

REPUBLIC OF KENYA

MINISTRY OF TRANSPORT, INFRASTRUCTURE, PUBLIC WORKS,  
HOUSING AND URBAN DEVELOPMENT  
STATE DEPARTMENT FOR PUBLIC WORKS

MECHANICAL PLUMBING WORKS FOR THE PROPOSED  
COMPLETION OF CONSTRUCTION WORKS OF TUITION  
BLOCK AT MOIBEN SCIENCE TEACHERS TRAINING  
COLLEGE, MOIBEN.

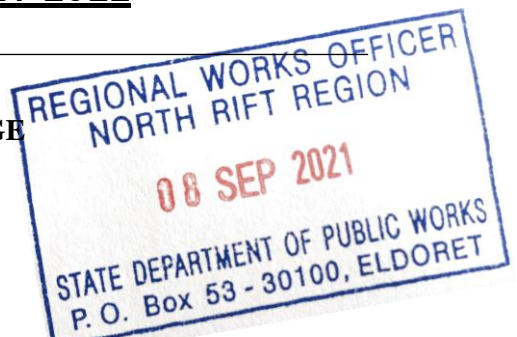
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TENDER DOCUMENTS

Tender NO. MSTTC/TTTC/008/2021-2022

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CLIENT  
TAMBACH TEACHERS COLLEGE  
P.O. BOX PRIVATE BAG  
TAMBACH, ITEN



**PREPARED BY:**

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**AUGUST, 2021**

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**INVITATION TO TENDER**

TO: .....

P.O. Box .....

**TENDER FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF WATER RETICULATION, PLUMBING, DRAINAGE, SANITARY FITTINGS AND FIRE APPLIANCES, TO PROPOSED COMPLETION OF CONSTRUCTION WORKS OF TUITION BLOCK AT MOIBEN SCIENCE TEACHERS TRAINING COLLEGE, MOIBEN.**

**TENDER No: MSTTC/TTTC/008/2021-2022**

**TAMBACH TEACHERS COLLEGE** intends to complete the construction of Moiben Science Teachers Training College Tuition block in Moiben.

Prospective contractors are invited to tender for the above works. Tenderers should be registered with **National Construction Authority** in **Category "NCA 4 "** and above for the above said specialized works.

Tender documents are obtainable during normal working hours from the Accounts Office at Tambach Teachers Training College , upon payment of a non-refundable fee of **Kshs.1000.00**, in cash or bankers cheque in favour of TAMBACH TEACHERS TRAINING COLLEGE, P.O. box PRIVATE BAG,TAMBACH

Instructions to tenderer, conditions of contract, technical specifications and all requirements are clearly indicated in the tender document.

Completed tender documents in plain sealed envelopes clearly marked "TENDER FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF WATER RETICULATION, PLUMBING, DRAINAGE, SANITARY FITTINGS AND FIRE APPLIANCES, TO PROPOSED COMPLETION OF CONSTRUCTION WORKS OF TUITION BLOCK AT MOIBEN SCIENCE TEACHERS TRAINING COLLEGE, MOIBEN, **TENDER No: MSTTC/TTTC/008/2021-2022** should be deposited into the tender box **at Tambach Teachers College.**

To reach him on or before **(AS PER ADVERT).**

Opening of tender documents will take place soon thereafter in the presence of bidders or their representatives who choose to attend.

**FORM OF TENDER**

**To:**.....

P.O. Box .....

TENDER FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF WATER  
RETICULATION, PLUMBING, DRAINAGE, SANITARY FITTINGS AND FIRE APPLIANCES, TO  
PROPOSED COMPLETION OF CONSTRUCTION WORKS OF TUITION BLOCK AT MOIBEN SCIENCE  
TEACHERS TRAINING COLLEGE, MOIBEN.

1. In accordance with the Instructions to Tenderers, Conditions of Contract, Specifications and Bills of Quantities for the execution of the above named Works, we, the undersigned offer to construct, install and complete such Works and remedy any defects therein for the sum of:

Kshs..... **[Amount in figures]** Kenya shillings

.....**[Amount in words]**

2. We undertake, if our tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Employer's Representative's notice to commence, and to complete the whole of the Works comprised in the Contract within the time stated in the Appendix to Conditions of Contract.
3. We agree to abide by this tender **for a period of 150 days from the date of tender opening**, and shall remain binding upon us and may be accepted at any time before the expiry of that period.
4. Unless and until a formal Agreement is prepared and executed this tender together with your written acceptance thereof, **shall constitute a binding Contract** between us.
5. We understand that you are not bound to accept the lowest or any tender you may receive.

Dated this ..... day of .....20.....

Signature .....in the capacity of .....

Duly authorized to sign tenders for and on behalf of:

..... **[Name of Tenderer]**

of..... **[Address of Tenderer]**

P.I.N. No. ....

V.A.T. CERTIFICATE No. ....

**Witness:** Name .....

Address .....

Signature .....

**FORM OF TENDER SECURITY**

WHEREAS ..... (hereinafter called "the Tenderer")  
has submitted his tender dated ..... for the construction of  
.....  
.....(name of Contract)

KNOW ALL PEOPLE by these presents that  
WE ..... having our registered office at  
.....(hereinafter called "the Bank"), are bound unto  
..... (hereinafter called "the Employer" in the  
sum of Ksh. .... (being 2 % of tender sum) for which  
payment well and truly to be made to the said Employer, the Bank binds itself, its successors and  
assigns by these presents sealed with the Common Seal of the said Bank this  
.....Day of ..... 20.....

THE CONDITIONS of this obligation are:

1. If after tender opening the tenderer withdraws his tender during the period of tender, validity specified in the instructions to Tenderers  
Or
2. If the tenderer, having been notified of the acceptance of this tender by the Employer during the period of tender validity:
  - a) fails or refuses to execute the form of Agreement in accordance with the Instructions to Tenderers, if required; or
  - b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Tenderers;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including thirty (30) days after the period of tender validity, and any demand in respect thereof should reach the Bank not later than the said date.

\_\_\_\_\_  
[date]

\_\_\_\_\_  
[signature of the Bank]

\_\_\_\_\_  
[witness]

\_\_\_\_\_  
[seal]

**PERFORMANCE BOND ( BANK GUARANTEE)**

**To:**.....  
**P.O. Box** .....,

Dear Sir,

WHEREAS..... (hereinafter called "the Contractor") has undertaken, in pursuance of Contract No. .... dated ..... to execute ..... (hereinafter called "the Works");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee:

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of:

Ksh. ....(Amount of Guarantee in figures)

Kenya Shillings .....

.....(amount of Guarantee in words),

and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of Kenya Shillings .....

..... (amount of Guarantee in words) as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change, addition or other modification of the terms of the Contract or of the Works to be performed thereunder or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this Guarantee, and we hereby waive notice of any change, addition, or modification.

This guarantee shall be valid until the date of issue of the Certificate of Completion.

SIGNATURE AND SEAL OF THE GUARANTOR .....

Name of Bank .....

Address .....

Date .....

TENDER QUESTIONNAIRE

Please fill in block letters.

1. Full names of Tenderer:  
.....
  
2. Full address of Tenderer to which tender correspondence is to be sent (unless an agent has been appointed below):  
.....
  
3. Telephone number (s) of Tenderer:  
.....
  
4. Telex/Fax Address of Tenderer:  
.....
  
5. Name of Tenderers representative to be contacted on matters of the tender during the tender period:  
.....
  
6. Details of Tenderers nominated agent (if any) to receive tender notices. This is essential if the Tenderer does not have his registered address in Kenya (name, address, telephone, telex):  
.....  
.....

\_\_\_\_\_  
Signature of Tenderer

Make copy and deliver to: The Regional Works Officer,  
Ministry of Transport, Infrastructure, Housing,  
Urban Development & Public Works  
(State Department for Public Works),  
P.O. Box 53,  
**ELDORET**

**CONFIDENTIAL BUSINESS QUESTIONNAIRE**

You are requested to give the particulars indicated in Part 1 and either Part 2 (a), 2 (b) or 2(c) and (2d) whichever applies to your type of business.

You are advised that it is a serious offence to give false information on this Form.

**Part 1 – General**

Business Name .....

Location of business premises:      Country/Town.....

Plot No..... Street/Road .....

Postal Address..... Tel No.....

Nature of Business.....

Current Trade License No..... Expiring date.....

Maximum value of business which you can handle at any time:  
Kenya Shillings.....

Name of your bankers.....

Branch.....

**Part 2 (a) – Sole Proprietor**

Your name in full..... Age.....

Nationality..... Country of Origin.....

Citizenship details .....

**Part 2 (b) – Partnership**

Give details of partners as follows:

	Name in full	Nationality	Citizenship Details	Shares
1.	.....	.....	.....	
2.	.....	.....	.....	
3.	.....	.....	.....	
4.	.....	.....	.....	



### Part 2(c) – Registered Company

Private or Public .....

State the nominal and issued capita of the company:

Nominal Kshs. ....

Issued Kshs. ....

Give details of all directors as follows:

	Name in full	Nationality	Citizenship Details*	Shares
1.	.....	.....	.....	.....
2.	.....	.....	.....	.....
3.	.....	.....	.....	.....
4.	.....	.....	.....	.....

### Part 2(d) Interest in the Firm:

Is there any person/persons in the employment of the Government of Kenya WHO has interest in this firm? Yes/No..... (Delete as necessary)

I certify that the above information is correct.

.....  
Title

.....  
Signature

.....  
Date

\* Attach proof of citizenship

## **SPECIAL NOTES**

1. These notes shall form part of the specifications and conditions.
2. The tenderer is required to check the number of the pages of this specification and should he find any missing, or in duplicate, or indistinct, he should inform, in writing, the Regional Mechanical Engineer (BS), Ministry of Transport, Infrastructure, Housing & Urban development – State Department for Public Works, North Rift Region.
3. Should the tenderer be in doubt about the precise meaning of any item or figure, for any reason whatsoever he must inform, in writing, the Regional Mechanical Engineer (BS), Ministry of Transport, Infrastructure, Housing & Urban development – State Department for Public Works, North Rift Region, in order that the correct meaning may be decided before the date of submission of the tender.
4. No liability will be admitted nor claim allowed, in respect of errors in the tender due to mistakes in the specification, which should have been rectified in the manner, described above.
5. All tenders must make a declaration that, they have not and will not make any payment to any person which will be perceived as an inducement to enable them win this tender.
6. Heavy rain falls during certain periods of the year and the tenderer shall be deemed to have taken account of this fact both in his pricing and his planning of the execution of the works.
7. An advance payment may not be granted to the winning tenderer by the employer except by special consideration by the project manager and against the production of an equivalent bank guarantee.
8. The successful tenderer is notified that these works are urgent and **MUST** be completed within the **specified contract period**. The tenderer shall allow in his rates, for any costs he deems he may incur by having to complete the works within the stipulated contract period. No liability will be admitted nor claim allowed for non-adherence to the aforementioned.

## CONDITIONS OF CONTRACT (MAIN WORKS)

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## CONDITIONS OF CONTRACT (MAIN WORKS)

### 1. Definitions

1.1 In this Contract, except where context otherwise requires, the following terms shall be interpreted as indicated;

**“Bills of Quantities”** means the priced and completed Bill of Quantities forming part of the tender [where applicable].

**“Schedule of Rates”** means the priced Schedule of Rates forming part of the tender [where applicable].

**“The Completion Date”** means the date of completion of the Works as certified by the Employer’s Representative.

**“The Contract”** means the agreement entered into by the Employer and the Contractor as recorded in the Agreement Form and signed by the parties.

**“The Contractor”** refers to the person or corporate body whose tender to carry out the Works has been accepted by the Employer.

**“The Contractor’s Tender”** is the completed tendering document submitted by the Contractor to the Employer.

**“The Contract Price”** is the price stated in the Letter of Acceptance.

**“Days”** are calendar days; **“Months”** are calendar months.

**“A Defect”** is any part of the Works not completed in accordance with the Contract.

**“The Defects Liability Certificate”** is the certificate issued by Employer’s Representative upon correction of defects by the Contractor.

**“The Defects Liability Period”** is the period named in the Appendix to Conditions of Contract and calculated from the Completion Date.

**“Drawings”** include calculations and other information provided or approved by the Employer’s Representative for the execution of the Contract.

**“Employer”** includes Central or Local Government administration, Universities, Public Institutions and Corporations and is the party who employs the Contractor to carry out the Works.

**“Equipment”** is the Contractor’s machinery and vehicles brought temporarily to the Site for the execution of the Works.

**“Site”** means the place or places where the permanent Works are to be carried out including workshops where the same is being prepared.

**“Materials”** are all supplies, including consumables, used by the Contractor for incorporation in the Works.

**“Employer’s Representative”** is the person appointed by the Employer and notified to the Contractor for the purpose of supervision of the Works.

**“Specification”** means the Specification of the Works included in the Contract.

**“Start Date”** is the date when the Contractor shall commence execution of the Works.

**“A Sub-contractor”** is a person or corporate body who has a Contract with the Contractor to carry out a part of the Work in the Contract, which includes Work on the Site.

**“Temporary works”** are works designed, constructed, installed, and removed by the Contractor which are needed for construction or installation of the Works.

**“A Variation”** is an instruction given by the Employer’s Representative which varies the Works.

**“The Works”** are what the Contract requires the Contractor to construct, install, and turnover to the Employer.

## **2. Contract Documents**

2.1 The following documents shall constitute the Contract documents and shall be interpreted in the following order of priority;

- (1) Agreement,
- (2) Letter of Acceptance,
- (3) Contractor's Tender,
- (4) Conditions of Contract,
- (5) Specifications,
- (6) Drawings,
- (7) Bills of Quantities or Schedule of Rates [whichever is applicable]

## **3. Employer's Representative's Decisions**

3.1 Except where otherwise specifically stated, the Employer's Representative will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

## **4. Works, Language and Law of Contract**

4.1 The Contractor shall construct and install the Works in accordance with the Contract documents. The Works may commence on the Start Date and shall be carried out in accordance with the Programme submitted by the Contractor, as updated with the approval of the Employer's Representative, and complete them by the Intended Completion Date.

4.2 The ruling language of the Contract shall be English language and the law governing the Contract shall be the law of the Republic of Kenya.

## **5. Safety, Temporary works and Discoveries**

- 5.1 The Contractor shall be responsible for design of temporary works and shall obtain approval of third parties to the design of the temporary works where required.
- 5.2 The Contractor shall be responsible for the safety of all activities on the Site.
- 5.3 Anything of historical or other interest or significant value unexpectedly discovered on the Site shall be the property of the Employer. The Contractor shall notify the Employer's Representative of such discoveries and carry out the Employer's Representative's instructions for dealing with them.

## **6. Work Programme and Sub-contracting**

- 6.1 Within seven days after Site possession date, the Contractor shall submit to the Employer's Representative for approval a programme showing the general methods, arrangements, order and timing for all the activities in the Works.
- 6.2 The Contractor may sub-contract the Works (but only to a maximum of 25 percent of the Contract Price) with the approval of the Employer's Representative. However, he shall not assign the Contract without the approval of the Employer in writing. Sub-contracting shall not alter the Contractor's obligations.



## **7. The site**

- 7.1 The Employer shall give possession of all parts of the Site to the Contractor.
- 7.2 The Contractor shall allow the Employer's Representative and any other person authorized by the Employer's Representative, access to the Site and to any place where work in connection with the Contract is being carried out or is intended to be carried out.

## **8. Instructions**

- 8.1 The Contractor shall carry out all instructions of the Employer's Representative, which are in accordance with the Contract.

## **9. Extension of Completion Date**

- 9.1 The Employer's Representative shall extend the Completion Date if an occurrence arises which makes it impossible for completion to be achieved by the Intended Completion Date. The Employer's Representative shall decide whether and by how much to extend the Completion Date.
- 9.2 For the purposes of this Clause, the following occurrences shall be valid for consideration;

Delay by:-

- (a) force majeure, or
- (b) reason of any exceptionally adverse weather conditions, or
- (c) reason of civil commotion, strike or lockout affecting any of the trades employed upon the Works or any of the trades engaged in the preparation, manufacture or transportation of any of the goods or materials required for the Works, or

- (d) reason of the Employer's Representative's instructions issued under these Conditions, or
- (e) reason of the contractor not having received in due time necessary instructions, drawings, details or levels from the Employer's Representative for which he specifically applied in writing on a date which having regard to the date for Completion stated in the appendix to these Conditions or to any extension of time then fixed under this Clause was neither unreasonably distant from nor unreasonably close to the date on which it was necessary for him to receive the same, or
- (f) delay on the part of artists, tradesmen or others engaged by the Employer in executing work not forming part of this Contract, or
- (g) reason of delay by statutory or other services providers or similar bodies engaged directly by the Employer, or
- (h) reason of opening up for inspection of any Work covered up or of the testing or any of the Work, materials or goods in accordance with these conditions unless the inspection or test showed that the Work, materials or goods were not in accordance with this Contract, or
- (i) reason of delay in appointing a replacement Employer's Representative, or
- (j) reason of delay caused by the late supply of goods or materials or in executing Work for which the Employer or his agents are contractually obliged to supply or to execute as the case may be, or
- (k) delay in receiving possession of or access to the Site.

## **10. Management Meetings**

- 10.1 A Contract management meeting shall be held regularly and attended by the Employer's Representative and the Contractor. Its business shall be to review the plans for the remaining Work. The Employer's Representative shall record the business of management meetings and provide copies of the record to those attending the meeting and the Employer. The responsibility of the parties for actions to be taken shall be decided by the Employer's Representative either at the management meeting or after the management meeting and stated in writing to all who attend the meeting.
- 10.2 Communication between parties shall be effective only when in writing.

## **11. Defects**

- 11.1 The Employer's Representative shall inspect the Contractor's work and notify the Contractor of any defects that are found. Such inspection shall not affect the Contractor's responsibilities. The Employer's Representative may instruct the Contractor to search for a defect and to uncover and test any Work that the Employer's Representative considers may have a defect. Should the defect be found, the cost of uncovering and making good shall be borne by the Contractor. However, if there is no defect found, the cost of uncovering and making good shall be treated as a variation and added to the Contract Price.
- 11.2 The Employer's Representative shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which begins at Completion, and is defined in the Appendix to Conditions of Contract.

- 11.3 Every time notice of a defect is given, the Contractor shall correct the notified defect within the length of time specified by the Employer's Representative's notice. If the Contractor has not corrected a defect within the time specified in the Employer's Representative's notice, the Employer's Representative will assess the cost of having the defect corrected by other parties and such cost shall be treated as a variation and be deducted from the Contract Price.

## **12. Bills of Quantities/Schedule of Rates**

- 12.1 The Bills of Quantities/Schedule of Rates shall contain items for the construction, installation, testing and commissioning of the Work to be done by the Contractor. The Contractor will be paid for the quantity of the Work done at the rates in the Bills of Quantities/Schedule of Rates for each item. Items against which no rate is entered by the Tenderer will not be paid for when executed and shall be deemed covered by the rates for other items in the Bills of Quantities/Schedule of Rates.
- 12.2 Where Bills of Quantities do not form part of the Contract, the Contract Price shall be a lump sum (which shall be deemed to have been based on the rates in the Schedule of Rates forming part of the tender) and shall be subject to re-measurement after each stage.

## **13. Variations**

- 13.1 The Contractor shall provide the Employer's Representative with a quotation for carrying out the variations when requested to do so. The Employer's Representative shall assess the quotation and shall obtain the necessary authority from the Employer before the variation is ordered.

- 13.2 the Work in the variation corresponds with an item description in the Bill of Quantities/Schedule of Rates, the rate in the Bill of Quantities/Schedule of Rates shall be used to calculate the value of the variation. If the nature of the Work in the variation does not correspond with items in the Bill of Quantities/Schedule of Rates, the quotation by the Contractor shall be in the form of new rates for the relevant items of Work.
- 13.3 If the Contractor's quotation is unreasonable, the Employer's Representative may order the variation and make a change to the Contract Price, which shall be based on the Employer's Representative's own forecast of the effects of the variation on the Contractor's costs.

#### **14. Payment Certificates and Final Account**

- 14.1 The Contractor shall be paid after each of the following stages of Work listed here below (subject to re-measurement by the Employer's Representative of the Work done in each stage before payment is made). In case of lump-sum Contracts, the valuation for each stage shall be based on the quantities so obtained in the re-measurement and the rates in the Schedule of Rates.
- (i) Advance payment **NIL** (*percent of Contract Price,*  
[after Contract execution] *to be inserted by the Employer*).
  - (ii) First stage (*define stage*) **AS PER PROGRESS**
  - (iii) Second stage (*define stage*) **AS PER PROGRESS**
  - (iv) Third stage (*define stage*) **AS PER PROGRESS**
  - (v) After defects liability period.

- 14.2 Upon deciding that Works included in a particular stage are complete, the Contractor shall submit to the Employer's Representative his application for payment. The Employer's Representative shall check, adjust if necessary and certify the amount to be paid to the Contractor within 21 days of receipt of the Contractor's application. The Employer shall pay the Contractor the amounts so certified within 30 days of the date of issue of each Interim Certificate.
- 14.3 The Contractor shall supply the Employer's Representative with a detailed final account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Employer's Representative shall issue a Defect Liability Certificate and certify any final payment that is due to the Contractor within 30 days of receiving the Contractor's account if it is correct and complete. If it is not, the Employer's Representative shall issue within 21 days a schedule that states the scope of the corrections or additions that are necessary. If the final account is still unsatisfactory after it has been resubmitted, the Employer's Representative shall decide on the amount payable to the Contractor and issue a Final Payment Certificate. The Employer shall pay the Contractor the amount so certified within 60 days of the issue of the Final Payment Certificate.
- 14.4 If the period laid down for payment to the Contractor upon each of the Employer's Representative's Certificate by the Employer has been exceeded, the Contractor shall be entitled to claim simple interest calculated pro-rata on the basis of the number of days delayed at the Central Bank of Kenya's average base lending rate prevailing on the first day the payment becomes overdue. The Contractor will be required to notify the Employer within 15 days of receipt of delayed payments of his intentions to claim interest..

**15. Insurance**

- 15.1 The Contractor shall be responsible for and shall take out appropriate cover against, among other risks, personal injury; loss of or damage to the Works, materials and plant; and loss of or damage to property.

**16. Liquidated Damages**

- 16.1 The Contractor shall pay liquidated damages to the Employer at the rate 0.001 per cent of the Contract price per day for each day that the actual Completion Date is later than the Intended Completion Date except in the case of any of the occurrences listed under Clause 9.2. The Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's liabilities.

**17. Completion and Taking Over**

- 17.1 Upon deciding that the Work is complete the Contractor shall request the Employer's Representative to issue a Certificate of Completion of the Works, upon deciding that the Work is completed.

The Employer shall take over the Site and the Works within seven days of the Employer's Representative issuing a Certificate of Completion.

**18. Termination**

- 18.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract. These fundamental breaches of Contract shall include, but shall not be limited to, the following;
- (a) the Contractor stops Work for 30 days continuously without reasonable cause or authority from the Employer's Representative;

- (b) the Contractor is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation;
  - (c) a payment certified by the Employer's Representative is not paid by the Employer to the Contractor within 30 days after the expiry of the payment periods stated in Sub-Clauses 14.2 and 14.3 here above.
  - (d) the Employer's Representative gives notice that failure to correct a particular defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time.
- 18.2 If the Contract is terminated, the Contractor shall stop Work immediately, and leave the Site as soon as reasonably possible. The Employer's Representative shall immediately thereafter arrange for a meeting for the purpose of taking record of the Works executed and materials, goods, equipment and temporary buildings on Site.

## **19. Payment Upon Termination**

- 19.1 The Employer may employ and pay other persons to carry out and complete the Works and to rectify any defects and may enter upon the Works and use all materials on Site, plant, equipment and temporary works.
- 19.2 The Contractor shall, during the execution or after the completion of the Works under this Clause, remove from the Site as and when required within such reasonable time as the Employer's Representative may in writing specify, any temporary buildings, plant, machinery, appliances, goods or materials belonging to him, and in default thereof, the Employer may (without being responsible for any loss or damage) remove and sell any such property of the Contractor, holding the proceeds less all costs incurred to the credit of the Contractor.



19.3 Until after completion of the Works under this Clause, the Employer shall not be bound by any other provision of this Contract to make any payment to the Contractor, but upon such completion as aforesaid and the verification within a reasonable time of the accounts therefor the Employer's Representative shall certify the amount of expenses properly incurred by the Employer and, if such amount added to the money paid to the Contractor before such determination exceeds the total amount which would have been payable on due completion in accordance with this Contract, the difference shall be a debt payable to the Employer by the Contractor; and if the said amount added to the said money be less than the said total amount, the difference shall be a debt payable by the Employer to the Contractor.

## **20. Corrupt Gifts and Payments of Commission**

20.1 The Contractor shall not:

- (a) Offer or give or agree to give to any person in the service of the Employer any gifts or consideration of any kind as an inducement or reward for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of this or any other contract with the Employer or for showing or forbearing to show favour or disfavour to any person in relation to this or any other contract with the Employer.
- (b) Any breach of this Condition by the Contractor or by anyone employed by him or acting on his behalf (whether with or without the knowledge of the Contractor) shall be an offence under the Laws of Kenya.

## **21. Settlement of Disputes**

21.1 Any dispute arising out of the Contract, which cannot be amicably settled, between the parties shall be referred by either party to the arbitration and final decision of a person to be agreed between the parties. Failing agreement to concur in the appointment of an Arbitrator, the Arbitrator shall be appointed by the chairman of the Chartered Institute of Arbitrators, Kenya branch, on the request of the applying party.

**APPENDIX TO CONDITIONS OF CONTRACT**

THE EMPLOYER IS

Name: **TAMBACH TEACHERS COLLEGE,**

**Represented By:**

**The Chief Principal Tambach Teachers College.**

Address: **P.O. Box Private Bag, Tambach, Iten.**

Name of Employer's Representative: **Regional Works Officer,**

**P.O. Box 53-30100, Eldoret.**

The name (and identification number) of the Contract is TENDER FOR SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF WATER RETICULATION, PLUMBING, DRAINAGE, SANITARY FITTINGS AND FIRE APPLIANCES, TO PROPOSED COMPLETION OF CONSTRUCTION WORKS OF TUITION BLOCK AT MOIBEN SCIENCE TEACHERS TRAINING COLLEGE, MOIBEN.

**Tender No. MSTTC/TTTC/008/2021-2022**

The Works consist of SUPPLY, INSTALLATION, TESTING AND COMMISSIONING OF WATER RETICULATION, PLUMBING, DRAINAGE, SANITARY FITTINGS AND FIRE APPLIANCES, TO PROPOSED COMPLETION OF CONSTRUCTION WORKS OF TUITION BLOCK AT MOIBEN SCIENCE TEACHERS TRAINING COLLEGE, MOIBEN.

The Start Date shall be **as stated in the Letter of Acceptance**

The Intended Completion Date for the whole of the Works shall be as stated in the letter of acceptance.

The following documents also form part of the Contract:

**(Only as listed in Clause 2)**

The Site Possession Date shall be as stated in the letter of acceptance.

The Sites is at the Moiben Science Teachers Training College, Moiben.

The Defects Liability Period is **6 Months**

Amount of Tender Security is letter figure

The name and Address of the Employer's representative for the purposes of submission of tenders is, The Chief Principal Tambach teachers training college, P.O. Box ...PRIVATE BAG TAMBACH, Iten.....,

The tender opening date and time is **as stated in the advertisement.**

The amount of performance security is **Kshs. 300,000.00** bank guarantee of the Contract Price.

Period of final measurement : **3 months from practical completion**

Liquidated and Ascertained damages: **At the rate of Ksh. 10,000 per week or part thereof**

Prime cost sums for which the: **Nil**  
Contractor desires to tender

Period of honouring certificate: **30 days**

Percentage of certified value retained: **10%**

Limit of retention fund: **10%**

## **INSTRUCTION TO TENDERERS**

### **1. General**

- 1.1 The employers as defined in the Appendix to conditions of contract invite Tender for works contract as described in the tender document. The successful tender will be expected to complete the works by the intended completion Date as specified in the said appendix.
- 1.2 Tender shall include the following information and documents with their tenders, unless otherwise stated;
- (a) Copies of certificates of registration and principal place of business;
  - (b) Total monetary value of construction works performed for each of the last five years;
  - (c) Experience in works of a similar nature and size for each of the last years, and clients who may be contacted for the further information on these contracts;
  - (d) Major items of construction equipment owned;
  - (e) Qualifications and experience of key site management and technical personnel proposed for the contract;
  - (f) Report on the financial standing of the tender, such as profit and loss statement and auditor's report for the last five years;
  - (g) Authority to seek reference from the tender's banker's bankers.
- 1.3 The tender, at the Tender's own responsibility and risk, is encouraged to visit and examine the site of the Works and its surroundings, and obtain all information that may be necessary for preparing the tender and entering into a contract for contraction of the Works. The cost of visiting the site shall be at the Tenderer's own expense.

## **2. Tender Documents**

- 2.1 The complete set of tender documents comprises the documents listed here below and any addenda issued in accordance with clause 2.4 here below: -  
These instructions to Tenderers  
Form of Tender  
Condition of Contract and Appendix to condition of Contract  
Specifications  
Drawings  
Bills of quantities/Schedule of rates (whichever is applicable)  
Other materials required be filling and submitting in accordance with these instructions and conditions.
- 2.2 The Tenderer shall examine all instructions, forms and specifications in the tender documents. Failure to furnish all information required by the tender documents may result in rejection of his tender.
- 2.3 A prospective Tenderer requiring any clarification of the tendering documents may notify the Employer in writing or by cable, telex or facsimile at the address indicated in the letter of invitation to tender. The employer will respond to any request for clarification received earlier than seven (7) days prior to the deadline for submission of tenders. Copies of the employer's response will be forwarded to all persons issued with tendering documents' including a description of the inquiry, but without identifying its source.
- 2.4 Before the deadline for submission of tenders, the Employer may modify the tendering documents issuing addenda. Any addendum thus issues shall be part of the tendering documents and shall be communicated in writing or by cable, telex or facsimile to all Tenderers. Prospective Tenderers shall acknowledge receipt of each addendum in writing to the employer.
- 2.5 To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend, as necessary, the deadline for submission of tenders in accordance with clause 4.2 here below.

### **3. Preparation of Tenders**

- 3.1 All documents relating to the tender and any corresponding shall be in English Language.
- 3.2 The tender submitted by the tenderer shall comprise the following: -
  - (a) The Tender
  - (b) Tender Security;
  - (c) Price Bill of Quantities/Schedule of Rates for Lump-Sum Contracts.
  
  - (d) Any Other materials required to be completed and submitted by Tenderers.
- 3.3 The Tenderer shall fill in rates and prices for all items of the Works description in the Bills of Quantities/Schedule of Rates. Items for which no rate or Prices is entered by the Tenderer will not be paid for when executed and shall be deemed covered by the other rates and prices in the bill of Quantities/ Schedule of Rates. All duties, taxes and other levies payable by the contractor under the contract, as of 30 days prior to the deadline for submission of Tenders, shall be included in the Tender price submitted by the tenderer.
- 3.4 The rates and prices quoted by the tender shall not be subject to any adjustment during the performance of the Contract.
- 3.5 The unit rates and prices shall be in Kenya Shillings
- 3.6 Tenders shall remain valid for a period of 90 days from the date of submission. However in exceptional circumstances, the Employer may request that the Tender extend the period of validity for a specific additional period. The request and the Tender's responses shall be written.

- 3.7 The Tender shall be prepared one original of the documents comprising the tender documents as described in these Instructions to Tenderers.
- 3.8 The original shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign on behalf of the Tenderer. All pages of the tender where alterations or additions have been made shall be initialed by the person or persons signed the tender.

#### **4. Submission of Tenders**

- 4.1 The tender duly filled and sealed in an envelope shall:-
- (a) be addressed to the Employer at the address provided in the invitation to tender;
  - (b) Bear the name and identification number of the Contractor as defined in the invitation to tender;
  - (c) Provide a warning not to open before the specified time and date for the tender opening.
- 4.2 The tender shall be delivered to the Employer at the address specified above not later than the time and Date specified in the invitation to tender.
- 4.3 The tenderer shall not submit any alternative offer unless they are specified required in the Tender documents

Only one Tender will be submitted by each Tenderer, any tenderer who fails to comply with this requirement will be disqualified.

- 4.4 Any tender received after the deadline for opening tenders will be returned to the tender un-opened.
- 4.5 The employer may extend the deadline for submission of Tenders by issuing an amendment in accordance with sub-clause 2.5 in which case all rights and obligations of Employer and the Tenderers previously subject to the original deadline will then be subjected to the new deadline.

**5. Tender Opening and Evaluation.**

- 5.1 The tender will be opened in the presence of the Tenderers' representatives who choose to attend at the time and in the place specified in the invitation to tender.
- 5.2 The Employer as may be considered appropriate will announce the Tenders' names, the total amount of each tender and such other details at the opening. Minutes of the Tender opening, including the information disclose to those presented will also be prepared by the Employer.
- 5.3 Information relating to the examination, evaluation and comparison of tender recommendation for the award of the Contract shall not be disclosed to Tender or any other persons not officially concerned with such process until award to the successful Tender has been announced. Any effort by a Tender to influence the Employer's officials, processing of tender or award decision may result in the rejection of his tender.
- 5.4 Tender determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows:
  - (a) Where there is a discrepancy between the amount in figures and the amount in words, the amount in words will prevail; and
  - (b) Where there is a discrepancy between the unit rate and the line item total results from multiplying the unit rate by the quantity, the unit rate quoted will prevail, unless in the opinion of the employer's representative, there is an obvious typographical error, in which case the adjustment will be made to the entry containing that error.
  - (c) In the event of a discrepancy between the tender amount as stated in the Form Of Tender and The contracted tender figure in the main summary of the bill of Quantities/Quotation, the amount as stated in the Form of Tender shall prevail.



- (d) The error correction Factor shall be computed by expressing the difference between the Tender amount and the corrected tender sum as a percentage of the Corrected Builder's Work (i.e. corrected tender sum less P.C and Provisional Sums).
- (e) The Error correction Factor shall be applied to all Builder's Work ( as a rebate or addition as the case may be) for the purpose of valuation for Interim Corticated and Valuation of variations.
- (f) The amount stated in the tender will be adjusted in accordance with the above procedure for the correction of errors and with concurrence of the Tenderer, shall be considered as binding upon the Tender. If the Tender does not accept the corrected amount, the tender may rejected and the Tender Security forfeited.

- 5.5 To assist in the examination, and comparison of Tender, the Employer at his discretion, may request [in writing] any Tenderer for clarification of the tender, including breakdowns of unit rates, the request for clarification and the response shall be in writing or by cable, telex or facsimile but no change in the tender price or substance of the tender shall be sought, offered or permitted.
- 5.6 The Tenderer shall not influence the Employer on any matter relating to his tender from the time of the tender opening to the time the Contract is awarded. Any effort by the Tenderer to influence the Employer or his Employees in his decision on tender evaluation, tender comparison or Contract award may result in the rejection of the tender.

## **6 Award of Contract**

- 6.1 The award of the Contract will be made to the Tenderer who has offered the lowest evaluated tender price.
- 6.2 Notwithstanding the provisions of clause 6.1 above, the Employer reserves the right to accept or reject any tender and to cancel the tendering process and reject all tenders at any time prior to the award of Contract without thereby incurring any liability to the affected Tenderer or Tenderers of any obligation to inform the affected Tenderer or Tenderers of the grounds for the action.

- 6.3 The Tenderer whose tender has been accepted will be notified of the award prior to expiration of the tender validity period in writing or by cable, telex or facsimile. This notification (hereinafter and in all Contract documents called the “Letter of Acceptance”) will state the sum [hereinafter and in all contract documents called the ‘ Contract Price’ which the Employer will pay the Contractor in consideration of the execution completion and maintenance of the notification of award will constitute the information of the Contract subject to the tenderer furnishing the performance Security and Signing the Contract Agreement.
- 6.4 The Contract Agreement will incorporate all agreement between the Employer and the successful tenderer. It will be signed by the Employer and sent to the successful tenderer, within 30 days following the notification of award. Within 21 days of receipt, the successful Tender will sign the Agreement and return it to the Employer.
- 6.5 Within 21 days after receipt of the Letter of Acceptance, the successful Tender shall deliver to the Employer a performance Security amount Stipulated in the Appendix to Condition of Contract.

## **PART A**

### **SUB-CONTRACT PRELIMINARIES**

#### **A. CONTRACT**

The successful tender will be appointed as a Nominated sub-contractor to the main Contractor under the Ministry of public works conditions of contract. He will be required to enter into a sub- contract with the main contractor indemnifying him against the same liabilities in respect of the sub-contract works as those for which the main contractor is liable to indemnify the Government under the contract.

The sub-contract agreement shall be the latest edition of agreement and schedule of conditions of building sub-contract published by the Kenya Association of Building and Civil Engineering Contractors.

The particular and general preliminaries or the Bill of Quantities for the main Contract where appropriate shall apply equally to the sub-contract who is to examine these section of the Bill and allow for all costs incurred.

Copies of the contract agreement conditions of contract, Bills of Quantities for the main contract can be seen at the office of the Ministry of, Public Works.

#### **BOND**

All Tenderers will submit the name of an approved surety who will be willing to be bound to the main contractor in an amount equal to 5% of the sub-contract amount as clause 31 of the main contract.

#### **PAYMENTS**

Payment will be made through certification to the main contractor, unless he specifically agrees to forgo this right in which case direct payment can be made to the sub-contractor. All payments will be less retention as specified in the main contract. No payment will become due until materials are delivered to the site.

**D. FIRM PRICES CONTRACT**

Unless otherwise specifically stated in the preliminaries, this is affirm price contract and the sub-contractor must allow in this tender for any increase in the cost of labour and/or materials during the currency of the sub-contract. No claim for increased costs will be entertained excepting only duties defined in condition No.30 of the conditions of contract. No claim will be for currency fluctuations.

**E. TRADE NAMES**

Where trade names or manufacture's catalogue numbers are nominated in the specification, the reference is intended as a guide to the type of articles or quality of material required. Alternate Brands of equal and approved quality will be acceptable.

**F. WATER AND ELECTRICITY FOR THE WORKS.**

The main contractor will make these available. The subcontractor shall be liable for the cost of any water or electricity current used for any installation provided especially for his or her own use by the main contractor.

**G. STORAGE**

The main contractor will provide space for storage on the site, but the sub-contractor will be responsible for provision of any lock-up sheds or stores required.

## **SAMPLES**

The sub-contractor shall finish at their own cost any samples materials or Workmanship that may be called for by the project manager. For his approval, and further samples in case of rejection until such samples are approved by the project manager. And the project manager. May reject any materials or workmanship in his opinion up to approved Standard.

### **H. PROTECTION**

The sub-Contract shall adequately cover and protect his own work to prevent injury and also to cover from damage all parts of the building premises where work is being performed by him under the contract.

### **I. HANDING OVER**

The sub-Contract works shall be considered complete and the defect liability period shall commence only when the sub-contract works and supporting services have been tested, commissioned and operated to the satisfaction of the project Manager and officially approved and accepted by the Employer, provided always that the handing over of the sub-contract works shall be coincident with the handing over of the Main contract Works.

### **J. DEFECT AFTER COMPLETION**

The defects liability period will be six months from the date of completion of the Main Contract as certified by the project Manager.

**K. DAMAGES FOR DELAYS**

Liquidated and Ascertained damaged as started in the Main Contract Agreement will be claimed against the Main Contract for any Unauthorized delay in completion. The sub- contractor will be liable for the whole or a portion of these damage should he cause delay in completion.

**L. CLEAR AWAY ON COMPETION**

The sub-Contract shall, upon completion of works, at his own experience remove and clear away all plants, equipment, rubbish and used materials, and shall leave the whole of the works in a clean and tidy state, to the satisfaction of the Project Manager on completion, the whole of the Works shall be delivered up clean, complete and perfect in every respect to the Delivered up clean, complete and perfect in every respect to the satisfaction of the Project Manager.

**M. SITE CONDITION**

The Sub-contractor shall be deemed to have visited the site to ascertain all condition affecting his sub-contract. No claims will be allowed due to lack of Knowledge in this respect.

**PART B**  
**GENERAL MECHANICAL SPECIFICATION**

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## **PART B**

### **GENERAL MECHANICAL SPECIFICATION**

#### **1. GENERAL**

This section specifies the general requirements for plants, equipment and material forming part of the sub-contract Works and shall apply except where specifically stated elsewhere in the specification or the contract Drawing.

#### **2. QUALITY OF MATERIALS**

All plants, equipment and material supplied as part of the sub-contract works shall be new and of first-class commercial quality, shall be free from defects and imperfections and where indicated shall be of grades and classifications designated herein.

All products or material not manufactured by the sub-contract shall be of the products of reputable manufacturers and so far as the provisions of the specification is concerned shall be as if they had been manufactured by the sub-contractor.

Materials and apparatus required for the complete installation as called for by the specification Contract Drawing shall be supplied by the Sub-Contract unless mention is made otherwise.

Materials and apparatus supplied by others for installation and connected by the sub-contractor shall be carefully examined on receipt and stored. Should any defects be noted, the sub-contractor shall immediately notify the Engineer. Defectives equipment or that damage in the course of installation or test shall be replace or required to the approval of the Engineer.

### **3. REGULATIONS AND STANDARDS.**

The sub-contract Works shall comply with the current editions of the following: -  
The Kenya Government Regulations  
The United Kingdom Institution

### **4. ELECTRICAL REQUIREMENT**

Plant and equipment supplied under this sub-contract shall be complete with all Necessary motor starters, control boards, and other control apparatus. Where control Panel incorporating several starters are supplied, they shall be complete with a main isolator.

The electrical sub-contractor will provide the supply power up to and including local isolators. He shall also provide all other wiring diagrams for the Engineer approval.

The starting current of all electrical motors and equipment shall not exceed the maximum Permissible-starting currents described in the Kenya Power and Lighting Company's By-Laws.

The Engineer may reject any equipment that is not rated for the above voltages and frequencies.

### **5. TRANSPORT AND STORAGE**

All plant and equipment shall, during transportation be suitably packed, crated and Protected to minimize the possibility of damages and to prevent corrosion or other deterioration.

On arrival at the site plant and equipment shall be examined and any damage to parts and protective priming coats made good before storage or installation.

Adequate measures shall be taken by the sub-contractor to ensure that plant and equipment do not suffer any deterioration during storage.

Prior to installation all piping, plant and equipment shall be thoroughly cleaned.

If, in the opinion of the Engineer any equipment as deteriorated or been damaged to such an extent that it is not suitable for installation, the sub-contractor shall replace this equipment at its own cost.

## **6. SITE SUPERVISION**

The sub-contractor shall ensure that there is an English speaking supervisor on the site at all times during normal working hours.

## **7. INSTALLATION**

Installation of all special plant and equipment shall be carried out by sub-contractor under adequate supervision from skilled staff provided by the plant and equipment manufacturer or is appointed agent in accordance with the standards of modern practice and the relevant regulations and standards Described under clause 3 of this section.

## **8. TESTING**

### **8.1 General**

The sub-contractor, s attention is drawn to part A sub clause 2.08 of the specification.

The following sub-clause are intended to define the sub-contractors responsibilities with respect to testing and inspection.

## **8.2 MATERIAL TESTS**

All materials for plant and equipment to be installed under the sub-contract shall be tested, unless otherwise directed, in accordance with the relevant B.S specification concerned.

For materials where B.S specification exists tests are to be made in accordance with the best modern commercial methods to the approval of the Engineer having the regard to the particular type and application of the materials concerned.

The sub-contractor shall prepare specimens and performance tests and analyses to demonstrate conformance of the various materials with the applicable standards.

If stock material, which has not been specifically manufactured for the plant and equipment specified is used, then the sub-contractor shall submit satisfactory evidence to the Engineer that such materials conform to the requirements stated here in which case tests of materials may be partially or completely waived.

Certified mill test reports of plates, piping and other materials shall be deemed acceptable.

## **8.3 Manufactured plant and Equipment – Works Tests**

The right of the Engineer, relating to the inspection, examinations and testing of plant and equipment during manufacture shall be applicable to the Insurance Companies or Inspection Authorities so nominated by the Engineer.

The sub-contractor shall give two week notice to the Engineer of the manufacturer's intention to carry out work tests and inspections.

The Engineer or his representative shall be entitled to witness such tests and inspections. The costs of such tests and inspections shall be borne by the sub-contractor.

Six copies of all test and inspection certificates and performance graphs shall be submitted to the Engineer for his approval as soon as possible after the completion of such tests and inspections.

Plant and equipment, which is shipped before the relevant test certificate has been approved by the Engineer, shall be shipped at the sub-contractor, s own risk and should the test and inspection certificates no be approved, new tests may be ordered by the Engineer at the sub-contractors expense.

#### **8.4 Pressure Testing.**

All pipe work installations shall be pressure tested in accordance with the requirements of the various sections of these specifications. The installation may be tested in sections to suit the progress of the works but all tests must be carried out before the work is buried or concealed behind building finishes. The Engineer must witness all tests.

Or his representative and the sub-contractor shall give 48 hours' notice to the Engineer or his intention to carry out such tests.

Any pipe work that is buried or concealed before witnessed pressure tests have been carried out shall be exposed at the expense of the sub-contractor and the specified tests shall then be applied.

The sub-contractor shall prepare test certificates for signature by the Engineer and shall give a progressive and up-to-date record of the sections of the work that have been tested.

### **9. COLOUR CODING**

Unless stated otherwise in the particular specification all pipe work shall be color Coded in accordance with the latest edition of B.S 1710.

## **10. WELDING**

### **10.1 Method**

All welding shall be carried out by the electric arc process using covered electrodes in accordance with the B.S 639.

Gas welding may be employed in certain circumstances providing that prior approval is obtained from the Engineer.

### **10.2 Welding codes and construction**

All welded joints shall be carried out in accordance with the following specification: -

#### (a) Pipe welding.

All pipe welds shall be carried out in accordance with the requirements of B.S 809.

#### (a) General welding

All welding of mild steel components other than pipe work shall comply with general requirements of B.S 1855.

### **10.3 Welders Qualifications**

Any welder employed on this sub-contract shall have passed the trade tests as laid down by the Government of Kenya.

The Engineer may require to see the appropriate certificate obtained by any welder and should it be proved that the welder does not have the necessary qualifications the Engineer may instruct the sub-contractor to replace him by a qualified welder.

**PART C**

**GENERAL PLUMBING AND DRAINAGE SPECIFICATION**

**INDEX**

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## SECTION C

### GENERAL PLUMBING AND DRAINAGE SPECIFICATION

#### 2.11 GENERAL

This section specifies the general requirement for plant, equipment and materials

#### 2.12 MATERIALS AND STANDARDS

##### 2.12.1 PIPE WORK AND FITTINGS

###### (a) Black steel pipe work

All black steel pipe work up to 65mm nominal bore shall be manufactured in accordance with B.S 1387 Medium grade with taped pipe threads in accordance with B.S. 143

Pipe joints shall be screwed and socketed and sufficient coupling union shall be allowed so that fitting can be disconnected without cutting the pipe. Running nipples and long screws shall not be permitted unless exceptionally approved by the Engineer.

All black steel pipe work, 80mm normal bore up to 150mm nominal bore, shall be manufactured to comply in all respects with the specification for 65mm pipe, except that screwed and bolted flanges shall replace unions and coupling for the jointing of pipes to valves and other items of plants

All flanges shall comply with the requirements of B.S. 10 to the relevant classifications contained hereinafter under section C of the Specifications.



(b) **Galvanized Steel Pipe work.**

Galvanized steel pipe work shall be manufactured to comply in all respect with the standards described for black steel pipe work in paragraph (a) above.

Galvanized shall be carried out in accordance with the requirement of B.S 1387 and B.S 143 respectively.

(c) **Copper Tubing**

All copper tubing shall be manufactured in accordance with B.S.2871 from C.160 'Phosphorous De-oxidized Non-Arsenical Copper 'in accordance with BSD 1172.

Pipe joints shall be made with soldered capillary fittings and connections to equipment shall be with compression fitting manufacture in accordance with B.S 864

Short copper connections tubes between galvanized pipe work and sanitary fitments shall not be used because of the risk of Gallivante action

If, as may occur in certain circumstances, it is not possible to make the connection in any other way than by use of copper tubing, then Brass straight connector shall be positioned between the galvanized pipe and the copper tube in order to prevent direct contact.

(d) **Cast Iron Pipe Work**

1. Internal iron pipe work and fitting for use above ground in connection with Internal building services, shall be manufactured with spigot and socket joints of the weight required by the Local Authority and shall fully with the requirements of B.S 416.

All joints on cast iron spigot and socket pipes shall be made with approved cold caulking compound and so installed as to allow any expansion or contraction that may take place.

All cast iron pipe work, branches, tees, bends and other fitting shall be supplied complete with inspection cover for cleaning purposes. These inspection covers shall be included as part of the fitting and shall comply with the requirement of B.S 461

2. External Services

Cast iron pipe work which is used in connection with buried external services, shall be manufactured, coated and tested in accordance with the requirement of B.S 1211

All buried cast iron bends, elbows swept tees and other fitting, shall comply with the requirement of BS 1130

Jointing on external cast iron pipes shall be carried out in accordance with one of the methods described in B.S code of practice 301, clause 505c (v), to the approval of the Engineer.

(e) Pitch Fibre Pipe work

Pitch Fibre pipe work and fitting for use in connection with external drainage services shall be manufactured in accordance with the requirement of BS 2760. Pipes shall be connected by means of pitch made tapered joints manufactured in accordance with B.S 2760.

Until such time as the use of Pitch impregnated fibre pipes is covered by a code of practice, the jointing laying and cutting these pipes shall carried out in accordance with the requirements of notes contained under Appendix C of B.S.

(f) **Concrete Pipe**

Where concrete pipe and fitting are used in connection with the conveyance of surface water or sewage under atmospheric pressure, they shall be manufactured in accordance with the requirement of BS 556, class I, except where otherwise stated.

The joints of concrete pipe and fitting may be one of the following depending upon application and conditions.

- (1) Flexible spigot and socket type
- (2) Flexible rebated type (Storm water drainage only)
- (3) Ordinary spigot and socket type
- (4) Ordinary rebated type (Storm water drainage Only)

Joints (1) and (2) shall be sealed with suitable rubber gaskets manufacture in accordance with BS 2494 except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance with B.S.

Joints (3) and (4) shall be made with approved cement mortar mix.

(g) **Asbestos Cement Pressure Pipes**

Where asbestos cement pressure pipe and fittings are used in connection with external, above ground or buried water service, they shall be manufacture in accordance with the requirements of B.S 486

The classification of these pipes falls onto four classes;

A, B, C and D respectively and the class to be used shall depend upon the pressure conditions pertaining at site.

Where cast iron detachable joints are used for connecting pipes, the materials shall comply with B. S 2494, except where they are likely to be contaminated by oil products, in which case the gaskets shall be manufactured in accordance with B.S 3514.

**(h) P.V.C. (Hard) Pressure Pipe and Fitting**

All P.V.C. pipes and fitting shall be manufactured in accordance with B.S 3505: 1968

Jointing

The method of Jointing to be employed shall be that of Solvent Welding, Using the pipe and manufacturers approved cement, Seal rings joints shall be introduced where it is necessary to accommodate expansion.

Anchoring

All bends, valves and hydrant tees etc, in the line of water main shall be adequately anchored to resist thrust due to internal water pressure. A concrete block shall be cast under and around the pipe and between it and sides of the trench. Well-rammed material shall be used to support the pipe and either side of the concrete.

Pipe Bed

Pipe shall be uniformly laid on a 75mm thick bed, (sand or red soil) and must not be allowed to rest on the joint or on stones etc.

Support to fitting.

In under ground installation care shall be taken to ensure that heavy components such as valves are fully supported so that the pipeline carries no weight.

Back filling

For the protection of the pipe initial backfill shall be carried out as soon as possible after laying. The initial backfill shall grained material thoroughly compacted around the pipe and consolidated to a depth of

6 above the crown of the pipes at no time shall heavy rocks, stone or other objects be included in the balance of the backfill that might protrude the initial backfill layer and come into contact with the pipe.

### Testing

Pipelines shall be tested in section under an internal water pressure normally one and half times the maximum allowable working pressure for the class of pipe used.

Testing shall be carried out as soon as practicable after laying and when the pipeline is adequately anchored. Precaution shall be taken to eliminate all air from the test section and to fill the pipes slowly to avoid risk of damage due to surge.

#### (i) **A.B.S. Waste System**

Where indication shows on the drawing and schedules, the Sub-Contractor shall supply and fix A.B.S. Waste pipes and fitting.

The pipes, traps and fitting shall be in accordance with the relevant British Standards, Including B.S 3943 and fixed generally in accordance with manufacture's instruction and B.S 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding. The manufacturer's recommended method of joint preparation and fixing shall be followed

Standard brackets, as supplied for use with the system, shall be used wherever possible. Where the building structure render this impracticable the sub-Contractor shall provide purpose made supports, the centre of which shall not exceed one meter.

Expansion joints shall be provided as indicated. Supporting brackets and pipe clips shall be fixed on each side of these joints.

(j) **P.V.C. Soil System**

The sub-Contractor shall supply and fix P.V.C. soil pipe and fitting as indicated on drawing and schedules.

{Pipe and fittings shall be in accordance with relevant British Standards, including B.S. 5572

The soil system shall incorporate synthetic rubber gaskets as provided by the manufacturer whose fixing instructions shall be strictly adhered to.

Connections to W.C and pass shall be affected by use of a W.C connector gasket and cover, sized to suit pan outlet.  
Suitable supporting brackets and pipe clips shall be provided at maximum of 2.0 metres centres.

The Sub-Contractor shall be responsible for the joint into the cully Trap on drain as indicated on the drawings.

**2.12.2 VALVES**

(a) Draw-off taps and stop Valves (up to 50mm Nominal Bore

Draw off taps and Valves up to 50mm nominal bore, unless otherwise stated or specified for attachment or connection to sanitary fitments shall be manufactured in accordance with the requirements of B.S 1010.

(b) **Gate Valves**

All gates valves 80mm nominal bore and above, other than those required for fitting to buried water mains shall be cast iron construction in accordance with the requirements of B.S 3464. All gate valves required for fitting to buried water mains shall be cast iron construction in accordance with the requirements of B.S 1218.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S 1952.

The pressure classified of all gate valves shall depend upon the pressure conditions pertaining to the site of works.

(c) **Globe Valve**

All globe valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S 3061

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the site of works

(d) **Check or Non- Return Valves**

All checks or non-return valves 80mm nominal bore and above shall be of the swing checks type of cast iron construction in accordance with the requirement of B.S 4090.

The pressure classification of all checks or non-return valves shall depend upon the pressure conditions pertaining to site of the works

(e) **Ball valves**

All ball valve for use in connection with hot and cold-water services shall be of the Portsmouth type in accordance with requirements of B.S 1212, construction from bronze or other corrosion resistant materials. These valves fall into three pressure classification as follow: -

- (i) Low Pressure \_ 3.58 b maximum
- (ii) Medium Pressure - 7.72 b maximum
- (iii) High Pressure - 12.62 b maximum

The pressure classification required for each ball valve will be designed in the description of its associated equipment contained in section C of the specification.

**(e) Manually Operated Mixing Valve**

Mixing valves for showed fitting and other appliances being provided under the Sub-contractor Works shall be manufactured in Accordance with the requirements of B.S 1415 from bronze or other corrosion resistant materials.

**2.12.3 WASTE PITMENT TRAPS**

**(a) Standard and Deep Seal P & S Traps**

Where standard or Deep Seal traps specified they shall be manufactured in suitable non-ferrous material in accordance with full requirements of B.S 1184

In certain circumstances, cast iron traps may be required for cast iron Bath and in these instances bath traps shall be provided which are Manufactured in accordance with the full requirements of B.S 1291

**(b) Ant- Syphon Traps**

Where ant-syphon traps are specified, these shall be similar or equal to the range traps manufactured by Greenwood and Hughes Ltd, Deacon Works Littellehampton, Sussex, England.  
The Trade Name for Traps Manufactured in Accordance with the requirements of B.S 1415 from bronze or other corrosion resistant materials.



#### 2.12.4

### **PIPE SUPPORTS**

#### **General**

This sub-clause deals with pipe supports securing pipes to the structure of building for above ground application.

The variety and type of support shall be kept to a minimum and their design shall be such to facilitate quick and secure fixing to metal, concrete, masonry or wood.

Consideration shall be given, when designing support, to the maintenance of desired pipe falls and the restraining of pipe movements to a longitudinal axial direction only.

The Sub-contractor shall supply and install all steelwork forming part of the pipe support assemblies and shall be responsible for making good any damage to builders work associated with pipe support installation.

The sub-Contract shall submit his entire proposal for pipe supports to the Engineer for approval before any erection work commences.

#### (b) **Steel, Copper pipes and Tubes**

Pipe runs shall be secured by pipe clips connected to pipe hangers, wall brackets, or trapeze type supports. 'U' bolts shall not be used as a substitute for pipe clips without the prior approval of the Engineer.

An approximately guide to the maximum permissible supports spacing in metres for steel and copper pipe and tube is given in the following table for horizontal runs.

---

Size Nominal Bores	Copper Tube to B.S 659	steel tube to B.S
1387		
15mm	1.25m	2.0m
20mm	2.0m	2.5m
25mm	2.0m	2.5m
32mm	2.5m	3.0m
40mm	2.5m	3.0m
50mm	2.5m	3.0m
65mm	3.0m	3.5m
80mm	3.0m	3.5m
100mm	3.0m	4.0m
125mm	3.0m	4.5m
150mm	3.5m	4.5m

---

The support sizing for vertical runs shall not exceed one and half times the distances given horizontal runs.

**(c) Cast Iron and Asbestos Cement Spigot and socket jointed Pipes**

Cast iron and asbestos cement socketed pipes shall generally be supported at every socket joint by means of either holder bats secured rigidly to the structure, or purpose made straps for attachment to rigid steel support brackets.

When holder bats are used, they shall conform to the requirements of B.S. 416.

Suitable anchors shall be provided at all changes of pipe directions, Junction and tees, to counter the effect of end thrust loads.

**(d) Asbestos Cement Pressure Pipes**

Asbestos Cement Pressure pipes with either cast iron detachable joints or asbestos cement screw joints shall be supported and anchored on either side of the joint. The joints shall remain free.

Pipe hangers and trapeze type supports shall not be suitable for the suspension of asbestos pressure pipes unless they are designed with suitable restrictions to prevent swinging while at the same time providing the necessary support requirements.

Within building, asbestos pressure pipe shall be carried either on concrete supports or on rigidly fixed wall brackets.

Suitable anchors shall be provided at all changes of pipe directions, junctions and tees to counterpart the effect of end thrust loads.

(e) **Concrete and Pitch Pipes**

These pipes shall not be used for above ground application.

(f) **Expansion Joint and Anchors**

Where practicable, cold pipe work systems shall be arranged with sufficient bends and changes of direction to absorb pipe expansion providing that the pipe stresses are contained within the working limits prescribed in the relevant B.S. specification.

The sub-Contractor shall pay particular care when supporting cast iron and asbestos cement pipes in order to ensure that settlement and building movement do not brake the pipe joints.

Where piping anchors are supplied, they shall be fixed to the main structure only. Detail of all anchors design proposals shall be submitted to the Engineer for approval before erection commences.

The sub-Contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flanges on pumps or other items of plant.

The Sub-Contractor shall supply flexible joints to prevent vibrations and other movements being transmitted from pumps to piping systems or Vice Versa.

**2.12.5      SANITARY APPLICANCES**

All sanitary appliances supplied and installed as part of the sub-contract works shall comply with the general requirements of B.S.specification.

**2.12.6      PIPE SLEEVES**

Main runs of pipework are to be fitted with sleeves where they pass through walls and floors. Generally the sleeves shall be of P.V.C. except where they pass through the structure, where they shall be mild steel. The sleeves shall have 6mm –12mm clearance all around the pipes or for insulated pipe work all around the installation. The sleeve will then be packed with slag wool or similar.

**2.13      INSTALLATION**

**2.13.1      GENERAL**

Installation of pipes work, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The sub-contractor shall be responsible to the main contractor for ensuring that all builders work associate with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

## 2.13.2

### **ABOVE GROUND INSTALLATION**

#### (a) Water Service

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

Where falls are shown on the contract Drawing or stated elsewhere in the specification, pipe work shall be installed parallel to the lines of the building and as close to the walls, ceilings, columns etc. as is practicable.

All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly. Valves and other user equipment shall be installed with adequate access for operation and maintenance. Where valves and other operation equipment are unavoidably installed beyond normal reach or in such position as to be difficult to reach from a short stepladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions to facilitate easy removals of fittings, and to enable alterations of pipe work to be carried out without the need to cut the pipe.

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

All screwed joint to piping and fitting shall be made with P.T.F.E. Tape.

The pump shall maintain the test pressure for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main in that time. A general leakage of one gallon per 25mm of diameter, per 1.6 Kilometer per 24 hour 30 metre head, may be considered reasonable but any visible individual leak shall be repaired.

**(b) Sanitary Services**

Soil, waste, and vent pipe systems shall be installed in accordance with the best standards of modern practice as described in B.S. 5572 to the approval of the Engineer.

The sub-Contractor shall provide all necessary rodding and inspection facilities within the draining system in position where easy accessibility is available.

Where a branch requires rodding facilities in a position to which normal access is unobtainable, then that branch shall be extended so as to provide a suitable purpose made rodding eye in the interest adjacent wall or floor to which easy access is available.

The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The sub-Contract shall be responsible for sealing the roof after installation of the stacks

The open end of each stack shall be fitted with a plastic coated, or galvanized steel, wire guard.

Access for rodding and testing shall be provided at the foot of each stack

(c) Sanitary Appliances

All sanitary appliances associated with the sub-Contract Work shall be Installed in accordance with the best standard of modern practice as described in B.S. 5572 to the approval of the Engineer.

**2.13.3 UNDERGROUND INSTALLATION**

(a) General

All underground water and drainage services installation shall be carried out in accordance with the best Standard of modern practice as described in C.P 301 and C.P. 310 respectively and the following clause.

(b) Sequence of Operation for Underground Services Installation

(1) Setting Out

As described in B.S. Codes of practice 301 Clause 502

(2) Breaking Up Surface (If In Roads)

As described in B.S. Code of practice 301 Clause 503

(3) Excavation and Timbering

As described in B.S. Code of practice 301 Clause 503 and the following: -

Excavation shall be made to such depths and dimensions as may be required by the Engineer to obtain prior falls and firm foundations. No permanent construction shall be commenced on any bottom until the excavation has been examined and approved by the Engineer.

Should the Sub-contractor in error or without the instruction of the Engineer make any excavation below the requirement level of the pipe or bed, as the case may be, then shall be required to refill such excavation to the correct levels with concrete 1:4:8: to 38mm maximum aggregate size.

The sub-contractor' prices shall have included for excavating in all material met with, for trimming bottoms to the necessary falls and for any extra excavation required for planking, strutting and working space.

The sub-contractor shall keep the whole of the trenches or other excavations free from water and shall execute such pumps as may be necessary to keep the excavation dry at all times.

No sub-soil water shall be discharged into the sewage system written permission of the Engineer.

(4) Laying of Concrete Beds or other Support for Pipes (If Required)

As described in B.S. Code of practice 301 Clause 504 and the following: -

All drains below buildings and roads shall be encased in concrete 150mm thick.

Concrete beds and support shall be concrete 1:3:6 to 20mm maximum aggregated size.



(5) Pipe Laying and Jointing

Drain pipes shall be laid and jointed as described under B.S Code of practice 301 Clause 505.

Pitch fibre drain pipe shall be laid, jointed and cut in accordance with the requirements on the Node contained under Appendix C of B.S 2760.

Water pipes shall be laid and jointed as described under B.S. code of practice 310. Clause 401,403 and 404.

(6) Manholes

(i) General

All manholes provided under the sub-Contract works shall be constructed or approved materials and in an approved manner.

All manholes shall be water-tight and if constructed of brickwork, solid block work or stonework, they shall be rendered internally with a cement mortar of at least 12mm thickness and finished with a smooth surface.

The sides of all channels in every manholes shall be brought up vertically to a height of not less than the diameter of the drain and shall be benched in a good concrete from the top of the channels at an angle of 30 to the horizontal and floated to a smooth hard surface with a coat of 1:1 cement mortar.

In all other respects, manholes shall be constructed in accordance with B.S code of practice 301.

(ii) Rectangular and Square Manholes

Rectangular and Square straight through manholes shall be constructed from brickwork, solid block work, stonework or concrete to comply with the following minimum internal dimensions (millimeters).

Depth Below Ground of Outgoing Invert	Internal Access Shift Dimensions LXW	Size of Main Shaft Diameter	Internal Chamber Dimensions LXW	Height of Chamber Above Benching	Wall Thickness
Up to 740	-	100 to 150	610 x 460	-	150
Up to 740	-	230 to 460	760 x 760	-	150
Up to 1200	-	100 to 150	760 x 760	-	150
160 to 1200	-	230 to 460	910 x 910	-	150
1220 to 1800	-	100 to 150	910 x 910	-	150
1220 to 1800	-	230 to 460	1070 x 910	-	150
1830 to 4550	100 x 150	100 to 150	1370 x 910	1370	230
1830 to 4550	760 x 760	230 to 460	1370 x 1070	1370	230
4570 & above	760 x 760	100 to 150	1370 x 1140	1680	230
4570 & above	760 x 760	230 to 460	1370 x 1140	1680	230

When branches are connected into the manhole, the length and width dimension of the chamber shall be increased as follows: -

Length

Branch Diameter

100mm 300mm/branch on side with most branches.

150mm 380mm/branch on the side with most branches.

230 and 300mm/branch on the side with most branches.

Width

Branch Diameter

100mm to 300mm for each side with branches plug 160mm 460mm or the diameter of the main drain whichever is the greater.

(iii) Precast Concrete Circular Manhole

Where specified straight through precast manholes shall be manufactured and constructed to comply with B.S. 556 and the following dimensional requirements, (Dimensions in Millimeters).

---

Depth Ground of Outgoing Invert	Internal Access Shaft Diameter	Size Main Channel Diameter	Chamber Diameter	Height Chamber Above Benching
Up to 740	-	100 to 460	910	-
760 to 2410	-	100 to 460	1070	-
2440 to 4550	760	100 to 460	1220	1370
4570 & over	760	100 to 460	1370	2680

---

When branches are connected into manholes the internal Diameter of the chamber shall be increased, as necessary, up to a maximum chamber 1830mm

(iv) Step Iron and cover

Access shaft manholes of depth greater than 760mm shall be provided with approved step irons at suitable intervals.

Every manhole or manholes access shaft shall be fitted with a removable airtight cast iron cover to adequate size and strength, fixed in a manner, which prevents surface water gaining access into the drainage system.

Cast manhole covers and frames shall be manufactured in accordance with the requirements of B.S. 497 and shall generally fall into the following categories:-

Heavy Duty	:	:	For carriageways
Medium Duty :	:	:	for footpaths
Light duty	:	:	For domestic remises or Other places where they Do not have to carry Wheeled traffic.

(v) Back Drop Connections

Where the level of the branch drain entering the manhole is higher than can be suitably accommodated by the normal type benching, then the branch drain shall be connected to the manhole by means of a back drop connection.

Back drop connections shall be made in accordance with the details shown on the relevant sub-contract Drawing and the requirements of B.S. code or practice 301.

(vi) Channels

Where the branch channel connects to the main channels in the manhole, the invert of the branch channel shall be a minimum of 38mm higher than the main channel.

(7) Testing of Pipelines

After pipelines are connected up and joints have been sealed, the pipelines shall be tested before pipe are, if required hunched or surrounded in concrete.

Methods of testing and inspection shall be in accordance with clause 4 of the specifications.

(8) Concrete Beddings, Hunching and Surround

Concrete bedding, hunching and surrounding shall be provided as necessary or where called for by the Engineer in accordance with the requirements laid down in B.S. code of Practice 301, Clause 310.

(9) Backfilling

Backfilling of trenches, headings and around manholes shall be carried out in accordance with the methods described in B.S. Codes.

(10) Reinstatement of surface

Following the final backfilling of all trenches, headings, and manhole surrounds, the surface of the excavated areas shall be fully reinstated to the approval of the Engineer.

Where excavation have been carried out in public or other areas are not forming part of the site, the Sub-Contract shall be deemed to have allowed in his price for all charge associated with the temporary and final reinstatements of the local of highway Authority, Whether this is carried out by the sub-Contractor or by the Authority concerned.

No claim for extra in this respect will be accepted.

(11) Sewer Connection

The Sub-Contract shall pay all charges associated with the connection by the Local Authority of the drainage to the Main sewer, including necessary reinstatement.

**2.14            TESTING AND INSPECTION**

**2.14.1        SITE TESTS-PIPEWORK SYSTEMS**

**(a)        Underground Water Mains**

After laying, jointing and anchoring, the main shall be slowly and carefully charged with water, so that all air is expelled and allowed to stand full for three days before testing under pressure.

Along main shall be tested in sections, as the work of laying proceeds and all joints shall be exposed for inspection during the testing.

The open end of the main may be temporarily closed for testing under moderate pressure by fitting water, pipe-expanding plug, of which several types are available. The end of the main and the plug, of which secured by struts or otherwise, to resist the end thrust of the water pressure in the main.

If the section of the main terminates with a slice valve, the wedge of the valve shall not be used to retain the water, instead the valve shall be fitted temporarily with a blank flange, or socket valve with a plug and wedge shall be placed in the open position while testing. The Sub-contractor shall provide suitable end supports withstand the end thrust of the water pressure in the main.

**(b)** Above Ground Internal Water Services Installation.

All water service pipe system installed above ground shall be tested hydraulically for a period of one hour to not less than one and half times the design working pressure.

If preferred, the Sub-contractor may test the pipelines in sections. Any such section found to be satisfactory need not to be the subject of a further test when system has been completed, unless specifically requested by the Engineer.

During the test, each branch and joint shall be examined carefully for the leaks and any defects revealed shall be made good by the sub-contractor and the section re-tested.

The sub-contractor shall take all necessary precautions to prevent damage occurring to special valves and fittings during the tests. Any item damaged shall be repaired or replaced at the sub-contractor's expense.

(c) **Underground Drainage System**

A site test shall be carried out on all drainage pipes before concrete Hunching or surrounds are applied. These tests shall be carried out preferably from manhole to manhole.

Short brand drains connected to main drain between manholes shall be tested as one system with the main drain. In long branches a testing junction shall be inserted next to the junction with the main drain and the branch tested separately. After the test has been passed, the testing junction shall be effectively sealed.

All tests on underground drains shall be permitted on cast iron drains at the discretion and the approval of the Engineer.

Water tests shall be carried out in accordance with the methods described under B.S code of practice 301, clause 601 (b) and (c) and the test pressure shall not be less than 1,520mm head at the highest point in the pipe section and do not more 10.360mm head at any point in the section.

The test pressure shall be maintained for a period of one hour during which time the pipe and joints shall be inspected for sweating and leakage. Any leakage discovered during the tests shall be made good by the sub-contractor and the section re-tested.

In addition to pressure tests, drain pipe runs shall also be tested for straightness where applicable. This test shall be carried out in accordance with one of the two methods described in B.S code of practice 301, clause 601 (e).

Testing of manholes shall be carried out in accordance with the methods described under B.S code of practice 301, clause 601 (f).



(d) **Above Ground Soil Waste and Ventilation System**

All soil, waste and ventilation pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in B.S. 5572:1972.

Smoke tests on above ground soil waste and ventilating pipe system shall not be permitted.

Pressure tests shall not be carried out before any work that is to be concealed is finally enclosed.

Any defects revealed by the tests shall be made good by the sub-contractor and the test repeated to the approval of the Engineer.

In all respects, tests shall comply with the requirements of B. S. 5572

**2.14.2**

**SITE TEST - PERFORMANCE**

Following satisfactory pressure test on the pipework systems. Operational tests shall be carried out in accordance with the relevant B.S. code of practice on the system as a whole to establish that special valves, gauges, controls, fittings, equipment and plant are functioning correctly to the satisfaction of the Engineer.

All hot water pipework shall be installed with performed fibre glass lagging to a thickness of 25mm where the pipe runs above a false ceiling or in areas where the ambient temperature is higher than normal with the result that pipe “seating” due to condensation will cause nuisance.

All lagged pipes which run in a visible position after erection shall be given a canvas cover and prepared for a painting as follows: -

- (i) Apply a coating of a suitable filler until the canvas weave disappear and allow to dry.
- (ii) Apply two undercoats of an approved paint and finish in suitable gloss enamel to colours approved by the Engineer.

All lagging for cold or hot water pipes erected in crawlways, ducts, and above false ceiling which, after erection are not visible from the corridors of rooms, shall be covered with a reinforce aluminum foil finish and banded in colours to be approved by the Engineer

In all respects, unless otherwise stated, the hot and cold water installation shall be carried out in accordance with the standards of modern practice as described in C.P. 342 and C.P. 310 respectively to the approval of the Engineer.

The test pressure shall be applied by means of manually operated test pump or, in the case of long main or mains or large diameter, by power driven test pump which shall not be left unattended. In either case precautions shall be taken to ensure that the requirement under this clause of specification.

The Sub-contractor shall be deemed to have included in his price for all test pumps, and other equipment required under this clause of specification.

The test pressure shall be one and half times the maximum working pressure except where a pipe is manufactured from a material for which the relevant B.S Specification designates a maximum test pressure as in the case of cast or spun iron pipe where the test pressure should not exceed 120,180, and 240 metre/ head of clause B, C and D pipes, respectively.

## 2.15

### **STERILIZATION OF HOT AND COLD WATER SYSTEMS**

All underground water mains and above ground water distribution systems, cistern, tanks, calorifiers, pumps etc. shall be thoroughly sterilized and flushed out after the completion of all tests and before being fully commissioned for Handing over.

The sterilization procedures shall be carried out by the sub-contractor in accordance with the requirements of B.S. codes of practice 310, Clause 409, to the approval of the Engineer.

**SECTION D:**

**PARTICULAR SPECIFICATIONS  
FOR  
PLUMBING AND DRAINAGE**

## PARTICULAR PLUMBING AND DRAINAGE SPECIFICATIONS

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## **PARTICULAR SPECIFICATIONS FOR PLUMBING AND DRAINAGE**

### **3.1 GENERAL**

This section specifies the general requirements for plant, equipment and materials forming part of the plumbing and drainage installations.

### **3.2 MATERIALS AND STANDARDS**

#### **3.2.1 Pipe work and Fittings**

Pipe work materials are to be used as follows:

a) **PP-R Pipe-work**

PP-R pipe-work upto 63mm bore shall be manufactured in accordance with the current British Standards i.e. DIN 8077 and DIN 8078 for PN 20 tubing, with metallic joints to DIN 8076, joints and fittings for tubings to DIN 16962. All threaded inserts in the fittings and joints shall be made of nickel brass OT58 and are turned from bars and manufactured in accordance with DVGW 534E.

Pipe joints shall be screwed and socketed and sufficient coupling unions shall be allowed so that fittings can be disconnected without cutting pipe. Running nipples long screws shall not be permitted unless exceptionally approved by the Engineer.

b) **Galvanized Steel Pipe work**

Galvanized steel pipe work up to 65mm nominal bore shall be manufactured in accordance with B.S. 1387 Medium Grade, with tapered pipe threads in accordance with B.S. 21. All fittings shall be malleable iron and manufactured in accordance with B.S. 143.

Pipe joints shall be screwed and socketed and sufficient coupling unions shall be allowed so that fittings can be disconnected without cutting the pipe. Running nipples and long screws shall not be permitted unless exceptionally approved by the Engineer.

Galvanized steel pipe work, 80mm nominal bore up to 150mm nominal bore shall be manufactured to comply in all respects with the specification for 65mm pipe, except that screwed and bolted flanges shall replace unions and couplings for the jointing of pipes to valves and other items of plant. All flanges shall comply with the requirements of B.S. 10 to the relevant classifications contained hereinafter under Section 'C' of the Specification.

Galvanizing shall be carried out in accordance with the requirements of B.S. 1387 and B.S. 143 respectively.

c) **Copper Tubing**

All copper tubing shall be manufactured in accordance with B.S. 2871 from C.160 'Phosphorous De-oxidized Non-Arsenical Copper' in accordance with B.S. 1172.

Pipe joints shall be made with soldered capillary fittings and connections to equipment shall be with compression fittings manufactured in accordance with B.S. 864.

Short copper connection tubes between galvanized pipe work and sanitary fittings shall not be used because of the risk of galvanic action.

If, as may occur in certain circumstances, it is not possible to make the connection in any way than the use of copper tubing, then a brass straight connector shall be positioned between the galvanized pipe and the copper tube in order to prevent direct contact.

d) **P.V.C. (Hard) Pressure Pipes and Fittings**

All P.V.C. pipes and fittings shall be manufactured in accordance with B.S. 3505: 1968.

**Jointing**

The method of jointing to be employed shall be that of solvent welding, using the pipe and manufacturer's approved cement. Seal ring joint shall be introduced where it is necessary to accommodate thermal expansion.

**Testing**

Pipelines shall be tested in sections under an internal water pressure normally one and a half times the maximum allowable working pressure of the class of pipe used. Testing shall be carried out as soon as practical after laying and when the pipeline is adequately anchored. Precautions shall be taken to eliminate all air from the test section and to fill the pipe slowly to avoid risk of damage due to surge.

e) **A.B.S. Waste System**

Where indicated on the Drawings and Schedules, the Sub-contractor shall supply and fix A.B.S. waste pipes and fittings.

The pipes, traps and fittings shall be in accordance with the relevant British Standards, including B.S. 3943, and fixed generally in accordance with manufacturer's instructions and B.S. 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding, the manufacturer's instructions and B.S. 5572: 1978.

Jointing of pipes shall be carried out by means of solvent welding. The manufacturer's recommended method of joint preparation and fixing shall be followed.

Standard brackets, as supplied for use with this system, shall be used wherever possible. Where the building structure renders this impracticable the Sub-contractor shall provide purpose made supports, centres of which shall not exceed one meter.

Expansion joints shall be provided as indicated. Supporting brackets and pipe clips shall be fixed on each side of these joints.

f) **PVC Soil System**

The Sub-contractor shall supply and fix PVC soil pipes and fittings as indicated on the Drawings and Schedules. Pipes and fittings shall be in accordance with relevant British Standards, including B.S. 4514 and fixed to the manufacturer's instructions and B.S. 5572.

The soil system shall incorporate synthetic rubber gaskets as provided by the manufacturer whose fixing instructions shall be strictly adhere to.

Connections to WC pans shall be effected by the use of a WC connector, gasket and cover, fixed to suit pan outlet.

Suitable supporting brackets and pipe clips shall be provided at maximum of one metre centres.

The Sub-contractor shall be responsible for the joint into the Gully Trap on Drain as indicated on the Drawings.

### **3.2.2 Valves**

#### a) Draw-off Taps and Stop Valves (Up to 50mm Nominal Bore)

Draw-off taps and valves up to 50mm nominal bore, unless otherwise stated or specified for attachment or connection to sanitary fitment shall be manufactured in accordance with the requirements of B.S.1010.

#### a) Gate Valves

All gate valves 80mm nominal bore and above, other than those required for fitting to buried water mains shall be of cast iron construction, in accordance with the requirements of B.S. 3464. All gate valves required for fitting to buried water mains shall be of cast iron construction in accordance with the requirements of B.S.1218.

All gate valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S. 1952.

The pressure classification of all valves shall depend upon the pressure conditions pertaining to the site of works.

#### c) Globe Valves

All globe valves up to and including 65mm nominal bore shall be of bronze construction in accordance with the requirements of B.S.3061.

The pressure classification of all globe valves shall depend upon the pressure conditions pertaining to the site of works.

### **3.2.3 Waste Fitment Traps**

#### a) Standard and Deep Seal P & S Traps

Where standard or deep seal traps are specified they shall be manufactured in suitable non-ferrous materials in accordance with the full requirements of B.S. 1184.



In certain circumstances, cast iron traps may be required for cast iron baths and in these instances bath traps shall be provided which are manufactured in accordance with the full requirements of B.S.1291.

b) Anti-Syphon Traps

Where anti-syphon traps are specified, these shall be similar or equal to the range of traps manufactured by Greenwood and Hughes Limited, Deacon Works Littlehampton, Sussex, England.

The trade name for traps manufactured by this company is 'Grevak'.

### **3.2.4 Pipe Supports**

a) General

This sub-clause deals with pipe supports securing pipes to the structure of buildings for above ground application.

The variety and type of support shall be kept to a minimum and their design shall be such as to facilitate quick and secure fixings to metal, concrete, masonry or wood.

Consideration shall be given, when designing supports, to the maintenance of desired pipe falls and the restraining of pipe movements to a longitudinal axial direction only.

The Sub-contractor shall supply and install all steelwork forming part of the pipe support assemblies and shall be responsible for making good damage to builders work associated with the pipe support installation.

The Sub-contractor shall submit all his proposals for pipe supports to the Engineer for approval before any erection works commence.

b) Steel and Copper Pipes and Tubes

Pipe runs shall be secured by clips connected to pipe angles, wall brackets, or trapeze type supports. 'U' bolts shall not be used as a substitute for pipe clips without the prior approval of the Engineer.

An approximate guide to the maximum permissible supports spacing in metres for steel and copper pipe and tube is given in the following table for horizontal runs.

Size Nominal Bores	Copper Tube to B.S. 659	Steel Tube to B.S. 1387
15mm	1.25m	2.0m
20mm	2.0m	2.5m
25mm	2.0m	2.5m
32mm	2.5m	3.0m
40mm	2.5m	3.0m
50mm	2.5m	3.0m
65mm	3.0m	3.5m
80mm	3.0m	3.5m
100mm	3.0m	4.0m
125mm	3.0m	4.5m
150mm	3.5m	4.5m

The support spacing for vertical runs shall not exceed one and a half times the distances given for horizontal runs.

c) Expansion Joints and Anchors

Where practicable, cold pipework systems shall be arranged with sufficient bends and changes of direction to absorb pipe expansion providing that the pipe stresses are contained within the working limits prescribed in the relevant B.S. specification.

Where piping anchors are supplied, they shall be fixed to the main structure only. Details of all anchor design proposals shall be submitted to the Engineer for approval before erection commences.

The Sub-contractor when arranging his piping shall ensure that no expansion movements are transmitted directly to connections and flanges on pumps or other items of plant.

The Sub-contractor shall supply flexible joints to prevent vibrations and other movements being transmitted from pumps to piping systems or vice versa.

### **3.2.5 Sanitary Appliances**

All sanitary appliances supplied and installed as part of the Sub-contract works shall comply with the general requirements of B.S. Code of Practice 305 and the particular requirements of the latest B.S. Specifications.

### **3.2.6 Pipe Sleeves**

Main runs of pipework are to be fitted with sleeves where they pass through walls and floors. Generally the sleeves shall be of P.V.C. except where they pass through the structure, where they shall be mild steel. The sleeves shall have 6mm - 12mm clearance all around the pipe or for insulated pipework all around the installation. The sleeve will then be packed with slag wool or similar.

## **3.3 INSTALLATION**

### **3.3.1 General**

Installation of all pipework, valves, fittings and equipment shall be carried out under adequate supervision from skilled staff to the relevant codes and standards as specified herein. The Sub-contractor shall be responsible to the Main Contractor for ensuring that all builders work associated with his piping installation is carried out in a satisfactory manner to the approval of the Engineer.

### **3.3.2 Above Ground Installation**

#### **a) Water Services**

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

Where falls are not shown on the Contract Drawings or stated elsewhere in the Specification, pipework shall be installed parallel to the lines of the buildings and as close to the walls, ceilings, columns, etc., as is practicable. All water systems shall be provided with sufficient drain points and automatic air vents to enable them to function correctly.

Valves and other user equipment shall be installed with adequate access for operation and maintenance. Where valves and other operational equipment are unavoidably installed beyond normal reach or in such position as to be difficult to reach from a small step ladder, extension spindles with floor or wall pedestals shall be provided.

Screwed piping shall be installed with sufficient number of unions to facilitate easy removal of valves and fittings and to enable alterations of pipework to be carried out without the need to cut the pipe.

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

All screwed joints to piping and fittings shall be made with P.T.F.E. tape.

The test pressure shall be maintained by the pump for about one hour and if there is any leakage, it shall be measured by the quantity of water pumped into the main in that time. A general leakage of 4.5 litres per 25mm of diameter, per 1.6 kilometres per 24 hours per 30 metres head, may be considered reasonable but any visible individual leak shall be repaired.

b) Sanitary Services

Soil, waste and vent pipe system shall be installed in accordance with the best standard of modern practice as described in B.S. 5572 to the approval of the Engineer.

The Sub-contractor shall be responsible for ensuring that all ground waste fittings are discharged to a gully trap before passing to the sewer via a manhole.

The Sub-contractor shall provide all necessary rodding and inspection facilities within the draining system in positions where easy accessibility is available. Where a branch requires rodding facilities in a position to which normal access is unobtainable, then that branch shall be extended so as to provide a suitable purpose made rodding eye in the nearest adjacent wall or floor to which easy access is available.

The vent stacks shall terminate above roof level and where stack passes through roof, a weather skirt shall be provided. The Sub-contractor shall be responsible for sealing the roof after installation of the stacks.

The open end of each stack shall be fitted with a plastic coated or galvanised steel wire guard.

Access for rodding and testing shall be provided at the foot of each stack.

c) Sanitary Appliances

All sanitary appliances associated with the Sub-contract works shall be installed in accordance with the best standard of modern practice as described in C.P. 305 to the approval of the Engineer.

### **3.4 TESTING AND INSPECTION**

#### **3.4.1 Site Tests – Pipework Systems**

a) Above Ground Internal Water Services Installation

All water service pipe system installed above ground shall be tested hydraulically for a period of one hour to not less than one and half times to design working pressure.

If preferred, the Sub-contractor may test the pipelines in sections. Any such section found to be satisfactory need not be the subject of a further test when system has been completed, unless specifically requested by the Engineer.

During the test, each branch and joint shall be examined carefully for leaks and any defects revealed shall be made good by the Sub-contractor and the section re-tested.

The Sub-contractor shall take all necessary precautions to prevent damage occurring to special valves and fittings during the tests. Any item damaged shall be repaired or replaced at the Sub-contractor's expenses.

d) Above Ground Soil Waste and Ventilation System

All soil, waste and ventilating pipe system forming part of the above ground installation, shall be given appropriate test procedures as described in B.S. 5572, 1972.

Smoke tests on above ground soil, waste and ventilating pipe system shall not be permitted. Pressure tests shall be carried out before any work which is to be concealed is finally enclosed.

In all respects, tests shall comply with the requirements of B.S. 5572.

**3.4.2 Site Test – Performance**

Following satisfactory pressure test on the pipework system operational tests shall be carried out in accordance with the relevant B. S. Code of practice on the systems as a whole to establish that special valves, gauges, control, fittings, equipment and plant are functioning correctly to the satisfaction of the Engineer.

All hot water pipework shall be installed with pre-formed fibre glass lagging to a thickness of 25mm where the pipe runs above a false ceiling or in areas where the ambient temperature is higher than normal with the result that pipe "sweating", due to condensation will cause nuisance.

All lagged pipes which run in a visible position after erection shall be given a canvas cover and prepared for painting as follows:

- i) Apply a coating of suitable filler until the canvas weave disappears and allow to dry.
- ii) Apply two coats of an approved paint and finish in suitable gloss enamel to colors approved by the Engineer.

All lagging for cold and hot water pipes erected in crawl ways, ducts and above false ceiling which after erection are not visible from the corridors of rooms, shall be covered with a reinforced aluminium foil finish banded in colours to be approved by the Engineer.

In all respects, unless otherwise stated, the hot and cold water installation shall be carried out in accordance with the best standard of modern practice and described in C.P.342 and C.P.310 respectively to the approval of the Engineer.

The test pressure shall be applied by means of a manually operated test pump or, in the case of long main or mains of large diameter, by a power driven test pump which shall not be left unattended. In either case precautions shall be taken to ensure that the required pressure is not exceeded.

Pressure gauges should be recalibrated before the tests.

The Sub-contractor shall be deemed to have included in his price for all test pumps, and other equipment required under this specification.

The test pressure shall be one and a half times the maximum working pressure except where a pipe is manufactured from a material for which the relevant B.S. specification designates a maximum test pressure.

### **3.5 STERILISATION OF COLD WATER SYSTEM**

All water distribution system shall be thoroughly sterilised and flushed out after the completion of all tests and before being fully commissioned for handover.

The sterilisation procedures shall be carried out by the Sub-contractor in accordance with the requirements of B.S. Code of Practice 301, Clause 409 and to the approval of the Engineer.

**PART E**

**PARTICULAR SPECIFICATIONS**

**FOR**

**PORTABLE FIRE EXTINGUISHERS AND  
BOOSTED HOSEREEL SYSTEM**

## **PART E**

### **PARTICULAR SPECIFICATION FOR PORTABLE FIRE EXTINGUISHERS AND BOOSTED HOSEREEL SYSTEM INSTALLATIONS**

<b><u>CLAUSE NO.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>PAGE</u></b>
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6.5	Dry Chemical Portable Fire Extinguisher	E-2-E-3
6.6	Air Foam Fire Extinguisher	E-3
6.7	Fire Blanket	E-3
6.8	Boosted Hosereel system	E-4-E-6



## **PART E**

### **PARTICULAR SPECIFICATIONS**

#### **FOR PORTABLE FIRE EXTINGUISHER AND HOSE REEL INSTALLATIONS**

##### **6.1 GENERAL**

The particular specification details the requirements for the supply and installation and commissioning of the Portable Fire Extinguishers and Boosted Hose Reel System. The Sub-contractor shall include for all appurtenances and appliances not necessarily called for in this specification or shown on the contract drawings but which are necessary for the completion and satisfactory functioning of the works.

If in the opinion of the Sub-contractor there is a difference between the requirements of the Specifications and the Contract Drawings, he shall clarify these differences with the Engineer before tendering.

##### **6.2 SCOPE OF WORKS**

The Sub-contractor shall supply, deliver, erect, test and commission all the portable fire extinguishers and Hose Reel which are called for in these Specifications and as shown on the Contract Drawings.

##### **6.3 WATER/CO<sub>2</sub> EXTINGUISHERS**

These shall be 9-litre water filled CO<sub>2</sub> cartridge operated portable fire extinguishers and shall comply with B.S. EN 3/BS 1449 and to the requirements of B.S.1004. Unless manufactured with stainless steel, bodies shall have all internal surfaces completely coated with either a lead tin, lead alloy or zinc applied by hot dipping. There shall be no visibly uncoated areas. The extinguishers shall be clearly marked with the following:

Method of operation.

The words 'WATER TYPE' (GAS PRESSURE) in prominent letters.

- a) Name and address of the manufacturer or responsible vendor.

The nominal charge of the liquid in imperial gallons and litres.

The liquid level to which the extinguisher is to be charged.

The year of manufacture.

A declaration to the effect that the extinguisher has been tested to a pressure of 24.1 bar (350 p.s.i.).

- h) The number of British Standard 'B.S' 1004 or B.S. 1449.

#### **6.4 PORTABLE CARBON DIOXIDE FIRE EXTINGUISHERS**

These shall be portable carbon dioxide fire extinguishers and shall comply with B.S. EN 3/BS 1449 and B.S. 1004.

The body of extinguisher shall be a seamless steel cylinder manufactured to one of the following British Standards; B.S. 401 or B.S. 1288.

The filling ratio shall comply with B.S. 5355 with valves fittings for compressed gas cylinders to B.S.341. Where a hose is fitted it shall be flexible and have a minimum working pressure of 206.85 bar (3000 p.s.i.). The hose is not to be under internal pressure until the extinguisher is operated.

The nozzle shall be manufactured of brass gunmetal, aluminium or stainless steel and may be fitted with a suitable valve for temporarily stopping the discharge if such means are not incorporated in the operating head.

The discharge horn shall be designed and constructed so as to direct the discharge and limit the entrainment of air. It shall be constructed of electrically non-conductive material.

The following markings shall be applied to the extinguishers:-

The words "Carbon Dioxide Fire Extinguisher" and to include the appropriate nominal gas content.

Method of operation.

The words "Re-charge immediately after use".

Instructions for periodic checking.

The number of the British Standard B.S. 3326: 1960 or B.S. 5423.

The manufacturers name or identification markings

#### **6.5 DRY CHEMICAL POWDER PORTABLE FIRE EXTINGUISHER**

The portable dry powder fire extinguishers shall comply with BS EN 3/BS 1449 and BS 1004. The body shall be constructed to steel not less than the requirements of BS 1449 or aluminium to BS 1470 : 1972 and shall be suitably protected against corrosion.

The dry powder charge shall be not-toxic and retain its free flowing properties under normal storage conditions. Any pressurizing agent used as an expellant shall be in dry state; in particular compressed air.

The discharge tube and gas tube if either is fitted shall be made of steel, brass, copper or other not less suitable material. Where a hose is provided it shall not exceed 1,060mm and shall be acid and alkali resistant. Provision shall be made for securing the nozzle when not in use.

The extinguisher shall be clearly marked with the following information

- a) The word "Dry Powder Fire Extinguisher"
- b) Method of operation in prominent letters.
- c) The working pressure and the weight of the powder charge in Kilogramme
- d) Manufacturers name or identification mark
- e) The words "RECHARGE AFTER USE" if rechargeable type.
- f) Instructions to regularly check the weight of the pressure container (gas Cartridge) or inspect the pressure indicator on stored pressure types when fitted, and remedy any loss indicated by either.
- g) The year of manufacture.
- h) The Pressure to which the extinguisher was tested.
- i) The number of this British Standard BS 3465 or BS 5423: 1977.
- j) When appropriate complete instructions for charging the extinguisher shall be clearly marked on the extinguisher or otherwise be supplied with the refill.

#### **6.6 AIR FOAM FIRE EXTINGUISHER**

These shall be of 9 litres capacity complete with refills cartridges and wall fixing brackets and complying with B.S. EN 3/BS 1449 and BS 1004 with the following specifications:-

**Cylinder:** to **B.S. 1449**

**Necking:** to be 76mm outside diameter steel EN 3A 2<sup>3</sup>/<sub>4</sub> X 8TPI female thread.

**Head cap:** to be plastic moulding acetyl resin.

**CO2 Cylinder:** to be 75gm P.V.C coated.

**Internal Finish:** to be polythene lining on phosphate coating.

**External finish:** to be phosphated - One coat primer paint and one coat stove enamel  
B.S 381 C.

#### **6.7 FIRE BLANKET**

The fire blanket shall be made from cloth woven with pre-asbestos yarn or any other fire proof material and to measure 1800 x 1210 mm and shall be fitted with special tapes folded so as to offer instantaneous single action to release blanket from storing jacket to BS 1721.

## **6.8 BOOSTED HOSE REEL SYSTEM**

### **6.8.1 General**

The Particular Specification details the requirements for the supply, installation and commissioning of the hose reel installation. The hose reel installation shall comply in all respects to the requirements set out in C.O.P 5306 Part 1: 1976, B.S 5041 and B.S 5274. The System shall comprise of a pumped system.

### **6.8.2 Hose Reel Pumps**

The fire hose reel pumps shall consist of a duplicate set of multi-line centrifugal pumps from approved manufacturers. The pumps shall be capable of delivering 2.3 lit/sec at a running pressure of 2.1 bar.

The pump casing shall be of cast iron construction with the impeller shaft of stainless steel with mechanical seal.

### **6.8.3 Control Panel**

The control panel shall be constructed of mild steel 1.0mm thick sheet, be moisture, insect and rodent proof and shall be provided complete with circuit breakers and a wiring diagram enclosed in plastic laminate.

The pump shall be controlled by a flow switch therefore, the control panel shall include the following facilities:

‘On’ push button for setting the control panel to live.

Green indicator light for indicating control panel live.

Duty / Stand-by pump auto change over.

Duty pump run green indicator light.

Stand-by pump run green indicator light.

Duty pump fail red indicator light.

Stand-by pump fail red indicator light.

Low water condition pump cut-out with red indicator light.

The pumps are to be protected by a low level cut-out switch to prevent dry pump run when low level water conditions occur in the water storage tank.

#### **6.8.4 Hose Reel**

The hose reel to the installation shall consist of a recessed, swing-type hose reel as Angus Fire Armour Model III or from other approved manufacturers.

The hose reel shall comply with B.S EN 671-1:1995 and EN 694 and is to be installed to the requirements of C.P. 5306 Part 1: 1976.

The hose reel shall be supplied and installed complete with a first-aid non-kinking hose 30 metres long with a nylon spray / jet / shut-off nozzle fitted. A screw down chrome - plated globe valve to B.S 1010 to the inlet to the reel is to be supplied.

The orifice to the nozzle is to be not less than 4.8mm to maintain a minimum flow of 0.4 lit / sec to jet.

The hose reels shall be installed at 1.5 metres centre above the finished floor level in locations shown in the contract drawings.

#### **6.8.5 Pipe Work**

The pipe work for the hose reel installation shall be galvanised wrought steel tubing heavy grade Class C to B.S 1387: 1967 with pipe threads to B.S 21.

#### **6.8.6 Pipe Fittings**

The pipe fittings shall be wrought steel pipe fittings, welded or seamless fittings conforming to B.S. 1740 or malleable iron fittings to B.S 143.

All changes in direction will be with standard bends or long radius fittings. No elbows will be provided.

#### **6.8.7 Non-return Valves**

The non-return valves up to and including 80mm diameter shall be to B.S. 5153 : 1974.

The valves shall be of cast iron construction with gunmetal seat and bronze hinge pin.

#### **6.8.8 Gate Valves**

The gate valves up to and including 80mm diameter shall be non-rising stem and wedge disc to B.S 5154: 1974 with screwed threads to B.S. 21 tapes thread

### **Sleeves**

Where pipe work passes through walls, floors or ceilings, a sleeve shall be provided one diameter larger than the diameter of the pipe, the space between them to be packed with mineral wool, to the Engineer's approval.

### **Earthing**

The hose reel installation shall be electrically earthed by a direct earth connection. The installation of the earthing shall be carried out by the Electrical Sub- contractor.

### **Finish Painting**

Upon completion of testing and commissioning the hose reel installation, the pipe work shall be primed and finish painted with 2 No. coats of paints to the Engineer's requirements.

### **Testing and Commissioning**

The hose reel installation shall be flushed out before testing to ensure that no builder's debris has entered the system. The installation is to be then tested to one and half times the working pressure of the installation to the approval of the Engineer. Simulated fault conditions of the pumping equipment are to be carried out before acceptance of the System by the Engineer.

#### **6.8.13 Instruction Period**

The Sub-contractor shall allow in his contract sum for instructing of the use of the equipment to the Client's maintenance staff. The period of instruction may be within the contract period but may also be required after the contract period has expired.

The period of time required shall be stipulated by the Client but will not exceed two days in which time the Client's staff shall be instructed on the operation and maintenance of the equipment.

**PARTICULAR SPECIFICATIONS**

**FOR**

**FIRE HYDRANTS**

**PART FA**

**PARTICULAR SPECIFICATIONS FOR FIRE HYDRANT**

<b><u>CLAUSE.</u></b>	<b><u>DESCRIPTION</u></b>	<b><u>PAGE</u></b>
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7.2	Scope of Works	FA-1
7.3	Fire Hydrant Details	FA-1
7.4	Stand Pipes	FA-2
7.5	Hose Pipe	FA-2



## **7.1 GENERAL**

This particular specification details the requirement for the supply, installation and Commissioning of the Fire Hydrants and Fire Hydrant Pump. The hydrants installation shall Comply in all respects to the requirements of BS. 750: 1977 or the latest version of it.

### **7.2 Scope of Works**

The Sub-Contractor shall supply, deliver, erect, test and commission underground screw-down type fire hydrants and portable fire hydrant pumps.

## **7.3 FIRE HYDRANT DETAILS**

### **(a) Hydrant body**

The body of the hydrant shall be made of grey cast iron complying with the requirements of BS 750 having a tensile strength not less than that given for grade 14.

### **(b) Hydrant Valve**

The valve shall be faced with suitable resilient material. The threaded part of the valve, which engages with the spindle, shall be of bronze.

Body seating for the valves shall be of copper alloy complying with the requirements of BS 750, or high tensile brass complying with the requirements of BS 2872 or BS 2874.

Turning the spindle cap in a clockwise direction when viewed from above shall close valves and the direction of opening shall be permanently marked on the gland.

### **(c) Spindle & Spindle Cap**

The spindle note shall be either of the same material as the spindle, or of copper alloy complying with the requirements of BS/1400 either type LG 2 or type LG 4.

It shall have a squared top formed to receive either a cast iron spindle cap.

The spindle shall be made of copper alloy complying with the requirements of BS 2874, either type CZ114 or type CZ115, and it shall have a threaded machined of trapezoidal form. The spindle cap shall be of a cast iron secured to the spindle by on M12 hexagon socket set screw conforming to BS 4168.

### **(d) Hydrant outlet**

The outlet flange of the hydrant shall have above nominal diameter 65mm, and shall be fitted with a screwed outlet – Both flanges shall be 50 mm conforming to BS 750. The screwed outlet shall be provided with a cap of cast iron or other suitable material. The cap shall cover the outlet thread completely and shall be attached to the hydrant by a chain

The distance between the axis of the outlet and the nearest point on the spindle fitting shall be not less than 100 mm. The screwed outlet shall be made of Copper alloy to BS 1400, type LG2G or DC BIC or Copper alloy to BS 2872, type CZ114 or CZ115, or Suitable spheroidal graphite iron to BS 2789 protected against corrosion accordance with CP 2008.

**(e) Drain Boss**

Each shall be provided with a suitable drain boss on the outlet side. This shall be located at the lowest practical point, which will permit the filling of self-operating a drilled drip plug.

**(f) Jointing**

The hydrants shall have machined joint faces through out and the fitting of adjoining parts shall be Such as to make sound joints, corresponding parts of hydrants of the same design and manufacture shall be interchangeable.

**(g) Hydrant coating**

The hydrant shall be coated in accordance to BS. 4164.

**(h) Surface Box.**

The clear opening of hydrant surface boxes at ground level shall not be less than 250mm x 380mm

The depth of frame shall normally be for boxes located on footpaths: 100mm for boxes located in roads: 125mm

**Markings**

Surface box covers shall be clearly marked by having the words 'FIRE HYDRANT' in letter not less than 30mm high, or the initials 'F.H.' in letters not less than 75mm high cost into the cover.

**Surface Box Covers & Frames.**

The surface box frames and covers shall be graded in accordance with 2.1. of BS 497:1967 and shall meet the loading test requirement also given in BS 497

**Testing**

The hydrants shall be deemed to have undergone the necessary hydrostatic and flow test at time of manufacture Necessary test certificates from the manufacturer shall be needed. The test, to conform to BS 750: 1977: Appendix a.1

**7.4 STAND PIPES**

One end of these shall have internal threads to couple with the 80mm diameter external threads of the screw down type fire Hydrant (BS750 type 2 hydrants) outlet. The other shall have 65mm diameter internal threads to couple with the interconnect or hose of the pump set

**7.5 HOSE PIPE**

Each cotton synthetic fibre rubberised fire hosepipe to be 25mm metres long with 65mm diameter female instantaneous type connector.

**SECTION F:**

**BILLS OF QUANTITIES  
AND  
SCHEDULE OF UNIT RATES**

**BILLS OF QUANTITIES AND SCHEDULE OF UNIT RATES**

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## SPECIAL NOTES

1. The Bills of Quantities form part of the contract documents and are to be read in conjunction with the contract drawings and general specifications of materials and works.
2. The prices quoted shall be deemed to include for all obligations under the Contract including but not limited to supply of materials, labour, delivery to site, storage on site, installation, testing, commissioning and all taxes (**including 16% VAT**).

In accordance with Government policy, 3% Withholding Tax **shall be deducted** from all payments made to the Tenderer, and the same shall be forwarded to the **Kenya Revenue Authority (KRA)**.

- 3 All prices omitted from any item, section or part of the Bills of Quantities shall be deemed to have been included to another item, section or part thereof.
4. The brief description of the items given in the Bills of Quantities are for the purpose of establishing a standard to which the Contractor shall adhere. Otherwise alternative brands of **equal** and **approved** quality will be accepted.

Should the Contractor install any material not specified here in before receiving **written approval** from the Project Manager, the Contractor shall remove the material in question and, **at his own cost**, install the proper material.

5. The grand total of prices in the price summary page must be carried forward to the **Form of Tender for the tender to be deemed valid**.
6. Tenderers must enclose, together with their submitted tenders, detailed manufacturer's Brochures detailing Technical Literature and specifications on all the equipment they intend to offer.

1. **Statement of Compliance**

- a) I confirm compliance of all clauses of the General Conditions, General Specifications and Particular Specifications in this tender.
- b) I confirm I have not made and will not make any payment to any person, which can be perceived as an inducement to win this tender.

Signed:.....*for and on behalf of the Tenderer*

Date: .....

Official Rubber Stamp: .....

## **BILLS No. 1**

### **A) PRICING OF PRELIMINARIES ITEMS.**

Prices will be inserted against item of preliminaries in the Contractor's Bills of Quantities and specification. These Bills are designated as Bill 1 in this Section. Where the Contractor fails to insert his price in any item he shall be deemed to have made adequate provision for this on various items in the Bills of Quantities. The preliminaries form part of this contract and together with other Bills of Quantities covers for the costs involved in complying with all the requirements for the proper execution of the whole of the works in the contract.

The Bills of Quantities are divided generally into three sections:-

#### **a. Preliminaries – Bill 1**

Contract preliminaries are as per those described in Section B – Contract preliminaries and conditions of contract. The Contractor shall study the conditions and make provision to cover their cost in this Bill. The number of preliminary items to be priced by the Tenderer has been limited to tangible items such as site office, temporary works and others. However the Tenderer is free to include and price any other items he deems necessary taking into consideration conditions he is likely to encounter on site.

#### **b. Installation Items – Other Bills**

- i. The brief description of the items in these Bills of Quantities should in no way modify or supersede the detailed descriptions in the contract Drawings, conditions of contract and specifications.
- ii. The unit of measurements and observations are as per those described in clause 3.05 of the section

#### **c. Summary**

The summary contains tabulation of the separate parts of the Bills of Quantities carried forward with provisional sum, contingencies and any prime cost sums included. The tenderer shall insert his totals and enter his grand total tender sum in the space provided below the summary. This grand total tender sum shall be entered in the Form of Tender provided elsewhere in this document

**BILL No. 1: CONTRACT PRELIMINARIES** (Refer to Section C of this Tender Document)

ITEM	DESCRIPTION	QTY	UNIT	RATE (KSHS)	AMOUNT (KSHS)
1	Discrepancies clause 1.02				
2	Conditions of Contract Agreement clause 1.03				
3	Payments clause 1.04				
4	Site location clause 1.06				
5	Scope of Contract Works clause 1.08				
6	Extent of the Contractor's Duties clause 1.09				
7	Firm price contract clause 1.12				
8	Variation clause 1.13				
9	Prime cost and provisional sum clause 1.14 (insert profit and attendance which is a percentage of expended PC or provisional sum.)				
10	Bond clause 1.15				
11	Government Legislation and Regulations clause 1.16				
12	Import Duty and Value Added Tax clause 1.17 (Note this clause applies for materials supplied only. VAT will also be paid by the sub-contractor as allowed in the summary page)				
13	Insurance company Fees clause 1.18				
14	Provision of services by the Contractor clause 1.19				
15	Samples and Materials Generally clause 1.21				
	<b>SUB-TOTAL CARRIED TO PAGE G-3</b>				



<b>ITEM</b>	<b>DESCRIPTION</b>	<b>QTY</b>	<b>UNIT</b>	<b>RATE (KSHS)</b>	<b>AMOUNT (KSHS)</b>
16	Supplies clause 1.20				
17	Bills of Quantities clause 1.23				
18	Contractor's Office in Kenya clause 1.24				
19	Builder's Work clause 1.25				
20	Setting to work and Regulating system clause 1.29				
21	Identification of plant components clause 1.30				
22	Working Drawings clause 1.32				
23	Record Drawings (As Installed) and Instructions clause 1.33				
24	Maintenance Manual clause 1.34				
25	Hand over clause 1.35				
26	Painting clause 1.36				
27	Testing and Inspection – manufactured plant clause 1.38				
28	Testing and Inspection – Installation clause 1.39				
29	Storage of Materials clause 1.41				
30	Initial Maintenance clause 1.42				
<b>SUB-TOTAL CARRIED TO PAGE G-3</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE (KSHS)	AMOUNT (KSHS)
31	Attendance Upon Tradesmen, etc. (Insert percentage only) clause 1.58				
32	Local and other Authorities notices and fees clause 1.60				
33	Temporary Works clause 1.63				
34	Patent Rights clause 1.64				
35	Mobilization and Demobilization Clause 1.65				
36	Extended Preliminaries Clause 1.66(see appendix on page C- 24)				
37	Supervision by Engineer and Site Meetings Clause 1.67				<b>200,000</b>
38	Allow for profit and Attendance for the above				
39	Amendment to Scope of Contract Works Clause 1.68				
40	Contractor Obligation and Employers Obligation clause 1.69(see appendix page C- 24)				
41	Any other preliminaries;				
	Subtotal above  Subtotal brought forward from page G-1  Subtotal brought forward from page G-2				
	<b>TOTAL FOR BILL NO. 1: PRELIMINARIES CARRIED FORWARD TO GRAND SUMMARY GS 01</b>				

**BILL NO. 2**  
**(BILL OF QUANTITY)**  
**MECHANICAL WORKS**

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	<p><b><u>SANITARYWARE</u></b></p> <p>Supply the following appliance including their support brackets, screws etc and their connection to water supply, waste/ soil drainage and electrical power supply;</p> <p><b><u>NOTE: TRADE NAMES</u></b></p> <p>Where trade Names are mentioned below the tenderer MUST provide the same materials and other brands shall not be accepted without a written authority to supply alternative brands by the Engineer/ Architect.</p> <p><b><u>WC SUITE</u></b></p> <p>A Western type close coupled white WC suite in vitreous China comprising of water closet bowl with white seat and cover, p- trap connector and stainless steel hinges. All to be as "Twyfords Oriental" or approved equivalent.</p> <p><b><u>TOILET FLUSH VALVE</u></b></p> <p>B Toilet flush valves as cobra No. Fm 3422, 1 1/4" Econoflush - concealed type with integral non-hold open vacuum breaker all complete with flush pipes and fittings</p> <p><b><u>URINAL BOWLS</u></b></p> <p>C Ceramic urinal bowl complete with 40mm heavy duty plastic bottle trap and 40mm diameter chrome plated outlet with grating firmly fixed on the wall with chrome plated screws. The fittings shall be as Roca or equal and approved.</p> <p>D Squatting wc suite in vitreous China, comprising of water closet bowl with top plate and integral foot threads , s-trap connector. All to be as Twyfords Oriental or approved equivalent.</p>	23	No		
<b>Sub Total c/f to collection Page</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	<p><b><u>URINAL BOWL DIVISIONS</u></b></p> <p>Ceramic urinal bowl divisions separating the above described urinal bowls fixed firmly on the wall. The fittings shall be as Roca or equal and approved.</p>	2	No		
B	<p><b><u>URINAL BOWL FLUSH VALVES</u></b></p> <p>32mm urinal bowl flush valve for the above urinal bowls complete with back entry with integral vacuum breaker, non-hold open features and non-return valve. Inlet control stop and wall plate comprising flush valve to be push button type. The fittings shall be as 'Docol' or equal and approved</p>	4	No		
C	<p><b><u>COUNTERTOP WASH HAND BASIN (WHB)</u></b></p> <p>Countertop wash hand basin size 635x500mm with one hole, 32mm diameter chrome plated chain waste, chain stay hole, chrome plated non-conclusive time delay press action pillar tap and heavy duty plastic bottle trap (32mm'P' trap)with 75mm seal. All to be as Roca Georgia or equal and approved.</p>	20	No		
D	<p><b><u>MIRRORS</u></b></p> <p>6mm thick polished plate glass, silver backed mirror with bevelled edges, size 610x497mm plugged and screwed to wall with 4No. Chrome capped screws and 5mm thick foam back nest.</p>	20	No		
E	<p><b><u>STAINLESS STEEL KITCHEN SINK</u></b></p> <p>Stainless steel kitchen sink, double bowl double drain size 2000 x 500, bowl size 370 x 340 x 150mm complete with all accessories and Two taps for proper function as ASL or approved equivalent.</p>	2	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	<b><u>TOILET ROLL HOLDER</u></b>  Toilet roll holder with stainless steel cover as Geesa Code 145	23	No		
B	<b><u>COAT HOOK</u></b>  Twyfords bathrooms Ltd Ref. No. PB0204SI satin aluminium screw to wall Coat Hook 84x78mm complete with screws.	23	No		
C	<b><u>HAND DRIERS</u></b>  Automatic Hand Face Drier in white colour, operating on an infra-red automatic sensing system with safety cut-out complete with plastic rawl plugs and fixing screws. The hand drier to have a heating capacity of 2.1 kw and to be of size 270x64x143mm deep as HEATREA SADIA "Hand Dri" or approved equivalent	8	No		
D	<b><u>AMBULANT DISABLED WATER CLOSET SUITE</u></b>  Low level wash down water closet suite for the elderly and disabled in white complete with horizontal outlet and bottom supply and overflow with close coupling side lever treatment 7.5litre cistern, raised heavy duty toilet seat and cover and s-trap outlet and 600x35mm stainless steel grab rails (4no).The set to be complete with wash hand basin, 6mm thick mirror, toilet roll holder. All to be as TwyfordS Avalon BTW or approved equitant.  <b>STAINLESS STEEL SLAB URINAL</b>  Stainless steel slab urinal size 3.6m complete with automatic cistern stainless steel spreader pipe and floor trap connected to waste to be As Twyfords or approved equivalent.	4  1	No  No		
<b>Sub Total c/f to collection Page</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	<p><b><u>SOAP DISPENSER</u></b></p> <p>Soap Dispenser capacity 1.136 litres complete with plastic rawl plugs, fixing screws, lock and key complete with initial fill of soap gel. The soap dispenser to be as ZALPON'S MARK 7 model, size 125x100 x290mm high or approved equivalent</p>	8	No		
B	<p><b><u>WALL MOUNTED WASH HAND BASIN</u></b></p> <p>Twyfords "SOLA 510" wash hand basin with two tap holes and chain stay hole No. WB2522WH. Size 510x420mm in white vitreous China. Complete with sola pedestal No. VC5910WH and wall support No. SR1319XX. Pedestal to be screwed to the floor No. AZTEC chrome plated pillar taps. No. A25800CP AZTEC chrome plated tap handles No. WF4330CP 32mm chrome plated chain waste No WF8463CP 32mm stainless steel bottle P trap with 75mm seal or equal and approved</p>	0	No		
C	<p><b><u>COPPER TUBING</u></b></p> <p>12mm diameter copper tubing 300mm long bent as required including union jointing to steel tubing and fittings</p>	20	No		
15	<p><b><u>ANGLE VALVES</u></b></p> <p>15mm dia Angle valve</p>	20	No		
D	<p><b><u>SHOWER ENCLOSURE</u></b></p> <p>Shower encloser as Novelini Lunes GF 114 complete with a hinged door and all accessories for proper function or approve <b>equivalent</b> of lunes GF114</p>	2	No		
<b>Sub Total c/f to collection Page</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
<b>B</b>	<b><u>INTERNAL PLUMBING</u></b> Supply, deliver and install CPVC SDR-11 pipes and fitting for sizes upto 2" SDR 13.5 and for sizes above 2" upto 4" Tenderers must allow in their pipework prices for all the couplings, connectors, joints etc required in the running length of pipework and also where necessary for pipe fixing clips, holderbats plugged and screwed, brackets and pipe sleeves through structural member				
	<b><u>CPVC PIPES</u></b>				
A	15mm diameter pipe work	72	Lm		
B	20mm diameter pipe work	78	Lm		
C	25mm diameter pipe work	56	Lm		
D	32mm diameter pipe work	72	Lm		
E	40mm diameter pipe work	0	Lm		
F	50mm diameter pipe work	172	Lm		
G	63mm diameter pipe work	48	Lm		
	<b><u>BENDS</u></b>				
H	15mm diameter bends	26	No		
I	20mm diameter bends	24	No		
J	25mm diameter bends	12	No		
K	32mm diameter bends	12	No		
L	40mm diameter bends	0	No		
M	50mm diameter bends	8	No		
N	63mm diameter bends	6	No		
	<b><u>REDUCERS</u></b>				
O	20x15mmdiameter reducer	18	No		
P	25x15mm diameter reducer	20	No		
Q	25x20mm diameter reducer	14	No		
R	32x20mm diameter reducer	4	No		
S	32x25mm diameter reducer	8	No		
T	40x20mm diameter reducer	0	No		
U	40x25mm ditto	0	No		
V	50x25mm ditto	0	No		
W	50x32mm ditto	0	No		
X	50x40mm ditto	8	No		
Y	63x50mm ditto	6	No		
	<b>Sub Total c/f to collection Page</b>				



ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>UNIONS</u></b>				
A	15mm diameter pipe unions	22	No		
B	20mm diameter pipe unions	18	No		
C	25mm diameter pipe unions	20	No		
D	32mm diameter pipe unions	8	No		
E	40mm diameter pipe unions	0	No		
F	50mm diameter pipe unions	18	No		
G	63mm diameter pipe unions	4	No		
	<b><u>THREADED FITTINGS</u></b>				
H	15mm male female threaded 90 bend /Elbow	18	No		
I	20mm male female threaded 90 bend /Elbow	16	No		
J	25mm male female threaded 90 bend /Elbow	16	No		
K	32mm ditto	0	No		
L	40mm ditto	0	No		
	<b><u>PLUGS</u></b>				
M	40mm diameter pipe threaded plug	0	No		
N	50mm diameter pipe threaded plug	6	No		
	<b><u>VALVES</u></b>				
O	25mm diameter approved medium pressure screw down full way non-rising stem wedge gate to BS 5154PN 25 for series B rating with wheel and head joints to steep tubing and complete with round male threaded transition fitting AS PEGLER	10	No		
P	32mm gate valve as pegler	4	No		
Q	40mm diameter ditto	0	No		
R	50mm diameter ditto	6	No		
S	63mm diameter ditto	3	No		
T	50mm non- return valve	4	No		
U	32 mm medium pressure ball valve	2	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>STAND PIPE</u></b>				
A	15mm diameter bib tap suitable for connecting hose pipe complete with threaded adaptors. The tap to be complete with 5meter long 20mm diameter pipe bends etc. The chrome plated bib taps to be as cobra ref.No.107EC taps or equal and approved	2	No		
	<b><u>WATER STORAGE TANKS</u></b>				
B	Supply and install vertical close end plastic moulded tank of capacity 5000 ltrs and diameter 1670x2060m high. The tank to be assembled complete with overflow 32mm high pressure ball valve. Drain pipes and any other necessary item for its proper functioning. The tank shall be mounted on a flat roof slab and shall be as ROTO model or approved equivalent	4	No		
C	Ditto 10,000 ltrs capacity mounted on a raised platform size 2400mmx2800mm	1	No		
D	Supply and install a set Of PKm70/10.8 HP x62mx60ltrs /min domestic pedrollo booster pumps complete with all Electrical controls, pressure switch and accessories	1	set		
<b>Sub Total c/f to collection Page</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>INTERNAL FOUL WATER DRAINAGE</u></b>				
	Supply, deliver and install the following UPVC,MUPVC,soil and waste systems respectively to BS5255 with fittings fixed to manufactures printed instructions and manufactured by reputable manufactures. Tenderers must allow in their pipework and also where necessary, for pipe fixing clips , holders bats plugged and screwed for the proper and satisfactory functioning of the system				
	<b><u>MUPVC AND UPVC WASTE AND SOIL PIPEWORK</u></b>				
A	100 diameter heavy gauge golden brown UPVC pipe	174	Lm		
B	100mm heavy gauge grey MUPVC pipe	94	Lm		
C	150mm H/G golden brown UPVC pipe	0	Lm		
D	75mm diameter heavy gauge grey MUPV pipe	94	Lm		
E	50mm diameter waste pipe	64	Lm		
F	40mm diameter waste pipe	0	Lm		
G	32mm diameter waste pipe	52	Lm		
	<b><u>BENDS</u></b>				
H	100mm diameter bend with access	18	No		
I	100mm diameter long radius bend	0	No		
J	75mm diameter long radius bend	8	No		
K	100mm diameter sweep bend	23	No		
L	50mm diameter sweep bend	14	No		
M	40mm diameter sweep bend	12	No		
N	32mm diameter sweep bend	8	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>TEES</u></b>				
A	75mm diameter sweep tee	24	No		
B	40mm diameter sweep tee	0	No		
C	32mm diameter sweep tee	0	No		
	<b><u>BRANCH</u></b>				
D	100mm diameter single branch	6	No		
E	100mm diameter double branch	6	No		
	<b><u>ACCESS CAPS</u></b>				
F	50mm diameter access cap	6	No		
G	40mm diameter access cap	10	No		
H	32mm diameter access cap	0	No		
	<b><u>WC CONNECTORS</u></b>				
I	100mm diameter WC connector	23	No		
	<b><u>TRAPS</u></b>				
J	100x50mm diameter floor trap	24	No		
K	100x100mm diameter floor drain and grating	0	No		
L	Standard 300x300x450mm masonry gully trap complete with 125mm reinforced concrete cover	6	No		
	<b><u>WEATHERING SLATES AND VENT COWLS</u></b>				
M	100mm diameter weathering slate and apron	6	No		
N	100mm diameter vent cowl	6	No		
	<b><u>EXCAVATIONS FOR PIPES</u></b>				
O	Allow for excavations in black cotton soil/murram for drainage pipes not exceeding 1500mm deep and average 900mm deep part return in ram and surplus cart away	50	Lm		
	<b><u>MANHOLES</u></b>				
P	Provide materials and erect a manhole standard including all necessary excavations, backfilling and disposal of surplus materials and formwork and medium duty manhole cover and frame average depth depth 1000mm	10	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>FIRE PROTECTION</u></b> Supply, deliver and install the following fire fighting equipment in positions indicated on the contract drawings or as shall be instructed by the Engineer, supply and install the following fire fighting installation and equipment as described and shown on the drawings. Tenderers should allow for all fittings, joining couplings including unions and clamps where necessary for the functioning of the installation when pricing				
	<b><u>HOSEREEL INSTALLATION HOSERELL</u></b>				
A	20mm diameter 30m long swinging type hose reel complete with delivery valve, mild steel feed pipe, isolation valve guide and all other accessories as "Angus Fire Armour" or equal and approved .	6	No		
	<b><u>GMS PIPE CLASS B</u></b>				
B	20mm diameter pipework	6	Lm		
C	25mm diameter pipework	12	Lm		
D	50mm diameter pipework	112	Lm		
	<b><u>EXTRA OVER PIPEWORK</u></b>				
	<b><u>BENDS</u></b>				
E	20mm diameter bends	6	No		
F	25mm diameter bends	6	No		
G	50mm diameter bends	6	No		
	<b><u>TEES</u></b>				
H	50mm diameter equal tees	12	No		
	<b><u>VALVES</u></b>				
I	25mm diameter approved medium pressure screw down full way non -rising stem wedge gate valve to BS 1952 with wheel and head joints to steel tubing. The gate valve to be as PEGLER	6	No		
J	50mm diameter ditto	12	No		
	<b><u>REDUCERS</u></b>				
K	50x25mm diameter reducer	6	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>UNIONS</u></b>				
A	25mm diameter pipe unions	10	No		
B	50mm diameter pipe unions	12	No		
	<b><u>HOSEREEL PUMPSET</u></b>				
C	Horse pumps, one duty the other standby mounted on a frame with a mild steel base plate. Each pump shall have a duty 5m <sup>3</sup> /hr against 50m head as Grundfos model CH4-40 or approved equivalent. In addition there shall be a 60ltrs diaphragm pressure vessel(as Varem or approved equivalent) pressure switches, a switch to protect dry run 65mm foot valve and strainer, tank connections, gate valves and non-return valves control shall be affected via a pressure switch through a pre-wired control panel which shall give automatic change over from duty pump within 5 seconds should the duty pump fail to deliver for any reason. The pumpset shall include all non-return valves, timer, isolating valves and pipe connections	1	Set		
	<b><u>CONTROL AND CONTROL PANEL</u></b>				
D	Control panel for the above pumps with contractors, over voltage and under voltage protection relays. MCBs start stop push buttons and indicators lights. All this shall be housed in a lockable cabinet (with integral isolator) made from SWG18 mild steel sheet that is oven powder coated. The control shall also include a float switch or flow switch for prevention against dry running complete with its cable	1	Item		
	<b><u>FIRE HOSE CABINET</u></b>				
E	Surface mounted fire hose cabinet manufactured from electro galvanized steel with folded edges and curled hose plate edges painted with electro static powder coating, 180o C baked .The cabinet size shall be capable of housing hosereel and 3No portable extinguishers as described in the next page and should confirm to BS EN 671-1 to be as Germania or equal and approved	1	No		
	<b><u>PAINTING</u></b>				
	Allow for painting of the hosereel installation with two coats of super gloss paint on a primer coat to the approval of the Project Engineer	1	Item		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>PORTABLE FIRE EXTINGUISHERS</u></b>				
	Supply, deliver, install, test and commission the following portable fire extinguishers and conforming to BS EN 3 BS 1449.				
	<b><u>WATER/CO2 FIRE EXTINGUISHER</u></b>				
A	9 litres water carbon dioxide gas portable fire extinguisher complete with pressure gauge, initial charge and mounting brackets.	10	No		
	<b><u>CARBON DIOXIDE GAS</u></b>				
B	5Kg carbon dioxide gas portable fire extinguisher complete with pressure gauge, initial charge and mountings brackets	10	No		
	<b><u>Dry Chemical Powder Fire Extinguisher</u></b>				
	<b><u>DRY CHEMICAL POWDER</u></b>				
C	9Kg chemical powder portable fire extinguisher complete with pressure gauge, initial charge and mountings brackets.	10	No		
	<b><u>MANUAL ALARM BELL</u></b>				
D	9 (225mm ) manual operated alarm bell(Gong)	0	No		
	<b><u>FIRE BLANKET</u></b>				
E	Fire blanket made of cloth woven with pre-asbestos yarn or any other fire proof material and to measure 1800x1210mm. It shall be fitted with special tapes folded so as to often instantaneous single action to release blanket from storing jacket to BS 1721 <b>Fire Notices</b>	10	No		
F	Allow for fire signage for the hose reel system , fire exits and fire instructions as described in the particular specifications as described in the particular specifications and to the Project Engineer's approval	20	No		
G	Testing and Commissioning	1	Item		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>COLLECTION PAGE.</u></b>				
1	Total carried to summary CH/1				
2	Total carried to summary CH/2				
3	Total carried to summary CH/3				
4	Total carried to summary CH/4				
5	Total carried to summary CH/5				
6	Total carried to summary CH/6				
7	Total carried to summary CH/7				
8	Total carried to summary CH/8				
9	Total carried to summary CH/9				
10	Total carried to summary CH/10				
11	Total carried to summary CH/11				
12	Total carried to summary CH/12				
	<b>Total for Mechanical and Internal Plumbing Works Carried Summary Page</b>				



ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
<b><u>LABORATORY</u></b>					
<b>FUME CUPBOARD</b>					
A	Supply deliver and install a fume cupboard of exterior dimension of 1200 mm wide x 1000 mm high . Fume cupboard to complete with sliding plexglass face with a " 12 " work opening running full width of cabinet with sliding doors an "8" diameter exhaust collar connection, overhead instrument control panel, and shall incorporate a vulcathene sink , L.P gas outlet and non corrosive bulhead light . fume cupboard to be lined with epoxy coated Aluminium on working surface and sides Fume cupboard to be as Method Full glass instructional Fume Hood or equal and approved equivalent	1	No		
<b>Fume Cupboard Extra fan</b>					
B	Supply deliver and install a fume cupboard extract fan capable of 0.4 m <sup>3</sup> /s against a system pressure drop of 50 n/m 2. Casing of the fan to be rigid PVC, impellers moulded in phenolic resin and motor protected by sealing coat of polyurethane compound . fan to be complete with montor starter, Electrical control panel fixed near the fume cupboard with On/Off and trip and manual override in plant room , flexible connections anti vibration mountings supports fan to be as "WOOD" fume Cupboard fan size 12 " running at 1400 RPM or equal and approved equivalent	1	No		
<b>LABORATORY SINKS</b>					
C	' Vulcathene " black injection moulded polythene sink with self draining base and anout let to accept the waste described below as Cat No. 602 complete with ;-_ " Vultex " labline bench mounted one way outlet fitting with inlet for supply and side valve having swivel nozzle and spout Vulcathene'11/2 waste plug back, butyl rubber gasket, and chain as Cat No 504 Vulcathene anti-siphon bottle trap as cat No. W 561	11	No		
<b>Sub Total c/f to collection Page</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b>Fume Cupboard Extract Ductwork</b>				
	<i>Supply deliver and install 200 mm diameter UPVC duct work for the fume cupboard above</i>				
A	200 mm diameter UPVC pipework class "D"	28	Lm		
B	Holder bats for 200 mm diameter pipework	1	Item		
C	200 mm diameter bends	2	No		
D	200 mm diameter ventilating cowls	1	No		
E	Weathering slate for 200 mm Ø pipe	1	NO		
F	Weathering Apron for 200 mm pipe	1	No		
G	Neoprene fan connections	1	No		
H	Supports and anti vibration amountings for the fan and any other necessary items	1	Item		
	<b>Water Supply</b>				
I	Control valve as vultex labline Ref No. VI 2105	14	NO		
J	Bench mounting outlet complete with backnuts, spout, as Vultex labline Ref. No. VL2107 /D	14	NO		
K	Allow for 1000mm long 12 mm diameter copper tube and nuts	15	NO		
	<b>Gas Supply</b>				
L	Control valve as vultex labline Ref No. VL.2109	14	No		
M	Back nuts and nozzles as vultex labline Ref No. VL.2110 /d	14	No		
N	Allow for 100mm long 6 mm diameter copper tube with nuts	14	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>DRAINAGE</u></b>				
A	11/4 diameter waste complete with integral grating removable chained plug and bucknut as vulcathene Ref No. 504	14	No		
B	76mm diameter valcathene waste pipe and fittings	66	LM		
C	76mm diameter valcathene pipe plus accessories	42	LM		
D	50mm diameter ditto	72	LM		
E	40 diameter ditto	50	LM		
F	35mm diameter ditto	26	LM		
	<b><u>WATER STORAGE TANK</u></b>				
G	Supply , deliver and install vertical close plastic moulded tank of capacity 1800 litres ( 400gallons ) diameter 1300 x 860 mm high . The tank to be assembled complete with cover and having a screwed connections for inlet, out later overflow, 32 mm high pressure ball valve , drain pipes and any other necessary item for its proper functioning .the tank shall be mounted onflat roof slab and shall be as ROTO model or approved equivalent.	0	No		
	<b>TESTING AND COMMISSIONING</b>				
H	Allow for setting to work , testing and commissioning	1	Item		
	<b>LABORATORY L.P GAS INSTALLATION</b>				
I	L.P Gas storage tank of 13 kg capacity	3	NO		
J	L.P gas supply	40	KG		
K	25mm diameter GMS class B pipe as sleeve for gas pipe	72	Lm		
	<b>WATER RETICULATION</b>				
L	25mm diameter PPR pipe bend	10	No		
M	25mm diameter bend	10	NO		
N	20mm diameter PPR pipe	48	Lm		
O	20 diameter bend	15	No		
P	15mm diameter PPR pipe	42	No		
Q	15mm diameter bend	10	No		
R	20mm diameter Tee	6	No		
S	15mm diameter Tee	10	No		
T	LPG pressure gauge	1	No		
U	50mm diameter GMS manifold with 3no branch tappings to gas cylinders c/w mounting plugs	1	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b>Copper tubing.</b>				
A	6/8 dia. Copper tubing	82	Lm		
B	8/10 ditto	42	Lm		
C	10/12 ditto	27	Lm		
	<b>Extra Over Copper tubing for the following fittings.</b>				
D	6/8mm diameter Brass Equal Tee	12	No		
E	8/10mm ditto	10	No		
F	10/12mm ditto	8	No		
G	8/10x6/8mm diameter Brass Un equal Tee	12	No		
H	10/12x8/10mm ditto	12	No		
I	10/12x8/10mm diameter Brass Reducer	12	No		
J	8/10x6/8mm ditto	12	No		
	<b>Gas Valves.</b>				
K	6/8mm diameter approved quarter turn lever operated ball valve to BS 5154 and joints to copper	3	NO		
	<b>Pressure regulator.</b>				
L	15mm dia. First stage gas pressure regulator as Rego 2403 V.9 complete with connections and brackets for 1 No gas cylinder Tank.	1	NO		
M	15mm dia. Second stage gas pressure regulator as Rego 2503 B for the supply pipe.	1	NO		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b>Gas outlet ( Tap )</b>				
A	Low pressure LP gas outlet with a safety drop lever to prevent accidental turn on 2 CFM at 2 p.s.i, 4mm diameter outlet and 1/4 BSP tail with backnut. The outlet shall be as Vultex Labline 2 way bench mounted with 2 cocks spaced at 90o angle model No. VL 2601/D	14	No		
	<b>Bunsen Burner</b>				
B	Bunsen burner to use the L.P gas with 9mm outlet diameter riffled gas inlet tube and air regulator. Overall height 120mm and burner tube of 13mm outside diameter. The burner shall be as PARCO Ltd Ref. BYB-045 R or equal and approved.	28	No		
C	12mm dia. 600mm long hose pipe to fit.	28	No		
D	Testing and commissioning.	1	item		
	<b><u>Emergency Laboratory Shower ( Eye &amp; Body)</u></b>				
E	Emergency shower shall consist of a combination unit comprising eye wash station, and shower station, complete with all accessories for fixing to waste and fixtures AS Method or approved equivalent.	1	No		
	<b>NEUTROLISING TANK</b>				
F	25 litre neutralising tank size 915 x 610 x 655mm (LxWxH).The inlet to tank and outlet shall be 76mm diameter. The tank to be as Method V930 or approved equivalent.	1	No		
	<b>SAFETY CABINET</b>				
	A biosafety cabinet class III complete with high functionality control panel, real time negative pressure and HEPA filter life,fan with alarm function to be AS METHOD or approved equivalent.	0	No		
	<b>Sub Total c/f to collection Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>COLLECTION PAGE.</u></b>				
1	Total carried to summary CH/14				
2	Total carried to summary CH/15				
3	Total carried to summary CH/16				
4	Total carried to summary CH/17				
5	Total carried to summary CH/18				
	<b>Total for one laboratory</b>				-
			<b>X2</b>		X 2
	<b>Total for two laboratories</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<p><b>PROPOSED BORE HOLE DRILLING AND EQUIPPING AT MOIBEN SCIENCE TEACHERS COLLEGE</b></p> <p><b><u>Preliminaries and General Conditions</u></b></p> <p>A Provide bond as stated in the published conditions</p> <p>B Provide insurance as required in the contract conditions</p> <p>C Preparation of working drawings and "As installed /as built " record drawings</p> <p>D Printing of Papers copies of item C above</p>		Sum		
	<p><b>Total For Preliminaries carried forward to summary page</b></p>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	Allow for conducting an hydrological site survey to establish the best point to drill a bore hole within the plot registered Hydrologist and produce report a detailed report to services Engineer. The result of this will either justify or negate the next event	1	Item		
B	Allow for application and acquisition of permit for drilling bore hole from relevant authorities. This will necessitate the activity of the next event	1	Item		
C	Allow for the application and acquisition of NEMA permit for drilling of bore hole <b>The following bore hole drilling shall take place if item A,B and C are successfully completed and the relevant document released to the services engineer for onward transmission to the client</b>	1	Item		
D	Mobilization/ demobilization of drilling unit, equipment materials and, personnel and all other required supplies	1	Sum		
E	Erecting / dismantling of drilling unit	1	Sum		
F	Drilling of 200 mm diameter bore hole from 0-100 m below surface	100	Lm		
G	Drilling from 100 - 200 m	100	Lm		
H	Drilling from 200 - 300 m	100	Lm		
I	drilling from 300 - 350 m	50	LM		
J	Supply and installation of 200 mm diameter stainless steel casing suitable for borehole	250	Lm		
K	Supply and installation of 200 mm diameter slotted stainless steel casing suitable for borehole	50	Lm		
L	Supply and installation of filler gravel pack	8	Ton		
M	Test pumping to ascertain bore hole yield for atleast 24 hours including installation and withdrawal of test pumping unit recovery measurements and production of detailed test pump results .	24	hr		
N	construction of concrete plinth around well head	1	Item		
O	borehole capping	1	Item		
<b>TOTAL CARRIED TO COLLECTION PAGE</b>					



ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	Allow for all costs involved in providing water for all requirements of the contract drilling field etc	1	Item		
B	Allow for the production of bacteriological water chemical analysis and bore hole completion report	1	Item		
C	Geological logging	1	Item		
D	Supply and install centrifugal borehole pump, continuously rated and capable of pumping 10m <sup>3</sup> /hr of water against a total head of 350 m. the entire pump - set body, impellers, shaft etc. shall be made of heavy duty stainless steel materials . The pump shall have inbuilt non return valve tail trainer , and cable guard. the pump shall e as GROUND FOS 12 d03927 S[ 17-27 N three phase 415 V	1	No		
	<b>Solar panel installation</b>				
E	Supply and instal sunverter solar pump control for the above pump and matching solar panels.	1	PC		
F	ditto pv disconnect switch	1	PC		
G	Ditto 6mm squared 4 core underground cable, Borehole to panel	30	M		
H	Ditto 6mm squared 4 core from panel to the main supply	20	M		
I	Ditto 1.5mm squared 2 core underground cable electrodes	20	M		
J	Ditto 1.5mm squared 2 underground cable floatswitch	20	M		
K	Earth rod coupled with clamp	1	PC		
L	6mm squared Earth cable	10	M		
M	Float switch for the storage tank	1	PC		
N	Borehole water meter i.e kent or equivalent approved	1	PC		
P	Electrodes pencil	1	Pair		
<b>TOTAL CARRIED TO COLLECTION PAGE</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	<p>Supply and install a control panel to be mounted off the wall. The control panel shall be water tight with corrosion resistant from hinged lockable door metal enclosure and Merlin Gerin switch- gear and Telemecanique control gear. The control panel 1 No. 25A 3 - pole isolator complete with extended rotar handle as main incomer</p> <p>* 0-500 v voltmeter complete with fuse protection and selector switch under/over voltage phase failure protection relay complete fuse protection</p> <p>* 0 -10 - 20 A ammeter for the 5.5 kw borehole pump</p> <p>* 1 No. 16 A 3 pole MCB for the 5.5 kw pump</p> <p>* 1 No. 1 A 3 pole MCB type for the 45 watt motor complete with auxiliary relay for 5.5 kw pump</p> <p>*1 No. pump 45 W 1 - phase 240 V AC DOL starter complete with thermal overload relay for doser pump</p> <p>* dry run alarm for the 45 watt chemical doser pump, incorporating a float switch in the doser level regulator , to trigger the alarm when chemical level is low .</p> <p>Low level indicator lamp for chlorine doser</p>	1	No		
B	6 mm 2 4- core PVC round hardened PVC submersible electric cable . Waterproof.	300	Lm		
C	2.5 mm 4 - core PVC round hardened PVC electrode cables water proof	300	Lm		
D	Solar control panel as item (A) above	1	No		
E	Supply and install module mounting structure for solar panels from hot galvanized steel to be 4metres above ground level with supports and braces	1	No		
<b>TOTAL CARRIED TO COLLECTION PAGE</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	2.5 mm <sup>2</sup> 4 - core PVC/SWA/PVC cable from control panel to water tank	20	Lm		
B	25 mm diameter heavy gauge PVC ducts	20	Lm		
C	Excavate trench of dimension 300 mm x 500 mm to invert to lay cables . The laid cable to be covered with 50 mm thick layer of fine soil, covered with tiles as "Hatari " then back fill and ram and dispose of Excess	20	Lm		
D	Electrode pair	0	No		
E	Level regular complete with mounting box	2	No		
F	Supply and install galvanized lockable masonry borehole protection cover size 750 x 750 x 400mm complete with 2 No. heavy duty stainless steel padlock	1	No		
G	Supply and install PVC Class 'B' 40 mm diameter water pipe ( observation pipe)	300	Lm		
H	Supply and install high quality pressure gauge as kent or equivalent range 0-7 kg /cm <sup>2</sup> complete with accessories for mounting on G 1 pipe	1	No		
I	Supply and install single office air valve, complete with pipe mounting accessories	1	No		
<b>TOTAL CARRIED TO COLLECTION PAGE</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	Supply and install 50 mm diameter rising main galvanized mild steel pipes class 'C' complying to BS 1387 with screwed and socketed joints to BS 143	406	Lm		
B	50 mm diameter gate valve as peglar	2	No		
C	50 mm diameter non - return valve as peglar or equal and approved	2	No		
D	50 mm diameter G1 bend	5	No		
E	50 mm diameter water meter as" kent " or equal and approved	1	No		
F	Allow for installation of temporary borehole pump and accessories	1	No		
G	Any other items necessary to complete the works (please specify)	1	Item		
<b>TOTAL CARRIED TO COLLECTION</b>					
<b><u>COLLECTION</u></b>					
A	Total Brought Forward From CH/21				
B	Total Brought Forward From CH/22				
C	Total Brought Forward From CH/23				
D	Total Brought Forward From CH/24				
E	Total Brought Down From CH/25 above				
<b>TOTAL FOR DRILLING WORKS CARRIED TO COLLECTION PAGE</b>					

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<p><b><u>COLLECTION PAGE</u></b></p> <p>A Total For Preliminaries Works Carried Forward From CH/20</p> <p>B Total For Drilling Works Carried Forward From CH/25</p>				
	<p><b>TOTAL FOR MECHANICAL DRILLING WORKS CARRIED TO SUMMARY PAGE</b></p>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	<b><u>WORKS TO BE COMPLETED FROM PHASE 1</u></b>				
	<b>GROUND WATER TANK</b>				
A	Dismantle, reassemble and provide missing bolts and water gauge, paint, test and commission all to the approval of the Mechanical Engineer		ITEM		
	<b>HIGH LEVEL WATER TANK</b>				
B	Provide the missing bolts and water gauge, paint and connect provided twin booster pumps, test and commission all to the approval of the Mechanical Engineer		ITEM		
	<b>KITCHEN HOOD</b>				
C	Fix the existing kitchen hood properly with accessories and connect to the duct including fixing the extract fan with connection to power, test and commission all to the approval of the Mechanical Engineer		ITEM		
	<b>COLD ROOM</b>				
D	Supply, install, test and commission condensing unit for cold room (m.s), provide and fix framing to cold room door complete with insulation, fix thermometer lighting to the satisfaction of the Mechanical Engineer		ITEM		
	<b>HOSE REELS</b>				
E	Provide piping, gate valve and fix and connect the hose reels, test and commission all to the approval of the Mechanical Engineer	6	No		
	<b>WASH HAND BASINS</b>				
F	Provide and fix wash hand basins in hostel washrooms as before described, test and commission all to the approval of the Mechanical Engineer	6	No		
	<b>LP GAS</b>				
G	Allow for the connection of the LP Gas to the cooking island, test and commission all to the approval of the Mechanical Engineer (provide gas for initial testing)		ITEM		
H	Allow for making good leakages on classroom walls as instructed and approved by the project Manager		ITEM		
I	Allow for anchoring of kitchen sinks properly on the worktops to the satisfaction of the Mechanical Engineer		ITEM		
J	Allow for Kenya Shillings Three Hundred Thousand Only (Kshs. 300,000.00) for any other works in Phase I not catered for here		ITEM		
	<b>Total For Completion Works From Phase I Carried To Summary Page</b>				

ITEM	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
A	<p><b><u>PRIME COST AND PROVISIONAL SUMS</u></b></p> <p><b><u>PROVISIONAL SUMS</u></b></p> <p><u>Provisional sums are to be measured on completion and priced in accordance with the rates contained in these bills of quantities or prorata thereto or deducted in whole if not required</u></p> <p>Allow a provisional sum of Kenya Shillings One Million (Kshs <b>1,000,000.00</b>) only for contingencies to be spent as directed by the Project Manger</p>		ITEM		1,000,000.00
	<b>TOTAL PROVISIONAL SUMS CARRIED TO GRAND SUMMARY</b>				<b>1,000,000</b>

<b><u>GRAND SUMMARY</u></b>						
<b>ITEM</b>	<b>DESCRIPTION</b>	<b>PAGE</b>	<b>OFFICIAL USE</b>		<b>TENDERER'S AMOUNT</b>	
			<b>KSH.</b>	<b>CTS.</b>	<b>KSHS.</b>	<b>CTS</b>
1	Total For Preliminaries					
2	Total For Mechanical and Internal Plumbing	CH/13				
3	Total For Laboratory	CH/19				
4	Total For Drilling Borehole	CH/26				
5	Total For Completion Works to Phase I	CH/27				
6	Total ForPC/Provisional Sums	CH/28				
	<b>TOTAL TENDER INCLUSIVE OF ALL GOVERNMENT TAXES CARRIED TO FORM OF TENDER</b>					

Amount of tender in words : Kenya Shillings

Tendere's name.....

Tenderer's Signature and Stamp .....

Address.....

Witness Name and Signature .....

Address:.....



# **SCHEDULE OF ON-GOING PROJECTS.**

Details of on-going or committed projects, including expected completion date.

PROJECT NAME	NAME OF CLIENT	CONTRACT SUM	% COMPLETE	COMPLETION DATE

**CONTRACTS COMPLETED IN THE LAST FIVE (5)**  
**YEARS**

Work performed on works of a similar nature and volume over the last five years.

PROJECT NAME	NAME OF CLIENT	TYPE OF WORK AND YEAR OF COMPLETION	VALUE OF CONTRACT (KSH)

NB: Attach separate lists if space here is not enough.

I certify that the above works were successfully carried out and completed by us.

-----  
Title

-----  
Signature

-----  
Date

# KEY PERSONNEL

Qualifications and experience of key personnel proposed for administration and execution of the contract.

POSITION	NAME	YEARS OF EXPERIENCE (GENERAL)	YEARS OF EXPERIENCE IN PROPOSED POSITION

I certify that the above information is correct.

-----  
Title

-----  
Signature

-----  
Date

**TECHNICAL SCHEDULE OF ITEMS TO BE  
SUPPLIED.**

**SECTION – H**

# **TECHNICAL SCHEDULE OF ITEMS TO BE SUPPLIED**

## **CONTENTS.**

CLAUSE NO.

PAGE NO.

1.0 GENERAL NOTES TO TENDERERS

H-1

2.0 TECHNICAL SCHEDULE

H-2

# TECHNICAL SCHEDULE

## **GENERAL NOTES.**

### **1. General Notes to the Tenderers.**

- 1.1 The Tenderer shall submit technical schedules for all materials and equipment, upon which he has based his tender sum.

The tenderer shall also submit separate comprehensive descriptive and performance details for all plant apparatus and fittings described in the technical schedules. Manufacturers' literature shall be accepted. Failure to comply with this may have his tender disqualified.

Completion of the technical schedule shall not relieve the Contractor from Complying with the requirements of the specifications except as may be approved by the Engineer.

## TECHNICAL SCHEDULE

ITEM	DESCRIPTION	MANUFACTURERS'	COUNTRY OF ORIGIN	REMARKS, CATALOGUE NO.,ETC
1	WC pans			
2	WC flush cisterns			
3	Urinal bowls			
4	Wash hand basins			
5	Mirrors			
6	Hand driers			
7	Tissue holders			
8	Urinal flush cistern			
9	S.S. Kitchen sinks			
10	Hose reel booster pumps			
11	Hose reel			
12	Fire hydrant valve			
13	Fire Extinguishers			
14	Water tanks			
15	PVC pipes			
16	GMS pipes			
17	Taps			
18	Bottle traps			
19	Gate valves			
20	Stop corks			
21	Non return valves			
22	Urinal flush valve			
23	Soap dispenser			
24	Instantaneous Hot water heaters			

## **TENDER EVALUATION CRITERIA**

After tender opening, evaluation of tenders will be done in 3 stages, as follows;

- i. Preliminary evaluation
- ii. Technical Evaluation; and
- iii. Financial Evaluation.

### **STAGE I: PRELIMINARY EVALUATION**

#### **i. Preliminary evaluation to open tenders**

Tenders shall be subjected to a preliminary evaluation to determine whether: -

- a) The tender has been submitted in the required format as per the advertisement and tender instructions
- b) Any tender security submitted is in the required form, amount and validity period (150 days); only from a Bank or an Insurance Company approved by the Public Procurement and Regulatory Authority (PPRA)
- c) The tender has been signed by the persons lawfully authorized to do so (signed and stamped form of tender);
- d) The required number of copies of the tender has been submitted as per the advertisement and tender instructions.
- e) The tender is valid for the period required.

#### **ii. Mandatory /Statutory requirements**

- a) Certificate of company incorporation / Firm Registration
- b) List of directors with respect to shareholding & details of citizenship.
- c) Valid tax compliance certificate
- d) Form of tender (Properly filled, signed and stamped)
- e) Audited accounts for each of the last three years (**i.e. 2018-2020**).
- f) Registration certificate in relevant categories from the National Construction Authority N.C.A. **category 4 and above (Mechanical Works)**
- g) Contractors Annual Practicing license from the N.C.A. for current year.
- h) Bid Bond of **Kshs. 300,000.00** in form of a guarantee from reputable bank located in Kenya and valid for 150 days from the closing date of the tender.
- i) Power of attorney (of Tender signatory).
- j) Signed and stamped statement of Verification that not debarred in matters of Public Procurement and Disposal Act.
- k) Duly filled and signed tender questionnaire.
- l) Duly filled business questionnaire
- m) Duly filled statement of compliance



- n) Bidders who fail to attend the mandatory pre-tender conference shall also be considered non-responsive. Attendance register shall be signed on the material date and the pretender conference form (*to be availed during the said conference*)
- o) Personal/company documents should be certified by an advocate as a true copy of the original
- p) Tender document shall be serialized/paginated

The employer may seek further clarification/confirmation if necessary to confirm authenticity/compliance of any condition of the tender.

**Tenderers who do not satisfy any of the above requirements shall be considered NON-RESPONSIVE and their tenders will not be evaluated further.**

**STAGE II: TECHNICAL EVALUATION**

Award of points for the **Technical Evaluation** will be as follows: -

<b><u>Parameter</u></b>	<b><u>Maximum Points</u></b>
a) Key personnel	15
b) Contracts completed in the last five (5) years	15
c) Schedules of on-going projects	6
d) Schedules of contractor's equipment	10
e) Audited Financial Report for the for the last 3 years	15
f) Evidence of Financial Resources	15
g) Litigation History	5
h) Detailed works program and methodology	4
i) Mandatory due diligence	15
<b>Total</b>	<b><u>100</u></b>

The detailed scoring plan shall be as shown in Table 1 overleaf: -

**Table 1: Scores for the Technical Evaluation**

Item	Description	Points Scored		Max. Score
		Bidder	Bidder	
1	<b>Key Personnel (Attach evidence)</b>  <b>Directors of the company (any one (1) director)</b> <ul style="list-style-type: none"> <li>· Degree in a relevant Engineering field - 5mks</li> <li>· Diploma in a relevant Engineering field - 4mks</li> <li>· Certificate in relevant Engineering field - 3mks</li> <li>· Holder of trade test certificate in relevant Engineering field - 2mks</li> <li>· No relevant certificate - 0mks</li> </ul>			5
	<b>1 No. Key personnel with degree/diploma in relevant Engineering field</b> <ul style="list-style-type: none"> <li>· Over 10 years relevant experience with a degree - 5mks</li> <li>· Over 10 years relevant experience with a diploma - 4mks</li> <li>· Over 5 years relevant experience with a degree - 3mks</li> <li>· Over 5 years relevant experience with a diploma - 2mks</li> <li>· Under 5years relevant experience with a degree - 2mks</li> <li>· Under 5years relevant experience with a diploma - 1mks</li> </ul>			5
	<b>At least 2No. certificate holder of key personnel in relevant Engineering field</b> <ul style="list-style-type: none"> <li>· Over 10 years relevant experience - 5mks</li> <li>· Over 5 years relevant experience - 3mks</li> <li>· Under 5 years relevant experience - 2mks</li> </ul>			5
				<b>15</b>
2	<b>Contracts completed in the last five (5) years; a max of 3 No. projects (Attach evidence)</b> <ul style="list-style-type: none"> <li>· Project of similar nature, complexity and magnitude -4marks each</li> <li>· Project of similar nature, complexity and magnitude using conventional materials - 3marks each</li> <li>· Project of similar nature but of lower value than the one in consideration - 2 marks each</li> <li>· Project of similar magnitude - 1 mark each</li> <li>· No completed project of similar nature - 0 marks</li> </ul> NB: The Procuring entity shall conduct <b>MANDATORY</b> due diligence on the projects listed here			5
				<b>12</b>

Item	Description	Points Scored		Max. Score
		Bidder	Bidder	
<b>3</b>	<b>On-going projects (A max of 3 No. projects) (Attach evidence)</b> <ul style="list-style-type: none"> <li>· Project of similar nature, complexity and magnitude - 2 marks each</li> <li>· Project of similar nature but conventional system, complexity and magnitude - 1.0 marks each</li> <li>· Project of similar nature but of lower value than the one in consideration - 0.5 marks each</li> <li>· No ongoing project of similar nature - 0 marks</li> </ul>			
				<b>6</b>
<b>4</b>	<b>Schedules of contractor's equipment</b> For each specific equipment required in the construction work being tendered for. (Maximum No. of equipment to be considered – 5 No.) -- ----- 2 marks each			
				<b>10</b>
<b>5</b>	<b>Financial report</b> <b>Audited financial report for the last three [3] years (2018,2019 and 2020)</b> <ul style="list-style-type: none"> <li>· Average Annual turnover equal to or greater than the cost of the project - 10mks</li> <li>· Average annual turnover above 50% but below 100% of the cost of the project - 6mks</li> <li>· Average annual turnover below 50% the cost of the project - 4mks</li> </ul>			
				<b>10</b>
<b>6</b>	<b>Evidence of adequacy of working capital (Cash at hand &amp; Banks-signed &amp; stamped current bank statement dated not more than a month from date of submission, letters of credit stating amount to be advanced)</b> <ul style="list-style-type: none"> <li>· Has financial resources equal or above the cost of the project - 10mks</li> <li>· Has financial resources below the cost of the project, but over 50% of the cost of the project - 10mks</li> <li>· Has financial resources below 50% of the cost of the project - 5mks</li> <li>· Has not given evidence for the financial resources - 0mks</li> </ul>			
				<b>10</b>

Item	Description	Points Scored		Max. Score
		Bidder	Bidder	
7	<b>Litigation History</b> <ul style="list-style-type: none"> <li>· Has <i>no</i> construction-related litigation or arbitration case in the last five years - 3mks</li> <li>· Has <i>less than three</i> construction-related litigation or arbitration cases in the last five years - 2mks</li> <li>· Has <i>more than three</i> construction-related litigation or arbitration cases in the last five years - 0mks</li> </ul>			
				<b>3</b>
8	<b>DETAILED WORKS PROGRAMME OUTLINING THE METHODOLOGY OF COMPLETING AND DELIVERING THE CONTRACT WORKS ON OR BEFORE THE EXPIRY OF THE CONTRACT PERIOD</b> <ul style="list-style-type: none"> <li>· Work program and work methodology provided</li> <li>· No work program or methodology provided</li> </ul>			
				<b>4</b>
	<b>TOTAL MARKS</b>			<b>70</b>

**Any bidder who scores 50 points and above in this First Part of the technical Evaluation shall be considered for financial stage**

### **STAGE 3 - FINANCIAL EVALUATION**

Upon completion of the technical evaluation a detailed financial evaluation shall follow and the bidder who will pass in financial stage will score a maximum of 30 points. The evaluation shall be in three stages;-

- a) Determination of arithmetic errors
- b) Comparison of rates; and
- c) Consistency of the rates

#### **A) Determination of Arithmetic errors**

Arithmetic errors will be corrected by the Procuring entity as follows: -

1. In the event of a discrepancy between the tender amount stated in the form of tender and the corrected figure in the main summary of the Bills of quantities, the amount as stated in the Form of tender shall prevail. Pursuant to Section 82 of the Public Procurement and Asset Disposal Act 2015, the tender sum as submitted and read during the tender opening shall be absolute and final and shall not be subject to correction, adjustment or amendment in any way by any person or entity.

If, in the opinion of the Tender Evaluation Committee, the arithmetic error is substantial and is to the disadvantage of the bidder under consideration, then the bidder under consideration shall be notified in writing for concurrence of such an error. If such a bidder does not concur with the error, then the bidder shall be considered financially non-responsive and disqualified from further analysis.

2. Error Correction Factor shall be computed by expressing the difference between the tender amount and the corrected tender sum as a percentage of the corrected Builder's Works (i.e. Corrected tender sum less P.C. and Provisional Sums)
3. The Error Correction Factor shall be applied to all Builder's Works (as a rebate or addition as the case may be) for the purposes of valuations for Interim Certificates and valuation of variations.

#### **B) Comparison of rates**

Items that are underpriced or overpriced may indicate potential non-delivery or front loading respectively. The committee shall promptly write to the tenderer asking for a detailed breakdown of costs for any of the quoted items, relationship between those prices, proposed construction/installation methods and schedules.

The evaluation committee shall evaluate the responses and make an appropriate recommendation to the procuring entity giving necessary evidence. Such recommendations may include but not limited to:

- a) Recommend no adverse action to the tenderer after a convincing response;
- b) Employer requiring that the amount of the performance bond be raised at the expense of the successful tenderer to a level sufficient to protect the employer against potential financial losses; and
- c) Recommend non-award based on the response provided and the available demonstrable evidence that the scope, quality, completion timing administration of the works to be undertaken by the tenderer, would adversely be affected or the rights of the employer or the tenderer obligations would be limited in a substantial way.

### **C) Consistency of the rates**

The evaluation committee will compare the consistency of the rates for similar items and note all inconsistencies of the rates for similar items.

### **STAGE IV: RECOMMENDATION FOR AWARD.**

At this stage a bidder that was lowest evaluated and responsive shall be subjected to due diligence before award of the tender.

**SIGNATURE PAGE.**

Grand Total in Figures: Ksh .....

Grand Total in Words: Kenya Shillings .....

.....

Expected Contract period ..... Weeks .....

**TENDERER.**

Signature ..... Date .....

Official Rubber Stamp .....

.....

.....

Address .....

.....

.....

Telephone .....

**WITNESS**

Signature .....

Date .....

Name .....

Address.....

.....

**PRE-TENDER CONFERENCE/SITE VISIT**

There will be a **mandatory** pre-tender conference to be held on (as per advert).

Failure to attend this pre-tender conference/ site visit will lead to automatic disqualification of the tenderer.

**Contractors representative's name.....**

**Signature.....Date.....**

**Client or Project manager's representative.....**

**Signature and Stamp.....Date.....**



## **FORM OF AGREEMENT**

THIS AGREEMENT, made the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between \_\_\_\_\_ of [or whose registered office is situated at] \_\_\_\_\_ (hereinafter called “the Employer”) of the one part AND \_\_\_\_\_ of [or whose registered office is situated at] \_\_\_\_\_ (hereinafter called “the Contractor”) of the other part.

WHEREAS THE Employer is desirous that the Contractor executes

(*name and identification number of Contract* ) (Hereinafter called “the Works”) located at \_\_\_\_\_ [*Place/location of the Works*] and the Employer has accepted the tender submitted by the Contractor for the execution and completion of such Works and the remedying of any defects therein for the Contract Price of Kshs \_\_\_\_\_ [*Amount in figures*], Kenya Shillings \_\_\_\_\_ [*Amount in words*].

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents shall be deemed to form and shall be read and construed as part of this Agreement i.e.
  - (i) Letter of Acceptance
  - (ii) Form of Tender
  - (iii) Conditions of Contract Part I
  - (iv) Conditions of Contract Part II and Appendix to Conditions of Contract
  - (v) Specifications
  - (vi) Drawings
  - (vii) Priced Bills of Quantities
3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties thereto have caused this Agreement to be executed the day and year first before written.

The common Seal of \_\_\_\_\_

Was hereunto affixed in the presence of \_\_\_\_\_

Signed Sealed, and Delivered by the said \_\_\_\_\_

Binding Signature of Employer \_\_\_\_\_

Binding Signature of Contractor \_\_\_\_\_

In the presence of (i) Name \_\_\_\_\_

Address \_\_\_\_\_

Signature \_\_\_\_\_

[ii] Name \_\_\_\_\_

Address \_\_\_\_\_

Signature \_\_\_\_\_

# **MECHANICAL DRAWINGS**



**FIRST FLOOR  
DRAINAGE**

**KEY**

**PLUMBING KEY**

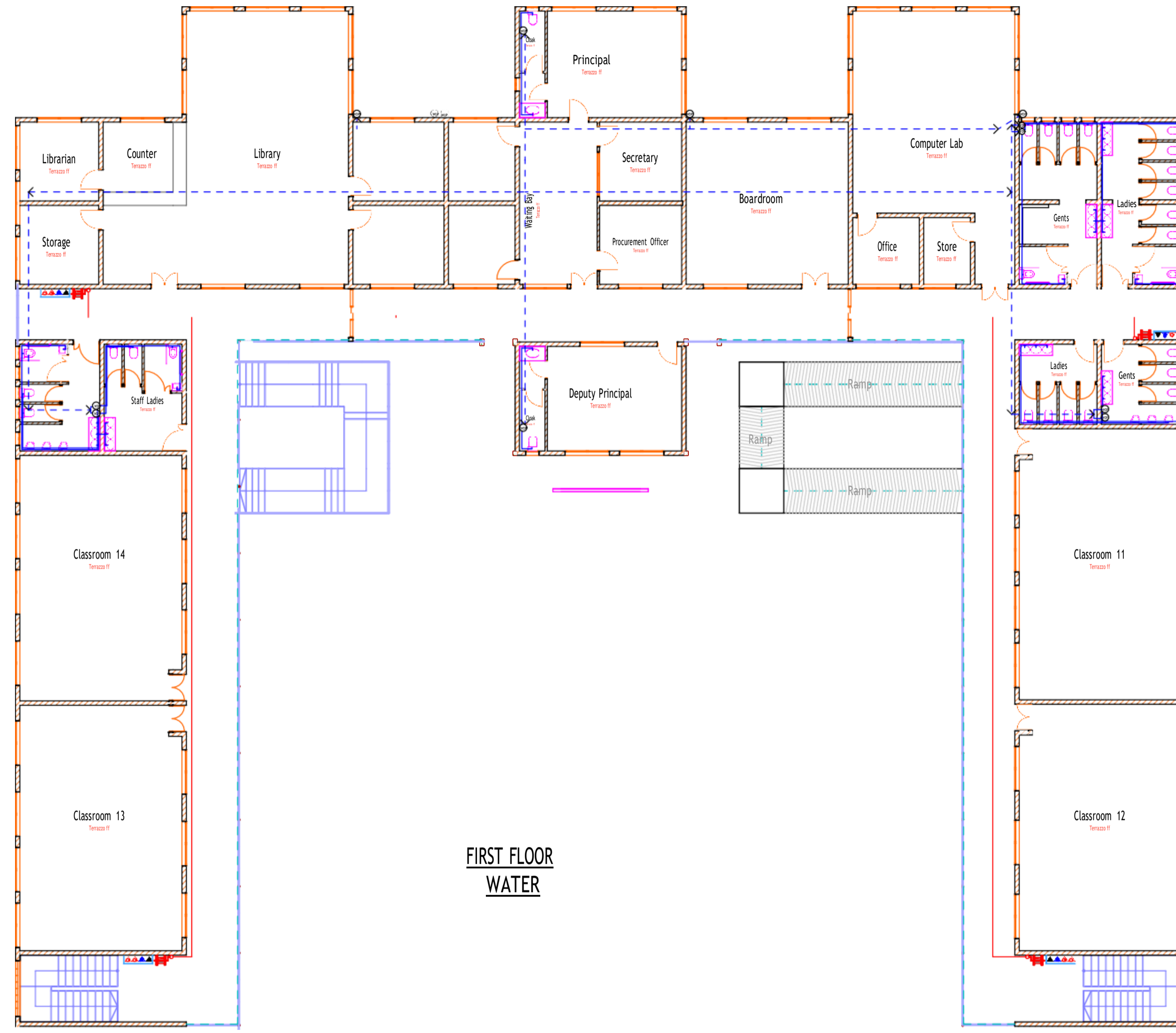
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	GAS UP PIPE
	INSPECTION CHAMBER
	INSPECTION CHAMBER
	GULLY TRAP
	STACK VENT PIPE
	FIRE HOSE REEL
	WATER
	WASTE WATER

**KEY**

**FIRE EQUIPMENT**

ITEM	SYMBOL
	FIRE POINT
	FIRE HOSE REEL
	WATER CO2 EXTINGUISHER
	ABC DRY CHEMICAL POWDER EXTINGUISHER
	CO2 EXTINGUISHER

CLIENT	MOI BEN SCIENCE TEACHERS
SCALE	1:100, 1:200
DATE	
SHEET No.	01
DWG	BLOCK A
DESIGND	JOTHAM LOKASA
DRAWN BY	
CHECKED BY	



**FIRST FLOOR  
WATER**

**KEY**

**PLUMBING KEY**

ITEM	SYMBOL
GUP	GAS UP PIPE
IC	INSPECTION CHAMBER
IC	INSPECTION CHAMBER
GT	GULLY TRAP
SVP	STACK VENT PIPE
—	FIRE HOSE REEL
—	WATER
—	WASTE WATER

**KEY**

**FIRE EQUIPMENT**

ITEM	SYMBOL
—	FIRE POINT
—	FIRE HOSE REEL
—	WATER CO <sub>2</sub> EXTINGUISHER
—	ABC DRY CHEMICAL POWDER EXTINGUISHER
—	CO <sub>2</sub> EXTINGUISHER

CLIENT	MOI BEN SCIENCE TEACHERS
SCALE	1:100, 1:200
DATE	
SHEET No.	01
DWG	BLOCK A
DESIGND	JOTHAM LOKASA
DRAWN BY	
CHECKED BY	



**SECOND FLOOR  
DRAINAGE**

**KEY**

**PLUMBING KEY**

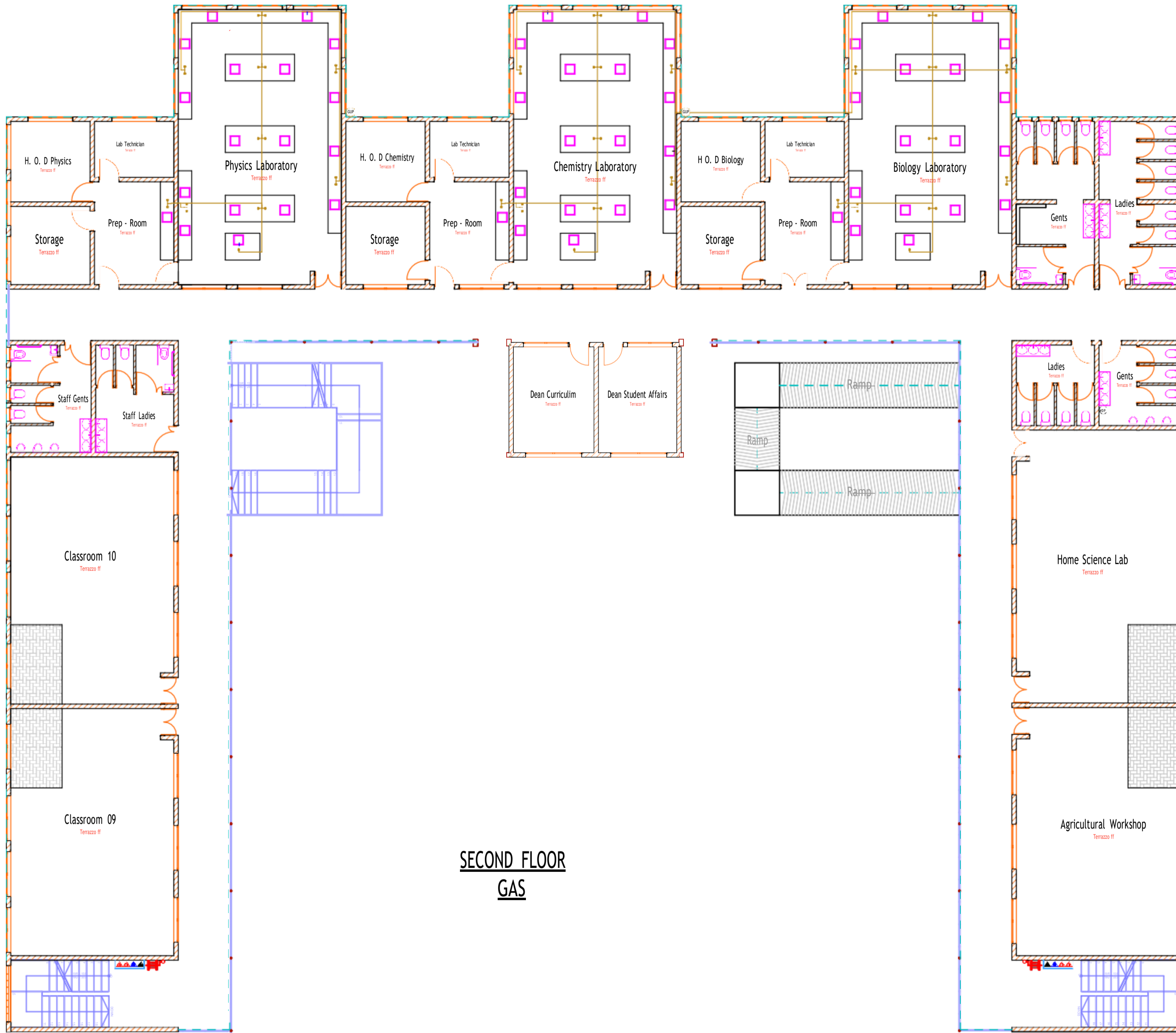
ITEM	SYMBOL
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	INSPECTION CHAMBER
	INSPECTION CHAMBER
	GULLY TRAP
	STACK VENT PIPE
	FIRE HOSE REEL
	WATER
	WASTE WATER

**KEY**

**FIRE EQUIPMENT**

ITEM	SYMBOL
	FIRE POINT
	FIRE HOSE REEL
	WATER CO <sub>2</sub> EXTINGUISHER
	ABC DRY CHEMICAL POWDER EXTINGUISHER
	CO <sub>2</sub> EXTINGUISHER

CLIENT	MOI BEN SCIENCE TEACHERS
SCALE	1:100, 1:200
DATE	
SHEET No.	01
DWG	BLOCK A
DESIGND	JOTHAM LOKASA
DRAWN BY	
CHECKED BY	



**SECOND FLOOR  
GAS**

**KEY**

**PLUMBING KEY**

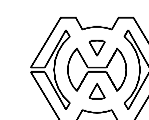
ITEM	SYMBOL
	GAS UP PIPE
	INSPECTION CHAMBER
	INSPECTION CHAMBER
	GULLY TRAP
	STACK VENT PIPE
	FIRE HOSE REEL
	WATER
	WASTE WATER

**KEY**

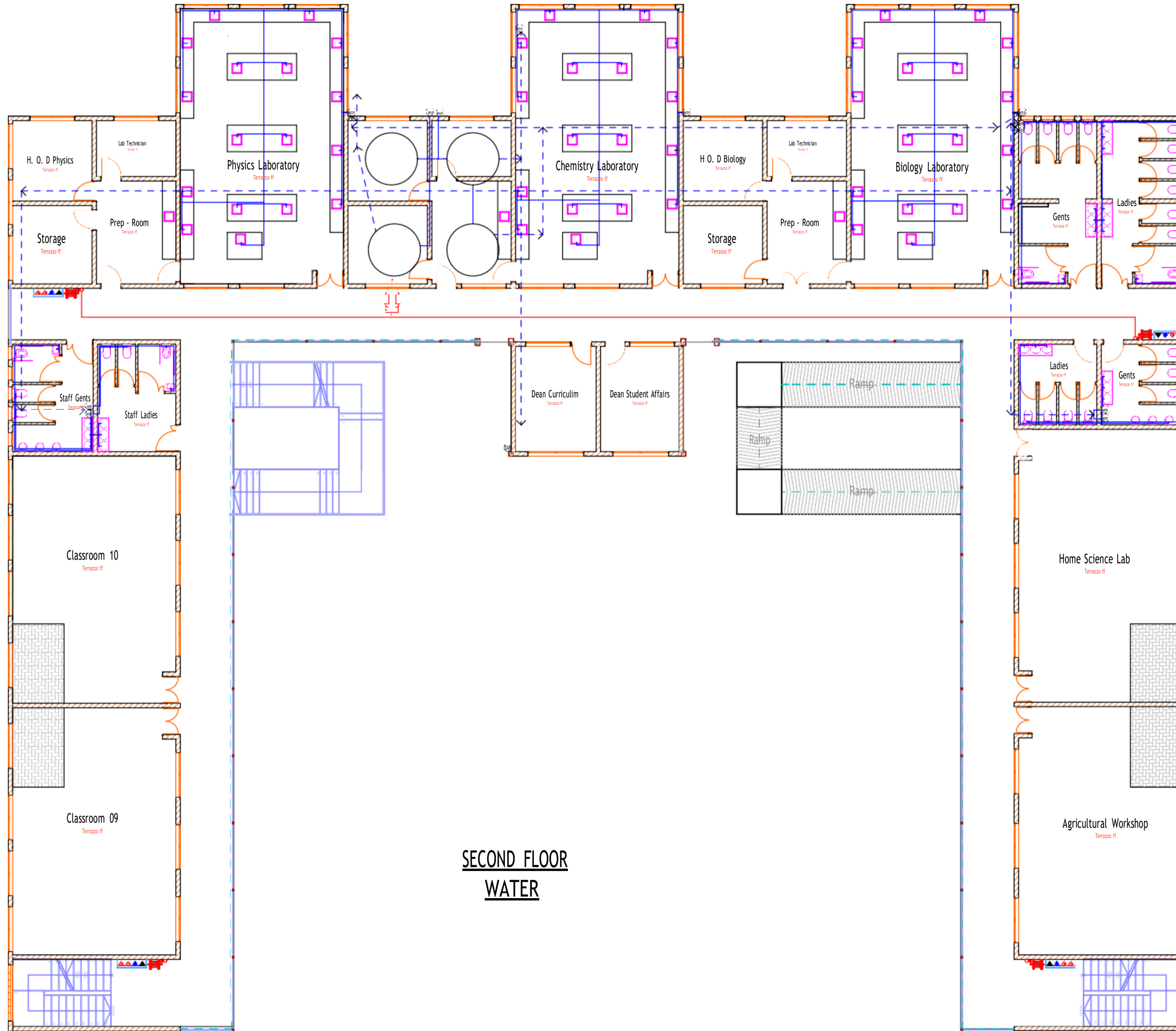
**FIRE EQUIPMENT**

ITEM	SYMBOL
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	ABC DRY CHEMICAL POWDER EXTINGUISHER
	CO <sub>2</sub> EXTINGUISHER

CLIENT	MOI BEN SCIENCE TEACHERS
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CHECKED BY	



MINISTRY OF TRANSPORT, INFRASTRUCTURE, HOUSING AND URBAN DEVELOPMENT  
STATE DEPARTMENT OF PUBLIC WORKS,  
P.O. BOX 33,  
MURANG'A.



**SECOND FLOOR  
WATER**

**KEY**

**PLUMBING KEY**

ITEM	SYMBOL
	GAS UP PIPE
	INSPECTION CHAMBER
	INSPECTION CHAMBER
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