concrete interlocking roofing tiles	SANS 10062
Roof and side cladding	SANS 10237
Sheet zinc	BS 849
Sheet lead	BS 1178
Sheet aluminium	BS 1470
Sheet copper	BS 2870

H.2 GALVANIZED STEEL PROFILED SHEETS ETC

Galvanized steel profiled sheets, ridge and hip coverings, etc shall be coated with a minimum of 275 g zinc per m2 and shall be free of white rust

H.3 GALVANIZED SHEET IRON

Galvanized sheet iron shall be rolled steel sheet coated on both sides with a minimum of 275 g of zinc per m2 and shall be free from white rust

H.4 NAILING AND SCREWING

Where nailing and screwing is required:

• galvanized iron nails and screws shall be used for galvanized sheet iron and sheet zinc

• copper or copper alloy nails and screws for sheet copper and sheet lead

• aluminium alloy or stainless steel nails and screws for sheet aluminium

H.5 LAPS

Sheet metal flashings shall have minimum 100mm laps and linings to valleys, secret gutters, etc minimum 225mm laps

H.6 GENERAL

Rates for profiled sheet roofing and rolled edges, ridge and hip coverings, flashing pieces, etc of metal, fibre-cement, plastic, etc shall include fixing accessories

I. CARPENTRY AND JOINERY

I.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Sawn softwood timber : General requirements	SANS 1783-1
Sawn softwood timber : Stress-graded structural timber and timber for frame wall construction	SANS 1783-2
Sawn softwood timber : Brandering and battens	SANS 1783-4
Softwood flooring boards	SANS 629
Hardwood furniture timber	SANS 1099
Hardwood block and strip flooring	SANS 281
Wooden ceiling and panelling boards	SANS 1039
Laminated timber (glulam)	SANS 1460
Gypsum plasterboard	SANS 266
Fibreboard products	SANS 540
Wood-wool panels (cement bonded)	SANS 637
Fibre-cement sheets (flat and profiled)	SANS 685
Fibre-cement boards	SANS 803
Plywood and composite board	SANS 929
Wooden ceiling and panelling boards	SANS 1039
Particle boards	SANS 50312-1to7
Decorative laminates	SANS 4586
Wooden doors	SANS 545
Fire doors	SANS 1253
Materials for thermal insulation of buildings	SANS 1381-1,2,4&6
Expanded polystyrene thermal insulation boards	SANS 1508
Mild steel nails	SANS 820
Metal screws for wood	SANS 1171
Wood-preserving creosote	SANS 539

Softwood shall bear the relevant SABS mark and shall be ordered in the sizes in which it will be used as no scantlings of marked timber will be allowed. Should SABS marked timber be unavailable, the Contracts Manager’s prior permission shall be obtained before using unmarked timber

I.2 HARDWOODS

All hardwoods shall be specially selected, well seasoned, free from sapwood and well kiln dried. Meranti shall be Red or Medium Brown Meranti, even in grain and colour, selected from “Standard and Better” quality from Malaysia

I.3 INFECTION AND PRE-TREATMENT OF TIMBER

All timber used on the site, whether for permanent or temporary work, shall be free of borer or other beetle and termite infection. If the work under this contract falls within an area designated under Government Notice R2577 of 1978-12-29, permanent softwood fixed in the building shall be treated against borer etc in accordance with Government Notice R451 of 1969-03-28 using Class B or C preservative

When treated timbers are cut, the cut surfaces shall be effectively brushed with at least two coats of preservative solution

I.4 CONSTRUCTION IN GENERAL

Where applicable, construction methods shall comply with SANS 10082. Wood and laminate flooring shall be installed in accordance with SANS 10043. Roof trusses shall be manufactured, erected and braced in accordance with SANS 10243

I.5 STRUCTURAL TIMBER

Timbers generally shall be in single lengths and jointing of timbers will only be permitted when the required length is unobtainable. Only the absolute minimum of joints to obtain a particular length will be permitted and such joints are to be evenly spaced along the length of the timber

Finger-jointing of structural timber will be permitted, in which case it shall be manufactured in accordance with SANS 10096

I.6 PLATE NAILED TIMBER ROOF TRUSSES

Plate nailed timber roof trusses shall be of approved design and manufacture and constructed with softwood structural timber by a truss Fabricator holding a current Certificate of Competence awarded by the Institute of Timber Construction

Each roof truss shall have all its members accurately cut and closely butted together and rigidly fixed by CSIR approved patented galvanized metal spiked connectors, precision pressed on both sides of each intersection by an approved method, all in accordance with the manufacturer’s instructions

The design, manufacture and transportation of the roof trusses, bracing, etc shall be under the control of a registered Structural Engineer in accordance with SANS 1900, SANS 10160 and SANS 10163, who shall, after erection, provide a certificate confirming that the design, manufacture, transportation, erection and bracing has been carried out in accordance with this specification

The design shall include for all live loads, wind loads and for dead loads imposed by roof covering, purlins, ceilings, etc

Fully detailed shop drawings of all trusses etc, indicating sizes, bracing, loading, etc, shall be submitted to the Contracts Manager for approval prior to fabrication

Unless specific erection instructions are given, erection shall be carried out in accordance with the procedures and recommendations of the manual “The Erection and Bracing of Timber Roof Trusses” published by the Institute for Timber Construction and the Council for Scientific and Industrial Research or as detailed by the designer

Roof trusses and bracing shall include design and preparation of shop drawings

I.7 TONGUED AND GROOVED BOARDING

Tongued and grooved boards for floors, panelling, etc shall be in long varying lengths with joints tightly cramped up and secret nailed. Flooring boarding shall be flush jointed with staggered heading joints and machine sanded after fixing

I.8 JOINERY

Skirtings, cornices, rails, etc shall be in single lengths wherever practicable and shall have splayed heading joints where necessary. Skirtings shall be trenched at back

All horns of door frames shall be checked and splayed back where frames are fixed projecting or flush with surface and built in

Heads of screws in exposed faces of hardwood joinery shall be sunk and match pelleted

Joinery shall have arris rounded angles and shall be blocked and planted on

I.9 VENEERS

All face veneers shall be of kiln dried timber, free from knots, cracks, patchwork, sapwood and other defects, selected and glued, dried and machine-sanded to a smooth finish. All veneers shall be applied under hydraulic pressure

I.10 DOORS

Flush doors shall have solid timber edge strips with concealed edges. Where doors are to be finished with a transparent finish, the veneer and the edge strips shall be timber of the same species and as far as possible of matching colour. Unless otherwise described all flush doors shall be of interior quality, but where exterior quality doors are specified the glue used shall be of the WBP type

Framed and ledged batten doors described as filled in with V-jointed boarding shall be filled in flush on one side with tongued and grooved vertical boarding, V-jointed on one or both sides and of the thickness stated. The boarding shall be in narrow widths, closely cramped up, rebated or tongued on outer edges and housed to grooves in stiles and rails and twice countersunk brass screwed at each intersection with ledges and braces and the inner edges of the abutting stiles and rails shall be chamfered to form a V-joint at junction with the board

Unless otherwise described double doors shall have rebated meeting stiles

I.11 FIXING

All nails and screws shall be of the size, length and type appropriate to their respective uses. All screws for hardwood joinery work shall be brass

Items described as “plugged” shall be screwed to fibre, plastic or metal plugs at not exceeding 600mm centres. Where items are described as “bolted”, the bolts have been given separately

I.12 ADHESIVES

Adhesives shall comply with BS 1204 and 4071 where applicable. Adhesives used in the manufacture of external joinery exposed to excessive moisture (eg kitchen and laboratory worktops) shall be of the WBP type

J. CEILINGS, PARTITIONS AND ACCESS FLOORING

J.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Gypsum plasterboard	SANS 266
Fibreboard products	SANS 540
Gypsum cove cornice	SANS 622
Wood-wool panels (cement-bonded)	SANS 637
Sawn softwood timber : Brandering and battens	SANS 1783-4
Sawn softwood timber : Timber for frame wall Construction	SANS 1783-2
Fibre-cement boards	SANS 803

Plywood and composite board	SANS 929
Wooden ceiling and panelling boards	SANS 1039
Materials for thermal insulation of buildings	SANS 1381-1&4
Expanded polystyrene thermal insulation boards	SANS 1508
Raised access flooring	SANS 1549

J.2 TONGUED AND GROOVED BOARDING

Tongued and grooved boarding for ceilings shall be in long varying lengths, V-jointed one side and with joints tightly cramped up and secret nailed

J.3 CEILINGS ETC

J.3.1 Brandering

Brandering for ceilings and eaves soffit coverings shall be symmetrically arranged with necessary smaller panels. Main branders shall be at right angles to roof timbers, with cross branders cut in between and branders shall be fixed with galvanized wire nails driven in on skew alternately in opposite directions

J.3.2 Ceiling boards

Ceiling boards shall be in long lengths symmetrically arranged with necessary smaller panels, closely butted and secured at 150mm centres to brandering with galvanized or cadmium-plated clout-headed nails

J.4 GYPSUM SKIM PLASTER

Gypsum skim plaster shall be pure gypsum plaster finished with a steel trowel

J.5 EXPOSED TEE-SYSTEM SUSPENDED CEILINGS

The ceiling panels shall be as described in the items and the panels shall be stiffened at back as recommended by the manufacturer to prevent bowing or sagging

The exposed surfaces of all ceiling panels and supporting members shall be uniform in colour and free from surface blemishes

The suspension grid system shall be an approved patent suspension system comprising 38mm galvanized steel main and cross tee bearers spaced in both directions at centres to suit sizes of ceiling panels used, with the cross bearers fitted between and notched to form flush fit with main bearers. The exposed flange of the tees shall be 25mm wide, covered with a rolled aluminium cap painted a low sheen satin white. Cornices etc shall be as described in the items and shall be finished to match the exposed tees

The main tee bearers shall have holes for cross tees at 300mm centres and holes for hangers at 50mm centres. In addition, main and cross tee bearers shall be holed as necessary for and provided with timber wedges or steel clips where recommended by the manufacturer to prevent ceiling panels from lifting

The web of the exposed cross tee bearers shall extend to form a positive interlock with the main tee bearers and the lower flange shall be cut back to provide a joint free appearance

All hangers shall be galvanized and shall be at centres to meet the requirements of the specification with one end fixed to the suspension grid main bearers and the other end fitted with suitable galvanized fixing cleat securely fixed to the structure. Fixing points shall be agreed to by the Contracts Manager before any power shot fixings are made. Hangers shall not be suspended from air-conditioning ducts. Where recommended by the manufacturer, hangers shall be of the rigid type

Component parts and fixings shall be non-corrosive and able to withstand atmospheric pollution. Surfaces of aluminium which are in contact with other materials when fixed, particularly metals, shall be suitably insulated to prevent electrolytic corrosion

Ceilings shall comprise hangers, suspension grid system and ceiling panels, shall be constructed in a manner suitable for carrying air-conditioning diffusers and light fittings in the positions required, shall be set out to layouts approved by the Contracts Manager and shall have the standard suspension systems modified as necessary to work around any pipes or light fittings

J.6 FLUSH PLASTERED SUSPENDED CEILINGS

Gypsum plasterboard panels of the specified thickness generally in 1200mm widths and in long lengths shall be fixed grey side down with self-tapping screws to the suspension system with the joints between boards loosely butt jointed and covered with 50mm wide strips of self-adhesive fibre tape

The plasterboard panels shall be finished with gypsum skim plaster trowelled to a smooth polished surface to the thickness etc recommended by the manufacturer

The suspension system shall be an approved patent concealed suspension system consisting of galvanized mild steel bearers suspended on approved non-rusting metal hangers spaced generally at 1200mm centres or to suit layout of air-conditioning ducts and other services etc above ceiling with one end bolted to the bearer and the other end fitted with a galvanized fixing cleat securely fixed to the structure as required

Fixing points shall be agreed to by the Contracts Manager before any power shot fixings are made. Hangers shall not be suspended from air-conditioning ducting

Ceilings shall comprise hangers, suspension system, ceiling panels and plaster finish, shall be constructed in a manner suitable for carrying air-conditioning diffusers and light fittings in the positions required, shall be set out to layouts approved by the Contracts Manager and shall have the standard suspension system modified as necessary to work around any pipes or light fittings

K. FLOOR COVERINGS, WALL LININGS, ETC

K.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Semi-flexible vinyl floor tiles	SANS 581
Resin modified vinyl floor tiles	SANS 586
Flexible vinyl flooring	SANS 786
Hardwood block and strip flooring	SANS 281
Wood mosaic flooring	SANS 978
Textile floor coverings (pile construction)	SANS 1375
Textile floor coverings (needle-punched construction)	SANS 141
Carpet underlays	SANS 1419
The installation of wood and laminate flooring	SANS 10043
The installation of resilient thermoplastic and similar flexible floor covering materials	SANS 10070
The installation of textile floor coverings	SANS 10186
Sheet linoleum (calendered types), cork, carpet and linoleum tiles	BS 810
Solid rubber flooring	BS 1711
Felt backed linoleum	BS 1863

K.2 LAYING OF MATERIAL

Floor tiles shall be laid with continuous joints in both directions

Patterned floor coverings shall be matched at joints

K.3 GENERAL

Floor coverings, wall linings, skirtings, nosings, etc shall include all preparatory work to screeded or plastered surfaces etc, priming coats and adhesives

Floor coverings and wall linings shall be dressed around and into corners. Wood block and wood mosaic flooring shall be sanded with a sanding machine and sealed with a coat of approved penetrating sealer

Plastic handrails shall have welded and polished butt joints

L. IRONMONGERY

L.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Locks, latches and associated furniture for doors. (Domestic type)	SANS 4
Kitchen cupboards: Built-in and free-standing	SANS 1385
Single action closers	SANS 1510
Padlocks	SANS 1533
Fasteners	SANS 1700
Chalk writing boards for schools	CKS 36

L.2 KEYS

Locks shall have the minimum possible number of interchangeable keys. Cylinder locks and locks described as “en suite” shall be clearly marked with consecutive numbers and each key shall be punched with the corresponding number of the relative lock

L.3 FIXING

Unless otherwise described, ironmongery is to be fixed to wood

Items described as “plugged” shall be screwed to fibre, plastic or metal plugs

Screws, bolts, etc for fixing of ironmongery shall be of matching metal and finish, except for aluminium ironmongery or ironmongery fixed to aluminium in which cases stainless steel screws may be used

All necessary preparation of pressed steel door frames for the fixing of ironmongery to the frames has been included with the pressed steel door frames

L.4 KITCHEN CUPBOARDS

Steel cupboards shall be finished with baked enamel. Tops of floor cupboards shall have laminated plastic covering

Cupboards shall be fitted with all necessary hinges, handles, catches, etc. Cupboards shall be securely fixed with all necessary screws and fibre, plastic or metal plugs

Where cupboards are described as a “series”, tops shall be continuous and cupboards shall be bolted or screwed together, including bolts, screws, holes, etc

M. STRUCTURAL STEELWORK

M.1 SPECIFICATION

All structural steelwork shall comply with SANS 1200H or 1200HA as applicable. Structural fasteners shall comply with SANS 1700

Whenever the term “Engineer” appears in SANS 1200H or 1200HA or in the following Project Specification this shall be deemed to mean the Contracts Manager’s representative responsible for this section of the Works

M.2 PROJECT SPECIFICATION INCORPORATING AMPLIFICATIONS, ADDITIONS AND AMENDMENTS TO SANS 1200H AND 1200HA

The following amplifications, additions and amendments to SANS 1200H and SANS 1200HA shall apply and clause numbers refer to either the existing clauses in the relevant SANS or to new clauses which are related to the clauses therein

SANS 1200H

3.1.1 Weldable structural steel

Weldable structural steel shall comply with SANS 1431

5.1.2 Contractor provides shop details

The Contractor shall be responsible for the preparation of all shop detail drawings

5.1.3 Engineer provides shop details

This clause shall not apply

5.3.9 Protective treatment

Structural steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and all surfaces shall be primed as specified to a minimum dry film thickness of 30 micrometres before leaving the workshop. Upon delivery to the site and again after erection all bared surfaces shall be made good with similar primer

8. Measurement and payment

This clause shall not apply

SANS 1200HA

5.2.10 Protective treatment

Structural steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and all surfaces shall be primed as specified to a minimum dry film thickness of 30 micrometres before leaving the workshop. Upon delivery to the site and again after erection all bared surfaces shall be made good with similar primer

5.3.7 Repairs to paint and site painting

This clause shall not apply

8. Measurement and payment

This clause shall not apply

N. METALWORK

N.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Fasteners	SANS 1700
Expanded metal	SANS 190-1&2
Windows and doors made of rolled mild steel sections	SANS 727
Hot-dip galvanized zinc coatings on fabricated iron and steel articles	SANS 121
Strongroom and vault doors	SANS 949
Anodized coatings on aluminium (for architectural applications)	SANS 999
Steel door frames	SANS 1129
Mushroom- and countersunk-head bolts and nuts	SANS 1143
Welding of metalwork	SANS 1044
Adjustable glass-louvred windows	CKS 413
Aluminium sheet and strips	BS 1470
Aluminium extruded tube and hollow sections	BS 1474
Aluminium bars and sections	BS 1476

N.2 STEEL

Steel shall be mild steel of approved commercial quality. Steelwork shall be cleaned and prepared by wire brushing in accordance with SANS 10064 and given one coat of primer as specified before leaving the workshop

N.2.1 Galvanizing of steel

Steelwork described as “galvanized” shall be galvanized by means of the hot-dip process after fabrication. Where welding on site is unavoidable, such welded joints shall be cleaned down and cold galvanized to approval

N.3 STAINLESS STEEL

Stainless steel shall be AISI Type 304 stainless steel and shall be buffed to an even satin finish. Stainless steel screws shall be used for fixing stainless steel

N.4 ALUMINIUM

Aluminium extrusions shall be of 6063-T6 alloy and temper. Aluminium sheet and strips shall be of 1200-H4 alloy and temper.

Joints in all aluminium members shall be formed in an approved manner so that the joints are practically invisible. Screw heads, pins, rivets, etc shall be concealed as far as possible. 300 Series stainless steel screws and bolts shall be used for jointing and fixing aluminium work

The surfaces of all aluminium which are in contact with other materials when fixed shall be suitably insulated with a non-absorbent insulating material to prevent corrosion. All aluminium work shall be suitably protected against damage, deterioration or discolouration caused by mortar droppings, paint, etc by taping with removable tape, covering with temporary casings or by covering with motor oil

N.4.1 Anodizing of aluminium

Aluminium described as “anodized” shall be treated with Grade 25 coating thickness for exterior use or Grade 15 for interior use as specified, to the required finish. All alloys to be anodized shall be suited to anodizing

N.5 BOLTS AND NUTS

Nuts shall be of at least the strength grade appropriate to the grade of bolt or other threaded element with which they are used

N.6 SCREWING OF METALWORK TO STEEL, WOOD, CONCRETE, ETC

Metalwork described as “screwed” to steel, wood, etc or “plugged” to brickwork, concrete, etc shall be fixed at not exceeding 500mm centres, with necessary holes, countersinking, threading, screws, set screws, self-tapping screws and fibre, plastic or metal plugs

N.7 BOLTING OF METALWORK

Where metalwork is described as “bolted” to steel, wood, brickwork, concrete, etc the bolts are measured elsewhere

N.8 WELDING OF METALWORK

All welds shall be cleaned and filed or ground off smooth to approval. All welded joints shall be continuous

N.9 METALWORK GENERALLY

Metalwork shall have all sharp edges ground smooth. Tubular and pipe work shall include running joints. Rails etc described as “continuous” shall be in long lengths with welded joints

N.10 PRESSED STEEL DOORS, FRAMES, ETC

N.10.1 Door frames

Frames shall project not less than 20mm into floor finish. Except where described as galvanized, frames shall be primed as specified before leaving the factory. Frames are to jambs and heads of openings. Frames for single doors shall be provided with two 100mm steel butt hinges and an adjustable striking plate for a mortice lock and frames for double doors shall be provided with four 100mm steel butt hinges. Butt hinges shall be steel butts with loose pins, welded to frames. Where necessary mortar caps shall be welded to frames and back plates shall be welded on behind tappings for screws

N.10.2 Cupboard door frames

Cupboard door frames shall be as described in N.10.1, but with thresholds of unequal channel section, two 100mm steel butt hinges to hanging stiles, two 75mm steel butt hinges to hanging stiles above transoms, necessary striking plates for mortice locks and keeps for barrel bolts

N.10.3 Combination doors and frames

Combination doors and frames shall be manufactured of 1,6mm thick steel plate. Frames shall be as described in N.10.1. Doors shall be standard design and required profile, with a 44mm wide edge all round, vertical reinforcing ribs pressed in and with two reinforcing rails welded on. The door shall be provided with two lever mortice lock with lock box welded to inside. Doors shall be welded to steel butts

N.10.4 Transformer room doors and frames

Transformer room doors and frames shall be manufactured of 1,6mm thick steel plate. Frames shall be as described in N.10.1. Doors shall be of standard design with a 44mm wide edge all round, vertical reinforcing ribs pressed in and with three reinforcing rails welded on. Single doors shall be fitted with a padlock cleat and two 100mm brass pintle hinges and double doors shall be fitted with a padlock cleat, two 150mm bolts and four 100mm brass pintle hinges. Each leaf shall be fitted with a louvered ventilation panel of standard design backed with 6mm mesh galvanized wire vermin proof screen

N.10.5 Sizes

The frame widths given refer to unfinished wall thicknesses

N.10.6 Glazing beads

Where specified, glazing beads shall be 12 x 12mm standard metal glazing beads mitred at angles and countersunk screwed on at not exceeding 300mm centres with self-tapping screws

N.11 STEEL WINDOWS, DOORS, ETC

N.11.1 Windows, doors, etc

All fittings to windows, doors, etc shall be chromium plated. Fixed lights and opening sashes shall be in single squares. Windows etc of single unit construction shall have weather bars at transoms above opening sashes

Composite windows not of single piece construction shall be coupled with standard coupling mullions and transoms that correspond with the window section used

Kicking plates and panels shall be 1,6mm metal plate fixed with standard metal glazing beads mitred at angles and countersunk screwed on at not exceeding 300mm centres with self-tapping screws

Except where described as galvanized, windows, doors, burglar bars, etc shall be primed as specified before leaving the factory

N.11.2 Burglar bars and flyscreens

Where windows are described as fitted with burglar bars or flyscreens, these shall be standard type fitted over opening sashes

N.12 ADJUSTABLE LOUVRE UNITS

Adjustable louvre units shall be suitable for hand or longarm operation

Louvre units shall include glass louvres with polished edges and installation, including holes, screws, rivets, preparation of openings, etc

N.13 ALUMINIUM WINDOWS AND DOORS

The foregoing preambles “N.4 – ALUMINIUM” shall apply to aluminium windows, doors, etc in all respects in so far as they are applicable. Aluminium windows and doors shall be manufactured from extruded aluminium members of 6063T6, 6261-T6 or 6082-T6 alloy and temper

Ancillary members such as sills, flashings, infill panels and the like formed from flat sheet material shall be of an appropriate alloy selected from 1200, 3004 or 5251 complying with BS 1470 of a temper suitable for the method of forming and a composition suitable for anodizing or painting as required

Windows, doors, etc shall be of an approved standard system, manufactured by an approved firm experienced in this type of work, and shall meet with the minimum recommended performance requirements as set out by the Association of Architectural Aluminium Manufacturers of South Africa (AAAMSA) in the latest edition of the Selection Guide

The fittings for all opening sashes shall be substantial and, unless otherwise described, shall be of high quality aluminium alloy finished to match the windows, doors, etc on which they occur. Samples of all fittings shall be supplied to the Contracts Manager for approval

Top, side and bottom hung opening sashes shall be hung on two aluminium hinges with 300 Series stainless steel pins, nylon bushes and stainless steel washers. Side hung sashes shall have fasteners and sliding stays, top hung sashes shall have peg stays and bottom hung sashes shall have spring catches and concealed arms

Projected out sashes shall have aluminium fasteners and concealed arms of a non-corrosive material compatible with aluminium

The frames which are to be built into openings in brickwork shall be fitted with the manufacturer’s standard type fixing lugs, not less than 20 x 3 x 150mm long, screwed to frame and placed one near each corner and intermediately not more than 450mm apart to sides, top and bottom and where fixed to concrete reveals, wood sub-frames or to preformed openings in brickwork shall have countersunk holes for screws, one near each corner and intermediately not more than 450mm apart to sides, top and bottom

N.13.1 Glazing beads

Where so described, openings and sashes of windows and doors shall be fitted with approved channel section aluminium glazing beads sufficient in size and profile to suit the method of glazing employed, finished to match the windows, doors, etc and neatly mitred. Screws where necessary shall be of aluminium or 300 Series stainless steel and have pan or raised heads finished to match the beads

N.13.2 Finishes

Windows, doors, etc described as “anodized” shall be treated with Grade 25 coating thickness. Windows, doors, etc described as “factory painted” shall have an electrostatically applied oven baked polyester paint coating not less than 25 micrometres thick

N.13.3 General

Aluminium windows, doors, etc shall include glass as described, fixing in position, sealing and protection against damage, deterioration or discolouration by taping with removable tape or covering with temporary casings or motor oil and removing same on completion

N.14 STRONGROOM AND RECORD ROOM DOORS

Strongroom and record room doors shall not be built in as the work proceeds, but shall be fixed later in the openings provided. The Contractor shall ensure that the lock or other important parts of the door are not tampered with. Should any such tampering occur, the Contractor will be held responsible and at the Contracts Manager’s discretion shall provide a new door or lock and keys at his own expense. The keys shall not be delivered together with the doors to the building site. The Contractor shall arrange for the manufacturer to send the keys direct to the Contracts Manager per registered post. If these instructions are not complied with, a new lock and keys shall be provided by the Contractor at his own expense

N.15 STEEL ROLLER SHUTTERS

Roller shutters shall be of approved manufacture comprising curtain, vertical channel guides and top mechanism. The curtain shall be constructed of 1mm thick machine-rolled galvanized interlocking slats with mild steel end locks spot welded to alternate strips. The bottom shall be provided with a galvanized rail riveted on and vertical edges shall slide in galvanized channel guides formed of steel not less than 2,5mm thick bolted to sides of openings

The mechanism shall be covered in a galvanized sheet iron box. The ungalvanized sections shall be primed as specified before leaving the factory

O. PLASTERING

O.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Common cement	SANS 50197-1(Class 32,5N)
Masonry cement	SANS 50413-1(Class 225X)
Limes for use in building	SANS 523 {Slaked (hydrated) limes}
Aggregates from natural sources – Fine aggregates for plaster and mortar	SANS 1090

O.2 PREPARATORY WORK

Surfaces shall be clean and free of oil and thoroughly wetted directly before any plastering or other in situ finishes are commenced. Concrete surfaces shall be slushed with a mixture of one part cement and one part coarse sand or otherwise treated to form a proper key. Preparatory coats shall be thoroughly scored and roughened to form a proper key

O.3 FINISH

All coats of paving and plastering shall be executed in one operation without any blemishes

O.4 SCREEDS

Screeds shall be composed of one part cement and four parts sand

O.5 CEMENT RENDER

Cement render shall be composed of one part cement and three parts sand finished with a steel trowel to a smooth polished surface and cured for at least seven days after laying

Cement render finish shall be divided into panels not exceeding 6m2 with V-joints and deep trowel cuts

O.6 GRANOLITHIC

Granolithic shall be composed of one part cement, one part fine sand, two parts coarse sand and one part granite or other approved stone aggregate that will pass through a 5mm sieve, finished with a steel trowel to a smooth polished surface and cured for at least seven days after laying

Coloured granolithic shall be carried out in two coats in one operation and shall be tinted to the required colour with approved colouring pigment mixed into the finishing coat. Under no circumstances is the pigment to be sprinkled on and trowelled in after the granolithic is laid

Granolithic shall be divided into panels not exceeding 6m2 with V-joints and deep trowel cuts

O.7 TERRAZZO

Terrazzo shall be applied in two coats. The undercoat shall be composed of one part cement and three parts sand and shall be finished with a wooden float. The finishing coat shall be composed of one part cement and two parts marble or stone aggregate of a colour and size to obtain the required colour and texture and shall be at least 12mm thick, and applied before the undercoat has dried out. The finishing coat shall be compacted by tamping or rolling until superfluous water has been expelled, finished with a steel trowel and cured for at least seven days after laying. The finished surface shall show at least 80% of the aggregate

Surfaces described as “polished” shall be polished by machine using various grades of abrasive and grouting with tinted cement as necessary between polishings

Surfaces described as “polished” shall be polished by machine using various grades of abrasive and grouting with tinted cement as necessary between polishings

Surfaces described as “brushed” shall be brushed with a steel wire brush on the day the terrazzo has been laid to expose the aggregate as required

Where required, brass or other dividing strips shall be embedded in the undercoat to finish flush with the finished surface

Three sample blocks, each size 300 x 300mm, as separately measured shall be prepared for approval by the Contracts Manager and kept in an accessible place on the site until the completion of the contract

O.8 SKIRTINGS

Skirtings shall not exceed 25mm thick and shall have a fair edge with arris or rounded external angle at top edge or V-joint to finish flush with plaster and coved or square junction with floor finish

O.9 THICKNESS OF PLASTER

All plaster, other than skim plaster, shall be not less than 10mm and not more than 20mm thick

O.10 CEMENT PLASTER

Cement plaster shall comply with the following table:

O.11 COMPO PLASTER

Compo plaster shall be composed of one part cement, two parts lime and nine parts sand

O.12 GYPSUM SKIM PLASTER

Gypsum skim plaster shall be pure gypsum plaster finished with a steel trowel

O.13 TWO COAT PLASTER WITH GYPSUM FINISH

Two coat plaster with gypsum finish shall comprise an undercoat of Class II cement plaster finished with a wooden float and a finishing coat of gypsum skim plaster

O.14 ROUGH-CAST PLASTER

Rough-cast plaster shall be applied in two coats. The undercoat shall be composed of one part cement and five parts sand finished with a wooden float. The finishing coat shall be composed of one part cement and three parts stone aggregate that will pass through a 4mm sieve. The finishing coat shall be flicked on with a machine before the undercoat has set to obtain an even texture

O.15 FINE ROUGH-CAST PLASTER

Fine rough-cast plaster shall be as for rough-cast plaster but the finishing coat shall be composed of one part cement and three parts coarse sand

0.16 GENERAL

Rates for plastering described as being on vertical surfaces of brickwork or blockwork shall include concrete columns, beams and lintels flush with the face of the wall

P. TILING

P.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Glazed ceramic wall tiles and fittings	SANS 22
Ceramic wall and floor tiles	SANS 1449
Common cement	SANS 50197-1(Class 32,5N)
Masonry cement	SANS 50413-1(Class 22,5X)
Aggregates from natural sources – Fine aggregates for plaster and mortar	SANS 1090
The design and installation of ceramic tiling	SANS 10107

P.2 TILES, MOSAICS, ETC

Tiles, mosaics, etc shall be even in shape and size, free from cracks, twists or blemishes and uniform in colour

P.3 PREPARATORY WORK

Surfaces shall be clean and free of oil and thoroughly wetted directly before any tiling is commenced. Concrete surfaces shall be slushed with a mixture of one part cement and one part coarse sand or otherwise treated to form a proper key

P.4 CERAMIC WALL AND FLOOR TILING

Where tiles are fixed to plaster or screeds with an adhesive, the adhesive shall be as recommended by the manufacturer of the tiles. Joints shall be straight, continuous and flush pointed with an approved grouting compound

P.5 GENERAL

Tiling described as “on walls” is on brick walls or block walls unless otherwise stated and shall include concrete columns, beams and lintels flush with the face of the wall

Q. PLUMBING AND DRAINAGE

Q.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Sheet metal

Sheet zinc	BS 849
Sheet aluminium	BS 1470
Sheet copper	BS 2870

Rainwater systems

Unplasticized poly(vinyl chloride) (PVC-U) components for external rainwater systems	SANS 11

Pipes and fittings

Steel pipes : Pipes suitable for threading and of nominal size not exceeding 150mm	SANS 62
Plain-ended solid drawn copper tubes for Potable water	SANS 460
Malleable cast iron fittings threaded to ISO 7-1	SANS 4
Polyethylene (PE) pipes for water supply – Specifications	SANS 4427
Cast iron fittings for asbestos cement pressure pipes	SANS 546
Vitrified clay sewer pipes and fittings	SANS 559
Reinforced concrete pressure pipes	SANS 676
Concrete non-pressure pipes	SANS 677
Cast iron pipes and pipe fittings for use above ground in drainage installations	SANS 746
Unplasticized poly(vinyl chloride) (PVC-U) sewer and drain pipes and pipe fittings	SANS 791
Fibre-cement pipes, couplings and fittings for sewerage, drainage and low-pressure irrigation	SANS 819
Pitch-impregnated fibre pipes and fittings and jointing	SANS 921
Unplasticized poly (vinyl chloride) (PVC-U) pressure pipe systems	SANS 966-1
Unplasticized poly(vinyl chloride) (PVC-U) soil, waste and vent pipes and pipe fittings	SANS 967
Rubber joint rings (non-cellular)	SANS 974-1
Copper-based fittings for copper tubes	SANS 1067-1&2

Fibre-cement pressure pipes and couplings	SANS 1223
Polypropylene pressure pipes	SANS 1315
Non-metallic waste traps	SANS 1321-1&2
Vent valves for drainage installations	SANS 1532
Heavy duty cast iron pipe fittings for drainage and gas and water supplies	BS 78
Lead pipes	BS 602
Cast iron pressure pipes for use in drainage and gas and water supplies	BS 1211
Stainless steel pipes for use with compression fittings	BS 4127

Sanitary fittings etc

Stainless steel sinks with draining boards (for domestic use)	SANS 242
Stainless steel wash-hand basins and wash troughs	SANS 906
Stainless steel sinks for institutional use	SANS 907
Stainless steel stall urinals	SANS 924
Acrylic sanitary ware : Baths	SANS 1402-1
Glazed ceramic sanitary ware	SANS 497
WC flushing cisterns	SANS 821
Flush valves for WC flushing cisterns	SANS 1509

Taps, valves etc

Water taps (metallic bodies)	SANS 226
Water taps (plastic bodies)	SANS 1021
Single control mixer taps	SANS 1480
Float valves	SANS 752
Plastic floats for ball valves	SANS 1006
Functional control valves and safety valves for Domestic hot and cold water supply systems	SANS 198
Cast iron gate valves for waterworks	SANS 664
Automatic shut-off flush valves for water closets and urinals	SANS 1240
Check valves (flanged and wafer types)	SANS 1551-1&2

Fire extinguishers

Portable refillable fire extinguishers	SANS 1910
Portable rechargeble fire extinguishers : Halogenated hydrocarbon type extinguishers	SANS 1151

Water heaters and fire hose reels

Fixed electric storage water heaters	SANS 151
Fire hose reels (with semi-rigid hose)	SANS 543

Drainage covers, gratings, etc

Cast iron surface boxes and manhole and inspection covers and frames	SANS 558
Cast iron gratings for gullies and stormwater drains	SANS 1115
The installation of polyethylene and poly (vinyl chloride) (PVC-U and PVC-M) pipes	SANS 10112
Water supply and drainage for buildings	SANS 10252-1&2
Cast iron step irons	BS 1247

Q.2 GENERAL

Q.2.1 Excavations

Excavations shall be deemed to be in “earth”. Backfilling to excavations shall be executed in 300mm thick layers, watered and compacted. Surplus excavated material shall be spread and levelled over site as directed

Q.2.2 Concrete

Unreinforced concrete shall be Class B prescribed mix concrete and reinforced and precast concrete shall be Class C prescribed mix concrete

Q.2.3 Brickwork

Brickwork shall be of extra hard burnt bricks built in Class I mortar

Q.2.4 Plaster

Plaster shall be 1:3 cement plaster finished smooth with a steel trowel. All angles shall be rounded

Q.2.5 Diameters of pipes etc

Diameters stated for pipes, traps, valves, etc are internal diameters except PVC, polyethylene, stainless steel and copper pipes and traps for which external diameters are stated

Q.3 SHEET METAL WORK

Q.3.1 Galvanized sheet iron

Galvanized sheet iron shall be rolled steel sheet coated on both sides with Class Z275, unless otherwise specified, zinc coating complying with SANS 3575/4998. Sheets shall be free from white rust

Q.4 EAVES GUTTERS

Q.4.1 Galvanized sheet iron gutters

Galvanized sheet iron gutters shall have beaded edges and all joints shall be riveted and soldered. Angles shall be strengthened with 50 x 0,6mm galvanized sheet iron strips soldered on over the internal faces of mitres

Gutters shall be fixed with falls to outlets on 30 x 3mm galvanized mild steel brackets, bent to the shape of gutters, with front ends taken up to the underside of beaded edge of gutter and each screwed to roof timbers or bolted to fibre-cement fascias with 6mm galvanized gutter bolts. Gutters shall be bolted to brackets at front with 6mm galvanized gutter bolts, one to each bracket

Brackets shall be positioned at joints of gutters and intermediately at not exceeding 1,25m centres

Q.4.2 Fibre-cement gutters

Fibre-cement gutters shall have spigot and socket joints. Gutters shall be fixed with falls to outlets on standard aluminium alloy brackets, screwed or bolted to roof timbers or fascias

Q.4.3 Unplasticized polyvinyl chloride (UPVC) gutters

Gutters shall be fixed with falls to outlets on brackets as supplied by the manufacturer, screwed or bolted to roof timbers or fascias

Q.4.4 Aluminium gutters

Aluminium gutters shall be roll formed on site to required lengths and profiles from 3003H14-3SH4 alloy strip not less than 0,7mm thick factory coated on both sides with baked enamel and two coats of silicone modified polyester to a total minimum thickness of 20 micrometres. Angles, stopped ends, etc shall be prefabricated units pop riveted to gutters with joints sealed with mastic. The guttering shall be in continuous lengths between angles, stopped ends, etc

Q.5 RAINWATER PIPES

Q.5.1 Galvanized sheet iron pipes

Galvanized sheet iron pipes shall have seams at the back and shall be jointed with soldered slip joints. Pipes shall be fixed to walls etc with galvanized mild steel holderbats spaced at not exceeding 2m centres with tails driven in or cut and pinned in 1:3 cement mortar

Q.5.2 Fibre-cement pipes

Fibre-cement pipes shall have spigot and socket joints. Pipes shall be fixed to walls etc with standard aluminium alloy holderbats with tails driven in or cut and pinned in 1:3 cement mortar

Q.5.3 Unplasticized polyvinyl chloride (UPVC) pipes

Pipes shall be fixed to walls etc with patented UPVC or aluminium clips and holderbats as supplied by the manufacturer of the pipe

Q.5.4 Aluminium pipes

Aluminium pipes and fixing straps shall be formed from 3003H14-3SH4 alloy strip not less than 0,7mm thick factory coated on both sides as described for aluminium gutters. Pipes shall be in continuous lengths with formed angles, offsets, shoes, etc. Pipes shall be fixed to walls etc with 20 x 0,6mm straps at not exceeding 1,5m centres screwed to 25 x 75 x 100mm hardwood chamfered and oiled blocks plugged to walls

Q.6 STORMWATER CHANNELS

In-situ concrete stormwater channels shall be constructed of unreinforced concrete with segmental channel formed in top. Channels shall be laid to falls on a well rammed earth bottom and finished smooth on exposed surfaces

Precast concrete channels shall be of 25 MPa concrete, generally in 1m lengths, finished smooth from the mould on exposed surfaces, laid to falls on a well rammed earth bottom, jointed in 1:3 cement mortar and pointed with keyed joints

Q.7 JOINTS

Q.8 FIXING OF PIPES

Q.9 PIPES LAID IN GROUND

Q.10 CLEANING EYE LIDS

Q.11 CLEANING EYES

Cleaning eyes shall consist of cast iron frames and lids with letters “CE” (or “SO”) cast in lids. The lids shall be secured with non-ferrous metal screws. Frames shall be jointed to vertical drain pipes. Cleaning eyes shall be encased in unreinforced concrete taken up to ground level and plastered on exposed surfaces

Q.12 INSPECTION EYE MARKER SLABS

Inspection eye marker slabs shall be 350 x 350 x 50mm thick precast concrete finished smooth from the mould, with letters “IE” (or “IO”) formed in top and placed flush in ground or paving

Q.13 GULLEYS

Gulleys shall be built up of traps, vertical piping and gulley heads with loose gratings, all encased in unreinforced concrete to finish flush with gulley head top and taken up to at least 50mm above surrounding finished surfaces. The outer top edge of the concrete encasing shall be splayed and the exposed surfaces plastered

Q.14 DISHED GULLEYS

Dished gulleys shall be built up of traps, vertical piping and gulley heads with loose gratings, all encased in unreinforced concrete and with dished unreinforced concrete hopper size 450 x 450mm overall around gulley head with rounded kerb 50mm wide to front and sides and 25mm wide at back, 100mm high above top of dishing and the hopper plastered on exposed surfaces. Top of hopper shall be taken up to at least 50mm above surrounding finished surfaces

Q.15 SUMPS, CATCHPITS, INSPECTION CHAMBERS, ETC

Q.15.1 Rainwater sumps

Rainwater sumps shall be built with half-brick sides on 100mm thick unreinforced concrete bottom, plastered internally on walls and with 80mm high unreinforced concrete kerb at top rebated for grating or cover and plastered on exposed surfaces

Q.15.2 Stormwater catchpits and inspection chambers

Brick catchpits and inspection chambers shall be built with one-brick sides on 150mm thick unreinforced concrete bottom projecting 100mm beyond walls all round, plastered internally on walls and with 100mm thick reinforced concrete cover slab with opening rebated for frame of grating or cover and plastered on exposed surfaces

Precast concrete catchpits and inspection chambers shall be constructed in accordance with the applicable details shown on Drawing LE-1 of SANS 1200LE. Precast concrete manhole sections and slabs shall comply with SANS 1294 and pipes shall be SC type and in accordance with SANS 677

Q.15.3 Sewer inspection chambers

Brick inspection chambers shall be built as for brick stormwater inspection chambers and with the bottom of the chamber well benched around half round channels, bends, junctions, etc up to sides of chamber in unreinforced concrete finished smooth

Precast concrete inspection chambers shall be constructed in accordance with the applicable details shown on Drawing LD-5 of SANS 1200LD. Precast concrete manhole sections and slabs shall comply with SANS 1294 and the pipes shall be SC type in accordance with SANS 677

Q.15.4 Stormwater drain junction boxes

Junction boxes shall be formed of 150mm thick unreinforced concrete bottom and sides to suit the various sizes of the drain pipes and built after the pipes have been laid, with the sides taken up slightly higher than the highest pipe and finished level on top for and covered with a 75mm thick loose precast concrete slab

Q.15.5 Step irons

Where inspection chambers exceed 1,2m deep, cast iron step irons shall be provided, built into the wall at 300mm centres and staggered regularly in vertical rows spaced at 200mm centres horizontally

Q.16 STOPCOCK AND METER BOXES

Stopcock and meter boxes shall be built with half-brick sides with a cast iron box and lid complying with SANS 558 set in 75mm wide unreinforced concrete kerb for the full depth of the cast iron box and plastered on exposed surfaces

Q.17 VALVE CHAMBERS

Valve chambers shall be built with half-brick sides with 100mm thick unreinforced concrete kerb to top with rebate for cover and frame to finish flush with adjacent paving or finished ground level and plastered on exposed surfaces

Q.18 CAST IRON COVERS, GRATINGS, ETC

All cast iron covers, gratings, frames and surface boxes shall be coated with preservative solution. Frames shall be cast into concrete. Covers, except covers to stormwater drainage or electrical cable inspection chambers, shall be set in grease

Q.19 CONCRETE ENCASING

Concrete encasing for pipes, bends, traps, gulleys, grease traps, etc shall be unreinforced concrete not less than 100mm thick all round

Q.20 SANITARY FITTINGS

Q.20.1 General

Glazed ceramic, acrylic and porcelain enamelled sanitary fittings and component parts shall be white. Accessories for sanitary fittings shall be chromium plated brass

Waste outlets for baths, basins, etc shall comprise chromium plated brass waste union with grating, rubber washers and locknut, fitted with rubber or vulcanite plug on a chromium plated brass chain and stay

Q.20.2 Stainless steel sanitary fittings

Stainless steel sinks and draining boards, basins, wash troughs and urinals shall be AISI Type 304 satin finished stainless steel. All stainless steel fittings shall be treated on the back with a vermin proof sound deadening coating. Sinks, basins and wash troughs shall be provided with 40mm diameter screwed waste outlets

Q.20.3 Precast concrete wash troughs

Reinforced precast concrete wash troughs shall have a sloping front with ribbed rubbing surface and shall be finished smooth on exposed faces with top edges and inner angles rounded. Each compartment shall be fitted with a 40mm diameter waste outlet. Wash troughs shall each be supported on two reinforced precast concrete pedestals finished smooth on exposed faces

Q.20.4 Steel baths

Steel baths shall be porcelain enamelled internally and painted externally and fitted with waste outlet and overflow grating with coupling

Q.20.5 Acrylic resinous baths

Acrylic resinous baths shall be fitted with waste outlet and overflow grating with coupling

Q.20.6 Acrylic resinous wash hand basins

Acrylic resinous wash hand basins and vanity units shall have a smooth high gloss finish, with outlet openings, soap recesses, tap-holes and integral overflow and shall be fitted with waste outlet and overflow grating with coupling

Q.20.7 Glazed ceramic sanitary fittings

Sinks shall be provided with integral weir overflows

Washdown closet pans shall have washdown action and be provided with smooth finished injection moulded polypropylene heavy duty double flap seats fixed with non-ferrous bolts. Urinal channels shall be provided with outlet gratings fitted in bitumen

Q.20.8 Flush and sparge pipes

Flush pipes for high level cisterns shall be of plastic or drawn galvanized steel

Flushpipes for low level cisterns shall be of plastic

Flush and sparge pipes for urinals with high level cisterns shall be of chromium plated copper piping and of the sizes recommended by the manufacturer of the urinal

Q.21 INSTALLATION OF SANITARY FITTINGS

Sanitary fittings shall be installed as follows:

Q.21.1 Precast concrete wash troughs

Precast concrete wash troughs shall be bedded on top of pedestals which shall be bedded on floors in 1:3 cement mortar

Q.21.2 Stainless steel wash troughs and wash hand basins

Stainless steel wash troughs and wash hand basins shall be fixed to walls on a pair of galvanized mild steel gallows brackets bolted to wall with 6mm diameter expanding bolts

Q.21.3 Acrylic resinous wash hand basins

Acrylic resinous wash hand basins shall be fixed to walls on a pair of standard painted cast iron brackets screwed to underside of basin and bolted to wall with 6mm diameter expanding bolts

Q.21.4 Ceramic wash hand basins

Ceramic wash hand basins shall be fixed to walls on a pair of standard painted steel or cast iron brackets bolted to wall with 6mm diameter expanding bolts

Q.21.5 Acrylic resinous baths

Acrylic resinous baths shall be bedded in 1:5 cement mortar on three cross rows of bricks or bedded solid on a layer of dry river sand and fixed to wall with galvanized steel brackets under edges (in the middle of the sides against walls) bolted to wall with 6mm diameter expanding bolts and sealed along top against wall finishes with patent mildew resistant silicone rubber

Q.21.6 Washdown closet pans and cisterns

Washdown closet pans shall be bedded on floors in 1:3 cement mortar. Cisterns shall be fixed to walls with 6mm diameter expanding bolts

Q.21.7 Ceramic urinals

Ceramic stall and slab urinals shall be bedded on floors and against walls in 1:3 cement mortar. Slabs, channels, treads, etc shall be jointed in 1:3 cement mortar and pointed in white cement

Ceramic bowl urinals shall be fixed to walls on standard steel brackets bolted to wall with 6mm diameter expanding bolts. Cisterns shall be fixed to walls on standard brackets bolted to wall with 6mm diameter expanding bolts

Q.21.8 Stainless steel urinals

Stainless steel stall and slab urinals shall be bedded on floors in 1:3 cement mortar and with backs and sides against walls filled in with fine unreinforced concrete. Cisterns shall be fixed as cisterns for ceramic urinals

Q.22 FIRE HOSE REELS

Fire hose reels shall each be fitted with a 30m long hose of internal diameter not less than 19mm with a 4,8mm internal diameter chromium plated brass nozzle

Q.23 FIRE EXTINGUISHERS

All fire extinguishers shall be fully charged

Q.24 TESTS

Sewerage pipe lines, sanitary plumbing including fittings and hot and cold water supply and fire service shall be tested to the approval of the Contracts Manager and Local Authority

The Contractor shall provide all testing apparatus, material and labour required for the tests and inspections

R. GLAZING

R.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Glass in building	SANS 50572-1 to 5
Glazing putty for wooden and metal window frames	SANS 680
Silvered glass mirrors for general use	SANS 1236
Safety and security glazing materials for buildings	SANS 1263-1 to 3
Sealing compounds for the building industry, one Component, silicone-rubber based	SANS 1305
The installation of glazing materials in buildings	SANS 10137
Work on glass for glazing	SANS 1817

R.2 PUTTY ETC

Glazing putty shall be Type I for wooden sashes and Type II for steel sashes. Putty for glazing to unpainted hardwood shall be tinted to match the colour of the wood

Back putty shall not exceed 3mm thick. Putty shall not be painted until it has formed a surface crust, and if the putty does not form a surface crust it shall be replaced

Butyl putty shall be used where glass is to be fixed in aluminium sashes with glazing beads

Non-setting compounds shall be used where laminated glass is fixed in sashes with glazing beads

S. PAINTWORK

S.1 MATERIALS AND WORKMANSHIP

Materials and workmanship shall comply with the following standards:

Decorative paint for interior use	SANS 515
Decorative high gloss enamel paints	SANS 630
Primers for wood (for external work)	SANS 678
Primers for wood (for internal work)	SANS 678
Zinc phosphate primer for steel	SANS 1319
Undercoats for paints (except emulsion paint)	SANS 681
Aluminium paint	SANS 682
Varnish for interior use	SANS 887
Emulsion paints	SANS 1586

Materials for paintwork shall be delivered to the site in unopened containers and applied in accordance with the manufacturer's instructions. Materials shall be suitable for application to the surfaces concerned. Undercoats shall be as recommended by the manufacturer of the finishing coats

S.2 PREPARATORY WORK

S.2.1 Plastered surfaces etc

Plastered surfaces shall be thoroughly inspected and, if necessary, washed down and brushed in order to remove any traces of efflorescence and allowed to dry completely before any paint finish is applied. Before any paint is applied, holes, cracks and irregularities in plaster and other surfaces shall be filled with a suitable filler and finished smooth. Unfinished concrete surfaces shall have all projections rubbed off and shall be thoroughly cleaned with a spirits-of-salts solution (1 part concentrated spirits-of-salts to 4 parts water)

S.2.2 Metal surfaces

Metal surfaces shall be sanded, where necessary, washed with a suitable cleaning agent and left smooth

Protective coatings applied by manufacturers to galvanized metal surfaces shall be removed with a suitable agent and the surfaces washed down

Rust, grease and defective factory primers on metal surfaces, as well as pitch on cast iron pipes, shall be removed

S.2.3 Wood surfaces

Knots in woodwork shall be treated with knotting. Minor blemishes shall be filled with a suitable filler. Wood surfaces shall be sanded smooth

S.3 APPLICATION OF PAINT

Primers to wood surfaces shall be applied by brush. Primers to other surfaces may be applied by roller with the approval of the Contracts Manager. Undercoats and finishing coats may be applied by brush or roller

Paint shall not be sprayed on except in the case of cellulose and other special paints where spray painting is the accepted method of application

Before subsequent coats of paint are applied the previous coat shall be properly dry and shall be sanded down where necessary 42

S.4 COLOUR SCHEME

A colour scheme comprising colours and the blending of colours approved by the Contracts Manager shall be used for the paintwork. The tints of the undercoats shall closely match the finishing coat but nevertheless differ sufficiently to indicate the number of undercoats. Colour samples of the finishing coats shall be provided in all cases

S.5 GENERAL

Paintwork shall include the preparation of surfaces, filling, stopping, sanding and priming of nail heads and screws. Where windows, sashes, etc are to be painted, the rebates of the openings to be glazed shall be primed

T. PAPERHANGING

T.1 PREPARATORY WORK

Plaster surfaces to be papered shall be dry, thoroughly cleaned down, filled with a suitable filler as necessary to obtain a smooth surface and painted thereafter with a single coat of emulsion paint

Wood surfaces to be papered shall be knotted, stopped and sanded

T.2 PAPERHANGING

Wallpaper shall be hung in vertical long lengths. Vertical joints shall be close-fitted and plumb and the paper shall be tightly fitted to skirtings, ceilings, door frames, windows, etc. Horizontal joints will not be allowed

U. EXTERNAL WORKS

U.1 GENERAL

U.1.1 Excavations

Excavations shall be deemed to be in “earth”

U.2 LANDSCAPING

U.2.1 Topsoil

Topsoil shall vary between sandy loamy soil and sandy clayey soil with an ideal composition of 15% to 25% clay, 10% silt/sludge and 65% to 75% sand, with a minimum ratio of organic material of 2%. All material shall be free of harmful deposits as well as unwanted seeds

U.2.2 Compost

Compost shall be composed of properly decayed organic material, free from harmful deposits, salts, seeds and other waste material and shall have a pH of more than 4 and less than 7

U.2.3 Mulch

Mulch shall be approved organic material free from small particles of bark residue, fungus, disease, etc

U.2.4 Lime

Lime shall be agricultural lime of an approved manufacture

U.2.5 Fertilizer

Fertilizer shall be of the type specified, mixed thoroughly into the soil as prescribed. No fertilizer shall be added more than two weeks prior to planting

U.2.6 Backfilling

Backfilling in plant and tree holes shall be composed of two parts topsoil to one part compost mixed thoroughly together and compacted by foot in 100mm layers. Fertilizer shall only be added if prescribed

U.2.7 Pebbles

Pebbles shall be smooth with a uniform colour and form and ranging in size from 50mm to 75mm diameter. Removal of pebbles from river beds shall be done selectively to avoid any major disruption to the ecology of the river and environment

U.2.8 Plant material

U.2.8.1 General

All plant material (plants, shrubs, trees, etc) shall be obtained from a registered nursery and shall be free from damaged parts, parasites, fungus, other plant diseases or insects. No container-bound plants will be acceptable

U.2.8.2 Trees

The height of trees described in the bills of quantities shall be measured from the top of the root ball to the top of the tree. Where trees are pruned, such prune wounds shall not be more than 25mm in diameter and be sealed with an approved sealing compound

U.2.8.3 Shrubs and small plants

Shrubs and small plants shall meet the requirements for height and spread as specified. Thin or sparsely branched plants shall not be accepted. Branches shall be well spread with ample young branches and the plant as a whole shall be growing well

U.2.8.4 Groundcover

Groundcover shall be dense and healthy and shall comply with the minimum requirements for leaf density as specified

Formal grass shall be planted as runners in 50mm deep drills at 150mm centres unless otherwise described

U.2.9 Cultivation and preparation of planting areas etc

All surface rocks and stones larger than 50mm shall be removed before commencing cultivation and preparation. The entire area shall be ripped and rotavated using approved machinery by breaking up the earth to a depth of 300mm at 600mm centres in both directions, unless otherwise described, and then levelled. Where fertilizer or compost is specified, it shall be worked into the topsoil after ripping and rotavation to a depth of 300mm and finished to final levels

All fertilizer to areas to be grassed shall be strewn on the final layer before final finishing is commenced and worked mechanically into the top 150mm soil

U.2.10 Planting procedure

Holes for shrubs and groundcover shall be as follows:

Shrubs – 500 x 500 x 500mm deep

Groundcover – 300 x 300 x 300mm deep (if not planted in drills)

Holes for trees shall be square, of adequate size to accommodate the root system and suitable for the height of the tree

All plant material shall be watered thoroughly before careful removal from the container and planted in the prescribed planting medium with the top of the soil in the container finishing level with the surrounding area. Water dams size 800mm diameter x 150mm deep and 500mm diameter x 150mm deep shall be formed around trees and shrubs respectively and all planting material shall be watered immediately after planting. Trees, shrubs, etc shall be properly staked or stayed, depending on their size, on the prevailing windy side with patent tree ties

U.2.11 Maintenance

All planted areas shall be maintained for a period of three months after practical completion as defined in the contract with the exception of hydroseeded areas which shall be maintained for 12 months after an acceptable cover has been obtained

This maintenance shall consist of keeping clear of weeds and litter, loosening soil where necessary every two weeks, replacing damaged, diseased or dead plants, pruning, cutting and mowing as necessary and watering so as to keep the plant material in a healthy growing condition

U.3 ROADWORK

U.3.1 Filling

Filling under roads etc shall be of inert material having a maximum plasticity index of 10, free from large stones etc spread, levelled, watered and compacted in layers not exceeding 200mm thick to a density of 98% Mod AASHTO

U.3.2 Preparation of sub-grade

The sub-grade shall be prepared by scarifying for a depth of 150mm and compacting to a density of 98% Mod. AASHTO, including trimming to the correct levels and grades

U.3.3 Base course

The base course shall consist of crusher run stone compacted to a density of 98% Mod. AASHTO and finished to the correct levels and grades

U.3.4 Weed killer

The completed sub-grade shall be treated with an approved total weed killer

U.3.5 Bituminous premix road surfacing

Before spreading the premix material, the base course shall be swept clean and free from all dust, dirt and loose particles, lightly wetted and sprayed with a prime coat of cutback bitumen complying with SANS 308 at the rate of 1 litre/m2

The material shall consist of semi-gap graded crushed stone aggregate having the following grading:

Sieve size (mm)	**% By mass passing sieve**
13,2	100
4,75	45-60
2,36	42-55
1,18	40-52
0,3	25-45
0,075	5-12

The aggregate shall be mixed with bituminous road tar binder complying with SANS 748 at the rate of 1m3 of stone to 120 litre of emulsion at atmospheric temperature

The binder shall be added to the stone and mixed until the stone is uniformly coated. Thereafter 5% of clean, dry quartzitic sand shall be added and mixed until evenly distributed through the mixture

The premix shall be applied only after the primer has dried out completely and shall be spread immediately after mixing and rolled on the same day

Spreading shall be done evenly over the prepared base course to a loose depth sufficient to ensure the consolidated thickness specified

Rolling shall commence as soon as the binder has set sufficiently, followed after three days by a final rolling

U.3.6 Precast concrete block road surfacing

Paving blocks shall be precast concrete blocks complying with SANS 1058

Blocks shall be laid to true levels and grades on and including a 25mm thick layer of river sand with joints exceeding 2mm and not exceeding 6mm wide

After laying, the paving shall be compacted by means of a vibrating plate compactor, with joints between the blocks filled in, after compaction, by sweeping in fine sand

Infill areas at edges of paving constituting less than 25% of a full block unit and of 25mm minimum dimension shall be filled with Class C prescribed mix unreinforced concrete with top surface trowelled smooth to match blocks. Smaller areas shall be filled with 1:4 cement mortar

U.3.7 Precast concrete kerbs and channels

Precast concrete kerbs and channels shall comply with SANS 927, generally in 1m lengths and finished smooth from the mould on exposed surfaces. Kerbs and channels shall be bedded on and jointed in 1:3 cement mortar and pointed with keyed joints. Bases to kerbs shall be Class B prescribed mix unreinforced concrete

U.3.8 Process control tests

The Contractor shall be responsible for carrying out all necessary process control tests on the density and moisture content of the compacted sub-grade, base course, etc to ensure that the required compaction is being attained

U.4 FENCING ETC

U.4.1 Materials

Materials and workmanship shall comply with the following specifications and requirements :

Wooden poles, droppers, guardrail posts and spacer blocks	SANS 457-2&3
Zinc-coated fencing wire	SANS 675
Prefabricated concrete components for fencing	SANS 1372
Chain-link fencing and its wire accessories	SANS 1373
Fasteners	SANS 1700
Anti-intruder fences	CKS 451
Metal droppers and standards	CKS 451

U.4.2 Galvanized wire

All galvanized wire shall be zinc coated wire with Class B zinc coating. Straining wire shall be 4mm diameter galvanized mild steel wire. Tie wire shall be 1,6mm diameter galvanized mild steel wire

U.4.3 Plastic coated wire

Plastic coated straining wire shall be 3,15mm diameter Class C galvanized mild steel wire plastic coated to an overall diameter of 3,95mm

Plastic coated tie wire shall be 1,8mm diameter Class C galvanized mild steel wire plastic coated to an overall diameter of 2,5mm

U.4.4 Galvanized barbed wire

Galvanized barbed wire shall be 2,5mm diameter mild steel double strand reverse twist zinc coated barbed wire with Class A zinc coating

U.4.5 Galvanized wire mesh

Galvanized wire mesh shall be 50mm mesh chain link netting of 2,5mm diameter Class C galvanized mild steel wire

U.4.6 Plastic coated wire mesh

Plastic coated wire mesh shall be 50mm mesh chain link netting of 2,5mm diameter Class C galvanized mild steel wire plastic coated to an overall diameter of 3,25mm

U.4.7 Galvanized welded wire mesh

Galvanized welded wire mesh shall be fabricated from pre-galvanized wires to rectangular pattern welded together at each intersection using a welding method which forms a zinc oxide protective coating at each intersection

U.4.8 Razor wire

Razor wire shall be fabricated from 2,5mm diameter galvanized high tensile steel wire fitted with razor barbs formed of 0,5mm galvanized steel strip clipped on at 37,5mm centres

U.4.9 Metal droppers and standards

Droppers shall be of ridged T-section mild steel with a mass of not less than 0,55kg/m. Standards shall be of I-section mild steel with a mass of not less than 3kg/m or of ridged edge Y-section mild steel with a mass of not less than 2,5kg/m, and shall be driven 600mm deep into the ground

Droppers and standards shall have either galvanized, sprayed metal or painted finish as described in the items and in accordance with CKS 451. In addition, those surfaces of standards embedded in the ground shall be coated with bitumen

U.4.10 Metal posts and stays

Posts and stays shall comply with CKS 451 and shall be of black galvanized mild steel tubing as specified

Straining posts shall be of 108mm outside diameter x 3mm wall thickness tubing, each with a 300 x 300 x 5mm thick mild steel sole plate and a steel cap welded on

Intermediate posts shall be of 50mm outside diameter x 2,5mm wall thickness tubing, each with a 230 x 230 x 5mm thick mild steel sole plate and a steel cap welded on

Stays for straining posts shall be of 50mm outside diameter x 2,5mm wall thickness tubing, each with a 230 x 230 x 5mm thick mild steel sole plate welded on and fixed raking with top end flattened, bent, holed and bolted to straining post with and including a 5mm diameter galvanized mild steel bolt with nut and washer

Posts and stays shall have either galvanized or painted finish as described in the items and in accordance with CKS 451. In addition, sole plates and portions of posts and stays embedded in ground shall be coated with bitumen

U.4.11 Timber posts, stays and droppers

Timber posts shall be 125mm diameter, timber stays shall be 100mm diameter and timber droppers shall be 30mm diameter

U.4.12 Prestressed concrete posts and stays

Prestressed concrete posts and stays shall be finished smooth from the mould and uniformly stressed by means of high tensile longitudinal prestressing wires with concrete cover to wires of not less than 20mm

Corner and straining posts shall be 100 x 100mm and intermediate posts and stays shall be 75 x 75mm. Stays shall be fixed raking with top end splayed and glued to posts with a suitable epoxy compound

U.4.13 Bolts, nuts and washers

Straining eye bolts, hinge bolts, bolts, nuts and washers shall be galvanized

U.4.14 Precast concrete fencing

Precast concrete fencing over sloping terrain shall be stepped to suit terrain, including the use of increased lengths of posts as necessary, excavation, etc

U.4.15 Concrete bases

Bases in ground for posts, stays, etc shall be of Class B prescribed mix concrete with tops 100mm below surface of ground

Sizes of concrete bases for posts, stays, etc shall be as follows:

Straining and gate posts	–	450 x 450 x 700mm deep
Intermediate posts	–	300 x 300 x 600mm deep
Stays	–	600 x 300 x 500mm deep

U.4.16 Security overhangs

Where fencing is described as having a security overhang, the posts and standards shall have angular (single arm) extension arms

Extension arms shall be attached to the posts and standards by welding in the case of steel and by spiking in the case of timber

Concrete extension arms shall be cast integrally with the post or standard

Barbed wire to security overhangs shall be tightly strained and wired at each intersection with extension arms and shall have barbed wire braces at 450mm centres between standards, posts, etc wired onto the barbed wire and the top straining wire

U.4.17 Gates

Gates shall be formed of 40mm outside diameter x 2,5mm wall thickness mild steel tubular framework with welded joints, strongly braced as necessary and filled in with wire mesh as described above, properly strained and securely bound to framework with tie wire

PRELIMINARIES AND GENERAL

CONSTRUCTION OF A NEW CHLORINE DOSING SYSTEM AND PLANT SAFETY UPGRADE PROJECT FOR CAMDEN POWER STATION

No.	Schedule Description	Unit	Amount
	PRELIMINARIES AND GENERAL		
	ESTABLISHMENT OF FACILITIES ON SITE		
1	**FIXED CHARGES**		
1.1	Contractual requirement (Contractor to supply Breakdown)	sum	
1.2	**Establishment of facilities on site**		
1.2.1	Transportation to site	sum	
1.2.2	Offices for engineer & staff and signs	sum	
1.2.3	Quality	sum	
1.2,4	SAPS Vetting and /or Finger Print Check	sum	
1.41	Other fixed-charge obligations: security.	sum	
1.5	**Contractor's obligations in respect of the Occupational Health and Safety Act**		
1.5.1	Health and Safety Requirements	sum	
1.3.2	PPE	sum	
1.3.3	Medicals and Induction	sum	
1,3.4	De- establishment	sum	
	TOTAL COST FIXED CHARGES (A)	**R**	
2	**TIME RELATED CHARGES**		
	FACILITIES FOR CONTRACTOR		
2.1	Operate & maintain facilities for the duration of the contract	sum	
2.2	Offices for engineer & staff	sum	
2.3	**Facilities for the Contractor for the duration of construction**		
2.5	Offices & storage sheds	sum	
2.6	Workshops	sum	
2.7	Ablution & latrine facilities	sum	
2.8	Accommodation	sum	
2.9	Transport	sum	
2.1	Plant	sum	
2.11	Other time-related obligations: security and other	sum	
	TOTAL COST TIME RELATED ITEMS (B)	**R**	
TOTAL COST A+B TRANSFERRED TO FINAL SUMMARY PAGE		**R**	

BILLS OF QUANTITIES

CONSTRUCTION OF A NEW CHLORINE DOSING SYSTEM AND PLANT SAFETY UPGRADE PROJECT FOR CAMDEN POWER STATION					
ITEM NO	**DESCRIPTION**	**UNIT**	**QTY**	**RATE**	**AMOUNT**
2	**BILL NO. 1: SEWAGE PLANT CHLORINATION SYSTEM**				
	PREAMBLES				
	For Preambles refer to SANS Documents which is obtainable on request for the full descriptions of materials and work to be done in this Bill.				
	DESIGN DETAILS				
	The Contractor is referred to the following Reports for comprehensive design details: **1. Detailed Design Report** **2. Detailed Design Report for Foundations - WTP and SWR** **3. Detailed Drawings**				
	SUPPLEMENTARY PREAMBLES				
	Rate approvals:				
	The tenderer is advised that any rate that is required for work must include the following breakdown: Material, labour, plant, wastage, transport and profit.				
	NATURE OF GROUND				
	The Tenderer must acquaint himself with the nature of the material to be excavated. The nature of the ground is assumed to be medium, dense and very dense material, therefore earth, but possibly interspersed with "hard rock" or "intermediate material".				
	LABOUR INTENSIVE ITEMS				
	The contractors must work in a labour intensive manner, . The Contractor must take this method of construction into consideration when programmes the work.				
	RATE ONLY ITEMS				
	The contractor is referred to the following items where RATE ONLY appears. The contractor is encourage to price these item with marketed related prices as these RATE ONLY items will be used during the course of the contract and Eskom will not renegotiate these rates,				
	PRICING OF THIS BILLS OF QUANTITIES				
	Any items left unpriced will be understood to be provided free of charge and no claim for any extras arising out of the Tenderers omission to price any item will be entertained.				
	TECHNICAL DOCUMENT				
	The Contractor is referred to entire Technical Document for the details of the Scope. The Contractor is to study the details of this document prior to pricing this Bills of Quantities				
	SUPPLY, DELIVERY, INSTALLATION, COMMISSIONING AND TESTING OF SEWAGE PLANT CHLORINATION SYSTEM COMPLETE WITH CONNECTIONS AND FITTINGS IN ACCORDANCE WITH SANS 10298:2009				
3.1	**A customised 6000x3000mm Double Unit container suitable for the storage of Chlorine gas, partitioned from roof to floor into 2 compartments to enable the separate storage of empty and full cylinders.**				
3.1.1	75mm MW Fire rated Wall Panels White	No	1		R
3.1.2	75mm MW Fire rated Ceiling Panels White	No	1		R
3.1.3	IBR Roof Sheeting (Galvanized)	No	1		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.1.4	Fixing Materials and Trimmings	No	1		R
3.1.5	Single Leaf MW , Hinged Type - "Chiller Seal" door with Polycarp Inspection Window	No	2		R
3.1.6	600x600 Fixed Polycarb Inspection Window	No	1		R
3.1.7	Structure Labour	No	1		R
3.1.8	Bulkhead Light Fitting 300mm	No	2		R
3.1.9	Steel Chassis c/w Termite Proof Floor Board	No	18		R
3.1.10	Rubberized Waterproof Paint - Internal Floor	No	20		R
3.1.11	20L Chlorinated rubber primer	No	1		R
3.1.12	20L Chlorinated HB Intercoat	No	1		R
3.1.13	20L Chlorinated rubber topcoat	No	1		R
3.1.14	Siting of Unit	No	1		R
3.1.15	Delivery of Goods Costed to Ermelo Area - TBC	No	1		R
3.2	**Chlorine Dosing Equipment**				
3.2.1	CL-16 Automatic Switchover Gas Chlorinator Direct Cylinder Mounted 0-100PPD | 0-2000g/hr.	No	1		R
3.2.2	RM-1, CL2 Remote Meter Panel 2kg/hr.	No	1		R
3.2.3	AV-1 SUPERIOR Auto Valve Maximum Capacity 0-2Kg/hr. System to be fitted with a flowrate controller 0 – 2kg/hr.	No	1		R
3.2.4	Free Chlorine, Total Residual Chlorine and Combined Chlorine Analyzer Dimensions (controller): (340 x 2200 x 130mm) Mounting board: (800 x 550 x 5mm) Power Supply: (100-120VAC / 1A), (200-230VAC / 0.5A), 50-60Hz, 12 volts DC Measuring Ranges: 0.00 to 5.00 ppm Sample Flow Rate: 60 - 200 mL/min through the instrument Signal Outputs: (2) Programmable Signal Outputs @ 4-20 mA Analog (2) Potential Free Relay Outputs @ 1A, 240 VAC Enclosure Rating: IP66	No	1		R
3.2.5	Manifold-4-Valve - Drip leg, 4 Valve High Pressure Manifold with drip leg	No	1		
3.2.6	EJ-1, CL2 HI/LO Press ejector 2kg/hr.	No	1		R
3.2.7	SLD-2-CL-CL Chlorine Gas Detector System including 2-off CL2 gas sensors chlorine, control panel and cable.	No	1		R
3.2.8	Strobe-siren and strobe light for gas leak alarm	No	2		R
3.2.9	WIZZARD, Electronic Cylinder Scale with 4-Channel Wizzard 4000 Weight Indicator with (3) 4-20mA Outputs - Electronic 70kg Type Multi-Cylinder Scale: 3-Channel Wizard 4000, (3) 420mA Outputs,(3) Adjustable PVC Weigh Platforms, (3) Chaining Brackets	No	1		R
3.2.10	70kg Chlorine Gas Cylinders	No	12		R
3.2.11	Cylinder chaining brackets	No	12		R
3.2.12	Flex2000, Flexible Connector (Pigtail) 2 m	No	4		R
3.2.13	Safe-wind, Fiberglass Windshock-Includes 1.5m pole	No	1		R
3.2.14	Emergency Shut off Valve Actuator mounted directly onto the cylinder valve(s) with a controller enclosure to operate up to (6) actuators. Controller internal battery charger, 2-off 12-volt power supply and backup batteries. Power input supply: 120/240 VAC 50/60 Hz.	No	6		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.3	**Chlorine safety equipment box**				
3.3.1	Safe-UV-Cab Large, UV Stabilised Outdoor Safety Cabinet 9 kg	No	1		R
3.3.2	CSW-2, Spanner Wrench for Regulator -Included in the CL-16 KIT	No	1		R
3.3.3	DH-FFM, Dromex Maxi Mask - Black	No	1		R
3.3.4	DCHT-ABEK1, Dromex Cartridge Unifilter Double Pack	No	1		R
3.3.5	Promax-C4000-XL, Dromax Promax C4000 Safety Suit Type 3	No	1		R
3.3.6	VIPER-10, Dromex CAT 3 Chemical Safety Gloves	No	1		R
3.3.7	GB-GP-9, Dromex Black Safety Gumboots	No	1		R
3.3.8	Safe-70kg, Chlorine Safety Kit for 70kg Cylinder	No	1		R
3.4	**Outdoor Foot Operated Shower**				
3.4.1	Single column foot operated emergency shower with an eyewash bowl-	No	1		R
3.4.2	ø15mm Threaded Isolating Valves (uPVC)	No	1		R
3.4.3	ø15mm uPVC Piping (6m)	No	1		R
3.4.4	ø15mm 90 Deg Threaded Elbow (uPVC)	No	1		R
3.4.5	ø15mm Threaded Tee (uPVC)	No	1		R
3.5	**All signage, labels and necessary emergency procedures**				
3.5.1	MV2 - Respiratory Protection Safety Sign	No	1		R
3.5.2	MV5 - Hand Protection Safety Sign	No	1		R
3.5.3	MA16E - Chained Cylinders Explanatory Safety Sign	No	1		R
3.5.4	PV2 - SABS No Open Flame Safety Sign	No	1		R
3.5.5	PV1 - SABS No Smoking Safety Sign	No	1		R
3.5.6	Danger : Chlorine Safety Sign (HW23)	No	1		R
3.5.7	Chlorine Safety Sign (HW24)	No	1		R
3.5.8	SABS Red Exit Photo Luminescent (Glow in the dark) Safety Sign (M069)	No	1		R
3.6	**Chlorine Gas Scrubber**				
3.6.1	Scrub-dry 70kg Dry bed emergency chlorine scrubber. Includes 70kg dry scrubber vessel, 70kg scrubber media	No	1		R
3.6.2	Scrubber pipe, scrubber 400mm pipe per meter	m	20		R
3.7	**Gas Cylinder Trolley**				
3.7.1	Double Gas Cylinder Trolley, Dimensions-45×55 ×120.2 cm, Weight-13.8 kg (Load Rating 225kg)	No	1		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.8	**Mechanical Extraction Fan and accessories**				
3.8.1	Centrifugal Plug Fan to extract a range of (1000m3/h- 200m3/h)	No	1		R
3.8.2	L10 10A Controller 220V	No	1		R
3.8.3	Fan Surface Mounted 1 Phase Isolator	No	1		R
3.8.4	A control panel for all equipment installed inside the Chlorine storage container	No	1		R
3.8.5	Cabling 2.5mm 2core + earth cable	m	30		R
3.8.6	Ultrasonic clamp-on flowmeter	No	1		R
3.8.7	Bulkhead 3000mm x 550	No	1		R
3.8.8	Exract Air Egg Crate Grille 150mm x 400mm	No	2		R
3.8.9	Weather Louvre 300mm x 300mm	No	1		R
3.8.10	Anti Vibration Mounts	No	4		R
3.8.11	M12 Stainless Steel Bolts	No	8		R
3.8.12	M12 Stainless Steel Nuts	No	8		R
3.8.13	M12 Stainless Steel Washers	No	8		R
3.9	**Portable Pumps and accessories**				
3.9.1	Motive water pumps with flow rate up to (5.4 m^3/h), Head up to 70 m and 10 bar working pressure.	No	2		R
3.9.2	1 Pole Enclosed Non Fused Isolator Switch,16A	No	2		R
3.9.3	Cabling 2.5mm 2core + earth cable	m	5		R
3.9.4	50mm Anti Vibration Mat 75psi Cork +100°C -50°C 50 x 50mm 22mm	No	8		R
3.9.5	M12 x 50mm Stainless Steel Bolts	No	8		R
3.9.6	M12 x 19mm Stainless Steel Nuts	No	8		R
3.9.7	M12 Stainless Steel Washers	No	8		R
3.10	**Unplasticized Polyvinyl Chloride (UPVC) Piping and fittings**				
3.10.1	ø40mm Threaded Isolating Valves (uPVC)	No	6		R
3.10.2	ø40mm Threaded Unions (uPVC)	No	2		R
3.10.3	ø40mm 0-1000KPa 100mm Dial Glycerin Filled Industrial Pressure Gauges	No	3		R
3.10.4	ø40mm uPVC Piping (6m)	No	6		R
3.10.5	ø40mm Threaded Non-return Valves (uPVC)	No	3		R
3.10.6	ø40mm Threaded Strainer (uPVC)	No	1		R
3.10.7	ø40mm 90 Deg Threaded Elbow (uPVC)	No	9		R
3.10.8	ø40mm Threaded Tee (uPVC)	No	4		R
3.10.9	ø40mm 0-1000KPa 100mm Dial Glycerin Filled Industrial Pressure gauge with chemical protector	No	1		R
3.11	**Electrical Equipment**				
3.11.1	2mm PVC Conduit	No	20		R
3.11.2	PVC Conduit Box 4-way side entry	No	5		R
3.11.3	PVC Conduit Box 3-way side entry	No	5		R
3.11.4	90 Deg PVC Solid Bend	No	20		R
3.11.5	PVC Spacer Bar Saddle	No	15		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.11.6	25mm PVC Solid Coupling	No	10		R
3.11.7	LED Light Fitting, Double, Damp proof Light - Anti Corrosive	No	2		R
3.11.8	Circuit Breaker 10A	No	4		R
3.11.9	18 Way Populated Flush Mount Distribution Board 255mm x 405mm	No	1		R
3.11.10	PVC Trunking 40x16x3000mm	No	20		R
3.11.11	Switch 1lever 1 way 4x2	No	2		R
3.11.12	Main sub-DB circuit breaker 16A Single phase, 5kA Isolator	No	1		R
3.11.13	Protection up stream breaker 16A Single phase, 5kA, curve 3 complete with locking material	No	1		R
3.11.14	Electrical Panel 550x400x220mm ENCL. IP65 Electric Orange single front door leaf type	No	1		R
3.11.15	Cabling 2.5mm 2core + earth cable	m	100		R
3.11.16	Din Rail 35 slotted steel +end clips	m	2		R
3.11.17	Shroud PVC	No	2		R
3.11.18	PVC Compression Gland White threaded type	No	2		R
3.11.19	1 Pole Enclosed Non Fused Isolator Switch,16A	No	2		R
3.11.20	Electrical Equipment Labelling	No	1		R
3.11.21	Electrical Labour + COC	No	1		R
3.11.22	SWA PVC 16mm2 Cu 3 core power cable 203m (Supply)	m	203		R
3.11.23	Trenching, lay cable, backfill, danger tape, cable markers, and of the SWA PVC 16mm2 Cu 3 core power cable 203m	m3	51		R
3.11.24	Equip the switchgear with MCB, 3 phase terminal block, cable glands, lugs, fasteners, gland plate and 16mm2 cabling for phase conductors to the terminal block and neutral, earth	No	1		R
3.11.25	Racking and Bosal Pipe Works	m	40		R
3.11.26	Site Manager	hr	5		R
3.11.27	Supervisor	hr	64		R
3.11.28	Technical Support QC	hr	8		R
3.11.29	Administrator	hr	2		R
3.11.30	Team leader	hr	64		R
3.11.31	Artisan	hr	16		R
3.11.32	SHEQ Officer	hr	8		R
3.11.33	Transporter	day	8		R
3.11.34	LDV 1ton	day	8		R
3.12	**Installation and Commissioning of Sewage Plant Chlorination System Installations**				
3.12.1	Installation and Commissioning of Sewage Plant Chlorination System Installations	Sum	1		R
3.13	**ASBUILT DRAWINGS,OPERATING MANUALS AND MAINTENANCE SCHEDULE**				
3.13.1	The Contractor is referred to provide all Asbuilt drawings,Operating Manuals and Maintenance Schedue	item	1		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
3.14	**SPARES AND CONSUMABLES**				
3.14.1	The Contractor is to provide Spares and Consumables for a least 12 months of the contract.	item	1		R
3.15	**TESTING AND INSPECTIONS BEFORE DELIVERY**				
3.15.1	The Contractor is to make Povision for Testing and Inspections before delivery of the contract.	item	1		R
3.16	**CORRECTION OF DEFECTS**				
3.16.1	The Contractor is to allow for Correction of Defects.	item	1		R
3.17	**TRAINING**				
3.17.1	The *Contractor* is to provide training to the operating staff, maintenance and engineering departments of the *Employer* .	item	1		R
3.18.1	All Operating & Maintenance requirements must be included in the training manuals.	item	1		R
3.19	**TECHNICAL SUPPORT**				
3.19.1	The *Contractor* is to provide onsite Technical Support for 3 months inclusive of weekends and holidays post completion of works.	item	1		R
TOTAL CARRIED TO FINAL SUMMARY					R

CONSTRUCTION OF A NEW CHLORINE DOSING SYSTEM AND PLANT SAFETY UPGRADE PROJECT FOR CAMDEN POWER STATION					
ITEM NO	**DESCRIPTION**	**UNIT**	**QTY**	**RATE**	**AMOUNT**
4	**BILL NO. 2 - PORTABLE WATER PLANT CHLORINATION SYSTEM**				
	PREAMBLES				
	For Preambles refer to SANS Documents which is obtainable on request for the full descriptions of materials and work to be done in this Bill.				
	DESIGN DETAILS				
	The Contractor is referred to the following Reports for comprehensive design details: **1. Detailed Design Report** **2. Detailed Design Report for Foundations - WTP and SWR** **3. Detailed Drawings**				
	SUPPLEMENTARY PREAMBLES				
	Rate approvals:				
	The tenderer is advised that any rate that is required for work must include the following breakdown: Material, labour, plant, wastage, transport and profit.				
	NATURE OF GROUND				
	The Tenderer must acquaint himself with the nature of the material to be excavated. The nature of the ground is assumed to be medium, dense and very dense material, therefore earth, but possibly interspersed with "hard rock" or "intermediate material".				
	LABOUR INTENSIVE ITEMS				
	The contractors must work in a labour intensive manner, . The Contractor must take this method of construction into consideration when programmes the work.				
	RATE ONLY ITEMS				
	The contractor is referred to the following items where RATE ONLY appears. The contractor is encourage to price these item with marketed related prices as these RATE ONLY items will be used during the course of the 6 month contract and Eskom will not renegotiate these rates,				
	SUPPLY, DELIVERY, INSTALLATION, COMMISSIONING AND TESTING OF PORTABLE WATER PLANT CHLORINATION SYSTEM COMPLETE WITH CONNECTIONS AND FITTINGS IN ACCORDANCE WITH SANS 10298:2009				
4.1	**A customized 6000x3000mm Double Unit container suitable for the storage of Chlorine gas, partitioned from roof to floor into 2 compartments to enable the separate storage of empty and full cylinders.**				
4.1.1	75mm MW Fire rated Wall Panels White	No	1		R
4.1.2	75mm MW Fire rated Ceiling Panels White	No	1		R
4.1.3	IBR Roof Sheeting (Galvanized)	No	1		R
4.1.4	Fixing Materials and Trimmings	No	1		R
4.1.5	Single Leaf MW , Hinged Type - "Chiller Seal" door with Polycarp Inspection Window	No	2		R
4.1.6	600x600 Fixed Polycarb Inspection Window	No	1		R
4.1.7	Structure Labour	No	1		R
4.1.8	Bulkhead Light Fitting 300mm	No	2		R
4.1.9	Steel Chassis c/w Termite Proof Floor Board	No	18		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4.1.10	Rubberized Waterproof Paint - Internal Floor	No	20		R
4.1.11	20L Chlorinated rubber primer	No	1		R
4.1.12	20L Chlorinated HB Intercoat	No	1		R
4.1.13	20L Chlorinated rubber topcoat	No	1		R
4.1.14	Siting of Unit	No	1		R
4.1.15	Delivery of Goods Costed to Ermelo Area - TBC	No	1		R
4.2	**Chlorine Dosing Equipment**				
4.2.1	CL-16 Automatic Switchover Gas Chlorinator Direct Cylinder Mounted 0-100PPD | 0-2000g/hr.	No	1		R
4.2.2	RM-1, CL2 Remote Meter Panel 2kg/hr.				
4.2.3	AV-1 SUPERIOR Auto Valve Maximum Capacity 0-2Kg/hr. System to be fitted with a flowrate controller 0 – 2kα/hr.	No	1		R
4.2.4	Free Chlorine, Total Residual Chlorine and Combined Chlorine Analyzer Dimensions (controller): (340 x 2200 x 130mm) Mounting board: (800 x 550 x 5mm) Power Supply: (100-120VAC / 1A), (200-230VAC / 0.5A), 50-60Hz, 12 volts DC Measuring Ranges: 0.00 to 5.00 ppm Sample Flow Rate: 60 - 200 mL/min through the instrument Signal Outputs: (2) Programmable Signal Outputs @ 4-20 mA Analog (2) Potential Free Relay Outputs @ 1A, 240 VAC Enclosure Rating: IP66	No	1		R
4.2.5	Manifold-4-Valve - Drip leg, 4 Valve High Pressure Manifold with drip leg	No	1		R
4.2.6	EJ-1, CL2 HI/LO Press ejector 2kg/hr.	No	1		R
4.2.7	SLD-2-CL-CL Chlorine Gas Detector System including 2-off CL2 gas sensors chlorine, control panel and cable.	No	1		R
4.2.8	Strobe-siren and strobe light for gas leak alarm	No	2		R
4.2.9	WIZZARD, Electronic Cylinder Scale with 4-Channel Wizzard 4000 Weight Indicator with (3) 4-20mA Outputs - Electronic 70kg Type Multi-Cylinder Scale: 3-Channel Wizard 4000, (3) 420mA Outputs,(3) Adjustable PVC Weigh Platforms, (3) Chaining Brackets	No	1		R
4.2.10	70kg Chlorine Gas Cylinders	No	12		R
4.2.11	Cylinder chaining brackets	No	12		R
4.2.12	Flex2000, Flexible Connector (Pigtail) 2 m	No	4		R
4.2.13	Safe-wind, Fiberglass Wind shock-Includes 1.5m pole	No	1		R
4.2.14	Emergency Shut off Valve Actuator mounted directly onto the cylinder valve(s) with a controller enclosure to operate up to (6) actuators. Controller internal battery charger, 2-off 12-volt power supply and backup batteries. Power input supply: 120/240 VAC 50/60 Hz.	No	6		R
4.3	**Chlorine safety equipment box**				
4.3.1	Safe-UV-Cab Large, UV Stabilised Outdoor Safety Cabinet 9 kg	No	1		R
4.3.2	CSW-2, Spanner Wrench for Regulator -Included in the CL-16 KIT	No	1		R
4.3.3	DH-FFM, Dromex Maxi Mask - Black	No	1		R
4.3.4	DCHT-ABEK1, Dromex Cartridge Unifilter Double Pack	No	1		R
4.3.5	Promax-C4000-XL, Dromax Promax C4000 Safety Suit Type 3	No	1		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4.3.6	VIPER-10, Dromex CAT 3 Chemical Safety Gloves	No	1		R
4.3.7	GB-GP-9, Dromex Black Safety Gumboots	No	1		R
4.3.8	Safe-70kg, Chlorine Safety Kit for 70kg Cylinder	No	1		R
4.4	**Outdoor Foot Operated Shower**				
4.4.1	Single column foot operated emergency shower with an eyewash bowl-	No	1		R
4.4.2	ø15mm Threaded Isolating Valves (uPVC)	No	1		R
4.4.3	ø15mm uPVC Piping (6m)	No	1		R
4.4.4	ø15mm 90 Deg Threaded Elbow (uPVC)	No	1		R
4.4.5	ø15mm Threaded Tee (uPVC)	No	1		R
4.5	**All signage, labels and necessary emergency procedures**				
4.5.1	MV2 - Respiratory Protection Safety Sign	No	1		R
4.5.2	MV5 - Hand Protection Safety Sign	No	1		R
4.5.3	MA16E - Chained Cylinders Explanatory Safety Sign	No	1		R
4.5.4	PV2 - SABS No Open Flame Safety Sign	No	1		R
4.5.5	PV1 - SABS No Smoking Safety Sign	No	1		
4.5.6	Danger : Chlorine Safety Sign (HW23)	No	1		R
4.5.7	Chlorine Safety Sign (HW24)	No	1		R
4.5.8	SABS Red Exit Photo Luminescent (Glow in the dark) Safety Sign (M069)	No	1		R
4.6	**Chlorine Gas Scrubber**				
4.6.1	Scrub-dry 70kg Dry bed emergency chlorine scrubber. Includes 70kg dry scrubber vessel, 70kg scrubber media	No	1		R
4.6.2	Scrubber pipe, scrubber 400mm pipe per meter	m	20		R
4.7	**Gas Cylinder Trolley**				
4.7.1	Double Gas Cylinder Trolley, Dimensions-45×55 ×120.2 cm, Weight-13.8 kg (Load Rating 225kg)	No	1		R
4.8	**Mechanical Extraction Fan and accessories**				
4.8.1	Centrifugal Plug Fan to extract a range of (1000m3/h- 200m3/h)	No	1		R
4.8.2	L10 10A Controller 220V	No	1		R
4.8.3	Fan Surface Mounted 1 Phase Isolator	No	1		R
4.8.4	A control panel for all equipment installed inside the Chlorine storage container	No	1		R
4.8.5	Cabling 2.5mm 2core + earth cable	m	30		R
4.8.6	Ultrasonic clamp-on flowmeter	No	1		R
4.8.7	Bulkhead 3000mm x 550	No	1		R
4.8.8	Extract Air Egg Crate Grille 150mm x 400mm	No	2		R
4.8.9	Weather Louvre 300mm x 300mm	No	1		R
4.8.10	Anti Vibration Mounts	No	4		R
4.8.11	M12 Stainless Steel Bolts	No	8		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4.8.12	M12 Stainless Steel Nuts	No	8		R
4.8.13	M12 Stainless Steel Washers	No	8		R
4.9	**Unplasticized Polyvinyl Chloride (UPVC) Piping and fittings**				
4.9.1	ø40mm Threaded Isolating Valves (uPVC)	No	6		R
4.9.2	ø40mm Threaded Unions (uPVC)	No	2		R
4.9.3	ø40mm 0-1000KPa 100mm Dial Glycerin Filled Industrial Pressure Gauges	No	3		R
4.9.4	ø40mm uPVC Piping (6m)	No	6		R
4.9.5	ø40mm Threaded Non-return Valves (uPVC)	No	1		R
4.9.6	ø40mm Threaded Strainer (uPVC)	No	1		R
4.9.7	ø40mm 90 Deg Threaded Elbow (uPVC)	No	4		R
4.9.8	ø40mm Threaded Tee (uPVC)	No	2		R
4.9.9	ø40mm 0-1000KPa 100mm Dial Glycerin Filled Industrial Pressure gauge with chemical protector	No	1		R
4.10	**Electrical Equipment**				
4.10.1	2mm PVC Conduit	No	20		R
4.10.2	PVC Conduit Box 4-way side entry	No	5		R
4.10.3	PVC Conduit Box 3-way side entry	No	5		R
4.10.4	90 Deg PVC Solid Bend	No	20		R
4.10.5	PVC Spacer Bar Saddle	No	15		R
4.10.6	25mm PVC Solid Coupling	No	10		R
4.10.7	LED Light Fitting, Double, Damp proof Light - Anti Corrosive	No	2		R
4.10.8	Circuit Breaker 10A	No	4		R
4.10.9	18 Way Populated Flush Mount Distribution Board 255mm x 405mm	No	1		R
4.10.10	PVC Trunking 40x16x3000mm	No	20		R
4.10.11	Switch 1lever 1 way 4x2	No	2		R
4.10.12	Main sub-DB circuit breaker 16A Single phase, 5kA Isolator	No	1		R
4.10.13	Protection up stream breaker 16A Single phase, 5kA, curve 3 complete with locking material	No	1		R
4.10.14	Electrical Panel 550x400x220mm ENCL. IP65 Electric Orange single front door leaf type	No	1		R
4.10.15	Cabling 2.5mm 2core + earth cable	m	100		R
4.10.16	Din Rail 35 slotted steel +end clips	m	2		R
4.10.17	Shroud PVC	No	2		R
4.10.18	PVC Compression Gland White threaded type	No	2		R
4.10.19	1 Pole Enclosed Non Fused Isolator Switch,16A	No	2		R
4.10.20	Electrical Equipment Labelling	No	1		R
4.10.21	Electrical Labour + COC	No	1		R
4.10.22	SWA PVC 10mm2 Cu 3 core power cable 111m (Supply)	m	111		R
4.10.23	Trenching, lay cable, backfill, danger tape, cable markers, of the SWA PVC 10mm2 Cu 3 core power cable 111m	m3	28		R
4.10.24	Equip the switchgear with MCB, 3 phase terminal block, cable glands, lugs, fasteners, gland plate and 10mm2 cabling for phase conductors to the terminal block and neutral, earth	No	1		R
4.10.25	Racking and Bosal Pipe Works	m	40		R
4.10.26	Site Manager	hr	3		R

ITEM NO	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
4.10.27	Supervisor	hr	32		R
4.10.28	Technical Support QC	hr	4		R
4.10.29	Administrator	hr	1		R
4.10.30	Team leader	hr	32		R
4.10.31	Artisan	hr	8		R
4.10.32	SHEQ Officer	hr	4		R
4.10.33	Transporter	day	4		R
4.10.34	LDV 1ton	day	4		R
4.11	**Installation and Commissioning of Sewage Plant Chlorination System Installations**				
4.11.1	Installation and Commissioning of Sewage Plant Chlorination System Installations	Sum	1		R
4.12	**ASBUILT DRAWINGS,OPERATING MANUALS AND MAINTENANCE SCHEDULE**				
4.12.1	The Contractor is referred to provide all As-built drawings, Operating Manuals and Maintenance Schedule	item	1		R
4.13	**SPARES AND CONSUMABLES**				
4.13.1	The Contractor is to provide Spares and Consumables for a least 12 months of the contract.	item	1		R
4.14	**TESTING AND INSPECTIONS BEFORE DELIVERY**				
4.14.1	The Contractor is to make Provision for Testing and Inspections before delivery of the contract.	item	1		R
4.15	**CORRECTION OF DEFECTS**				
4.15.1	The Contractor is to allow for Correction of Defects.	item	1		R
4.16	**TRAINING**				
4.16.1	The *Contractor* is to provide training to the operating staff, maintenance and engineering departments of the *Employer* .	item	1		R
4.16.2	All Operating & Maintenance requirements must be included in the training manuals.	item	1		R
4.17	**TECHNICAL SUPPORT**				
4.17.1	The *Contractor* is to provide onsite Technical Support for 3 months inclusive of weekends and holidays post completion of works.	item	1		R
	TOTAL CARRIED TO FINAL SUMMARY				R

CONSTRUCTION OF A NEW CHLORINE DOSING SYSTEM AND PLANT SAFETY UPGRADE PROJECT FOR CAMDEN POWER STATION					
	DESCRIPTION	**UNIT**	**QTY**	**RATE**	**AMOUNT**
5	**BILL NO. 3 CIVIL WORKS**				
	PREAMBLES				
	The Contractor is referred to the SANS Documents and Model Preambles for trades which is obtainable on request for the full descriptions of materials and work to be done in this Bill.				
	DESIGN DETAILS				
	The Contractor is referred to the following Reports for comprehensive design details:				
	1. Detailed Design Report **2. Detailed Design Report for Foundations - WTP and SWR** **3. Detailed Drawings**				
	SUPPLEMENTARY PREAMBLES				
	Rate approvals:				
	The tenderer is advised that any rate that is required for work must include the following breakdown:				
	Material, labour, plant, wastage, transport and profit.				
	NATURE OF GROUND				
	The Tenderer must acquaint himself with the nature of the material to be excavated. The nature of the ground is assumed to be medium, dense and very dense material, therefore earth, but possibly interspersed with "hard rock" or "intermediate material".				
	LABOUR INTENSIVE ITEMS				
	The contractors must work in a labour intensive manner, . The Contractor must take this method of construction into consideration when programmes the work.				
	RATE ONLY ITEMS				
	The contractor is referred to the following items where RATE ONLY appears. The contractor is encourage to price these item with marketed related prices as these RATE ONLY items will be used during the course of the 6 month contract and Eskom will not renegotiate these rates,				
5.1	**RE-ADJUSTMENT OF SITE GROUND LEVEL**				
	Excavations in earth not exceeding 2m deep				
5.1.1	250mm Deep over site to remove top soil and depositing excavated material in prescribed stock piles on site	m3	1 428		R
	Layer works				
5.1.2	Rip and re-compact 125mm depth in situ material, conditioned and compacted to 91% Mod AASHTO density	m3	708		R
5.1.3	Compaction of ground surface including scarifying for a depth of 125mm of G5 material, breaking down oversize material, adding suitable material where necessary and compacting to 93% modified AASHTO density	m3	708		R
5.1.3	Compaction of ground surface including scarifying for a depth of 125mm of G5 material, breaking down oversize material, adding suitable material where necessary and compacting to 97% modified AASHTO density Reinstatement	m3	708		R
5.1.4	Reinstatement of site to pre-existing conditions	Sum	1		R
5.15	**Spreading and levelling Top Soil**				
	Take from stockpile and spread and level over site	m2	5 712		R

5.2	**PAVED AREA AROUND EXISTING STRUCTURES**				
	Excavations in earth not exceeding 2m deep				
5.2.1	250mm Deep over site around existing structures to remove top soil and depositing excavated material in prescribed stock piles on site Layer works	m3	195		R
5.2.2	Rip and re-compact 125mm depth in situ material, conditioned and compacted to 93% Mod AASHTO density	m3	98		R
5.2.3	Compaction of ground surface including scarifying for a depth of 150mm of G5 material, breaking down oversize material, adding suitable material where necessary and compacting to 95% modified AASHTO density	m3	98		R
5.2.4	Compaction of ground surface including scarifying for a depth of 150mm of C4 material, stabilized with 3% cement, conditioned and compacted to 97% modified AASHTO density	m3	98		R
	Paving				
	Brick surfacing:				
	Brick paving to be manufactured in accordance with SANS 1058				
	Paving is to be laid in accordance with SANS 1200 MJ, SANS 1058 and the Concrete Manufacturer's Association Specifications.				
	Paving to be installed with a minimum longitudinal fall of 1% and a transverse fall of at least 2%				
	Paving is to be laid to herringbone pattern on 25mm (thickness after final compaction) clean river sand (preparation of ground or filling elsewhere)				
	Clean sand is to be swept into joints between roadstones				
	Paving must be resanded three months after laying.				
5.2.5	60mm Thick "Corobrik Meadow" or similar approved paving bricks with butt joints	m2	2 430		R
	Kerbing				
	PRECAST CONCRETE KERBING				
	Descriptions:				
	Precast concrete Kerbs finished smooth on exposed surfaces including 20mm cement mortar 1:3 bedding, cutting and pointing				
5.2.6	Kerbs Figure 12(SANS 927) 600 x 100mm strip foundation 150 x 150mm haunching at back and 300 x 100mm channel steel floated smooth, including excavation, backfilling, formwork, etc.:	m	900		R
5.3	**DRIVEWAY**				
	Excavations in earth not exceeding 2m deep				
5.3.1	250mm Deep over site along the driveway to remove top soil and depositing excavated material in prescribed stock piles on site	m3	120		R
	Layer works				
	Filling in accordance with SANS 1200 DM, to be supplied by Contractor:				
5.3.2	Rip and re-compact 125mm depth in situ material, conditioned and compacted to 93% Mod AASHTO density	m3	60		R
5.3.3	Compaction of ground surface including scarifying for a depth of 150mm of G5 material, breaking down oversize material, adding suitable material where necessary and compacting to 95% modified AASHTO density	m3	60		R
5.3.4	Compaction of ground surface including scarifying for a depth of 150mm of C4 material, stabilized with 3% cement, conditioned and compacted to 97% modified AASHTO density	m3	60		R

	Paving				
	Brick surfacing:				
	Brick paving to be manufactured in accordance with SANS 1058				
	Paving is to be laid in accordance with SANS 1200 MJ, SANS 1058 and the Concrete Manufacturer's Association Specifications.				
	Paving to be installed with a minimum longitudinal fall of 1% and a transverse fall of at least 2%				
	Paving is to be laid to herringbone pattern on 25mm (thickness after final compaction) clean river sand (preparation of ground or filling elsewhere)				
	Clean sand is to be swept into joints between roadstones				
	Paving must be resanded three months after laying.				
5.3.5	60mm Thick "Corobrik Meadow" or similar approved paving bricks with butt joints	m2	480		R
	Kerbing				
	PRECAST CONCRETE KERBING				
	Descriptions:				
	Precast concrete Kerbs finished smooth on exposed surfaces including 20mm cement mortar 1:3 bedding, cutting and pointing.				
5.3.6	Kerbs Figure 8b(SANS 927) 600 x 100mm strip foundation 150 x 150mm haunching at back and 300 x 100mm channel steel floated smooth, including excavation, backfilling, formwork, etc.:	m	80		R
5.3.7	Kerbs Figure 3(SANS 927) 600 x 100mm strip foundation 150 x 150mm haunching at back and 300 x 100mm channel steel floated smooth, including excavation, backfilling, formwork, etc.:	m	10		R
5.4	**STORMWATER DRAINAGE**				
	Precast concrete channel finished smooth on exposed surfaces including 20mm cement mortar 1:3 bedding, cutting and pointing.				
5.4.1	1000mm Wide V-Drain	m	15		R
5.4.2	600mm Wide Spoon Drain (Cut Off Drain)	m	50		R
5.5	**CHLORINE CONTACT CHAMBER**				
	Excavations in earth exceeding 2m and not exceeding 4m deep				
5.5.1	3000mm Deep over site a rounding existing structures to remove top soil and depositing excavated material in prescribed stock piles on site	m3	217		R
	Extra over bulk excavation in earth for excavation in:				
5.5.2	Intermediate material.	m³	22		R
5.5.3	Hard rock material.	m³	11		R
5.5.4	Boulders	m³	5		R
	Extra over all excavations for loading, carting and dumping surplus excavated material (no allowance made for increase in bulk):				
5.5.5	Surplus material from stock piles on site to a dumping site to be located by the Contractor (Provisional)	m³	315		R
	Layer works				
5.5.6	**Filling in accordance with SANS 1200 DM, to be supplied by Contractor:**				
5.5.7	In situ material, scarified to a depth of 125mm, conditioned and compacted to 93% modified AASHTO density	m3	7		R
	Keeping excavations free of water:				
5.5.8	Keeping excavations free of all water other than subterranean water	Item	1		R

	Prescribed density tests on filling				
5.5.9	In-situ dry density (sand replacement) test in accordance with method A10 (a) of TMH 1	No	5		R
5.5.10	Maximum dry density and optimum moisture content test in accordance with method A7 of TMH 1	No	6		R
5.5.11	Atterberg limits test in accordance with methods A2 to A4 of TMH1	No	9		R
5.5.12	UCS test in accordance with method A14 of TMH1	No	4		R
	SOIL POISONING:				
	Approved brand of anti-termite soil poison applied by a Registered Pest Control company and guaranteed against termite infestation for ten years:				
5.5.13	Under concrete interlocking paving blocks including forming and poisoning shallow furrows against edges, etc., filling in furrows and ramming.	m²	1260		R
	Surface Preparation:				
5.5.14	Trim and level off surface of ground to receive brick paving, including excavating or filling, ripping and scarifying as necessary and compacting the whole area for a depth of 150mm to a density of at least 93% Mod. AASHTO maximum density, to falls to maximum final slope of 1%.	m²	1260		R
	15MPa/19mm concrete				
5.5.3	Surface blinding under contact chamber base	m3	4		R
	30MPa/19mm Reinforced concrete				
5.5.4	Bases	m3	14		R
5.5.5	Walls	m3	22		R
	Test Tubes				
	Allow for all necessary concrete test cubes size 150 x 150 x 150mm cast from batches of concrete required for this Bill as specified, made, stored, cured and tested in accordance with SANS Methods 861 and 863, including use of approved cube Moulds, transporting to an approved testing laboratory for testing, paying all charges and submitting reports to the Eskom				
5.5.6	Making and testing 150 x 150 x 150mm concrete strength test cubes (Provisional)	No.	15		R
	Smooth Formwork to sides				
5.5.7	Walls	m2	347		R
	Reinforcement (Provisional)				
	Mild steel reinforcement to structural concrete work				
5.5.8	Various diameter bars	tonne	3		R
	Sundries				
5.5.9	1500x300mm fixed stainless steel weir plate	No.	1		R
5.5.10	Non-Rising Extended Valve Spindle 2000mm Long Grade 304 Stainless Steel	No.	1		R
5.5.11	Handrails all complete as per specifications	m	120		R
	ASBUILT DRAWINGS,OPERATING MANUALS AND MAINTENANCE SCHEDULE				
5.5.12	The Contractor is referred to provide all As-built drawings, Operating Manuals and Maintenance Schedule	item	1		R
	TESTING AND INSPECTIONS BEFORE DELIVERY				
5.5.13	The Contractor is to make Provision for Testing and Inspections before delivery of the contract.	item	1		R

	CORRECTION OF DEFECTS				
5.5.14	The Contractor is to allow for Correction of Defects.	item	1		R
	TECHNICAL SUPPORT				
5.5.15	The *Contractor* is to provide onsite Technical Support for 3 months inclusive of weekends and holidays post completion of works.	item	1		R
	TOTAL CARRIED TO FINAL SUMMARY				R

FINAL SUMMARY

Camden Power Station Design of New Chlorine Dosing Systems and Plant Safety Upgrade Project - BOQ

FINAL SUMMARY

SECTION	DESCRIPTION	AMOUNT
1	Preliminaries and Generals	R
2	Sewage Plant Chlorination System	R
3	Potable Water Disinfection System	R
4	Civil Works	R
	SUB TOTAL	R
	VAT @15%	R
TOTAL BID PRICE INCL. VAT - TRANFERRED TO FORM OF OFFER AND ACCEPTANCE		R