DESIGNED TO EXCEL

ODISHA CONSTRUCTION CORPORATION LTD.
(A Govt. of Odisha Undertaking)

Jajpur Group of Projects, Jajpur

COVER – I

(TECHNICAL BID)

Tender Call Notice
No. 01/2022-23/SM/OCCL/JGP, dt. 13.07.2022

NAME OF WORK

Extension of district veterinary hospital of Jajpur.
Last date of submission of Tender: 27.07.2022(Up to 5.00 PM)

The Standard Bidding Document for invitation of tenders at Project Level pertaining to the work received from Veterinary & Fishery Department is hereby recommended for approval.

Manager (Civil) **Senior Manager (C),P.M-2** **G.M (C), H.O**

APPROVED

MANAGING DIRECTOR

TABLE OF CONTENTS

1. DETAILS OF DEMAND DRAFTS SUBMITTED BY THE BIDDER WITH THE TECHNICAL BID (COVER-I)

(DETAILS TO BE FILLED IN BY THE BIDDER)

A. DETAILS OF TENDER PAPER COST SUBMITTED BY THE BIDDER

Tender Paper cost Rs._____

(Rupees_____

_____) only vide A/C Payee D.D..

_____Dated_____issued by

_____

Bank,_____Branch in favour of " **Odisha Construction Corporation Ltd**" payable at **Bhubaneswar**.

B. DETAILS OF EARNEST MONEY DEPOSIT (EMD) SUBMITTED BY THE BIDDER

Exempted till 31.12.2022 as per Finance Department Office Memorandum No. 8484, dated. 05.04.2022. The Bid Security Declaration form in prescribed proforma is attached herewith.

Full signature of "Bidder" with seal

2. **Particulars of the Bidder**

(Details to be filled in by the bidder in all respect in the blank space ***otherwise his tender will not be considered****.)*

Full Name of the Bidder: -
…….

Full Address of the Bidder :-

……

……

……

…… PIN -
…….

Telephone No. – Land line : ……. Mobile :

…….

E-mail ID :-

…….

OCC Enlistment No. of the Bidder:
……..

Signature of the Bidder with seal

Contractor Senior Manager (Civil)

3. **OTHER STATUTORY DOCUMENTS SUBMITTED** :- (*Please write the GSTN / PAN / EPF No. etc. in the relevant box and attach the certified copies of the documents*)

i.	GST No.	
ii.	PAN	
iii.	EPF No.	
iv.	Labour License No.	
v.	OCCL Enlistment No. -	Valid upto-
vi.	Any other documents. (As per Tender Call Notice)	

Full signature of the "Bidder" with date and seal

Contractor Senior Manager (Civil)

4. **Undertaking by the Contractor**

I / We Shri _____

(In case of the firm, the name of the proprietor/head of the firm along with the designation & name of firm should be mentioned)

S/o Sri _____, Permanent resident of

Vill./Street _____, P.O. - _____, P.S.- _____ Via - _____, Dist. - _____ State - _____, PIN -_____

declare that I/We have thoroughly gone through the tender document and I/We know about the site(s) of works. I/We agree to work at rates quoted by me/us or at settled rates and abide by the terms and conditions of the tender document.

Full signature of the "Contractor" with date and seal

Contractor Senior Manager (Civil)

ODISHA CONSTRUCTION CORPORATION LIMITED
(A Government of Odisha Undertaking)
OFFICE OF THE SENIOR MANAGER(CIVIL)
JAJPUR GROUP OF PROJECTS
1ST FLOOR, PLOT NO-2546,
LALITESWAR NAGAR, JAJPUR - 755001,
E-mail: - occjajpur@gmail.com

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TENDER CALL NOTICE

NOTICE NO:- 01/2022-23/SM/OCCL/JGP dt. 13.07.2022

1. The Senior Manager (Civil), Jajpur Group of Project, Jajpur on behalf of Odisha Construction Corporation Ltd. ("OCCL") invites sealed tender on percentage rate basis on double cover system from the eligible class of contractors enlisted with "OCCL" for the following work. The agency must be enlisted as C-II & above class of contractor in OCC Ltd. If not enlisted, agency is to get enlisted in OCC Ltd as C-II & above class of contractor preferably before submission of tender but Mandatory before drawl of agreement. The enlistment form of OCCL is available in the website of OCC Ltd. i.e. www.odishaconstruction.com or may be collected from OCC Ltd. Head Office and should be submitted at the same office along with the necessary documents and fees before submitting the tender document positively failing which it will not be considered for the present work. In case intending bidder applied for such Certificate but not received up to the time of submission of bid, he has to submit the certificate of Registration of concerned State Government/ Railway/ CPWD/ Government bodies along with copy of the application for C-II or above enlistment in OCCL.

Sl. No.	Name of work	Approx. value of work (Excluding GST) In ₹	Bid Security (EMD)	Cost of Tender document (non-refundable including GST) In ₹	Period of completion.	Class of Contractor
1	Extension of district veterinary hospital of Jajpur.	₹8096160/-	Bid Security Declaration as per W.D.O.M No. 4710, dated. 12.04.2022 is to be furnished	₹ 10,000/- + ₹ 1800/-(GST) = ₹ 11,800/-	11 (Eleven) calendar months	C-II & above

2. The tender document can be downloaded from the official websites of OCC Ltd. (www.odishaconstruction.com) from 13.07.2022 to 27.07.2022 up to 5.00 P.M. In such case, the Contractors have to deposit the cost of tender paper as above by demand draft to be drawn on or before dt. 27.07.2022 from any nationalized / scheduled bank and payable at Jajpur Town in favour of Odisha Construction Corporation Ltd. along with the tender.
3. The tender document can also be obtained from office of the Senior Manager (Civil), OCC Ltd., Jajpur Group of Projects, Jajpur during office hour from Dt. 13.07.2022 to 27.07.2022 up to 5.00 PM. The Bidder (Job worker) have to deposit the non-refundable cost of tender paper specified for the work in the table as above in shape of Demand Draft from any Nationalized / Schedule Bank operative in Odisha, payble at Jajpur Town in favour of Odisha Construction Corporation Ltd. Interested Bidders may obtain further information, if any from the undersigned.
4. The provision of on-line transfer of EMD/submission of EMD by any method has been exempted by the Govt. of Odisha till 31.12.2022. However, the Bidders have to submit a Bid Security Declaration as per Works Department Office Memorandum No. 4710, dated

Contractor Senior Manager (Civil)

12.04.2022 as part of its bid in prescribed proforma failing which the bid will be treated as non-responsive.

5. The tender is to be dropped in the tender box kept in the office of the Senior Manager (Civil), Jajpur Group of Project, Jajpur in **a cover containing Cover-I & Cover-II**.
    a. **Cover- I** is to contain Bid Security Declaration form, copy of valid enlistment certificate as Contractor/job-worker issued by "OCCL"., Copy of PAN card, copy of GST Registration & Clearance Certificate, Copy of EPF registration and Copies of Credential certificates and documents required as per the relevant clauses of DTCN and special conditions if any. The cover is to be sealed and super scribed as **Cover – I (Technical Bid)** for the work: - "Extension of district veterinary hospital of Jajpur."

    b. **Cover – II** is to contain the price bid duly filled in and signed by the bidder and is to super scribed as **Cover – II (Price Bid)** for the work: "Extension of district veterinary hospital of Jajpur." **The bidders are required to write their names over the Cover-II.**

    Both the covers are then to be kept inside a third cover duly sealed and super scribed with the name of the work "Extension of district veterinary hospital of Jajpur." In order to ensure that the envelopes are properly sealed, the contractor can seal them with superglue and also add tamper proof tapes as additional precaution.

6. The bidders are not required to write their name on the outer cover containing the bid documents. They are only required to write the name of the work and authority who had invited the bid.
7. The bid must be dropped in the Tender Box kept in office of the Senior Manager (Civil), Jajpur Group of Project, Jajpur on or before 5:00 pm of 27.07.2022. Cover- I (Technical Bid) will be opened on 28.07.2022 at 11.00 AM in the same venue in presence of the tenderers or their authorized representatives, who may like to be present. If there will be a public holiday on the last date of receipt & opening of the tenders as specified above, the tender documents shall be received & opened on the next working day at the same time & venue. Date time and place of opening of **cover- II (Price Bid)** shall be intimated subsequently to those bidders who will be found eligible after evaluation of Technical Bid.
8. Intending bidders are required to furnish the following documents duly signed by the bidders along with their tender.
    i. Copy of valid enlistment certificate as Bidder issued by "OCCL".
    ii. Bid Security Declaration as per W.D.O.M. No. 4710, dated 12.04.2022.
    iii. Copy of valid GST Certificate.
    iv. Copy of PAN Card.
    v. No Relation Certificate.
    vi. Copy of document indicating residential address.
    vii. Undertaking to pay minimum wages.
    viii. Undertaking to pay royalty as per prevailing rate during the time of execution.
    ix. Affidavit in support of genuineness of certificate.
    x. Complete tender document duly filled-in and signed on each page by the tenderer or his /their Attorney holder with date, full name, Designation, & Official Seal. In case of power of Attorney holder, the copy of such delegation is to be enclosed with the tender document.
    xi. Detail list and copies of documents of machineries owned by the tender

9. **Additional Performance Security** shall be submitted by the bidder when the bid amount is less than the estimated cost put to tender. In such an event, only the successful bidder who

has quoted less bid price/rates than the estimated cost put to tender shall have to furnish an amount as stipulated below towards Additional Performance Security (APS) in shape of Demand Draft in favour of "Odisha Construction Corporation Ltd." payable at **Jajpur** / Term Deposit Receipt (TDR) pledged in favour of Odisha Construction Corporation Limited / Bank Guarantee in prescribed format (Annexure-C) in favour of Odisha Construction Corporation Limited from any nationalized/scheduled bank in India counter guaranteed by its local branch at **Bhubaneswar** within seven days of issue of Letter of Acceptance (LoA) by Odisha Construction Corporation Limited (by email) to the successful bidder otherwise the bid of the successful bidder shall be cancelled and further proceedings for blacklisting shall be initiated against the bidder.

Sl. No.	Range of difference between the estimated cost put to tender and bid amount	Additional Security to be deposited by the successful bidder
1	Below 5%	No additional Security
2	From 5% and above and below 10%	50% of (Difference between estimated cost put to tender and Bid amount)
3	From 10% and above	150% of (Difference between estimated cost put to tender and Bid amount)

10. The bidder shall have to furnish an affidavit in support of the authenticity/ genuineness of the documents/certificates and credentials submitted along with the tender document. In case of production of forged document, the penalty shall be rejection of their tenders, and cancellation of their enlistment with the Corporation. The authority reserves the right to verify the authenticity of documents in case of any doubt or complain.
11. The tender received will remain valid for 90 (Ninety) days from the last date of receipt of tenders and the validity of tenders can also be extended if agreed to by the tenderer and OCCL.
12. The Job-Worker are to quote the %(percentage) excess or less or at par of the amount put to tender in the bill of quantity in the format enclosed with the tender document. For evaluation, the amount quoted in words shall be taken, if there is any difference in figure and words in the tender document. If the rate quoted by the bidder is **less than 15%** of the tendered amount then such a bid shall be rejected & the tender shall be finalized basing on merits of rest bids. But if more than one bid is quoted at same rate up to 14.99% (Decimals up to two numbers will be taken for all practical purposes) less than the estimated cost, the tender accepting authority will finalize the bid through a transparent lottery system, where all such bidders/their authorized representatives, the Senior Manager (Civil), Jajpur Group of Projects, Jajpur, Accounts Clerk, Jajpur Group of Projects, Jajpur will remain present.
13. The successful Job-Worker shall have to execute the work as per scope of work, Methodology of work, technical specification & price schedule as per direction of Engineer-in-charge and terms & conditions of agreement.
14. The authority reserves the absolute right to accept or reject the tender and to split up work to award to one or more Contractors without assigning any reason thereof.
15. Any dispute arising out of the above tender call notice shall be subject to Jurisdiction of Hon'ble High Court, Odisha.

For Odisha Construction Corporation Ltd.

Senior Manager (Civil),
Jajpur Group of Projects, Jajpur.

Contractor Senior Manager (Civil)

INSTRUCTIONS TO BIDDERS

1. Bidder may go through the tenders published in the web site and download the required documents/tender schedules for the tenders he/she is interested.

1.1 Bidder should go through the tender schedules carefully and submit the documents as asked; otherwise, the bid will be rejected.

1.2 If any further clarifications required, this may be obtained from the project office of Senior Manager (Civil), Jajpur Group of Project, Jajpur. Bidders should take into account of the corrigendum (s) if any, published before submitting the bids.

1.3 The bidder should read the terms & conditions and accept the same to proceed further to submit the bids.

2. Method of submission of Tender Documents

2.1 If the intending bidder is an individual, the documents shall be signed by the individual with his full written name and current address.

2.2 If the intending tender is a proprietary firm, it shall be signed by the proprietor with his full name and current address.

2.3 If the intending bidder is a firm in partnership, it shall be signed by a partner holding the power of attorney for the firm in partnership in which case a certified copy of power of attorney shall accompany in the technical documents.

2.4 If the intending bidder is a limited company or Corporation, it shall be signed by a duly authorized person holding the power of attorney in which case certified copy of power of attorney shall accompany.

2.5 The Tender containing all required documents shall be dropped in the Tender Box kept at **the office of Senior Manager (Civil), Jajpur Group of Project, Jajpur.**

3. Opening of Tender Documents.

The Technical Bid Documents **will be opened on dt. 28.07.2022 at 11.00 hrs.** in the office of the Senior Manager (Civil), Jajpur Group of Project, Jajpur, Odisha Construction Corporation Limited in presence of the bidders or their authorized representatives who wish to be present. Date & time of opening of Financial Bid will be intimated later on to the successful bidders i,e, who have qualified in Technical Bid evaluation.

4. Minimum Qualifying Criteria

The Cover-I shall contain the following documents failing which their bid shall be liable for rejection

(a) Demand Draft towards cost of tender document in Original.
(b) Bid Security Declaration Form in prescribed proforma (Annexure-F).
(c) Photocopy of PAN
(d) GST Registration & Clearance Certificate
(e) EPF Registration No. & Clearance Certificate.
(f) Affidavit towards authenticity/genuineness of certificate in Original (Annexure-A).
(g) Undertaking to pay minimum wages in prescribed proforma in Original (Annexure-E).
(h) Undertaking to pay Royalty in prescribed proforma in Original (Annexure-D)
(i) Valid OCCL Enlistment Certificate.
(j) Income Tax Clearance Certificate.
(k) No Relationship Certificate (Annexure-B).

Contractor Senior Manager (Civil)

5. The agency/Contractor has to extend all necessary co-operation to the electrical and P.H contractors selected by OCCL for execution of the electrical & P.H work. During execution of the Civil Portion of work, the agency/contractor must ensure that all the electrical pipeline works are performed by the electrical contractor prior to roof casting. Similarly, provisions towards underground pipeline wiring for electrical and P.H works are also to be kept by the Civil Contractor/agency prior to plastering and flooring of the building.

6. Final Decision making authority

The Managing Director of the Corporation is the competent authority who reserves the right to accept or reject or disqualify any of the tender without assigning any reasons thereof and his decision shall be final and binding on all the bidders.

7. Further Clarification

The **Senior Manager (Civil), Jajpur Group of Project, Jajpur** may be contacted during office hours on any working days during the bidding period for any further clarification.

8. Sample of all Materials : The contractor shall supply sample of all materials at his own cost before procurement for the work for testing and acceptance as may be required by the concerned Engineer-in-Charge.

9. ISSUE OF ADDENDA / CORRIGENDA/ CANCELLATION NOTICE:-

The Officer inviting the tender may publish any addendum / corrigendum/ cancellation of tender in the notice board and in web site and such notice shall form part of the bidding documents.

Contractor Senior Manager (Civil)

General terms and conditions

1. DEFINATIONS

(i) "CORPORATION" means **"ODISHA CONSTRUCTION CORPORATION LTD. ("OCCL" in short)"** with registered office at Unit-8, Gopabandhunagar, Bhubaneswar – 751 012 (Odisha) represented through its Managing Director or any other officer as designated by the "Corporation" from time to time.

(ii) "ENGINEER-IN-CHARGE" means the qualified engineer deployed by the "Corporation" at work site for the work including the Senior Manager (Civil), "OCCL" in charge of the work

(iii) "CONTRACTOR" means the enlisted person/firm/organisation having men, machinery, materials etc. to execute the work satisfactorily as per scope indicated herein within stipulated period.

(iv) "CLIENT" means the State Govt. or Central Govt. organization or any individual from whom "OCCL" has received the work for execution.

2. AGREEMENT

The "Contractor" shall enter into an agreement with the "Engineer-in-Charge" in the format on requisite value of stamp paper prescribed for the purpose by the "Corporation" within a stipulated period to be specified by the "Engineer-in-Charge" failing which the EMD and ISD shall be forfeited. The work may be awarded in favour of some other agency at the discretion of the "Corporation".

3. RATE

The rate quoted by the tenderer is to be indicated in % (Percentage) up to two decimal point excess or less or at par of the total amount of the estimated value of work put to tender, which shall be valid for the full period of execution or till completion of work whichever is later. The % (Percentage) excess or less or at par quoted by the "Contractors" should be firm for the entire period of execution.

The "Contractor" shall quote the rate in % (Percentage) excess or less or at par of total amount put to tender to complete the works as per specifications inclusive of all transportation, handling, loading, unloading, lift, de-lift, taxes, duties, watering/ curing, dewatering, levies, incidental expenses etc. that will be applicable on the work to be executed by him. No claim in this regard in whatsoever form shall be entertained.

4. PAYMENT TERMS

(i) No advance, shall be paid for the work. The rates shall remain firm throughout the agreement period.

(ii) The payment to the "Contractor" shall be limited to the measurements taken and accepted by the client. The "Contractor" cannot raise any dispute over the measurements allowed by the "Engineer-in-Charge" for the purpose of payment.

(iii) The Contractor will bear the full cost of rectification or replacement of works required as per direction of "Client" or "Engineer-in-Charge".

(iv) The payment to the "Contractor" against any item shall be released only after receipt of payment by the "Corporation" from the "Client" against respective item.

(v) Any penalty levied by "Client" on "OCCL" due to delay in work will be borne by the "Contractor" in full, if the "Contractor" is responsible for delay.

Contractor Senior Manager (Civil)

(vi) The Agreement rate of the Contractor shall be exclusive of GST. GST as applicable shall be paid extra over and above the Running account bills on production of GST invoice.

(vii) Price adjustment/price variation as per Govt Circular, 2019 shall be applicable to the agreement with a condition that the same is accepted by the client. No claim towards price adjustment/Price variation will be entertained prior receipt of the same from the client.

5. INITIAL SECURITY DEPOSIT (ISD)

The "Contractor" shall deposit Initial Security Deposit (ISD) at the rate of 2(Two) % of the work/agreement value on receipt of letter of intent of work within a period of 15 days from the date of issue but before execution of agreement.

If the "Contractor" fails to deposit such initial security within the stipulated date, the the work may be awarded in favour of some other agency at the discretion of the "Corporation" and suitable actions as deemed fit shall be initiated against the L-1 bidder.

6. SECURITY DEPOSIT (SD)

The Security Deposit (SD) at the rate of **3 (Three)%** shall be deducted on the gross amount of each bill of the "Contractor". The security will be released after 12 (Twelve) months of completion of the work or settlement of final bill of the "Contractor", whichever is later, if no defect in the work is noticed and material account as well as all disputes including compliance of labour rules, ESI rules etc. are settled.

29. ADDITIONAL SECURITY DEPOSIT

The "Engineer-in-Charge" may, if he feels it necessary can deduct and withhold from the bill of the "Contractor" a sum not exceeding 10% and not less than 5% of the gross value of work done as additional security deposit for the rectification of defective and/or unsatisfactory work.

The additional Security Deposit shall be deducted in addition to normal security deposit. Such defects shall be rectified by the "Contractor" within such period as the "Engineer-in-Charge" may fix-up and if the "Contractor" fails to rectify the defects within the specified period, this shall be rectified by the "Engineer-in-Charge" at the cost and risk of the "Contractor". The expenses so incurred in the rectification of the defective works and/or unsatisfactory work done by the "Contractor" shall be recovered from the bills or any other dues of the "Contractor" or otherwise as per law. In this connection, the decision of the "Engineer-in-Charge" shall be final and binding on the "Contractor". The additional security deposit shall be released in full, when the "Contractor" rectifies the defects in time at his cost.

8. WITH HELD AMOUNT FOR EPF, FPF AND ESI DUES

2(Two) % shall be deducted and kept withheld from R.A. bills of the "Contractor" towards EPF, FPF and ESI dues. If the "Contractor" produces either a clearance in support of deposit of EPF, FPF and ESI dues with the concerned authority within 3(Three) months from the end of each financial year then the above withheld amount shall be released. Otherwise, the "Corporation" shall deposit the same with Provident Fund Authority and ESI Authority. Defects, if any, shall be recovered from the "Contractor".

Contractor Senior Manager (Civil)

9. <u>INCOME TAX, GST, CESS OTHER TAXES, DUTIES, LEVIES ETC</u>.

(a) The **bidders** have to quote the **percentage rate** excluding GST (Goods and Service Tax).

(b) The **percentage rate** quoted by the Contractor in the tender for works shall exclude GST that may be levied on turnover on works contract according to the Laws and Regulations as applicable & as amended from time to time.

(c) GST as applicable on works contract will be deposited by the Contractor after passing of each bill and the Contractor is to intimate to the Corporation subsequently.

(d) TDS on works contract as applicable towards GST will be deducted from the bill and credited to Govt. account by the Corporation.

(e) **<u>1% (One Percent)</u>** of the gross amount of the bill will be deducted from the Contractor bill towards labour Cess as per Odisha building and other construction workers (RE & CS) rules 2002 and Amendment during 2008 and as amended by Govt. from time to time.

10. THE AMOUNT OF ROYALTY OF DIFFERENT MATERIALS AS UTILIZED BY THE CONTRACTOR IN THE WORK WILL BE RECOVERED FROM THEIR BILL, BASING ON THE RATE FIXED BY THE GOVT. OR AS AMENDED FROM TIME TO TIME DURING THE PERIOD OF EXECUTION.

11. OPTIMUM USE OF MACHINERY, VEHICLES, EQUIPMENTS, TOOLS, TACKLES, CONSUMABLES AND STEEL MATERIALS

THE "CONTRACTOR" SHALL ENSURE OPTIMUM UTILISATION OF THE PLANTS, MACHINERY, EQUIPMENTS, TOOLS, TACKLES, CONSUMABLES, CEMENT, STEEL MATERIALS ETC. AND SHALL NOT CREATE ANY HINDRANCE FOR OTHERS. THE DECISION OF THE "ENGINEER-IN-CHARGE" REGARDING THE OPTIMUM REQUIREMENT SHALL BE FINAL AND BINDING ON THE "CONTRACTOR"

12. RECORD OF MATERIALS, CONSUMABLES, MACHINERY, EQUIPMENTS, TOOLS, TACKLES ETC.

If steel & cement are to be supplied by the corporation as per the requirement at the work site, the cost of the material will be realized at the following rate.

a) Cement - at estimate rate / procurement rate whichever is higher.

b) Steel - at the procurement rate of SAIL / RINL

N.B :- Transportation charges will be borne by the Contractor.

The "Contractor" shall be responsible for maintaining the data and complete records of issue and consumption of materials and consumables as well as record of plants, machinery, equipments, tools, tackles, cement, steel materials etc. issued to him by the owner and "Corporation". The materials, plants, machinery, equipments, tools, tackles cement, steel materials etc. shall be issued as per requirement and availability only.

The materials supplied by the "Corporation" will be received by the "Contractor" from the "Corporation" store on submission of indent by the "Engineer-in-Charge". Transportation of materials to site of work and storage at site are the responsibility of the "Contractor".

The "Contractor" will keep an accurate record of "Corporation" materials and furnish the consumption statement of such materials. The surplus materials, if any, are to be returned to the "Corporation" store at his cost failing which, the cost of excess materials will be recovered from the dues of the "Contractor" @ 5(Five) times the issue rate of "OCCL" or market rate, whichever is higher.

Contractor Senior Manager (Civil)

The materials, if and when supplied by the "Contractor", shall be of the best and suitable quality as per specifications stipulated in the technical specifications and subject to approval of "Engineer-in-Charge"/"Client", whose decisions, as regards quality of the materials, shall be final.

13. RETURN OF PLANTS, MACHINERY, EQUIPMENTS, TOOLS, TACKLES, MATERIALS, CONSUMABLES ETC.

The plants, machinery, equipment, tools, tackles, excess cement, excess steel materials, excess consumables etc. of the "Corporation" are to be returned by the "Contractor" in good working condition after completion of the work/termination of the contract by the "Corporation". The "Corporation" may hire plants, machinery, equipment, tools, tackles etc. from the owner as well as outside for use in work. The same are also to be returned by the "Contractor" in acceptable good working condition with original fittings after completion of the work/termination of the contract by the "Corporation".

Any damage to/ by the plants, machinery, equipment, tools, tackles etc. during use by the "Contractor" shall be booked to the "Contractor" for recovery from his bills.

The balance unused/excess cement, steel materials, balance consumables etc. of the "Corporation", if any, shall be returned by the "Contractor" in good condition at specified places as per direction of the "Engineer-in-Charge" failing which the cost at 5(Five) times the market rate shall be deducted from the "Contractor".

14. EMPTY CEMENT BAGS AND SCRAP STEEL MATERIALS/CUT PIECE RODS

The cost of empty cement bags against cement issued by "OCCL" shall be deducted by "OCCL" from the bills/dues of the "Contractor" @ prevailing schedule of rate (Post GST)

The scrap steel materials/cut piece rods generated during execution of work out of steel materials issued by ""OCCL"" shall be the property of the "Corporation". It is the responsibility of the "Contractor" to collect and stack them at proper location/locations as per direction of the "Engineer-in-Charge". The "Contractor" shall be responsible for return of the same. An unaccounted loss of 0.5% shall be allowed. Balance has to be returned to the "Corporation". In case of non-return of the same, the cost as decided by the "Engineer-in-Charge" shall be recovered from the "Contractor".

15. ELECTRICITY

Electricity required for execution of work is to be arranged by the "Contractor" or the "Contractor" shall arrange generator for execution of works.

16. MEASUREMENT OF WORK

The quantity of work executed shall be measured and payment made once in a month or on completion of work or on termination of the agreement, when final measurement will be made and account will be adjusted accordingly. The decision of the "Engineer-in-Charge" regarding the rates, progress, measurement and quality of the work shall be final and binding on the "Contractor".

17. INDIAN STANDARDS, DRAWINGS AND SPECIFICATIONS

The work shall be carried with due diligence and in a workman like manner in accordance with relevant Bureau of Indian Standard specifications on the basis of latest approved drawings and technical specifications supplied by "Corporation" in absence of which as per the direction of "Engineer-in-Charge".

The technical specifications in the relevant agreement between the "Corporation" & owner and approved drawings & technical specifications issued by the owner & "Corporation" shall be the basis for execution of work under the agreement. In the absence of approved drawings and technical specifications, the direction of the "Engineer-in-Charge" shall be final and binding on the "Contractor".

The "Contractor" shall make arrangements to take copies of the approved drawings from the office of the "Engineer-in-Charge" for reference during execution of work.

18. PAYMENT TO WORKMEN

The "Contractor" should maintain job register and payment rolls of their workmen and get those checked by the "Engineer-in-Charge" or his authorised representative from time to time. The payment to the workers/ supervisory staff shall be made by the "Contractor" in the presence of the owner and/or "Engineer-in-Charge" or his authorised representative. The paid pay roll register shall be signed by the "Engineer-in-Charge" or his authorised representative as a token of disbursement. The copies of paid pay roll shall be submitted to the "Engineer-in-Charge" within a period of 7(Seven) days from the date of payment failing which no further payment to the "Contractor" shall be released.

19. WORKMEN COMPENSATION

In case of any loss due to accident arising during/in connection with execution of the contract, the "Contractor" will pay compensation to his workmen. The "Contractor" will be fully responsible for his workmen as per workmen's compensation act and labour laws in force during entire period of execution of contract. In case, the "Contractor" fails to do so, the "Corporation" may pay the same and recover the same from the bills/ dues of the "Contractor".

20. INFORMATION OF WORKMEN

The "Contractor" will make his own arrangements for procurement of labour and shall furnish all information of workmen employed by him like name, father's name, full permanent address, sex and age to the "Engineer-in-Charge" along with the pay.

21. STATUTORY REQUIREMENTS

The "Contractor" shall comply all statutory requirements applicable at site of work such as minimum wage act, labour act, factory act, workmen's compensation act, provident fund rules, employee's state insurance rules etc. A certificate to this effect shall be enclosed by the "Contractor" with each Running Account Bill for payment.

22. MINIMUM AGE OF WORKMEN

The "Contractor" shall not employ any person, who is below the age of 18(Eighteen) years or unfit for the tendered items. The "Engineer-in-Charge" shall have right to decide, whether any labour employed by the "Contractor" is below the age of 18(Eighteen) years or unfit and refuse to allow any labour, whom he decides to be below the age of 18 years or unfit for any other reason.

23. LABOUR LICENCE

The "Contractor" has to obtain valid labour licence and maintain all records at his own cost as per the conditions laid down in the labour rules in vogue and amended from time to time.

24. MINIMUM WAGE ACT

The "Contractor" shall pay wages of each labour at the rate not less than the wages as per Minimum Wages Act in force and as may be ammended from time to time. The "Engineer-in-Charge" has the right to enquire into and decide on any complaint of the labourers relating to non-payment or less payment of wages to them and his decision will be final and binding on the "Contractor".

25. NON-PAYMENT OF DUES OF LABOURERS

If the "Contractor" fails to pay the dues of labourers engaged by him for this work in time, the same shall be paid by the "Engineer-in-Charge" directly to the deserving workers. The expenditure so incurred on account of non-payment or less payment shall be recovered from the bills or any other dues of the "Contractor".

26. PROVIDEND FUND (PF)

Employees Provident Fund., wherever applicable, shall be payable by the "Contractor" as per the Provident Fund Rules in force and shall keep the "Corporation" indemnified for it. He should get the registration number for this from the Regional Provident Fund Commissioner, Odisha. He shall produce the records in support of payment of EPF/FPF dues to the "Engineer-in-Charge" for check and record by the "Engineer-in-Charge".

27. EMPLOYEES STATE INSURANCE SCHEME (ESI)

The Employees State Insurance Scheme(ESI), wherever applicable, shall be payable by the "Contractor" as per the E.S.I. Rules in force and shall keep the "Corporation" indemnified for it. He should get the Registration Number for this from the E.S.I. Deptt., Odisha. He shall produce the records in support of payment of ESI dues to the "Engineer-in-Charge" for check and record.

28. WORKMEN INSURANCE

The workmen insurance shall be the responsibility of the "Contractor". He shall produce the records in support of workmen insurance to the "Engineer-in-Charge" for check and record.

29. HUTMENTS/TEMPORARY ACCOMMODATION

The "Contractor" has to arrange hutments/temporary accommodation for his own labourers/ workmen at the work site at his own cost.

30. IDLE LABOUR

"OCCL" will not be held responsible for idle labourers of the "Contractor" for any reason, whatsoever and no claim on this account will be entertained.

31. WORKING IN SHIFTS

If necessary, the "Contractor" may be asked to work in two(2) or 3(three) shifts. Normally, the work shall be executed in shifts. The "Contractor" may, if required, have to engage the workmen on overtime to complete the work in scheduled time. The overtime cost shall be borne by the "Contractor".

32. **CLAIMS AND LIABITIES**

All claims/liabilities etc. arising out of Explosives act and labour laws shall be borne by the "Contractor" and he shall keep the "Corporation" indemnified against them and also in case of injuries or death of labourer(s) resulting from accidents during the execution of the work. In case the "Corporation" will have to pay for any such claims under Workmen's Compensation Act, the same shall be adjusted from the pending bills/dues of the "Contractor" or shall be recovered otherwise as per law from him.

33. SAFETY

The "Contractor" should abide by the safety laws and rules of statutory bodies, "Corporation" and owner as per directions of "Engineer-in-Charge" and Safety Officers inspecting from time to time.

34. WATCH AND WARD

The "Contractor" shall arrange watch and ward and safety of the site of work, constructed structures, machinery, vehicles, equipments, tools, tackles, consumables, cement, steel materials etc. of the "Corporation" and owner at his own cost.

35. AUTHORISED PERSON

The "Contractor" may in writing authorise his power of attorney holder or any other person to draw materials, avail facilities, and attend measurements etc. during the course of execution of work. All liabilities created by the authorised person of the "Contractor" by way of loss of materials drawn, amenities availed, unpaid wages created etc. shall be considered as the liabilities of the "Contractor" and such liabilities shall be made good by the "Contractor" or it shall be recovered from the bill/payment due to him.

36. SPLITTING UP WORK

The authority reserves the right to split up the work amongst various "Contractors" and increase or decrease the quantity of work mentioned in the tender document without assigning any reason thereof and no claim whatsoever will be entertained on this account. The quantity as per agreement may also increase or decrease as per actuals.

If "Corporation" desires, different agencies can be engaged at a single site of work for which each agency is to co-operate so that other agency does not face any difficulty in engagement of his machinery, equipments, vehicles etc.

37. BREACH OF CONTRACT

The ISD including EMD, SD and additional SD are liable to be forfeited in the event of breach of contract and the agreement shall be terminated. The dues of the "Corporation" including due of labourers/workmen and other statutory payable liabilities payable by the "Corporation" as principal employer shall be cleared by the "Contractor". The decision of the "Engineer-in-Charge" in this regard shall be final and binding on the "Contractor". The amount remaining as outstanding against the "Contractor" after adjustment of his dues shall be payable by him to "OCCL". If necessary, legal action may be taken for recovery of the dues of the "Corporation" including labour and statutory dues to be cleared by the "Corporation" as principal employer and "OCCL" reserves the right to recover the payable amount from the "Contractor" from works done by his under any other organization or from his properties.

38. TERMINATION OF CONTRACT

The "Engineer-in-Charge" may put an end to the agreement at his option at any time due to (a) Bad workmanship (b) Dis-proportionate progress (c) Non-compliance of labour rules or (d) Any other reason. The decision of the "Engineer-in-Charge" is final in this respect and no claim on this account will be entertained. "OCCL" also reserves the right to take expert measurements, if the "Contractor" does not co-operate in taking final measurements after termination of contract.

Contractor Senior Manager (Civil)

39. **RESPONSIBILITY OF CONTRACTOR**

The work shall be completed by the "Contractor" in all respect within the stipulated period of completion and the responsibility of the "Contractor" shall cease only, when the items are fully accepted by the owner after erection at project site.

40. **PROGRESS OF WORK AND PENALTY**

The "Contractor" will achieve the desired progress as per programme.. If the "Contractor" fails to achieve the contracted quantity every month as per programme, penalty at the following rates shall be imposed.

Sl. No.	Failure percentage(%)	Penalty percentage(%)
(i)	Less than 10(Ten)%	1(One)% of value of defaulted quantity
(ii)	Above10(Ten)% and upto 20(Twenty)%	2(Two)% of value of defaulted quantity
(iii)	Above 20(Twenty)% and upto 30(Thirty)%	5(Five)% of value of defaulted quantity
(iv)	Above 30(Thirty)%	To be asked to demobilise with penalty equivalent to 10(Ten)% of value of defaulted quantity. The "Engineer-in-Charge" will off-load the work and get the work done through any other agency or of its own at the risk and cost of the "Contractor". No claim will be allowed to the "Contractor" in this regard.

41. REJECTION DUE TO BAD WORKMANSHIP

The rejection due to bad workmanship shall be charged to the "Contractor" at a cost of rejected items plus 20(Twenty) %.

42. **TESTING OF WELDERS AND OTHER SKILLED/SEMI-SKILLED WORKMEN**

The qualification test of welders and other skilled/semi-skilled workmen may be conducted at site by the "Engineer-in-Charge" and only qualified welders and other skilled/semi-skilled workmen shall be deployed for the work. The cost of testing shall be borne by the respective "Contractor".

43. **QUALITY ASSURANCE AND QUALITY CONTROL**

Quality Assurance/Quality Control Plan shall be prepared before commencement of site activities and shall be followed maintaining stage-wise up-to-date record of the work.

44. **SITE VISIT**

The "Contractor", interested to participate in the tender, should visit the site of work and get himself acquainted with site conditions and tendered work before submitting the tender.

45. **DEVIATION OF PROVISIONS IN AGREEMENT**

The "Contractor" will not vary or deviate from the provisions in the agreement without obtaining prior permission in writing from the "Corporation".

46. RIGHT OF THE "CORPORATION"

The "Corporation" reserves the right to cancel a particular tender call or all tender calls without assigning any reason thereof. The items can be splitted among two or more tenderers at any stage. The offer of any tenderer or all may be cancelled

without assigning any reason thereof. The requirement shown in any tender call notice are only indicative and may vary.

47. **APPROACH ROAD, HAUL ROAD ETC.**

The approach road, haul road etc. if required, at site of work are to be constructed and maintained by the "Contractor" at his cost.

48. **SUB-LETTING**

The work under any agreement shall not be assigned or sublet to anybody by the "Contractor". If the "Contractor" shall assign or sublet or attempt to do so, the "Engineer-in-Charge" shall terminate the agreement and shall get the work done through any other agency or of its own at the risk and cost of the "Contractor". No claim will be allowed to the "Contractor" in this regard. "OCCL" reserves the right to have access also to units of the "Contractor" to verify, if works are actually executed by him.

49. EXECUTION OF EXTRA ITEMS AND EXTRA QUANTITIES

All extra items are to be executed by the "Contractor" at prevailing S/R rates. All extra quantities are to be executed at agreement rates.

50. FORCE MAJEURE:

Neither party shall be liable to the other for any loss or damage occasioned by or arising out of acts of God such as unprecedented flood, volcanic eruption, earthquake or other convulsion of nature and other acts such as but not restricted to invasion, the act of foreign countries, hostilities, or war-like operations before or after declaration of war, rebellion, military or unurped power which prevent performance of the contract and which could not be foreseen or avoided by a prudent person.

50. **JURISDICTION**

For all liabilities created under the various contractual obligations/impositions under this agreement, the "Contractor" undertakes not to raise any dispute or litigations in connection there with and shall make all endeavours to resolve all disputes amicably through conciliation and in all such cases, the decision of the Managing Director, "OCCL" shall be final and binding on the "Corporation" as well as on the "Contractor" failing which all such disputes arising out of the agreement shall be subject to jurisdiction of Hon'ble High Court of Odisha at Cuttack and their sub-ordinate courts at Bhubaneswar only. Both the parties agree by mutual consent that any dispute relating to this agreement is barred from arbitration.

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Contractor Senior Manager (Civil)

SPECIAL CONDITIONS OF CONTRACT

1. The contractor is to supply labour for giving section and profiles. All materials necessary for such work will be supplied by the Contractor at his own cost and responsibility and profiles are to be maintained till the work is completed.
2. The offer submitted by the Contractor will remain valid till finalization of the award of the work. He is not entitled to withdraw his offer during the period of consideration of his offer. Withdrawal of offer prior to finalization of the tender will entail for actions as deemed fit.
3. The Contractor shall furnish the postal address of his site office as well as his permanent registered office along with Phone numbers (both Landline & Mobile) and valid e-mail id. Any notice shall be deemed to have been served if it is delivered to his authorized agent/representative at site or sent by Registered Post or sent by e-mail to the said site office.
4. The Contractor shall arrange to obtain drawings and specification of the work from the Senior Manager's Office. He has to carry out the work at the agreement rates including any additions/alternations in drawings/specifications as may be instructed by the Engineer-in-Charge during course of execution of the work.
5. The Contractor will install display board at his cost mentioning information about the work at worksite after drawal of the agreement.
6. The work has to be executed strictly as per drawings and specifications. The Contractor has to engage technical persons to assist the corporation for taking initial levels, final levels, giving layout and to supervise day-to-day work.
7. Required Engineering personnel for day-to-day supervision of works will be provided by the Contractor. Engineering personnel of OCCL will monitor the quality and progress of work and will do check measurement for payment.
8. The quantities mentioned against each item of work are subject to variations. Such variations shall not vitiate the contract. The rates quoted shall apply for increased or decreased quantities of different items.
9. The agency/Contractor has to extend all necessary co-operation to the electrical and P.H contractors selected by OCCL for execution of the electrical & P.H work. During execution of the Civil Portion of work, the agency/contractor must ensure that all the electrical pipeline works are performed by the electrical contractor prior to roof casting. Similarly, provisions towards underground pipeline wiring for electrical and P.H works are also to be kept by the Civil Contractor/agency prior to plastering and flooring of the building.
10. The bidder has to visit the site and quote his rate which should include cost of haul road, dewatering if required by suitable method and other ancillary works for completion of work and no extra payment shall be made.

Contractor Senior Manager (Civil)

11. **PERIOD OF COMPLETION:**

This work is to be completed in all respect within **12 (Twelve)** calendar months (including rainy season) from the date of issue of work order. The Contractor, whose tender is accepted must submit a programme of work within 7(Seven) days after issue of work order for approval of the Engineer-in-Charge. The Contractor will execute the work strictly as per the programme submitted by him, failing which action will be taken by the Senior Manager as per clauses indicated in the general terms and conditions of OCCL

12. OCCL shall provide temporary Bench Mark (T.B.M.) at convenient location. The Contractor has to establish at his cost sufficient Nos. of temporary B.Ms. for smooth execution and measurement of work.

13. Due to non-issue of design and drawings by the client in time and any hindrances caused due to non-settlement of rehabilitation and resettlement problems if any by the client which may likely to affect the progress of work or stoppage of work, the Contractor shall have no right to claim any compensation in whatsoever manner from OCCL. The Senior Manager (Civil) in-charge of the work may direct the Contractor to suspend the work or any part of the work temporarily for any period as may be necessary. This temporary suspension shall not vitiate the contract and the Contractor shall not be entitled to any claim on account of such temporary closure. However this temporary suspension period will be considered towards extension of time for completion of the work.

14. All materials required for the work shall be approved by the Engineer-in-Charge before use in the work. The contractor must extend necessary co-operation for sampling and testing of materials by OCCL/client. However, testing charges shall be borne by the Contractor.

15. The Contractor has to obey all rules and regulations for movement of transport vehicles in main roads, village roads, in factory and colony areas. He has to obtain necessary permission from the concerned authorities at his cost and risk. Necessary permission/license for borrowing earth from borrow areas whether Government or private will be borne at his own risk and cost. The rate quoted is inclusive of such expenditure.

16. The Contractor shall allow the quality control organization to take as many samples as may be required by them during course of execution of different items of works. He shall also extend necessary co-operation to carry out any number of field tests as may be necessary. Any portion of work or material rejected by Quality Control Organization/ Department shall be treated to have been finally rejected by the Engineer-in-Charge.

17. Maintenance of the work during construction and during the **Defect Liability Period of 1 (one) year after completion of the work** is the responsibility of the Contractor.

18. The Contractor shall display notice both in English and Oriya indicating prevailing wages of different categories of labour in a conspicuous place. He shall also maintain wage book of each worker and shall issue wage cards in the prescribed forms to different workers.

19. Payment for the work done by the Contractor shall be based on actual field measurement. The Contractor or his authorized representative shall be present at the time of recording the measurement at each stage and sign the field level book and measurement book as token of acceptance.

The payment for the quantity of different items executed by the Contractor shall in no case exceed the quantity admitted by the Department/client for the respective items and certified / paid to OCCL.

20. Statutory deductions, such as security deposit, income tax including surcharge, hire charges of machineries, cost of materials, EPF contribution, labour clearance etc. shall be deducted from the R/A bills. If the Contractor fails to submit the receipt in support of payments towards royalty, cess, tolls and other taxes, the same shall also be deducted from the R/A bills.

21. **SAFETY PROVISIONS:**

The Contractor shall at his own expenses arrange for the safety during construction as required including the provisions in the safety manual published by the Central Water and Power Commission, New Delhi (January'1962) edition). In case the Contractor fails to make such arrangement, the corporation shall be entitled to cause them to be provided and to recover the cost thereof from the Contractor. For failure to comply with the provision of the safety manual, the Contractor shall without prejudice to any other liability pay to the Corporation a sum not exceeding **rupees five hundred per day** for each day of default.

22. **ACCIDENTS :**

It shall be the Contractor's responsibility to protect against accidents on the works. He shall indemnify the corporation against any claims for damage or for injury to person/ machineries/ transport/ vehicle property resulting from any in the course of work and also under the provision of the workmen's compensation Act.

On the occurrences of an accident arising out of the works which results in death or which is so serious as to be likely to result in death, the Contractor shall within twenty four hours of such accident report in writing to the Senior Manager (Civil) in charge of the work stating the fact clearly and in sufficient details the circumstances of such accidents and the subsequent action. All other accidents on the works involving injuries to persons of damage to property other than that of the Contractor shall be promptly reported to the Senior Manager stating clearly and in sufficient details the facts and circumstances against all loss or damage resulting directly or indirectly from the Contractor failure to confirm to the provisions of the said act in regard to such accidents. In the event of an accident in respect of which compensation may become payable

Contractor Senior Manager (Civil)

under the workmen's compensation Act including all modifications thereof. The Senior Manager (Civil) in charge of the work may retain. Out of any money due and payable to the Contractor such sum or sums of money as may be in opinion of the Senior Manager be sufficient to meet such liability. On receipt of award from the Labour Commissioner in regard to quantum of compensation, the difference in amount will be reimbursed or recovered from the Contractor

23. **WAGES :**

Wages shall have the same meaning as defined in the payment of wages Act and include time and piece rate wages, if any.

(i) Display of notices regarding wages etc.

The Contractor shall :

(a) Before he commences his work, continue to display and correctly maintain in a clean and legible condition in conspicuous places on the work, notices in English and in the local India language spoken by the majority of the workers, giving the rates of wages prescribed by the State Public Department/Electricity Department for the district which the work is done.

(b) Send a copy of such notice to be Engineer-in-Charge of the work.

(ii) Payment of wages :

(a) Wages due to every workers shall be paid to him / her directly.

(b) All wages shall have to be paid in current coin or currency or in both.

(iii) **Fixing of wages period :**

(a) The Contractor shall fix the wage period in respect of which the wages are payable.

(b) No wage period shall exceed one month.

(c) Wages of every workman employed on the contract shall be paid before the expiry of ten days, after the last day of the wage period in respect of which the wages are payable.

(d) When the employment of any worker is terminated by or on behalf of the Contractor, the wages earned by him shall be paid before the expiry of the day succeeding the one on which his employment is terminated.

(e) All payments of wages shall be made on a working day.

(iv) **Wage book and wage cards etc. :**

(a) The Contractor shall maintain a wage book of each worker in such as may be convenient, but the same shall include the following particulars.

(b) Rate of daily/monthly wages.

(c) Nature of work on which employed.

(d) Total No. of days working during each wage period.

(e) Total amount payable for the work during each wage period.

(f) All deductions made from the wages with an indication in each case of ground for which the deduction(s) is/are made.

Contractor Senior Manager (Civil)

(g) Wage actually paid for each period.

24. During excavation of cut-off-trench and other components, shoring, shuttering including cost, carriage of materials including all taxes and cost of dewatering is to be borne by the contractor. Only the designed sectional quantity will be paid. Dewatering from the foundation trenches including and running charges of pump and coffer dam if required will be borne by the contractor.

25. It must be definitely understood that the Corporation / Government do not accept any responsibility for the correctness and completeness of the trial borings shown in the cross sections.

26. Excavated materials and debris unused in the area are to be removed from the site by the contractor at his own cost and responsibility as per the direction of Engineer-in-charge.

27. The work will be executed as per approved drawing, design and B.I.S. specification and as per the instruction of Engineer-in-charge.

28. No claim whatsoever on account of interest will be entertained under any circumstances.

29. The Contractor will remain responsible to arrange all mechanical means whenever required to complete the work in time at his own cost.

30. Any damage caused to the work due to any cause except major natural calamity whatsoever during the execution will be made good by the contractor until it is handed over to the Department in complete shape.

31. The quantities provided in the tender schedule are tentative which is likely to vary during execution as directed by the Engineer-in- charge.

32. If use of explosives is necessary for the purpose of blasting of rock required at any stage of the execution, the contractor is to obtain necessary blasting area license from the appropriate authorities and procure the explosives and store them at his own responsibility and arrange in the work sites. The procurement and storage of the explosives is the sole responsibility of the contractor &he shall abide by all the laws of explosive act.

33. No extra cost is to be paid to the contractor towards construction of coffer dam, diversion channel, approach road & haul road etc. required for execution of work. The approach road / haul road to work site will be maintained by the contractor.

34. The detail specification enclosed with the tender papers for different item of work should be strictly adhered to during course of execution of work. The work is to be carried out strictly as per OPWD code, BIS specification and as per prevailing standards of State Govt. and Central Govt.

35. If departmental land is available, the contractor will be allowed to use the same for accommodation of his labourers, stores and machineries free of rent. If department land is not available the contractor will make his own arrangement for land for such requirement at his own cost.

36. The quantity mentioned can be increased or reduced to the extent of 10% for individual items subject to a maximum of 5% over the estimated cost. If it exceeds the limit stated above, prior approval of competent authority is mandatory before making any payment.

37. The period of completion is fixed as **12 (twelve) calendar months (including rainy season)** and cannot be altered except in case of exceptional circumstances with due approval of next higher authority / Client Department.

38. Royalty for stone products, sand, and Borrow earth are to be recovered from the contractor's bill as per prevailing Govt. Notification.

39. The Contractor is required to establish a field labour with required equipments for quality control testing at site at his own cost.

Contractor Senior Manager (Civil)

40. **Testing of reinforcement bar and concrete works.**

(i) If, in the opinion of the Engineer-in-Charge of the work, the reinforcement bars to be used in the work requires testing in order to confirm its technical specification, the same shall be tested either in the Department laboratory or in any other authorized laboratory as referred by the Engineer-in-Charge at the cost of the contractor. The contractor shall bear all the cost towards supply of required samples, transportation and testing charges. The decision of the Engineer-in-Charge on this aspect is final and binding on the contactor.

(ii) All the testing of concrete works shall be carried out as per the direction of the engineer-in-charge or his authorized field functionaries and in case of any dispute arises on this aspect, the decision of the **Engineer-in-Charge** is final and binding on the contractor. Testing of all the concrete works of all grade required for structures, Cement Concrete lining and in any other construction activities of the work shall be tested in the Department Laboratory at the cost of the contractor. The contractor shall supply all the required samples at his own cost including transportation and bear all the testing charges of the concrete. The cost for the testing as charged by the Govt Quality control testing unit shall be final and binding on the contractor. If, in the opinion of the engineer-in-charge a Field Laboratory for acceleration of testing of concrete is required, the contractor shall install it at the work site at his own cost with all the required machineries and equipments as per the direction of the engineer-in-charge and cement testing work shall be carried out in the Field Laboratory under the direct supervision of the Field functionaries of the Govt Quality control testing unit.

41. The Bidders are required to inspect the site and satisfy themselves regarding availability of land for the work and other facilities for execution of same. It may be noted that, he is to complete the work within the time specified. No extension of time will be allowed in any account. If the Bidder fails to complete the work within the scheduled time or leaves the work in complete, he will have no claim on the work so executed and in this matter the decision of the Engineer-In-Charge of the Corporation is final & binding.

42. The work has to be executed confirming to ISI standards and specifications.

43. The rate quoted will be inclusive of all taxes, duties and cess etc.but excluding GST The rates will be firm and binding during the entire period of execution and extension thereof.

44. The contract price will be inclusive of all ancillary works such as approach road to work site, dewatering, desilting, cofferdams, water diversion measures, shoring, strutting, gangways, chutes, ramps, ladders, scaffolding, the quality control testing charges and any other such works, which will not be measured but are necessary for carrying out the proposed construction. No extra payments will be made to the contractor for such ancillary works/jobs.

45. The price of the contractor will be inclusive of all finishing jobs and rectifications works as and when required. The defect liability period will be for a period of 1 year after the date of handing over. Successful completion and handing over on the part of the contractor will not resolve him from the responsibility of attending to all the required rectifications and maintenance of the system during the defect liability period.

46. The contractor will be fully responsible for the safety of the work, property and workmen. The contractor will provide proper insurance cover for the work and property against any damage due to accidents, natural calamities or otherwise from the date of commencement till the end of defect liability period and also insurance cover against possible accidents and personal injuries to workers and workmen during the period of construction.

Contractor Senior Manager (Civil)

PERCENTAGE RATE TENDER AND CONTRACT FOR WORKS

GENERAL RULES & DIRECTIONS FOR THE GUIDANCE OF CONTRACTORS

1. The work proposed for execution by contract will be notified in a form of invitation to tender posted through websites www.tendersodisha.gov.in & www.odishaconstruction.com

This notice will state the work to be carried out, the items and approximate quantities thereof as well as the date for submitting and opening tenders also the amount of earnest money to be deposited and the amount of the security deposit by the successful tenderer and the percentage if any to be deducted from bills. Copies of the specifications, designs and drawings and any other documents required in connection with the submission of tender signed for the purpose of identification by the Sub-divisional Officer/Executive Engineer shall also be open for inspection by the Contractor at the office of the Sub-Divisional Officer/Executive Engineer during office hours.

2. In the event of the tender being submitted by a firm it must be signed separately by each member thereof, or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney authorizing him to do so.

3. Receipts for payment made on accounts of works, when executed by a firm must also be signed by the several partners, except where the Contractors are described in their tender as a firm in which case the receipts must be signed in the name of the firm by one of the partners, or by some other person having authority to give effectual receipts for the firm.

4. The memorandum of work tendered for and the memorandum of materials to be supplied by the OCCL and their issue rates shall be filled in and completed in the office of the Senior Manager (Civil) before the tender form is issued if a form is issued to an intending tender without having been so filled in and completed, he shall request the office to have this done before he completes and delivers his tender.

5. The amount of earnest money to be remitted will be 1% (online).

6. The Engineer-in-charge or his duly authorized assistant will open the tenders in the presence of any intending Contractors who may be present at the time and will enter the amounts of the several tenders in a comparative statement in a suitable form. In the event of tender being rejected the earnest money shall thereupon be returned to the tenderer.

7. The Engineer-in-charge shall have the right of rejecting all or any of the tenders.

8. In the event of a tender being selected for acceptance the Engineer who opened the tenders will, if he is competent to accept the tender, inform the tenderer of the selected.

tender who shall there upon sign copies of the specification and other documents with the agreement. The tenderer of the selected tender shall also deposit the required amount of the security money within the prescribed time. If the tenderer fails to deposit the required amount of the security money within the prescribed time the Engineer-in-charge may reject the tender.

If the Engineer is not competent to accept the tender himself, he will inform the tenderer of the tender which he decides to recommend for acceptance, such tenderer shall thereupon sign forthwith copies of the specification and other documents mentioned in rules 1 and 4 and shall deposit the required amount of the ISD/PSD within the prescribed time. The tender with the specification and other documents signed by the tenderer will then be forwarded for acceptance to the Engineer who is competent to accept the same. If the said Engineer rejects the tender the ISD/PSD deposited shall be refunded to the tenderer.

9. When a tender is selected for acceptance, the tenderer shall deposit the required amount of the ISD/PSD. No tender shall be finally accepted until the required amount of the ISD/PSD has been deposited.

10. The amount of Initial security Deposit to be deposited by the tenderer whose tender is selected for acceptance shall be 2 (two) percent of the agreement value of the work, failing which tender shall be liable to rejection.

Taxes as per provisions of Government shall be deducted from the bills of tenderer.

11. When tender has been selected for acceptance and the required amount of the security money has been deposited the Engineer shall scrutinize all pages of the form of item, Rate Tendered/quoted percentage in case of percentage tender and Contract for works to see that the form has been properly filled up and signed by the Contractor and the signature witnessed. He shall then, if he is competent to accept the tender, sign the acceptance of the tenders or if he is not so competent to, shall send the form for signature of the acceptance to the officer competent to accept it.

12. All tenderers are required to submit a list of works, which are in hand at the time of submitting their tenders. The list of works are required to be submitted in the proforma by the Executive Engineer under whom he has executed the work in order to judge their past performance (vide Works Department Circular No. 15443 dt. 01.08.2005.)

13. The earnest money deposited is liable to be forfeited to Corporation, if the tenderer backs out from the offer before acceptance of the tender by the competent authority.

14. IT towards GST will be deducted at the rate prescribed in the Odisha Goods & Service Tax Act-2017 or as amended from time to time.

Contractor Senior Manager (Civil)

TECHNICAL SPECIFICATIONS

SECTION – 1
GENERAL INFORMATION

1.0 General Information & Scope of Work

1.1 Description of work to be executed: "Extension of district veterinary hospital of Jajpur."

1.2 Location of work site:

The works site is well communicated from Jajpur Town in Jajpur District.

1.3 **Transport communication facilities.**
Private buses and trucks are playing through frequently from work site. The contractor has to make arrangement at his own cost to transport all his construction equipments, construction materials and labour to work site, as stated via above root.

1.4 **Climate :**

The project area has moderated climate with mean temperature from 29^0C to 38^0C during summer month. The rainy season is generally confined to four months from 16th June to 15th October during which about 90% of the total annual precipitation is received.

1.5 **Availability of Labour:**

Both Semi-Skilled & unskilled labour required for the work are available in project area and it is preferable to engage local labourer, However the Contractor must make his own arrangements for labour / machineries / equipments.

1.6 **Nearest Town:**

The nearest town to the work site is Jajpur Town.

1.7. **Availability of Petrol, Diesel and other lubricants:**

The nearest petrol pumps for procurement of petrol, diesel and other lubricants are available at Jajpur Town. The contractor shall make his own arrangement for procurement of same at his own cost required for the machineries and equipments engaged for the work.

1.8 **Electric Supply:**

Electricity supply is available at work site. The Contractor shall make his own arrangement for extension of electric connection at his own cost if so required by him.

1.9 **Observation of Rules:**

The Contractor shall take precaution to ensure safety to the workers. The department/Corporation will not take any responsibility for accident if any that may occur during the period of execution. The Contactor shall take immediate action to rectify the defects, immediately if any during the period of execution pointed out by the Department. Labour licence most be produce before the starting of work.

Contractor Senior Manager (Civil)

1.10 **Housing Facilities:**

Private house may or may not available in the vicinity of the work site. The Contractor shall make his own arrangement for housing the labourers, workers and staff at the work site.

1.11 **Medical Aid:**

The nearest Health Centre available at Jajpur Town, C.H.C. However, the Contractor shall make first aid arrangement at his own cost in accordance with rule and regulations of prevailing Labour Act.

1.12 **Post, Telegraph & Telephones**:

Post, Telegraph, Telephones, & Fax are available at Jajpur Town.

1.13 **Local Roads:**

The existing available approach road to the work site can be used by the contractor. The contractor shall however construct and maintain the connecting roads in the working areas including drainage, sanitary etc. at his own cost. The contractor shall construct haul road and other approach road as maybe necessary for proper execution of the work at his own cost.

1.14 **General Information:**

1.14.1 The information and the data related to work site conditions described above represents the site condition in general and for information of the bidders/contractors. The department does not guarantee the reliabilities or accuracy of any other data. The Contractor shall undertake at his expense such studies as are necessary to assess the reliabilities and accuracy of information presented.

1.14.2 It shall be presumed that the bidder / contractor visits sites of proposed works at his expense and satisfy himself as to the nature and location of work and local condition in general and particularly about the availability of construction materials electricity supply, water supply, storage and handling of materials, disposal of soil, road communication, availability of labour and other related matters, planning for execution etc. before quoting his rates for different items of work. The department therefore will not bear any responsibility for any interpretation or conclusion made by the contractor in respect of site condition and consequence thereof.

1.15 **Sources of Fund:**

Department of Animal Husbandry & Veterinary Services, Odisha

SECTION-2 (I)

2.0 GENERAL SPECIFICATION

2.1 The enclosed drawing in the Quotation document gives broad dimensions and outline of the works to be executed through this contract. These drawings may however be revised/modified from time to time and supplementary additional drawing may also be issued as per necessity. During the course of execution there may be changes in dimension, specifications and shape of components. These chances in the drawing can be done without in any way deviating the terms of the contract and the Job Worker is to execute the work as per revised drawings and specifications at the same rate as agreed upon for the work awarded under the original contract. The Job Worker shall do no work without proper drawings. He shall check all drawings and specifications carefully and advise the Engineer-in-charge if any error and omission are discovered where upon the Executive Engineer will prepare revised additional drawings and specifications and may be required to suit the stage of the work.

2.2 Where the drawings are not consistent with the text of the specifications, the text shall govern.

2.3 The rates shall be for finished items of works as per description in the schedule of quantities and according to drawings, specification and conditions of the contract. The rates quoted shall be for execution of finished items of work & the specifications of which confirm to the details furnished in the Agreement and provisions in Bureau of Indian Standards and shall include all general and incidental charges which will not be paid separately. Such general and incidental charges are listed in succeeding Para for the convenience of the Quotationers but are not exhaustive. Omission of any such items here in but required for delivering finished items of work, shall not be plea, that such items are not covered by the rates quoted.

2.4 Formation and maintenance of haul roads including river and drainage crossings within the work site. The existing approaches and haul roads, if any, under the control of the Department may be made use of but improvement, if required, shall be done by the Job Worker at his own cost.

2.5 Labour and material required for the construction of reference points, bench marks, pillars, diversions, signboards, road signals etc. for setting out works shall be at Job Workers cost.

2.6 Scaffolding and gangways as and when required for the work will be done by the Job Worker at his own cost. No additional payment in this regard, will be entertained.

2.7 The rate includes all leads, lifts & delifts.

2.8 Form work complete includes cost of materials, labour, maintenance, erection dismantling and removal.

2.9 Construction of coffer dam, dewatering of any water, that may accumulate in the areas required for carrying out the items under schedule of quantities, includes the initial dewatering of the pond formed after the formation of coffer dam or any type of cross bound and all seepage that may accumulate in the area before of during construction.

Contractor Senior Manager (Civil)

2.10 Protection of the components of work during the rainy season & khariff irrigation supply shall be the responsibility of the Job Worker. The responsibility for the safety of the structure rests, entirely on the Job Worker and any damages that may occur, has to be made good by the Job Worker at his own cost.

2.11 The sequence of construction adopted by the Job Worker shall have to be approved by the Engineer-in-Charge.

2.12 The Job Worker has to make his own design for coffer dam or any type of cross bund required during course of execution. All materials for the coffer dam of cross bound shall be arranged by the Job Worker at his cost. The Job Worker shall maintain the coffer dam/cross bund till completion of the work.

2.13 Quality Control :

2.13.1 Before collecting materials required for execution of the respective items of work as laid down in the schedule of quantities and in the detailed specifications described hereafter in the subsequent sections, the Job Worker shall ensure that samples of materials proposed to be used are first approved by the Engineer-in-Charge. When directed the samples of materials proposed to be used should be furnished to the Departmental laboratory i.e. Quality Assurance Division, Cuttack.

2.13.2 All such testing charges shall be borne by the Job Worker. The Job Worker will provide necessary assistance if required for collection of samples.

The Job Worker is liable to pay for any test which is not included in the agreement but required in the opinion of the Engineer-in-Charge during execution of the work for which no additional payment will be made to the Job Worker.

2.13.3 On the basis of satisfactory test results confirming to technical specification, collection of materials shall be started in the field. The testing of materials shall be checked in the field Laboratory by the Junior Engineer/ Assistant Engineer of the Department as well as staff of Quality Assurance Division, Cuttack. If the field test result is found unsatisfactory, the materials shall be rejected and action taken to remove the same from work site by the Job Worker at his own cost. In no case the defective materials shall be used in the work.

2.13.4 On receipt of notice from the Engineer-in-charge and on observation of concerned officials of Department of Animal Husbandry & Veterinary Services, Odisha the Job Worker will rectify the defect in stipulated period at his own cost. If the defects are not rectified in the stipulated period, the Engineer-in-charge shall assess the cost, get the defect rectified and recover the same from the dues of the Job Worker.

2.13.5 A quarry chart indicating possible source of materials may be seen in the office of the Senior Manager (Civil), OCC Ltd., Jajpur Group of Projects, Jajpur. The Job Worker must however satisfy himself that materials as per required specifications and quantity are available in those quarries. No extra payment will be made due to non-availability of materials as per required specification and quantity in the quarries shown in the departmental quarry chart. The quarry chart is only an indication of

source of material and the department does not accept the responsibility if the materials are not available in full quantity and quality.

2.13.6 No claim for carriages of water whatsoever will be entertained.

2.13.7 Decision regarding usefulness of excavated materials rests fully on the Engineer-in-Charge. However he may take advice of Quality Control Organization or higher authorities if required.

SECTION-2(II)

2. EARTH WORK IN EXCAVATION OF FOUNDATION AND FILLING

2.1. General

The Item in the schedule excavation of foundation and pile driving include removal of all materials up to the level as per profile specified in the drawing or as directed by the Engineer-in-charge.

2.2. Setting out of the Work.

2.2.1. In the vicinity of the Building site temporary Bench Marks shall be set up by the department at different convenient location.

2.2.2. The contractor shall establish sufficient No. of reference Bench Marks for facilitating the setting out and talking levels for measurement of work with the approval of the Engineer in charge at his own cost. The Bench mark showing value of R.L. shall be conspicuously carved and painted on the Bench Mark.

2.2.3. The layout of the building shall have to be given in appropriate manner with pegs and pillars as per layout plan prepared by contractor after duly approved by the Engineer in charge. The center line of the building and the reference line for all alignments for setting out works including constructions of reference Bench mark, reference lines check profiles, surveys, as may be required at the various stages of the constructions, shall be done by the contractor at his own cost. The cost of such work shall be deemed to have been included if the costs of the items in schedule.

2.3. Clearing the Sites.

2.3.1. The contractor shall clear the entire area required for setting out of all tree stumps, bushes, jungles roots, bush wood rubbish of all kinds of all other objectionable materials. The ownership of all the useful materials so removed from clearing site and or excavations shall rest with the department. The contractor shall have to remove all the stumps and roots of trees for which no additional payment will be made roots of trees shall dispose off all such materials within 1 Km/ as directed by the Engineer-in-charge. As operations in connection with clearance of jungle and bushes shall be subject to provision of forest Acts and rules.

2.3.2. No separate payment will be made to the contractor for complying the requirements of this Para graphic and all cost shall be deemed to have been included in the rates quoted in schedule for the items of excavation.

2.4. Pile Driving

The R.C.C. double under reamed Piles of size and shape as shown in approved drawing or as directed by Engineer-in-charge will be drived in all kinds of soils to line, levels and plumb. By engaging labour all materials and obstacles inside the hole will be removed by scooping out from inside. All precautions will be taken against shifting, and tilting.

2.4.1. Measurement and Payment.

The item rate includes driving of R.C.C double under reamed Piles of dia specified. and

Contractor Senior Manager (Civil)

labour charges for sinking of the same in all kinds of soil to lines, levels and plumb including supply of necessary T & P for removal of materials and obstructions, disposal of spoil with all leads and lifts, delifts and cost of all materials conveyance, taxes, royalty and labour etc. as directed by Engineer-in-charge.

2.5. Excavation

The excavation of foundation may be carried out manually as per specification, drawing and directions of the Engineer in charge. It should be finished reasonably to the prescribed dimension.

2.5.1. Measurement and Payment.

2.5.2 The measurement for excavation will be based on level section only. No allowance shall be made for any excavation except where specifically authorized.

2.5.3 The payment will be made on volumetric basis for the quantities excavated to the required extent.

2.5.4 The cross sections shall be taken initially and on completion of excavations, final cross sections shall be taken. These sections will be marked on the initial cross section taken prior to commencement of works. The quantities between initial and final cross sections shall be worked out and paid for. It shall be clearly understood that no excavation beyond the prescribed dimensions will not be paid for.

2.5.5 The unit bid price for this item shall be inclusive of full compensation for mobilizing, demobilizing and supplying all materials, equipments T&P, labour, supervision and incidental works including running, maintenance and hire charge of pumps used for running, maintenance of coffer dam if required, dressing and leveling the bed of foundation to the proper profile and disposal of excavated materials away from the working area as per direction of the Engineer-in-charge.

2.6. Filling Foundation and Plinth

2.6.1. With Excavation Materials.

The Item in the schedule filling of foundations and plinth includes the filling with excavated earth including conveying to the foundation site, laying in layers, breakings, clods, watering and ramming as specified and as per direction of the Engineer-in-charge.

2.6.2. The unit bid price for this item shall be inclusive of supplying all materials, equipments T & P, labour, supervision and incidental works, running, and maintenance and hire charges of pumps used for dewatering, and leveling to the proper profile and disposal of extra excavated materials away from the working area as per direction of the Engineer in charge.

2.7 With Sand

2.7.1. Filling of foundation and plinth will be made with sand and the manner of depositing the materials shall be subject to approval by the Engineer-in-charge.

2.7.2. Any sand coarse or fine which is fairly clean and free from salts may be used without screening or further treatment.

2.7.3. The sand shall be placed carefully and spreaded in uniform layers not exceeding 15 cm. lamping to be used for compaction of filling materials immediately adjoining the foundation wall. Sufficient care is to be taken for profuse watering in order to avoid voids and for proper settlement.

2..4. The sand should satisfy the specification specified. The sand shall be laid in layers well watered and rammed.

2.8. Measurements and Payment.

The payment shall be made on cubic meter basis under relevant items of schedule of quantities. The quantities between initial and final cross sections shall be worked out and paid for.

2.8.1. The unit bid price for this item shall be inclusive of full compensation for mobilizing, demobilizing supplying all materials, equipment, I & P labour, supervision

and incidental works including running maintenance, dressing and leveling the top of the filling materials, to the proper profile and including conveyance etc. complete as per the direction of the Engineer-in-charge.

2.8.2. The materials required for development of site shall be obtained from borrow area duly approved Engineer-in-charge. The contractor has to arrange borrow area to borrow earth at his own cost and responsibility. Adequate lighting arrangement should be provided by the contractor. All areas require for borrowing earth for development of site shall be cleared of all trees stumps, roots bushes rubbist other objectionable materials. The materials free from all objectionable materials

shall be deposited spread in the uniform layers not exceeding
22.5 cm. and breaking clods upto maximum to 5 to 7 cm.

2.8.3 a) All works shall be measured by level

b) All linear measurement shall be in meters correct to 0.01 meters, area worked out in sqm. Co to 0.01m^2 and volume work out in cubic meter connect to 0.01m^2.

2.9. Soil Treatment.

2.9.1. Chemicals.

The treatment of the areas shall be carried out by applying one of the following chemicals to be supplied by the contractor.

i) Aldrin
ii) Chlordane
iii) Dieldrin
iv) Lindane
v) Heptachlor, or
vi) Any other and similar type.

A daily record shall be maintained by the Contractor indicating the details of work done and the quantity of chemical consumed for the work. This record book shall be the properly of the employer and should be loaded over to employer on completion of work.

2.9.2. Method of Application

The following paragraphs specify the manner and sequency of operations, which must be followed. They also indicate the rate of application of chemicals of stated concentration for various operations. It shall be distinctly understood that these represent the minimum rates of application for each operation and that the Contractor may have to actually apply chemicals at rates higher than those specified as per instruction of the Engineer to the extent considered.

i) After the final depth of the foundation trenches (which shall also include foundation pits) is reached. The horizontal and vertical sides shall be soaked with insecticides by high pressure pumps at the rate of at least 5 liters per sqm. of trench surface area. i.e the surface area of the vertical sides as well as bottom of the foundation trench should be soaked with chemical solution at the rate of 5 liters per sqm.

ii) After the vertical and horizontal side of the foundation trenches are treated in the manner described above, the floor area in between the walls shall be treated by saturating the soil with insecticides. For this purpose holes of 50mm. dia shall be bored in the natural soil surface at suitable at suitable space intervals depending upon the type of soil. The chemical used shall be at the rate of 5 liters per sqm.

iii) After the earth, to raise the plinth level, has been filled in, the whole area should be saturated with the insecticidal solution at the rate of at least 5 liters per sqm.

iv) After the walls are constructed and the plinth filled in treated as specified above,

Contractor Senior Manager (Civil)

complete saturation treatment shall be given by digging 450 mm, deep trench around the walls of the building on the outer side and saturating the same with insecticides at the 5 liter per running meter of the wall.

2.9.3. Treatment shall not be made when the soil or fill is excessively wet immediately after heavy rains, to avoid surface flow of the toxicant from application at site. Unless the treated areas are to be immediately covered, precautions shall be taken to prevent disturbances of the treatment by human or animal contact with the treated soil.

2.9.4. The contractor shall include in the rate cost of all items of operations including supplying, handling and transportation of chemicals, enabling works and other contingencies required for the completion of the job and tools, land plants as required for the work such as spraying pumps, basket, bucket, through, measuring glasses etc. The Contractor shall also include in his rate the cost of masks and other protective and safety appliances are necessary as specified by the manufacturer or as instructed by the Engineer) for the labourers engaged for the job.

2.9.5. Mode of Measurement.

The rate for the item shall be based on the unit plinth area of the building treated and this shall cover all the four stages of work.

3.0. PLAIN CEMENT CONCRETE, REINFORCED CEMENT CONCRETE AND FROM WORK.

3.1. General

3.1.1. Concrete for all structure works shall be composed of cement sand coarse aggregates water and any other admixture as specified all well mixed and brought to the proper consistency. Test shall be came out on the concrete at specified intervals during the progress of work and the mixes modified as necessary in order to consistently secure the required strength, work ability, density and impermeability together with the maximum practicable economy. The water cement ratio for the concretes will be regulated by the maximum practicable economy. The water cement ration for the concretes will be regulated by the requirements of strength, durability and workability. The concrete shall be of uniform consistency and quality throughout any pour and for similar parts of the same structure. However the consistency and composition shall be such that the concrete can be worked into all corners and angles of the forms.

3.1.2. The control concrete is based, besides other factors, on maintaining a fairly uniform slump at the point of placement and on holding the water-cement ratio as closely as practicable for the standard determined for the purpose under no condition shall be slump be greater than that required to provide proper placement and compaction of the fresh concrete within the form.

3.1.3. The slump shall be measured in accordance with the standard methods prescribed in I.S. specification.

3.1.4. The allowable slump or consistency shall be used as directed. The consistency of the concrete shall be varied only by increasing or by decreasing the amount of cement paste in batch and nor by any change of the water-cement ratio established for each class of concrete. Concrete classification is related to the specified 28 days compressive strength. Test specimens of concrete shall be taken for quality control operation of the work as per requirement in Indian Standard Specification.

3.2. Composition

3.2.1. General

Concrete shall be composed of Portland cement, sand coarse-aggregate admixtures (if required) and water as specified, all well mixed and brought to the proper consistency. Use of approved admixture shall be permitted by Engineer in charge. Only on satisfactory evidence that its use does not adversely affect the properties of

concrete.

3.2.2. Material

3.2.2.1. General

The materials such as cement, steel shall have to be arranged by the contractor.

3.2.2.2. Cement.

a) Cement for concrete to be arranged by the contractor will be Ordinary PORTLAND.

b) The Contractor shall create a suitable and adequate infrastructures and arrangement for procuring, handling, storing and conveying cement to mixed at site with advance planning of work to be done during next one month.

c) Cement shall be stored separately in dry, water tight and properly ventilated structures at the cost of contractor. All storing facilities shall be subject to approval and shall be such as to permit easy access for inspection and identification. The contractor shall produce test certificate of the manufacturer for 10 tons of receipt of cement or as approved by the Engineer-in-charge.

d) Sampling and testing shall be done by at the laboratory of the Deptt. No cement shall be used clearance has been given by the Engineer-in-charge. That the test results are satisfactory, cement than 90 days shall not be used unless the test results satisfy the minimum strength requirements.

3.2.2.3. Fine Aggregates

General aggregates shall conform to I.S 383-1970 or its latest version. Sand to be used shall be as obtained from river bed from specified quarries. The contractors for may obtain sand form different which shall meet required of specification.

3.2.2.3.1. Quality

Sand shall consist of hard, dense, durable and uncoated siliceous grittier materials. It shall be free from injurious amount of dust, lumps, soft and fluffy particles, shale, alkali, organic matter, loan and other deleterious substance. Sand shall be washed if necessary to remove all vegetations and other foreign matter. The cost of washing and screening shall be borne by the contractor. The sand will pass a 4mm. sieve.

3.2.2.3.2. Fineness Modulus

Sand should have a fineness modulus between 2.1 to 3.0

3.2.2.3.3. Storage.

All sand shall be stored on the site of work in such a manner as to prevent intrusion of foreign matter.

3.2.2.4. Coarse Aggregate.

3.2.2.4.1. General

Coarse aggregates for concrete shall consist of clean, dense and durable crusher broken hard gram metal free from vegetable matter. Predominantly flaky aggregates shall not be used.

The sum of total of all deleterious materials shall not exceed 5 percent by weight.

Coarse aggregate shall be washed if necessary to remove all vegetables and other perishable substances and objectionable amounts of foreign matters. The cost of washing and screening shall be borne by the contractor.

3.2.2.4.2. Grading

a) Coarse aggregates shall have a maximum size of 40mm. and well graded.

b) For heavily reinforced concrete members, maximum size of aggregates shall usually be restricted to 5mm less then the minimum lateral clear distance between the main bars of 5mm less then the minimum cover to the reinforcement, whichever is smaller.

c) The gradation shall give a dense concrete of the specified strength and consistency that will work readily into position without segregation and without use of excessive water content.

d) The grading of coarse aggregates shall be in the nominal sizes as mentioned I.S.

3831970.

e) Specific Gravity – 2.60 minimum.

3.2.2.4.3. Storage

a) Aggregates shall be stacked in such a way as to prevent the intrusion of foreign materials such as soils, vegetable matter etc. Heaps of fine and coarse aggregates shall be kept separate.
b) The aggregates shall be stock piled adjacent to the mixer site so as to require minimum re-handling and labour when conveyed to the mixer.
c) The aggregates shall be placed on a dry hard patch of ground. The aggregates shall be kept free of dirt, rubbish, papers, vegetables matters and bidi etc. on the stock piles.
d) To minimize moisture variations the stock piles shall be spread over the large in area as possible but left low and fairly uniform height preferably 1.25. to 1.50 meter and the lowest layers of about 30cm height shall be allowed to act as drainage layers and not used till end.

3.2.2.5. Water

Water used for fixing of concrete and mortar shall be free from injurious amounts and deleterious materials. Portable water is generally considered satisfactory for mixing and curing. Samples of water will be tested before use.

Where water is found to contain any sugar or an excess of acid, alkali or salt, the Engineer-in-charge will refuse to permit its use.

3.2.2.6. Admixtures.

3.2.2.6.1. General

No materials other than the essential ingredient i.e. cement, aggregate and water shall ordinarily be used in manufacture of concrete of mortar. But the Engineer-in-charge may permit the use of approved admixtures or imparting specific characteristic to concrete. On satisfactory evidence that is used on not in any way adversely affect the properties of concrete particularly its strength, volume changes durability and has no deleterious effect on the reinforcement. Cost of such admixture shall be born by the contractor and shall be deemed to have been included in the unit rates for relevant items.

Air entraining agent (AEA) confirming to requirement of IS 9103-1976 may be used as necessary only on approval of the Engineer-in-charge. The air entraining agent as an admixture may be added to the concrete batch in form of solution. It shall be batched by means of mechanical batches capable of correct measurement and in such a manner as will ensure uniform distribution of the agent through out the batch during the specified mixing period. The amount of AEA used shall be such as to effect air entrainment from 4 to 6 percent by volume. The resulting modification if any to the content of proportion of cement a consequence there of shall be accounted for in the rate for payment according to general technical specification for concrete.

3.2.2.6.2. Epoxy

Use of Epoxy for binding fresh concrete for repairs may be permitted on written approval of the Engineer-in-charge. Epoxy shall be applied in accordance with the instructions of the manufacturers. The cost of such repairs with all materials shall be borne by the contractor.

3.3.3. **Mixing**

3.3.3.1. General

The concrete ingredients shall be mixed thoroughly in appropriate proportion in mixers so as to insure uniform homogeneous distribution of all the component materials throughout the mass at the end of mixing period.

3.3.3.2. Operation of Mixtures.

The following general principles should be followed in the operations of mixer

i) The ingredients (cement, sand and aggregates) should be fed into the mixer simultaneously in such manner that the period of flow of each is about the same.
ii) A portion of the water about 5 to 10 percent should precede and a like quantity should follow the introduction of the other materials.
iii) The remaining water (80 to 90%) should be added uniformly along with the introduction of dry ingredients.

3.3.4. Conveyance of Concrete

Concrete shall be conveyed from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation of ingredients. In case, such segregation occurs inadvertently, concrete shall be mixed before being laid in place. The mode of transport of concrete shall be subject to approval of the Engineer-in-charge.

It shall be deposited in its final position as early as practicable, but always within a period of 30 minutes of its removal from the mixer. The handling and conveyance of concrete shall conform to para 4.8 of IS 475-1975 (with latest amendments)

3.3.5 Preparation for placing concrete

Concrete shall not be placed until all form work required is completed, exploded parts, if any, installed checked and surface prepared for placing. No concrete shall be deposited until the foundation has been inspected and approved.

3.3.6 Consistency.

The amount of water used in the concrete shall be regulated as required to secure concrete of the proper consistency and to adjust for any variation in the moisture content for grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete before placing will not permitted. Uniformity in the concrete consistency from batch to batch will be required.

The slump of the concrete should be fairly uniform at the point of placement keeping the water cement ration as closely as practicable to the standard ratio determined for the required mix. Under no condition, shall the slump be greater than that required to provide proper placement and compaction of the fresh concrete.

3.3.7 Tests

The compressive strength test of the concrete and also other test if necessary will be conducted by the Department in accordance with the provisions as per Indian Standard specification. The contractor shall provide such facility as may be necessary for procuring and handling representative test samples sand, coarse aggregates or concrete at site and will allow department any number of samples to collect from the mix for testing purpose without any compensation.

3.3.8 Preparation for Placing Concrete.

3.3.8.1 Concrete shall not be placed until all form works required is completed, embedded parts, if any installation and checked and surface prepared for placing. No concrete shall be deposited until the foundation beer inspected and approved.

All surface of forms and embedded materials that have become encrusted with dried mortar or concrete previously placed shall be cleaned of all such mortar or grout before the surrounding of adjacent concrete is placed.

3.3.8.2 Foundation Surface.

Immediately before placing concrete, all surface of foundation upon or against which the concrete be placed shall be free from standing water, mud and debris. All surfaces of rock upon or against with concrete is to be placed shall, in addition to the foregoing requirements be cleaned and free from lubricants, Objectionable coating and loose semi detached or unsound fragments. The surfaces absorptive foundations upon or against which concrete is to be placed shall be moisten thoroughly kept sufficiently wet for at least 24 hours and immediately prior to placing so that the

moisture will not be dry from the freshly placed concrete.

3.3.8.3 Surface of construction and Contraction Joints.

Concrete surface, upon or against, which concrete is to be placed and which new concrete is to adhere that have become so rigid that the new concrete cannot be incorporated integrally with that the previously placed are defined as construction joints. The surface of construction joints shall be cleaned and when covered with fresh concrete mortar. Cleaning shall consist of removal of loose of defective con and other foreign materials. The surface of all construction joints shall be washed thoroughly with air jet immediately prior to placement of adjoining concrete. Surface of construction joints which have been permitted to dry by reasons of succeeding lift not being placed within the specific moist curing permit shall be kept continuously moist for at least 72 hours immediately prior to placing the succeeding lifts pools of water shall be removal from the surface of construction joints before the new concrete is place.

3.3.9 Placing

3.3.9.1 The contractor shall kept the Engineer-in-charge informed as to when placing of concrete will be performed. Placing of concrete shall be performed only in the presence of a duly authorized person shall of the department.

3.3.9.2 Re tampering of concrete will not be permitted. Any concrete which has become so stiff that proper placing can not be ensured shall be wasted. Concrete shall be deposited directly in its final position and shall not be caused to flow such that the lateral movement will permit or cause segregation of the coarse aggregate, mortar or water from the concrete mass. Methods and equipments employed in depositing concrete I forms be such as will not result in clusters or group of coarse aggregate being separated from the concrete mass but if clusters do occur, they shall be scattered before the concrete is vibrated.

3.3.9.3 Except as intercepted by joints, all formed concrete shall be placed in continuous approximately horizontal layers, the depth of which generally shall not exceed 50 centimeters.

3.3.9.4 The department reserves the right to require lesser depth and layers as per necessity.

3.3.9.5 Each deposit of concrete shall be vibrated completely before another deposit of concrete is placed over it.

3.3.9.6 Mass concrete shall not be placed during rains, sufficiently heavy or prolonged to wash mortar from aggregates. During such rains mortar would not be spread on construction joints and diluted mortar already spread shall be removed and replaced before continuing with the work.

3.3.9.7 Construction joints shall be approximately horizontal unless otherwise shown on the drawings or prescribed by the Engineer-in-charge and shall be given the prescribed shape by the use of forms, where required or other means that will ensure suitable joining with subsequent work. All intersection joints with concrete surface which will be exposed to view shall be made straight and level or plumb.

3.3.10 Consolidation (Compaction)

i) Consolidation of newly placed concrete shall be done with immersion type vibrators. The equipment for vibration should have adequate power and shall be of high frequency, rugged and reliable. Operator should be experienced, competent, dependable and energetic. Ample stand by units and parts as well as systematic servicing should be provided. Vibrator should not be used to cause concrete to move more than a short distance laterally, otherwise fine materials runs ahead and segregates from the coarse aggregate.

ii) Re-vibration shall be restored to only after specified instructions as given by the Engineer-in-charge.

iii) Where vibrator is used to full advantage for consolidation of newly placed concrete, no supplementary Roding or other working of concrete is necessary. At corners, obstruction block outs, location with congested reinforcement special care shall be taken to attend to these places with sample and properly applied additional vibration.

iv) Immersion type vibrators of approved weight and frequency 7000 to 9000 r.p.m. to secure maximum consolidation shall be used. Extended vibrators of any approved type shall be used on only in inaccessible location and where it is impracticable to use immersion type.

v) All excessive vibrations sufficient to cause segregation and laitance or tending to bring an excess amount of water to eh surface shall be avoided.

vi) The immersible type vibrators should generally be inserted vertically. In very shallow concrete some consolidation can be obtained by using vibrators in horizontal position. Vibrators should be inserted at feasible intervals of 450mm to 1000 mm apart or as directed by the Engineer-in-charge and withdraw after 10 to 20 second. The entire depth of new layer of concrete should be vibrated and ordinarily the vibrators should penetrate the layer below (which had not yet become rigid) for several millimeters to ensure through bond between the layers. Under ordinary job consolidation, there is little likelihood or damage from direct re-vibration of lower layer or by vibration transmitted by embedded steel. Vibrators shall not be however inserted into lower course that have commenced final set, nor shall they be directly applied or allowed to disturb reinforcement extending into hardened or partially hardened concrete.

vii) When smooth surface are required for all surface that will be permanently exposed to weather and for all surface next to embedded metal work around which it is desired to prevent leakage the adjacent concrete shall be properly vibrated, spaded or tamped. For formed concrete surface to be exposed to high velocities of water, special precautions shall be taken to prevent to minimize surface pitting without resorting to over manipulation of the concrete. Concrete shall not be deposited under water.

The compaction concrete shall confirm to para 4.11 of I.S. 457 of 1957.

viii) The Contractor shall construct all concrete structures to the exact lines, grades and dimensional established in the drawing specified by the department and as directed by the Engineer-in-charge. After the forms have been constructed and erected all surface imperfections shall be corrected, all nails shall be hidden and any roughness and angles on the surface to the required curvature be finished.

3.3.11 Curing and Protections.

i) All concrete shall be protected against injury until final acceptance. Expose finished surface of concrete shall be protected from the direct rays of the Sun for at least 72 hours after placement. Exposed concrete shall also be protected from the action of rains and mechanical injury. No fire shall be permitted in direct contact with concrete at a time. Concrete in which standard profit and cement is used shall be kept continuously moist for not less than 14 days for normal concrete by covering pipes or by any other methods approved by the Engineer-in-charge.

ii) All opening formed through the concrete, should be closed during the entire curing period and as long thereafter as practicable to prevent circulation of air and the resultant cracking.

iii) Construction joints shall be cured in the same way as the other concrete and shall also be kept moist for at least 72 hours prior to the placing of additional

concrete upon the joints.

iv) The methods of keeping formed concrete surface moist shall be by continuous sprinkling of spraying of water as may be necessary to prevent any portion of the surface from drying during the specified curing period.

v) The water and other methods of curing shall be handled so as not to stain concrete surface which shall be exposed.

vi) The actual method curing adopted shall be subject to the approval of the Engineer-in-charge. The contractor shall have on hand and ready to install before actual concrete placement is started, all equipments needed for the adequate curing and protection at all locations of concrete placement.

vii) In case, curing operations are inadequate or unsatisfactory, the Engineer-in-charge shall be entitled to take such steps as it may deem necessary to make good the deficiencies and defects at the contractor's risk and cost.

Curing and protection should conform to Para 4.14 of IS 457 of 1957 with the latest.

3.3.12 Repair of Concrete.

i) Repair of concrete shall be performed by skilled workmen and in the presence of the Engineer-in-charge of his authorized representatives. The contractor shall correct all imperfections on the concrete surface as necessary to produce surface that shall conform to the required standards. All materials, procedures and operation used in the repair of concrete shall be subject to approval of the Engineer-in-charge.

ii) Surface concrete finished against from shall be smooth free from projections. After removal of forms, within 24 hours thereof, whenever practicable, all unsightly tigges of fins shall be removed and any local bulges on exposed surface shall be removed by toweling and robbing. All holes left by the removal of fasters from the tie-rods, shall after being removed with a toothed rammer by neatly filled with dray requisite patching mortar.

iii) All honey combed, porous, fractured or otherwise defective concrete which in the opinion of the Engineer-in-charge is to be replaced to the required standard shall be removed by chipping. The chipped opening shall be sharp edged and keyed and shall be filled to the required lines with fresh concrete.

iv) Concrete replacement shall be used when holes extend 0.05 sq m. in area and deeper than the reinforcement steel in reinforced concrete and in unreinforced concrete where the holes are 0.1 sqm.in area and 100 millimeters or more in depth.

v) Where concrete is used for filling as mentioned above, the defective concrete shall be remove and good concrete exposed but in no case less than millimeters in depth and the concrete will reinforced if necessary and as directed by the Engineer-incharge.

vi) Dry patching mortar shall consist of one part of cement to two parts of sand by volume and just enough water so that the mortar as used will stick together on being moulded into ball sight pressure of the hands and will not exclude free water when so pressed but will leave the hands damp. The mortar shall be placed within 30 minutes of preparation.

vii) The mortar shall be placed in layers not more than 25mm in thickness after being compacted and each layer shall be thoroughly tamped to the satisfaction of the Engineer-in-charge. Each layer except the last shall be roughened thoroughly to provide an effective bond with the succeeding layers. The last or finishing layers shall be smoothened to form a surface continuous with the surrounding concrete. Dry packing mortar shall be used for filling behind reinforcement or for filling holes that

extend completely through a concrete section.

viii) All patches shall be bonded thoroughly to the surface of the chipped opening and shall be sound and free from shrinkage crack, repair of concrete shall conform to para – 4.15 of I.S. – 1957.

ix) Chipping and Roughening Concrete Surfaces

1) The surface upon or against which additional concrete is to be placed shall be chipped and roughened by the contractor at his cost for expose of fresh surface. The roughening shall be performed by chipping or other satisfactory method and in such manners as not to loosen, crack or shatter any part of the concrete beyond the roughened surface. After being roughened the surface of the concrete shall be cleaned thoroughly of the loosen fragments dirt and other objectionable substances by the use of high velocity air and water jet. All concrete which is not hard, dense and durable be removed to the depth required to secure a satisfactory surface.

2) The cost of the work of chipping and roughening shall be deemed to have been included in the contractor's tendered rate for the respective items of concrete.

x) Damaged Defective Concrete

Concrete damage from any cause and any concrete which shall be found defective by reason of the contractor's operations at any time before, if and where so directed, be removed and replaced by the contractor with acceptable concrete as directed by the Engineer-in-charge.

3.4. False Work and Forms.

These make up the temporary supports of the concrete consists of three parts.

3.4.1 Centering constituting the bottom forms supporting the weight of the concrete.

3.4.2 Centering constituting the side forms retaining the concrete at the sides and subject to hydraulic pressure as long as the concrete does not set.

3.4.3 Props, beams and bracing supporting and stiffening the forms.

3.4.4 Forms made from timber planks or steel sheets properly tightened with timer framing are suitable both for centering and side shutters. For centering, platforms of rough planks suitable supported and leveled up with earth and finished at the top with cement plaster

1:12 with neat cement punning should be done unless otherwise permitted by the executive Engineer in case of slabs requiring an appreciable camber and a smooth un plastered ceiling. The use of temporary masonry finished with smooth cement plaster is permissible for side shutters provided that it can be made strong enough to withstand distortion due to hydraulic pressure. Any of the above type of centering and side shuttering or a combination thereof may be used as most convenient in each case. Beams, props and bracing of steel or timber are all useful and may be used according to materials available and as required in each case. All forms shall be true to line and shape according to the requirements of the design of the finished reinforced concrete work. They shall be tightly assembled and fixed, soundly supported on beams and props or a combination thereof and efficiently braced. The forms shall present flush and smooth contract surface with the concrete and shall be slot and rigid enough to hold the we concrete without distortion and the whole assembly shall be strong and rigid enough to stand any incidental loads-including wind pressure or shocks- without any appreciable vibration, deflection, distortion bulging or settlement. They shall also be sufficiently water tight to prevent escape of water from the concrete. The beams and props and other members supporting or stiffening the centering and side shuttering shall be so fixed and arranged over collapsing wedges or other contrivances that the following operations which are required after the concrete has sufficiently hardened can be easily and safely performed.

3.4.5 Stacking and removing the side shuttering earlier than the centering without disturbing or giving shocks to the latter or any other part of the structure or essential temporary supports.

3.4.6 Slackening the centering without jarring the structure.

3.4.7 Removing the centering, beams, props and other member of the false work or shutters without jarring any parts of the structure or other false work in the neighbourhood.

3.4.8 Forms for all rectangular columns shall preferable be so arranged that the shutters on one side can be fixed in position and tightened up with rest of the shutters as work proceeds. This enable concrete to be compacted uniformly from bottom upward and it is not necessary to throw concrete into the forms from a great height which is always likely to cause defective work. For the same reasons forms for other shapes of columns shall be so designed that the forms can be build rapidly as the work proceeds.

3.4.9 In making centering for slabs, beams, lintels or arches in building sometimes chases, holes or recesses are kept for supporting centering without the use of props. This should not be done at the places of hearing of the beams, arches or lintels.

3.4.10 When cambers are required in slabs or beams these shall be carefully provided in the centering. The usual figures for central cambers and as follow and shall be adhered to unless some other cambers are specified.

a) slab-about 0.93 cm per 3.0 m of span

b) Beams – about 0.46 cm per 3.0 m of span.

3.4.11 Before arranging reinforcement in the forms the interior surface of the later which have to remain in contract with concrete shall be very lightly smeared with nonstaining mineral oil, soap solution, line white wash other approved materials to prevent them from adhering to the concrete. The interiors of the forms shall be cleaned or any dust wood shavings or other extraneous materials before concrete is laid.

3.4.12 In some locations reinforced concrete is laid over or between masonry or concrete or over ground. In such cause forms are not required and reinforced concrete is to be laid over existing masonry or concrete the latter having been over previously moistened to prevent it from sucking on water from the from the cement concrete. When laid directly over earth in foundation the bed shall be watered and rammed hard and if too porous lined with paper or other approved water proofing materials, before this is done.

3.4.13 Measurement and Payment of Concrete.

Measurement and payment for cement concrete items shall be made on the basis of the actual volume of the concrete laid for finished items. No. deductions shall be made for the space occupied by reinforcement rods, embedded metal parts, equipments, electrical conduit lines etc. The quantity of concrete covered by the grooves for stop logs and gates in abutments and piers shall however be deduct from the total quantity to arrive at the concrete works under respective items. The reinforcement steel shall be separately paid at the rates under items of tender schedule. The rate includes the cost of labour and material for fabrication of stuttering plates, cleaning, painting, fixing in position with centering, nuts and bolts, tie etc. and removing after specified period from the date of lying of concrete. All labour material plants etc. Involved in providing cement, slurry and mortar on concrete and construction joints shall be deemed to be included in the unit rates for the respective items. The unit rates for concrete items shall cover the labour charges for erection of first stage embedded metal parts. No payment shall however be made for providing grooves for gates and stop log gates, piezometer pipes and installation of the instrumentation, electrical conduits, the cost of which shall be deemed to be included in the rates. The rates shall include incidental operations like construction of

coffer dam and dewatering etc.

4.0. REINFORCEMENT

4.1. Procurement of Steel

4.1.1. General

The reinforcement steel shall have to be arranged by the contractor. Steel reinforcement bars shall be used wherever shown in the drawings or and where directed by the Engineer-in-charge. Steel for reinforcement shall be plain M.S. bars conforming to I.S. 2062-1992 or Tor steel conforming to I.S. 1786-1986. The contractor shall prepare all details for bending, binding and placing the reinforcement which may be required to facilitate the fabrication and placement for all reinforcement bars at his own cost. The department shall furnish reinforcement design and drawing to the contractor.

4.1.2. Structural steel required for reinforcement should be procured sufficiently ahead of its use in the work subject to the observation of the following points.

4.2.3 The procurement schedule of steel required for the work should be submitted for approval of the Engineer-in-charge prior to its procurement.

4.2.4 Unless otherwise specified elsewhere, general requirements relating to the use and procurement of materials, inspection and testing shall conform to I.S. 1387-1959 with its latest amendments.

4.2.5 No materials should be dispatched/received from the manufacturer's or supplier's premises prior being certified by the contractor or his authorized representative as having fulfilled the tests are requirements laid down in this standard (IS-1387-1959 with amendments). Except where the or coil containing the bars is marked with the ISI certification Marks.

4.2.6 The contractor should make an arrangement with the manufacturers or suppliers so that the engineer-in-charge or his representative shall be at liberty to inspect and verify the steel makes certificates of cast analysis at the premises of the manufacturer or supplier. When the Engineer-in-charge required and actual analysis of finished analysis, the contractor must ensure that the manufacturers or suppliers carry the analysis at a place as agreed by the Engineer-in-charge.

4.2.7 The exact position, size and shape of reinforcement bars as shown in the drawing are subject reasonable alternations by the department without any compensation to the contractor. Where not shown reinforcement, design and drawings will be supplied to the contractor after final design.

4.2. Placing

4.2.1 Reinforcement shall be placed in concrete wherever shown as the drawings or where directed. Unless otherwise prescribed, measurements made in placing the bars shall be to the centre-lines of the bars.

4.2.2 Reinforcement shall be inspected for compliance with requirements as to size and shape before placement and as to length, spacing position and amount after placement.

4.2.3 Before reinforcement is placed, the surface of the bars and the surface of any mental bars, supports shall be cleared of heavy flaky-rust, loose dirt, grease or other foreign substances which in the opinion Engineer-in-charge are objectionable.

4.2.4 Reinforcement shall be accurately placed and secured in position so that they will not be placed during placing of concrete and special care shall be exercised to prevent any disturbances of the reinforcement in the concrete that has already been placed. Metal chair and hangers, spares or other satisfactory support may be used for supporting reinforcement bars.

4.2.5 Special care shall be exercises to prevent any disturbances of the reinforcement in concrete that has already been placed. The reinforcement after being placed in

position shall be maintained in clean condition until it is completely embedded in concrete.

4.2.6 Reinforcement shall be straightened or bent in a manner that will not injure or weaken the materials. Bars shall be bend cold to the shape and dimension shown in the drawing or as directed. Hearing of reinforcement bars to facilitate bending shall not be permitted.

4.2.7 The reinforcement provision, fixing, providing lap length etc. shall be in conformity with relevant provisions in I.S. 456-1978 and its amendments from time to time.

4.2.8 Wire for bending reinforcement shall be of 20 SWG or heavier gauge. Wires shall be of soft and annealed mild steel and shall conform to IS 280-1978. It shall have tensile strength of not less than 50 Kg/mm^2. The wire shall have minimum diameter of 1mm, chairs, hangers, spacers and others supports for reinforcement may be of steel or other approved materials.

4.2.9 Sufficient concrete coverage as indicated in the drawings should be provided to protect reinforcement from corrosion.

4.2.10 The minimum allowable clearance between parallel steel bars shall not be less than 1.5 times the diameter of the larger bars or 1.5 times the maximum size of aggregate whichever is greater. Bars crossing each other, where required shall be secured by binding wire in such manner, that they do not slip over each other at the time of fixing and concreting. Wire used for binding reinforcement shall not be measured for payment.

4.2.11 Bars bent during the transport or handling shall be straightened before being used on work.

1 U-type hook at the end of each bars shall invariably be provided if plain M.S round bars are used. The radius of the bend shall not be less than twice the diameter of round bar and the length of the straight part of the bar beyond the end of the curve shall be at least four times the diameter of the round bar.

2 MASONRY CONSTRUCTION

4.2.13 No welding generally permitted in steel rods less than 20mm diameter in size. Welding of joints in case of rods less than 20 mm diameter may be allowed in place of overlapping at the direction of the Engineer-in-charge, a approved locations as per IS 2751-1979 (with its latest amendments).

4.3 Measurement and Payment.

Measurement for payment for supplying and placing reinforcing bars and structural steel will be made only on the calculated of the material placed in concrete or fixed in auxiliary structure in accordance with the drawings or as directed by the Engineer-in-charge. The calculated weight of reinforcing bars and structural steel shall be determined as follows:

i) The weight per unit length of reinforcing bars and structural steel used shall be based on the standard weights as per Bureau of Indian Standards. The calculated weight of reinforcing bar for payment will be the above weight per unit length multiplied by corresponding lengths of bars placed in concrete, which will be measured and should in no case, be more than the length provided in the drawing, unless the Engineer-in-charge specifically approves. Splices shall not be measured for payment. Wastage of rods, chairs, ties, hangers etc. will not be measured. The binding wires shall not be measured.

ii) Payment for supplying and placing reinforcement bars shall be made at rate tendered thereof the schedule. The rates shall include the cost of preparing reinforcement as per detailed drawing including bar placing drawings, bar bending diagrams, submitting the drawings to the department preparing all necessary bar bending and cutting lines, cost of steel and binding wire, labour equipment for binding and welding at site of work including all taxes, furnishing and attaching ties and cutting, bending, cleaning, placing and maintaining in position all reinforcing bars of jointing as per approved method etc. all complete finished to as shown on the drawings or directed by the Engineer-in-charge. The unit rate shall also include cost of and splices chairs, ties, hangers, wastage of bars due to cutting, incidental operations necessary to complete work as per specification, like dewatering, construction of cofferdam etc.

a. General

The masonry work will be built lines shown in the drawings and carried out in through workmen line manner with aid of templates. Scaffolding, hoisting arrangements, tools & plants etc. required for the proper execution of the work. The limits prescribed for Brick Masonry will be subject to such changes as will be authorized by the Engineer-in-charge. The unit bid price of the tender and all conditions will hold good for such changes.

All brick masonry shall conform to I.S. 2212 1991. It shall consists of first class bricks cleaned and immersed in water for at least six hours before use and set in cement mortar.

5.2 Bricks.

The Bricks to be used in all masonry works should be kiln burnt bricks conforming to I.S: 2180-1988 unless otherwise specified in the drawings or directed by the Engineer-in charge. Bricks shall be table moulded (except where g round mending with equally good variety is specially permitted) of uniform size, shape and colour (generally deep red or copper) and must be well burnt so as to give a clear ringing sound when struck. They shall not break when thrown on the ground or against other bricks from a height of 1.8m, shall be clear, whole and free from flaws, cracks, stones and under burnt lumps of any kind. They have sharp edge and angles and even surfaces. The bricks shall not absorb more then 1/5th of weight when immersed in water for 6 hours.

b. Cement

Cement to be used in the mortar for the brick masonry should be ordinary Portland cement conforming I.S:269-1976 and Portland Pozzolana cement (P.P.C). The cement is to be arranged by the bidder at his own cost and it is the responsibility of bidder to being cement to work site and to the mixer or mixing platform.

c. Sand and Water

Sand and water required to be used in the mortar for brick-masonry shall conform to provisions relevant paragraphs out lines under concrete specifications Vide I.S: 156-1978.

Sand to be used confirm to I.S:2116-1980.

d. Mortar

The cement mortar to be used in brick-masonry shall be prepared in accordance with IS: 2250-1981 mortar shall conform to provision of relevant paragraphs outline under concrete specifications.

5.5. Bond and

5.6. Joints

5.6.1. No bond / joints shall be thicker then 12mm and the thickness of bond / joints shall be such that four course and three joints taken consecutively shall measure equal to 39 cm.

5.6.2. The face joints of brick work shall be finished by plastering or by pointing.

5.6.3. The joint shall be squarely raked out to a depth of 10mm while the mortar is still green for subsequent plastering. The faces of the brick-work shall be cleaned with wire brush so as to remove any splashed of mortar during the course of raising the brick work.

5.6.4. In pointing the joints shall be squarely raked quit to a depth of 15mm. while the mortar is still green and the raked joint shall be well brushed to remove dust and loose particles and well wetted and shall be later completely refilled with mortar to give required finish.

5.7. Scaffolding

Scaffolding shall be rigid and strong enough for its purposes. When single scaffolding is used, put log holes are necessary, the latter shall always be given in the headers courses and no more than one header brick shall be temporarily omitted for this purpose. No put log holes are permissible in pillars which are less than 3" wide or in masonry at or close to the springing of arches or bearing of beams and lintels. All put log holes shall be closed with sand bricks and mortar before any plastering or painting is done.

5.8 Storage and Handling of Materials.

5.8.1 Bricks

The bricks are to be arranged by the bidder. Bricks shall not be dumped at site. They shall be stacked in regular layers while unloading to minimize breakages and defacement of brick. The bricks shall be so arranged by the bidder that as far as possible at least two days requirement of bricks are available at site at any time.
Bricks required for different locations of works, shall be stacked separately.

5.8.2 Cement

The cement for brick-work is to be arranged by the bidder. It should be stored above ground level in perfectly dry and water-tight sheds. Cement shall be stacked not more than eight bags high. The bags shall be stacked in a manner to facilitate removal and use in the order in which they are brought to site.

5.8.3 Mortars.

Mortars shall be well mixed and shall be transported from the mixer or mixing platform to the site of work in such a manner so as prevent formation of laitance or segregation.

5.9. Soaking of Bricks.

Bricks shall be soaked in water before use for a period that is sufficient for the water to just penetrate whole depth of the brick so as to remove the dirt, sand and dust from bricks. The bricks shall not be wet at the time of use as these are likely to slip on the mortar bed and there will be difficulty in ensuring plumbness of the wall.

5.10. Laying of Bricks Work

5.10.1. Bricks shall be laid on a full bed of mortar and should be slightly pressed so that the mortar gets into at pores of the bricks surface to ensure proper adhesion. Cross joints and wall joints shall be proper flushed and packed with mortar so that no hollow spaces are left in order to ensure maximum strength. The brick-work shall be built in uniform layers.

5.10.2. The corners and other advance works shall be racked back. No part of wall during construction rise more than one meter above the general construction level to avoid unequal settlement and improper jointing.

5.11. Protection Against Damage

5.11.1. Care shall be taken by the bidder during construction that edges of jambs, sills, head etc are damaged. In inclement weather, newly built works shall be covered with gunny bags or tarpaulin to prevent the mortar from being washed away.

5.12. Curing

5.12.1. The brick-work shall be kept constantly wet for a period not less than seven days in order to avoid mortar being dried up before it has attained final set and also to prevent crumbling.

5.13. Inspection.

5.13.1. The brick masonry should ensure its satisfactory performance and all recommended practice workmanship shall be adopted at every stage.

5.13.2. The Engineer-in-charge may inspect and reject the defective works which should be rebuilt at the cost of bidder for which no extra compensation what so ever will be entertained.

5.13.3. If necessary samples of bricks, sands cement etc. used in brick masonry shall be periodically tested in laboratory at the cost of the bidder in order to conform to the required standards.

5.14. Workmanship

The following shall be ensured at the time of construction of brick masonry.

a) All loose materials, dirt and set lumps of mortar which may be lying over the surface over which brick work is to be freshly stated, shall be removed with a wire brush.
b) All brick shall be thoroughly soaked in clean water immediately before use.
c) The surface over which the brick-work is to be started shall be slightly wetted.
d) The first course shall be made horizontal by providing enough mortar in the joint to till up the undulations in the bed course.
e) Care should be taken to see that the required quantity of water is added to the mortar at the mixing platform itself and not over the course.
f) All the joints shall as far as possible be thin and per specification mentioned in as the earlier paragraphs.
g) Care should be taken to see there is no through joint and the lap is not less than half the width of the brick and all vertical joints are to be properly filled with mortar.
h) The vertically of the walls and horizontality of courses should be checked very often with plumber and spirit level respectively.
i) No portion of the brick work shall be left more than one meter lower than the other, where the masonry of one part has to be delayed due to unavoidable circumstances the brick work already done should be raked back suitably at an angle not exceeding 45^0 according to bond and toothed.
j) Care should be taken to ensure that the brick work is kept wet for seven days commencing from 24 hours after the course is laid.

5.15. Measurement and Payments.

5.15.1. Measurement for brick-work masonry shall be made on the basis of the volume of work calculated as actually contained within the profile as shown in the drawings or as directed by the Engineer –in-charge.

1 The unit bid price for brick masonry shall be inclusive of mobilizing, demobilizing, supplying all equipments. Cost of all materials, labour, supervision, curing and all incidentals works including all leads, lifts and delifts charges for loading, unloading, conveyance, taxes, royalties of all materials including scaffolding, shuttering and all other operations etc. complete.

2 **FLOORING**

6.1 Dry Brick Khoa

6.1.1 Dry brick Khoa rammed to 10 cm is very suitable as a base for ordinary light duty cement concrete artificial stone floors.

6.1.2 The khoa shall be sound and of 5 cm. gauge, clear dust free laterite gravel or stone metal of the soft variation 3./cm. gauge may be used instead of khoa without objection. Over the plinth filling 12.5 cm. thickness of brick khoa or other ballast and rammed hard with the help of water and 6 KG iron rammers to the thickness of 10 cm. shall be laid. The finished surface shall be uniform and un yielding through rough. Brick khoa should not be rammed so hard as to crush and powder the top surface.
The brick khoa shall be made from sound first and second class bats. Khoa is so brittee which crushes easily under rammers shall be made.

6.2 Rates shall cover rammed ballast. The rate shall include the cost of rammed khoa to 10 cm. depths with its conveyance, royalty taxes and labour etc. The payment shall be made by area.

6.3 Artificial Stone Flooring.

Artificial stone flooring shall be 2.5 cm thick unless greater thickness of providing is specified. The floor shall be laid in 2 simultaneous layers in cement concrete of the following mixes, no sand at all being used.

For the layer of 20mm thickness or more for floor paying thicker than 25mm. cement a part, stone ball 20 mm, gauge 3 parts. For the upper layer of 6mm thickness-cement 1 part, stone aggregate 6mm gage 2 parts.

Concrete for both layers shall be mixed at the same time but kept separate. The base over which the floor is to be laid (rammed khoa, concrete, masonry etc.) shall be saturated with water and slightly roughened and divided into blocks not exceeding 5.24 sqm by means of rectangular wooden battens laid over the base in cement mortar to a height equal to the exact finished thickness of the floor. Re-entrant shall be avoided in forming the blocks, and sills should always form separate blocks by themselves. The cement concrete mixed with the minimum amount of water necessary shall now be laid over the base and beaten down quickly to a depth of 20mm. Over this will be laid immediately the finer concrete for the top level quickly beaten down and worked by means of straight edges to the correct thickness between the batterns. The beating and laying shall be completed within 20 minutes and polishing of the surface mostly within 30 minutes of mixing. Excessive trowelling does not result in a good polish. Use the trowel sparingly and give the final polishing strokes covering the entire surface just as the cement is taking its initial which may take half an hour or more after the cement is moistened. It should not usually be necessary to add any more cement to the top surface while polishing, but a little neat cement paste mixed at the same time as the concrete may be used if found essential to assist polishing.

6.3.1 48 hours after the floor has set or later, the battens shall be carefully removed so as not to break the edges. Alternate blocks shall be laid the same day and intervening blocks shall be laid on the third day of as may be suitable after removing the battens from the previous blocks. Junctions of floors and plaster or dadoes shall be rounded to a radius of 2.5 cm in floor material along with the floor of the plaster. Outer edges of the artificial stone over steps shall be finished with rounded nosing projecting 12mm beyond the face of the risers. Outer edges of the floor in verandah sills shall be finished with nosing or shall be rounded to a radius of 12mm according to order.

6.3.2 When laying the artificial stone between the existing blocks the edges of the finished blocks can be as guides. The dividing lines between the blocks shall be marked

accurately and truly by stretching string over them and pressing it down while the surface is just setting. Any smear of cement over the surface of old finished blocks while laying intermediate blocks shall be cleaned by means of a moist rag before the smear has had time to set. On the day any block is laid it shall be left entirely undisturbed but the next day it shall be sprinkled with water and kept moist. On the day any block is laid it shall be left entirely undisturbed but the next day it shall be sprinkled with water and kept moist. On the third day it can be bonded or covered with sand or straw and cured in this manner for 10 days. Clay bunds discolor the surface and shall not be used for ponding.

6.4 Measurements and Payment

The payment for cement concrete A.S. Flooring shall be made by area.

6.5. Terrazzo Tile flooring (Marble Mosaic Tile)

The tiles shall conform to IS: 1237 having the colour and chips approved by the Engineer. The mosaic topping of lighter shade tiles hall be made of white cement with a shade pigment and natural shade tiles shall be of grey cement with an approved shade pigment. The type of tiles shall be as specific in respective items.

A bed of cement mortar consisting of one part of cement and 6 parts of sand shall be laid and properly leveled to an average thickness of 20mm. and the surface shall be kept slightly rough to form a satisfactory key for tiles. Neat cement paste of honey like consistency shall be spread over mortar bed, over such area at a time as would accommodate about 20 tiles. Tiles shall be soaked in water for at least 15 minutes and allowed to dry for the same duration. Tiles shall then be fixed with a thin coat of cement paste on back of each tile and then each tile gently tapped with a wooden mallet till it is properly bedded and in level with adjoining tiles. Joints shall be file and as imperceptible as possible (not more than 1.5mm. wide.)

After tiles have been laid in a room or a day's fixing work is completed, surplus cement grout that may have come out of the joints may be wiped off gently and joints cleaned. A thick slurry of coloured cement matching the colour of tiles shall be spread over it and rubbed so as to seal even the thinnest joint between the tiles and make it impervious and the flooring cured for 14 days. The floor shall be polished and finished according to IS:1443.

6.6. KOTA STONE FLOORING.

The slabs shall be of selected quality, hard sound, dense, homogenous in texture, free from cracks, decay, weathering and flaws and of thickness as specified. The top exposed faces should have been roughly polished before bringing it to site. Unless otherwise specified the slabs should be cut to the required shape and size, by hand using fine chisel or machine cut as specified. All pieces should be of uniform size.

A bed of cement mortar 1:6 shall be laid and properly leveled to an average thickness of 20mm and the surface should be kept slightly ought to form a satisfactory key for the tiles. Neat cement paste of honey like consistency shall be spread over mortar bed over such an area so that the paste will not harden before laying tiles. Slabs shall be soaked in water for 15 minutes and allowed to dry. The slabs shall then be fixed as per approved pattern with thin coat of cement paste on back of each slab. They will be tapped with a wooden mallet till it is properly bedded in level with adjoining slabs. Joints shall not be more than 1.5mm. wide. The surplus cement grout that may have come out of the joints has to be wiped off gently and joints cleaned. The joints shall be filled up with grey or white cement with an admixture of pigments to match the shade of the slab. The flooring shall be cured for 14 days. Then it shall be polished according to IS: 1443, except that (1) First polishing with course grade carborandum shall not be done (2) Cement slurry with or without pigment shall not be applied before polishing.

6.7. Marble Works.

Marble shall be hard, sound, dense and homogenous in texture with crystalline and course grams. It shall be free from stains, cracks, decay and weathering. The place of quarring, colour and quality and thickness should be as specified. Every stone must be cut to required size and shape chisel dressed on all and joints so as to be free from waviness and to give truly vertical, horizontal, radial and circular joints as required. Chisel dressing shall also be done on exposed faces to remove any waviness. The side and top surfaces of marble slabls shall be machine rubbed with coarse sand before using. Marble slab in borders, joints and sof its of entrance, opening and skirting shall be in full width, Marble slabs in treat and risers of steps shall be in single pieces with rounded edges or angular edges as may be described.

The exposed edges of these are to be machine cut and polished smooth along with exposed faces all cases samples shall be got approved. Flooring slabs will be set in cement mortar 1:6 proportion 2.5mm thick and cement slurry. In other places slabs will be set in CM 1:3-20mm. thick. Polishing will be aspect IS 1443 except that (1) the first polishing with course grained carborandum shall not be done (2) cement slurry with or without pigments shall not be applied before polishing.

6.8 Cement Tile Flooring.

Cement tiles shall conform to ISI 12.37 and the size will be 250mm X 250 mm or 300 x 300 mm and should be 25 mm thick. They shall be of the colour approved and conform to IS 12.37. A bed of cement mortar 1.6 shall be laid and properly leveled to an average thickness of 20mm and the surface shall below slightly rough to form a satisfactory key for the tiles. In other aspects the tiles will be set and polished as per ISI 1443.

6.9 Glazed Tile Flooring, Dado & Skirting.

Glazed tiles from an approved manufacturer conforming to IS: 777 shall be of specified size and thickness and colour. All special viz. coves, internal and external angles, corners, beads etc. shall be used wherever directed. Under layer of 12mm average thickness of cement mortar 1:3 proportion shall be laid. Tiles shall be well soaked in water washed clean and set in cement grout and each tile being gently tapped with a wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints shall be kept as think as possible and in straight lines or to suit the required pattern. After the tiles have been laid, surplus cement grout shall be cleaned off. The joints shall be cleaned off the grey cement grout will a wire brush or trowel to a depth of 5mm. and all dust and loose mortar removed. Joints shall then be flushed pointed with white cement if necessary mixed with colour to match the colour of the tile. The floor/dado shall then be kept wet for 14 days. After curing the surface shall be washed with mild hydrochloric acid and clean water. The finished floor/dado shall not sound hollow when tapped with a wooden mallet. The rate will include the cost of under layer of cement mortar.

6.10 In-situ Mosaic for Flooring, Dado & Skirting.

On a base coat of 12mm thick cement mortar 1:4 propertion, a top layer 10mm thick consisting of marble chips upto 10mm size approved coloured mixed with paste depending on the base colour required shall be laid and polished as required as per IS code IS 2114. or grey base, Portland cement shall be mixed with marble powder in 3:1 proportion. To this shall be added marble chips of approved colour and size in proportion of 4 of cement marble powder and 7 marble chips and thoroughly mixed by adding water gradually to have a uniform plastic mix. Within an hour of laying the base coat of cement mortar the top layer consisting of cement marble chips shall be laid in panels as instructed and the surface tamped lightly and finished perfectly level or shape with straight edges float and trowel. Within one hour of laying the surface shall be covered with polythene sheet and left undisturbed for 2 days. The surface shall then be rubbed by sand stone blocks and all cement slush removed. A neat

cement marble powder dust wash shall then be given on the surface and left undisturbed for six days.

Grinding and polishing in the case of flooring may be done by hand or machine. In the case of machine grinding the process shall start seven days after completion of laying. In the case of skirting, dadoing or flooring where hand grinding is allowed the grinding will start 2 days afer laying. Where the lengths are more than 1:2 meter dividing strips of glass or aluminum or any other prescribed materials shall be provided at spacing as instructed by

For base other than grey, white cement will be used in place of grey cement with necessary approved pigment of permanent colour shall be used to get the necessary shade.

6.11 Khandelite Stone Cladding.

Khandelite stone tiles from an approved manufacturer shall be of specified size and thickness and colour. The specification for this work will cover same as specification of paragraph of Glazed tile flooring, Dado and Skirting.

6.12 Vineyle Flooring.

The type and thickness of sheet shall be as shown on drawings or described in the schedule of quantities or otherwise directed by the Engineer-in-charge. The floor surface including dado shall be washed with soap and soda water. Then the adhesive used shall be of good quality and approved by Engineer in charge. The sheet should be laid and finished as per the Indian standards code of practice for laying and maintenance of linoleum floors IS 1198.

6.13 Measurement and Payment.

Floors of any kind shall be laid on the basis of the surface area appearing between the plastered walls of the room Dado/Skirting shall be laid for the surface area upto floor level.

Tile facing shall be measured by their actual surface. The prices quoted shall include all special transition pieces, grooved moulds, corners etc.

7.0 **PLASTERING.**

7.1 General

The cement plastering over brick masonry is to be done in accordance with the required specifications as provided in the drawings.

Materials (Cement, Sand, Water), Cement, Sand and water to be used in the mortar for plastering should conform to the required specifications as mentioned in earlier paragraphs under concrete, Brick masonry vide Code- I.S. 456-1978.

7.2 Mortar

The composition, mixing and transportation of mortar to be used for plastering should conform to required specifications as provided in the drawings and mention in earlier paragraphs under Brick masonry.

For punning and skirting works the sand to be used shall be thoroughly screened and washed to remove all dust and silt. The skirting shall be finished smooth with neat cement to obtain the same finish as for granolithic flooring. The junction at the flooring shall be finished straight, vertical or rounded at the base as directed by the Engineer. The skirting shall be cured for at least 15 days. Continuous horizontal grooves at the top of the skirting shall be provided as per drawings or as directed by the Engineer. No extra will be paid for grooves.

7.3 Workmanship.

Before plastering is carried out all the vertical and horizontal joints shall be taken to a depth of 10mm while mortar is wet in order to obtain satisfactory adhesion between the plaster and brick work.

The corners between walls and ceilings shall be rounded of to a radius of 75 mm

without any extra payment. Any concrete surface, if specially ordered to be plastered, shall be so roughened and racked to form key for plastering and given a wash of cement before applying the rendering coast.

The surface to be plastered shall be damped evenly, preferably with a frogs sprayer, to produce optimum suction, effect between the surface and the new plaster.

Cement mortar for plastering shall be used within 30 minutes after adding water to cement, provided it is kept agitated at intervals of at least 20 minutes.

After making the plaster surface even, cement punning shall be done by sprinkling neat cement powder evenly on the surface and rubbed smoothly with a towel to give a fine coating, at no extra cost. The plaster shall be kept wet for at least seven days and protected from extremes of temperature and weather during this period.

Quality of completed plaster work can be checked for by test opening of some places and these openings shall be made good by the contractor.

7.4 Curing.

Curing of plastering should be done continuously for a minimum period of 7 days commencing from 24 hours after the plastering is done.

7.5 Measurement and Payment

7.5.1 Measurement for cement of plaster shall be made on the basis of surface area of plaster actually contained within the profile as shown in drawings or as directed by the engineer-in-charge.

1 The unit bid price for plastering shall be inclusive of mobilizing, demobilizing and supplying all equipments, cost of all materials, labour, supervision, curing, and all incidental works including, taxes loyalities, scaffolding, shuttering and all operations etc. complete.

2 **Doors and Windows, Aluminum Fittings.**

8.1 **Description of Items.**

8.2. Carpentry & Joiner.

8.2.1. This specification deals with the requirements regarding materials, construction and workmanship of timber doors, windows and ventilators.

8.2.2. Materials and workmanship shall confirm with provisions of the following codes in particulars and with such other Standards as are mentioned hereinafter.

IS: 1003 Specification for timber paneled and glazed doors & windows.
IS: 2191 Wooden flush door shutters (Cellular & hollow core type).
IS: 2202 Wooden flush door shutters (Solid core type)
IS: 1141 Code of practice for seasoning of timber.
IS: 419 Specification for putty for use on wooden frames.

8.2.3. Materials used in the fabrication of timber doors, windows and ventilators shall be the best procurable and conforming to the relevant Indian Standard Specifications.

8.3. Timber

Timbers for doors, windows and ventilators shall be free from decay, fungal growth, boxed heart, pitch pockets, borer holes, splits, loose knots, flaws, sun-cracks or any other defects.

Unless otherwise specified, all timber shall be first class teak wood conforming to IS: 1141 before being planned to the required sizes. The finished components shall be given suitable preservative treatment.

8.4. Plywood

Plywood, when used for paneling of interior doors and windows, shall be of MPF-1 Grade conforming to IS: 303. Plywood shall not be used for panel of exterior doors and windows.

8.5. General Workmanship

All wood work shall be of a high quality of workmanship. Wood work shall be neatly

and truly finished to exact dimensions and details as per drawings, without patting or plugging of any kind. Exposed work shall be finished smooth with well planned faces.

All assembly of shutters of doors, windows, ventilators and frames shall be exactly at right angles. In the case of frames, the right angle shall be checked from the inside surfaces of the respective members.

All doors land windows frames shall be clamped together so as to be square and flat at the time of deliver. Door frames without sills shall be fitted with temporary stretchers.

Horns of frames and other parts that go into or butt against the masonry, shall be protected against moisture and decay with two coats of coal tar or other approved material.

All surfaces of the door, window and ventilators frames and shutters which are required to be painted ultimately shall be covered evenly by brush painting with a priming coat of a white lead based primer as specified in IS: 103. In the case of doors to be polished or varnish shall be given before delivery. No primer shall be applied to the wood work until it has been inspected and passed by the Engineer.

8.6. Shrinkage & Tolerance.

The arrangement, joining and fixing of all joinery work shall be such that shrinkage in any part and in any direction shall no impair the strength and appearance of the finished work.

The tolerance on overall dimensions shall be within the limits prescribed in IS: 1003.

Any shrinkage and defects due to bad workmanship are detected after execution, the contractor shall at his own cost replace and reaffix such work, as may be required by Engineer.

8.7. Fixing.

Door and window frames shall generally be built at the time the walls are constructed. Alternatively, where permitted by the Engineer, the frames may be subsequently fixed into prepared openings, for which purpose holes to accommodate the hold fasts shall be left at the time of construction. The method of fixing shall be followed as described in relevant specification.

8.8. Frames & Shutters.

Shutters of flush doors shall be 38mm. thick block-board construction with smooth finish. Shutters shall be single leaf or double leaf type as mentioned on drawings. All necessary rebates, holes, recesses, required for fixture shall be worked to lines, centers and in workman like manner. Teakwood in frame shall also be specified above. Frames beadings, mullions, shutters, tipping, etc. shall be smoothened by sand paper.

8.9. Finishes

Finishes shall be strictly in accordance with the schedule of finishes, using approved make and colour of paint, finished with stippled and uniform texture.

8.10. Hardware for Doors

Hardware for doors shall conform to the hardware schedule given in drawings. All hardware shall be approved in advance by Engineer. Samples of all hardware fixture and fittings shall be collected by the approved in advance by Engineer. Samples of all hardware fixture and fittings shall be collected by the contractors for Engineer approval and approved samples maintained on board in Engineer site office. Selected piece of hardware shall be used. All aluminum hardware shall be anodized.

a) Butt Hinges

Butt Hinges shall be steel with brass pins and washers of heavy duty type, first quality.

b) Projecting type hinges.

Projecting type hinges shall be pressed steel with brash washers and pins, quality.

c) Three way bolding devices.

Three-way bolting devices for emergency doors.

d) Tower bolts

Tower bolts shall be manganese brass, flush type vertical bolts, heavy duty 20 cm. half-round 35cm. at top and 20cm. at bottom of doubles shutters of first closing leaf (LH shutter locking from inside.)

e) Two point handles

Two points handles shall be manganese brass or cast-iron or die cast zinc base alloy.

f) Peg Stays. Peg stays shall be manganese brass or die cast zinc base alloy to keep the shutters at least open in three different positions upto 90^0. g) Motice Locks. i) Shutters of flush doors shall be 38mm. thick block-board construction with smooth finish. Shutters shall be single leaf or double leaf type as mentioned on drawings. All necessary rebates, holes, recesses, required for fixture shall be worked to lines, centers and in workman like manner. Teakwood in frame shall also be specified above. Frames beadings, mullions, shutters, tipping, etc. shall be smoothened by sand paper.

8.9. Finishes

Finishes shall be strictly in accordance with the schedule of finishes, using approved make and colour of paint, finished with stippled and uniform texture.

8.10. Hardware for Doors

Hardware for doors shall conform to the hardware schedule given in drawings. All hardware shall be approved in advance by Engineer. Samples of all hardware fixture and fittings shall be collected by the approved in advance by Engineer. Samples of all hardware fixture and fittings shall be collected by the contractors for Engineer approval and approved samples maintained on board in Engineer site office. Selected piece of hardware shall be used. All aluminum hardware shall be anodized.

a) Butt Hinges

Butt Hinges shall be steel with brass pins and washers of heavy duty type, first quality.

b) Projecting type hinges.

Projecting type hinges shall be pressed steel with brash washers and pins, quality.

c) Three way bolding devices.

Three-way bolting devices for emergency doors.

d) Tower bolts

Tower bolts shall be manganese brass, flush type vertical bolts, heavy duty 20 cm. half-round 35cm. at top and 20cm. at bottom of doubles shutters of first closing leaf (LH shutter locking from inside.)

e) Two point handles

Two points handles shall be manganese brass or cast-iron or die cast zinc base alloy.

f) Peg Stays. Peg stays shall be manganese brass or die cast zinc base alloy to keep the shutters at least open in three different positions upto 90^0. g) Motice Locks. i)

8.11. Aluminum Doors and Windows.

Material and workmanship shall conform to I.S. 1948-1961 unless otherwise noted herein, and shall be the standard product of the manufacturer approved by Engineer. All sections shall be made of O.E.L. extruded. Aluminum surface in contact with concrete or masonry shall be given two coats of heavy bodied bituminous paint. The finish shall be polished and lacquered unless otherwise specified in the drawings. All

joints shall be screwed (mechanical) type using cadmium plated screws.

8.12. Measurements.

Doors shall be measured for the area of the inside clear size of shutters closed. The rate shall include frames hardware, vision panels, hold-fasts and painting or polishing stipulated in the finish schedule. Motice locks, door closers will be paid extra.

9.0. FINISHED WORKS (Painting/ Distempering)

9.1. Description of Items.

9.2. Distempering

9.2.1. Oil Bound Distemper Ready mixed type oil bound distemper of approved make and tint shall be used. Manufacturer's instruction for use shall be followed. The primer shall be of the same manufacturer as that of the distemper. The surface to be treated shall be dry and cleaned
with sand paper and free from any unevenness. The prepared surface shall receive not less than 3 coats as specified below. First, a coat of primer shall be applied. The second and third coat shall be applied in oil
bound distemper.

9.3. SNOWCEM or similar Decorative Cement Finish.

"Snowcem" or approved equivalent make of required tint shall be used. Manufacturer's

instructions shall be followed.
The surface shall be cleaned of all oil, grease and dirt using steel brushes or abrasive stone. Efflorescence on concrete surfaces shall be eliminated by wetting the surface and
scrubbing it with a 20% solution of muriatic acid.

One coat of cement wash used as primer shall be applied to new wall surface. Two or specified number of "Snowcem" coats shall be applied. First coat shall be well brushed into the pores of the surface to form a good bond. Second coat shall be applied by re-brushing or spraying to produce a uniform shade. Each "Snowcem" or equivalent application shall be wetted at the end of the day with fine water spray.

No additional water shall be added to the mix, if the same cannot be used within one hour
of preparation due to delay in site conditions or otherwise.

9.4. Painting Metal Work

All rust and scales shall be removed by scrapping or by brushing with steel wire brushes. Hard skin of oxide formed on the surface or without iron during rolling which becomes loose by rusting, shall be removed. All dust and dirt shall be thoroughly wiped away from the surface. If the surface is wet, it shall be dried before priming coat is undertaken. The priming coat shall be of readymade primer of approved brand and manufacture. The primer shall be applied with brushes, worked well into the surface and spread even and smooth. The painting shall be done by crossing and laying off. The crossing and laying off consist of covering the area with paint, brushing the surface hard for the first time over and then brushing alternately in opposite direction, two or three times and then finally brushing lightly in a direction rightangle to the same. In this process no brush marks shall be left after the lying off is finished. The full process of crossing and laying off will constitute one coat. The priming coat shall have dried up completely before painting is started.

9.5. Painting over Timber

The timber to be painted must be properly seasoned and free from moisture, in its

pores before application of paint of dry not may result. Before applying the paint the woodwork most be thoroughly cleaned and sand-prepared smooth knots shall be "killed" and covered with a preparation of red lead and glue size laid on hot called "Knotting". To kill knots in resinous woods, such as Deodar they shall be painted over with hot lime. After 24 hours the lime is scraped off and the knots painted over with "Knotting". When dry the surface shall be pumice stoned smooth. When the priming coat is dry, any cracks or holes shall be filled with putty and the whole surface (Except in case of lead paints) rubbed down with pumice stone or sand- paper and well dusted. The second coat shall then be applied consisting of paint of the desired colour and specification laid uniformly with the help of a spraying apparatus or regular paint brushes. If third coat is required the second coat will (except in case of lead paints) be rubbed down smooth with pumice-stone or sand paper. No brush marks should be visible on the completed surface. To effect uniformity in brush work as soon as the whole or convenient, area is covered the brush should be passed over it in a direction contrary to that in which it is to be finally laid off. This is called "Crossing". After "crossing the brush shall be laid off softly and carefully in a direction contrary to the crossing, but with the grain of the wood, taking care that none of the crossed brush marks are left visible. In painting doors and windows, the putty round the glass must also be painted. After the completion of the final coat any paint stains on glass shall be cleaned with the help of turpentine or mentholated spirits or both. Sand preparing and dusting of intermediate coats shall not be done in case of lead paints as the operations cannot be performed without risk of rubbing paint against hands and inhaling dry lead paint dust. When repainting old painted woodwork, the old paint, if crusted or otherwise patchy and inferior shall first be removed. This shall be done either by a blow lamp or by application of some alkaline paint remover. A solution of equal parts of soda quicklime in water does this effectively. Apply the solution with a brush and after a few minutes wash it with hot water when the old paint will come off. Carefully clean off all the alkali with water and thin dry sand paper, after which it will be ready to receive new coats of paint. When the old paint is sound and is declared fit by the Executive Engineer to take further coats priming is not required. The old paint surface may be simply cleaned and rubbed down fairly smooth and renovated with one or two coat of paints as may be specified.

French polishing is only spirit polish which shall be applied after making the shutter surface very smooth and plane.

9.6. Rates and Payments.

Rates are generally given separately for one coat, two coats or three coats, but in all cases, they cover all the contingencies mentioned above, payment is being made by area.

10. STEEL WORKS

10.1. Steel Works

10.1.1. This specification deals with the requirements regarding material, fabrication and fixing of steel doors, windows and ventilators.

10.1.2. Materials and workmanship shall conform with the provisions of the following Codes in particular, and with such other standards as are mentioned hereinafter.

IS: 1038 Specification for steel doors, windows and ventilators.

IS: 1361 Specifications for steel windows for Industrial building.

IS: 1081 Code of practice for fixing & glazing of metal doors, windows and ventilators.

10.1.3. Materials used in the fabrications of Industrial doors, windows, ventilators, etc. shall be the best procurable and conforming to the relevant Indian Standard Specification.

10.2. Rolled Steel Section

The steel used shall conform to IS 226. The forms of sections, dimension and weights shall conform to relevant IS Codes for industrial sashes. The sections shall be cold straightened and finished goods shall be free from dents and/or other defects.

10.3. General Workmanship.

Doors, windows and ventilators etc. shall be truly square and flat, i.e free from twist and warp. They shall be constructed of sections which has been cut to the required lengths, revetted or welded at the corners. The general fabrication shall conform to IS: 1038 and IS:1361.

If the contractor is required to supply doors, windows, ventilators, etc., he shall obtain them from an approved manufacturer. The contractor shall first submit for the approval of the Engineer, the name and address of the manufacturer whose metal casements and doors and windows he in tends to use, together with typical drawings and specifications, describing the details of construction for each type of door/windows.

The doors, windows and ventilators shall be either galvanized or painted. All steel surfaces shall first be thoroughly cleaned free of rust, scale or dirt and mill scale by picking or similar process and they shall be painted with one coat of an approved primer conforming to IS:102 before dispatch. Alternatively, they may be galvanized by the "Hot Dip", zinc sprayer electro-galvanizing process as described in IS: 1361.

10.4. Fixing.

Doors, windows and ventilators shall not be built in at the time the walls are constructed but shall be subsequently fixed into prepared openings, as laid down in IS: 1081. Holes to accommodate the fixing lugs are to be left or cut, and the casements fixed after all the rough masonry and plaster work have been finalized. The lugs of the casement shall be jammed in cement concrete (150 mark) with stone chips (10mm down) after holding the casement in proper position, line and level.

The width of the clear unfinished opening in the wall should be 25mm. more than the overall width of the door frame to allow for 12.5mm. plaster on each jamb. The height of the unfinished opening shall depend upon whether a threshold is required or not. While fixing the door, care shall be taken to see that at least 6 mm. spaces are left between the door and the finished floor.

10.5. Fittings.

Hardware shall be fixed as late as possible, preferably just before the final coat of paint is applied. It shall be fitted in workman like manner, so that it may not work lost and in such a way that screws and pins are not marked and mutilated by hammers and screwdrivers. It shall be tested for correct operation.

Where specified, doors shall be fitted with a three way bolting device which can be operated from outside as well as inside, and a locking system, which can similarly be operated from either side. Solid steel bolt handles shall be provided, one on the outside and one on the inside of each shutter. In case of doors provided with a service, door, the lock shall be fitted on the service door. All materials shall be the best procurable and shall conform to the relevant IS specification.

10.6. Rolling Shutter

The mild steel shutters shall be power or hand operated as specified on the drawings and shall be obtained from an approved manufacturer. Unless otherwise specified, the shutter shall be made of 18 gauge, 75 mm. galvanized mild steel laths of convex corrugation, complete with one piece construction. These shall be fitted with press

inside guides and pressed bottom rails, bracket, door suspension shafts and top rolling springs. They shall be provided with locking arrangements for pad-locks, pulling hooks, handles, top-cover, etc.

10.7. Collapsible Gate

Mild steel collapsible gates shall be obtained from an approved manufacturer. These shall be of mild bar type made out of 20mm channels and shall be top hung with roller bearings, and fitted with locking arrangement. Collapsible gates under 3.0 meter height, shall generally have 3 seats of lattices and those over 3.0 meter height, 4 sets of lattices. Guide tracks shall be fitted in the floor.

10.8. MS/ Grills, Railings and Gates.

Mild steel grills, railings and gates etc. shall be fabricated and fixed in position as specified on the drawings or by the Engineer. All intersections or meeting of members shall be welded and the workmanship shall be of good quality to the entire satisfaction of the Engineer. MS grills, gates, etc. shall be cleaned of dust, dirt, rust or scales and rubbed with emery paper, and given 2 coats of oil paint of approved manufacture over a coat of approved anti-corrosive primer.

10.9. Measurement and Payment,

Steel gates, shutters, doors and windows including fixtures shall be computed by weight. The unit rate shall also include cost, conveyance, taxes, royalty etc. of steel, with its making charges including wastage, all other incidental charges necessary to complete the work as per specification, design and drawing with all T & P, labour required to fix at site of work.

11. MISCELLANEOUS

11.1. Description of Item

11.2. Aluminum False Ceiling with Gypsum Board.

11.2.1. Scope

The work covered by this specification consists of furnishing and installation of the suspended ceiling specified herein and shown on the reference drawings and finish schedule.

11.2.2. Materials.

i. The ceiling material shall be as specified on the drawings ceiling insulation tiles shall be of approved make such as specified in the schedule of items, lay – in- unit type, not less than 12mm thick and of size 600 mm x 600 mm. of gypsum board. Units shall have square edges and standard finish and plain of perforated design. The tiles shall be free from sagging for the type of installation.

ii. Suspension System.

Suspension tile shall be of the exposed slum, grid system consisting of standard main and cross tees executed OEL section of approved equal, in natural finish, including aluminum edge trim angle of M.S Main and cross tees including MS edge firm angle section in paint finish, approved by Architect/Engineer. The Dimensions of grids shall be approx. 600 x 12mm or 600 x 600mm or as specified on the drawings.

iii. Hanger Rods.

M.S. hanger rods shall be 6mm diameter hooked at one end and painted with one coat of red-lead based paint.

iv. Fasteners.

Fasteners shall be either propriety fasteners of the type suited for the system being used or fabricated aluminum strap hangers.

11.2.3. Installation.

Units shall be laid out in the joint pattern as shown on drawing. Units shall be laid out from the mid-point of the long axis of area so that opposite borders will be of equal width, unless

specifically indicated on the drawing. Cut-outs for ventilating and electrical outlets shall be provided as shown on the drawings. Joints shall be straight, true to line and exposed surfaces shall be flush and level. Unit shall be tightly butted and neatly jointed to connecting work. Aluminum edge angles or M.S angles or M.S angles shall be provided along the perimeter or each ceiling area. The hanger rods for attaching aluminum framing shall not exceed 1200 mm centers on every main tees.

11.2.4. Measurement and Payment

Measurement shall be made on basis of Sqm. Of entire ceiling area on which gypsum board actually laid as per approved drawing, specification. The unit rate mentioned in schedule shall include cost of gypsum board with all aluminum fittings for suspension system, hanger rods, fasteners, all labour, T&P, scaffolding, conveyance of all materials and all other incidental charges including all taxes, royalty and with all leads, lifts, delifts etc. complete. No payment will be made for cut pieces not utilized in work, breakage and damage of ceiling materials during transportation and laying as the unit rate is deemed to include the cost of the same.

11.3. Roofer.

This specification deals with providing water proofing in roof with bitumen felts and lime concrete terracing. The materials and workmanship shall conform with the provisions of the following Codes and Standard Specifications in particular and with such other Standards as are mentioned hereinafter.

IS: 73,702,1322,1346

11.3.1. Cement, Fine and coarse Aggregates & Water.

Cement, fine and coarse aggregates and water used in construction shall conform to the provisions made specification.

11.3.2. Lime and Surkhi. Lime and surkhi used shall conform to the provision made in specification.

11.3.3. Brick Aggregates. Brick aggregates for lime terracing shall have nominal maximum size of 25cm. and be

made from first class brick conforming to specification. They shall be free from dirt and other foreign materials.

11.3.4. Khunji "Khunji" used in lime terracing shall have the following ingredients for ten square meters

terraching:

a) Pulse (URAD)	100gms.
b) Molasses	2 Kg.
c) Fruit (Bel)	1 Kg.
d) Catechue	60gms.
e) Water	50-60 liters
f) Methi	60gms.

11.3.5. Primer

Primer shall be a bituminous solution of suitable and approved viscosity which shall be applied to the roof surface to assist adhesion of the bonding materials.

11.3.6. Bonding Material

Bonding material shall be a bitumen adhesive conforming to IS: 702 for blown type bitumens and IS: 73 for residue bitumens.

11.3.7. Bitumen Felts.

Bitumen felts shall conform to IS: 1322.

11.3.8. Gravel and Grit.

Gravel used as surface finishing over bitumen felts shall be pre-sized, rounded and be of

approved quality.

11.3.9. Lime Concrete Terracing.

The lime concrete shall have mix proportions of 2 parts lime, 2 parts, surkhi and 7 parts brick aggregate by volume. The brick aggregates shall be soaked in water for 3 hours before use. All the materials shall be mixed dry first and then water shall be added and mixed together to produce a thoroughly mixed wet concrete. The concrete shall then be placed, rammed and trimmed to falls. The terracing shall have a minimum run off gradient of 1 in 60. Thickness of terracing shall be as specified in the drawing and have a minimum thickness of 75mm. The concrete shall be beaten with wooden mallets for 7 days or more until mallets rebound from the surface readily when struck on it. While beating the concrete surface, it shall be moistened. The mortar which has been brought to the surface by beating shall be smoothened and worked to a finish with steel trowels. The surface shall be kept thoroughly saturated with water for at least 25 days after completion.

At junctions of roof and parapet or other vertical walls, the terracing shall be provided to a raised thickness with suitable covering as indicated in the drawing. Unless otherwise specified, such treatment shall be 50mm high and 100 mm radius.

11.3.10. Measurement and payment

These shall be computed on the basis of Geometrical surfaces actually constructed in Sqm.

11.4. Drainage.

This specification deals with drainage in the works.

11.4.1. The materials and workmanship shall conform with the provisions of the following Codes or Standard specifications in particular and with such other standards as are mentioned hereinafter IS: 783 and IS: 1742.

11.4.2. Materials

All Pipes shall conform to the sizes and materials shown on the drawings. They Bitumen felts shall conform to IS: 1322.

11.3.8. Gravel and Grit.

Gravel used as surface finishing over bitumen felts shall be pre-sized, rounded and be of approved quality.

11.3.9. Lime Concrete Terracing.

The lime concrete shall have mix proportions of 2 parts lime, 2 parts, surkhi and 7 parts brick aggregate by volume. The brick aggregates shall be soaked in water for 3 hours before use. All the materials shall be mixed dry first and then water shall be added and mixed together to produce a thoroughly mixed wet concrete. The concrete shall then be placed, rammed and trimmed to falls. The terracing shall have a minimum run off gradient of 1 in 60. Thickness of terracing shall be as specified in the drawing and have a minimum thickness of 75mm. The concrete shall be beaten with wooden mallets for 7 days or more until mallets rebound from the surface readily when struck on it. While beating the concrete surface, it shall be moistened. The mortar which has been brought to the surface by beating shall be smoothened and worked to a finish with steel trowels. The surface shall be kept thoroughly saturated with water for at least 25 days after completion.

At junctions of roof and parapet or other vertical walls, the terracing shall be provided to a raised thickness with suitable covering as indicated in the drawing. Unless otherwise specified, such treatment shall be 50mm high and 100 mm radius.

11.3.10. Measurement and payment

These shall be computed on the basis of Geometrical surfaces actually constructed in Sqm.

11.4. Drainage.

This specification deals with drainage in the works.

11.4.1. The materials and workmanship shall conform with the provisions of the following Codes or Standard specifications in particular and with such other standards as are mentioned hereinafter IS: 783 and IS: 1742.

11.4.2. Materials

All Pipes shall conform to the sizes and materials shown on the drawings. They laid or fixed, from inside of one manhole/catch pit to the inside of the other manhole/catch pit. The length shall be taken along the centre line of the pipe or the length of the open drain.

The rate shall include the cost of excavation refilling, shorting and timbering in trenches, and cement concreting, including encasing, R.C.C. pipe or P.V.C/H.C.I pipe shuttering etc. all labor and materials.

11.5. Random Rubble Rough Stone Dry Packing.

Stone protection work for loose apron of the structures both in upstream and downstream are to be provided as per relevant drawings.

Rough stone dry packing has to be provided on the side slopes of approach road for development of site.

Fitter satisfying relevant I.S. specification should be provided in slopes of road and in the location as indicated in the drawing and as directed by the Engineer-in-charge.

11.5.1. Material for Stone pitching

The pitching material shall consist of the most durable rock fragments of approved quality selected for the purpose. Stone shall be procured from the approved quarries and if required shall be subjected to inspection and approval by the Engineer-in-charge. The quality of individual stone shall be dense, sound and free from conglomerate, bonds and other defects that would tend to increase their susceptibility to destruction by water and weathering actions. Stones having thickness less than 50% of their maximum dimension shall not be used for pitching.

11.5.2. Size of Stones.

For stone pitching, no stones shall be $0.015m^3$ to $0.03m^3$ in size. At least 15% of stones to be used for pitching shall have depth equal to the thickness of pitching. The list thickness of the laterite stone shall be 17.5.cm. The contractor will be held responsible for suitability of the stone used in the work.

11.5.3. Stone Pitching.

11.5.4. Slope Cutting.

The compacted road the slope of which is protected with stone pitching shall be trimmed to the lines and slopes as prescribed on drawings or as directed by the Engineer-in-charge from time to time. The earth obtained from this trimming shall be laid on top of the road if required or as directed by the Engineer-in-Charge. The pitching shall be hand placed on side slope of the road.

11.5.5. Thickness of Pitching

The thickness of pitching shall be as indicated on the drawings. The thickness shall be measured normal to the slope.

11.5.6. Method of Placement Pitching

a) Before laying the pitching on level ground or on sides of the slope, the receiving surface shall be trimmed to the required slopes and profiles put by means of lines and pegs at regular intervals. Depressions shall be filled up and thoroughly compacted. Pitching on inverted filter if any shall be started from the end and built in courses upwards. Stones shall be placed by derrick or by hand and so placed that the largest dimensions are perpendicular to the face of the slope. The largest stones shall be placed in the bottom course and for use as headers for subsequent courses.
b) All interstices between adjacent stones shall be filled with spills of proper sizes and wedged in with hammer to ensure tight packing.

11.5.7. Measurement and Payment

Measurement for payment will be made on the basis of cubic meter of the finished works for the respective items as mentioned earlier. All measurement will be made by finished level section. Where level section measurement is not possible due to un-avoidable reasons, measurement of stone to be made in regular closely packed stacks

and then used in the work.

The unit rate is inclusive of trimming the earth to required profile, slopes and grade and/ or preparing level strips at suitable intervals as directed to have uniform base, cost conveyance, royalty and other taxes of all materials, supply of equipments, labour, grouting with sand where specified in schedule, other contingency like cost of construction of coffer dam and dewatering etc. complete.

12. SANITARY & WATER SUPPLY

12.1. Description of Items

12.1.1 General

All sanitary ware shall be vitreous china of fire clay as specified in the schedule, and shall be best quality and Hindustan Twyfords make or approved equal. The sanitary ware shall be free from any warp, cracks, blemishes and shall have a smooth surface, free from crazing, blister, deformities and uneven glazing.

All sanitary fittings and fixtures shall be approved by Engineer prior to installation of fixtures and the approved samples shall be maintained at site till the completion of the work.

All rates for fixing shall include the provision for making holes in walls providing wooden plugs and cleats where necessary, cutting floors, chasing in walls and floors etc. and making good and restoring the same to original conditions. The rates are for the completed work as laid down in the schedule and the contractor is not entitled for any payment.

The contractor in carrying out the construction work shall take effective steps to carefully open out all existing channels, culverts, bridges, pipe lines, conduits, water courses, sewers, drains, electric cables, transmission lines and their supports and all other works buried or otherwise, where such have to be interfered with for the purpose of the construction of the works. He shall provide and arrange all necessary, temporary, supports and diversions if necessary therefore, across, under, over, through and alongside the trenches and all other parts of construction work and shall leave all such existing channels, culverts, bridges, pipe lines, conduits, water courses, sewers, electric cables, transmission lines, telegraph and telephone lines and all other works in their original condition to the satisfaction of their owners and Engineer.

The sanitary fittings and fixtures will be handed over complete in all respects on the completion of work. No incomplete items will be taken over. Any loss of damage of these due to any reason whatsoever before the handing over shall be at the contractor's cost and charges.

All exposed pipes and specials, C.I. or G.I. shall be painted with three coats of approved paint of approved colour shades. The rate for all piping shall be inclusive of cost for such painting.

The materials and workmanship shall conform with the provision of the latest versions of the following codes in particular and with such other standards as are mentioned hereinafter.

IS: 1172 Basic requirements for water supply, drainage and sanitation.

IS: 1742 Code of Practice for building drainage.

IS: 2064 Code of Practice for selection installation and maintenance of sanitary appliances.

IS: 2056 Vitreous sanitary appliances

IS: 771 Glazed earthenware sanitary appliances

IS: 774 Flushing cisterns for closets and urinals.

IS: 1728. Sheet metal rain water pipes, gutters, fittings & accessories.

For items such as earthwork, concrete, masonry, plaster etc. the relevant specification of this series shall apply.

The internal plumbing and sanitary work shall be executed accordance with the regulations of the municipal Corporation Act of the state concerned.

12.2. Sanitary Fixtures to the Appurtenances

12.2.1 European Water Closet suites.

The rate shall include providing and fixing the following components as described in schedule. a) Wash down closet in white vitreous chinaware b) 'P' or 'S' trap with or without vent c) Solid plastic seat of approved type with rim, C.P. brass pillar hinges, with rubber buffers. d) Pressed steel porcelain enameled low level flushing cistern 15 liters capacity, with

C.P fittings, mounted on a pair of porcelain enameled m.s brackets, valve less syphone, 12mm silent acting ball cock, C.P, flush bend.

e) 12mm. lead inlet connection with 12mm C.P. stop cock, C.P overflow pipe of required length
f) C.I. soil pipe and bend with cleaning cap upto outside face of wall and vent piping upto outside face of wall.
g) Making chases and opening in walls and floors and making good the same to match complete.

12.2.2 Indian Water Closet Suites

The rate shall include providing and fixing the following components as described in the schedule:

Best Indian type water closet pan in white vitreous china ware with 'P' or 'S' trap with or without vent with raised foot treads, the size of the pan as shall be as described in the schedule.

High level pressed steel flushing cistern 15 liters capacity porcelain enameled 'Fordham' or equal mounted or porcelain enameled M.S. brackets, 32mm G.I. flush pipe of appropriate length and bends with joints embedded in wall. G.I. pull chain and 122 mm.

G.I. over flow pipe lead, supply pipe with C.P stop cock G.I. branch including C.P push tap and all fittings of the cistern complete exposed piping shall be painted with 3 coats of approved paint and shade.

The rate shall also include cutting, floor and other structural members excavation of pit and fixing the closet pan in cement concrete 1:2:4 and make good the surface to original conditions complete.

12.2.3 European Water Closet – Syphonic – Pattern.

The rate for this item shall include for providing and fixing the following components and as described in the schedule

a) European water closet symphonic pattern with integral 'P' or 'S' trap in vitrious China ware
b) Cistern with lid (15 liters capacity) in Vitreous Chine Ware.
c) Complete fittings for siphon, cistern, flush bend, air pipe etc.
d) Solid plastic seat of approved colour
e) Rubber joints for inlet connections.
f) 12 mm lead inlet connections 12mm. cp. Brass, stop cock easy clean type.

Wash Hand Basin

The rate shall include for providing and fixing the following components.

a) Wash basins of size as specified in the schedule in Vitreous Chine ware with anti-splash rim with one side, tap hole on the left side.
b) Supporting bracket as specified.

c) 12mm. cp. Pillar cock with triangular knob marked 'C'
d) 32mm. cp brass waste coupling with rubber plug and chain.
e) 32mm. cp brass bottle trap with extension pieces and C.P. walls flanges.
f) 12mm. cp brass stop cock and 12mm lead inlet connection necessary pipe connection complete.

12.2.4 Showers

The rate shall include provision and installation of plated brass rose of 175.mm dia and 12mm C.P. brass arm of appropriate length, C.P. wall flange.

12.2.5 Mirrors.

The mirrors shall be of the size specified in the schedule with beveled edged (Pilkington's make) mounted on asbestors sheet fixed to walls with C.P brass screws with detachable

C.P. caps. The rae shall include for making necessary holes in walls and fixing plugs. Etc.

12.2.6 Soap Dispenser

The soap dispenser shall be C.P or glass with chromium plated brass cap anodized or aluminum fixed on to chromium plated brass holder brackets. The rate includes for fixing to walls with C.P brass screws complete.

12.2.7 Toilet paper Roll holder.

a) The toilet paper roller holder shall be of size specified in the drawing in white glazed earthenware (surface mounted type). Rate includes for fising the holder to wall with necessary raw plugs and C.P brass screws.

b) C.P projecting type.

12.2.8 Towel Rails.

The towel rails shall be of C.P brass tube with a pair of C.P brackets Materials to be of best and approved quality of sizes as specified in schedule. The rates shall include fixing the towel rails to walls with necessary C.P screws with required provision of wooden plugs etc. complete.

12.2.9 Stop cocks and Bib cocks

They shall be of C.P brass approved heavy quality "Ego" make easy clean type with capstan head. The size shall be as specified in the schedule.

12.2.10 .Lead Connections

These shall be of specified size, appropriate, length made out of heavy lead with brass union and wiped solder joint, cost include bending to proper shape, fixing, painting etc., complete.

12.3.0 G.I Pipe work

The galvanized iron pipes and specials shall be of 'C' class, heavy type first quality and shall conform to I.S No. 1239-33. The rate includes for cutting to required length, threading, jointing, fixing, testing and removal of leakages. When fixed to walls exposed, the pipes shall be fixed on wooden packing, with G.I clamps and screws, such that they are away from the wall to the extent required. All pipes and specials shall be got approved by Engineer- before incorporation in work. The rate includes for cutting through walls and floors and making good the same thoroughly whenever pipes are concealed, to the entire satisfaction of Engineer. The pipes shall be tested for 91.5m head of water and the pressure maintained for 12 hours. Leakage if any, shall be made good by contractor and the pipes and specials rendered absolutely water tight. The measurement for the finished work shall be taken along the longitudinal axis of the pipe line. The rate of pipes shall include the cost of all specials and painting, the pipes with 3 coats of approved paint to the exposed surfaces, as instructed by Engineer.

12.3.1 Peet Valves.

The peet valves shall be of gun metal heavy quality and of approved make provided with hand wheels. The rate shall include testing and making good leakages.

12.3.2 G.I. Soil Waste, Vent and Antisyphonage pipe & rain water pipes.

The soil waste, vent and antisyphonage pipes and specials shall be approved quality and make. The rate shall include provision of specials with access doors wherever necessary, jointing with spunyarn and lead including caulking, testing and removal of leakages. The rate shall also include making holes in walls, floors etc. and making good the surfaces and restoring to original conditions. All measurements shall be taken along the longitudinal axis of the pipe line. The pipes in exposed position shall be fixed to walls by M.S or heavy flat iron clamps on wooden packing, 5cm. thick or any other manner as instructed by Engineer so that the stacks are at least 5cm. away from wall surface.

12.3.3 Nahani Traps.

The nahani traps shall be of cast iron with the outlet of required size. The rate shall include fixing the trap in cement concrete 1:2:4 and C.P brass hinged heavy type grating on top.

12.3.4 The lead pipes shall be of the diameter and weight as specified in schedule. The rate shall include cutting, jointing with wiped solder joints, bending, fixing the pipes as required, brass thimbles, cleaning eyes wherever required, complete.

12.4 White Glazed Traps for Urinals.

The trap provided for urinals shall be of type and size specified with approved C.P. hinged dome grating to match. The traps shall be fixed in cement concrete 1:2:4 to correct elevations.

12.4.1 Half Round Channels for Urinals.

The half round channels for urinals shall be of best Indian made white glazed earthenware and of the specified size. They shall be bedded on 7.5 cm. thick cement concrete bed (1:2:4) laid to proper slope and pointed with cement mortar 1:3.

12.4.2. Marble Partitions for Urinals.

The marble partitions shall be 40 cm. thick best Indian white marble, machine cut and polished with rounded corners and of sizes as specified built 2.5 cm. into the wall, including cutting groves in the wall where required and fixing etc. complete.

12.4.3 Automatic Flushing tanks for Urinals

The automatic cister shall be porcelain enameled ("Nomos" or equivalent) of capacity as specified in schedule, supported on a pair of porcelain enameled brackets fixed to the wall as directed and the rate shall include the following fittings in addition to the cistern.

a) C.P brass distributors as required for the range.

b) 12mm C.P spreader, C.P wall clips, as required for the range.

c) 12mm G.I. overflow pipe with specials from the cistern upto 15cm above floor level terminated with 12mm. C.P brass perforated cap complete.

12.5. Valve Chamber.

The rate for these items shall include excavation of dimensions as required.

a) 1:4:8 cement concrete of specified thickness in foundation. This shall have 7.5.cm. off set over the overall size of masonry.

b) Brick masonary in cement mortar as specified to give the inside clear size given in the schedule.

c) 12mm. cement plaster (1:3) from side with 8mm. thick floating coat of neat cement and outside with trowel finish.

d) C.I. manhole cover and frame of specified clear opening and weight fixed in cement concrete 1:2:4. The C.I. covers and frames shall be painted with three coats of anti-corrosive black bitumastic paint.

12.5.1. Automatic Ball Valves

These shall be of best Indian made of available for high pressure and of heavy quality. The connecting rod from the valves to the copper float shall be of brass and shall withstand the high pressure encountered. The float shall be of copper. This shall be soldered/ blazed to render it leak proof. The material will be as approved by Engineer.

12.6. C.I. Manhole frames and covers.

The C.I.M.H frame and cover shall be of size and weight as specified in schedule. The rate shall include provision and fixing in position and finishing. The cover & frame shall be painted with three coats of anticorrosive paint.

12.7. M.S Tanks.

These shall be of required dimensions, welded construction together with suitable internal stays and supports frames. The rate shall provide for all accessories like inlet, outlet scour and over flow by welding flanges, painting inside and outside surfaces of the tanks with 3 coats of paint of approved colour and shade. The rate for item shall include transport, hoisting and installing, making connections, testing access frame and cover with locking arrangements 2m long 12mm diameter G.I. overflow pipe with brass mosquito-proof coupling.

The rate shall also include for necessary staging as described in the schedule.

12.8. Fire Clay sinks.

The rate for this item should include provision and fixing the following components: a) Best Indian make white glazed fire clay sink of size and type as specified in the schedule. b) 4cm. chromium plated bars waster, heavy quality with rubber plug C.P. chain and stay. c) cm. C.P. brass bottle trap with C.P wall flanges and extension pieces to suite. d) A pair of C.I Cantilever brackets built into the wall painted with three coats of approved paint of approved colour.

12.8.1 Stainless Steel Kitchen Sinks.

The kitchen sinks shall be of stainless steel of size noted in the schedule. These shall be of approved type seamless on piece pressing. The rate shall include for necessary waster coupling, bottle trap and piping upto waster pipe and placing or fixing over the benches or tables in a manner as required by Engineer.

12.9. Soap Tray

The soap dish shall be of size 15 cm x 7.6 cm white glazed earthenware (recessed type). Rate includes for fixing the holder to wall with necessary rawl plugs and C.P brass screws.

12.10. Tumbler Holder. The tumbler holder shall be white vitreous china ware.

12.11. Flat Back Urinal.

The rate shall include for providing and fixing the following components.

a) Flat back urinal approved Indian makes in white vitreous chinaware with automatic flushing.

b) C.P brass bottle trap with extension piece, C.P spreader pipe 10mm. lead connector with cock to flushing cistern G.I. overflow pipe complete.

12.12. Laboratory Sink

The rate shall include for providing and fixing the following components.

a) Plain edge sink of approved Indian made in white vitreous china ware.

b) Supporting C.I. brackets painted with 3 coats of deluxe or approved white enamel paint.

c) 32mm C.P brass waster coupling with rubber plug including C.P. chain and stay.

d) 32mm C.P brass bottle trap with extension piece upto C.I. waste pipe, C.P. wall flanges and 12mm. dia C.P. bib cock all complete.

12.13. C.P Coat hooks.

The rate shall include for providing and fixing the following components. C.P coat and hooks, C.P screws and raw plugs for fixing to wall.

12.14. Painting.

The C.I. brackets, lead connection pipe and waster pipe shall be painted with two coats of an approved paint over a coat of approved primer. The inside and outside of cistern shall be painted with an approved bitumen paint, conforming to Indian Standard Specifications.

12.15. Cast Iron Waterman

All C.I. pipes and fittings for water main shall be of 'B' class and shall conform to Indian Standard specifications. The pipe shall be socketed at one end and spigotted at the other. All joints shall be lead caulked with lead and spun yarn.

12.16. Brass Water Fittings.

All water fittings shall be of approved manufacture and shall in all respects comply with Indian Standard Specifications. The brass fittings shall be fixed in the pipe line in a workmanlike manner. Care shall be taken to see that joints between the fittings and pipes are made leak – proof. All defective fittins and joints shall be repaired, redone or replaced free of cost.

Bibcock and stop cock: These shall be of approved manufacture of plain C.P brass, of easy clean, screw down pattern and of the size specified.

Bibcock and stop cock: These shall be of approved manufacture of plain C.P brass, of easy clean, screw down pattern and of the size specified.

The ferrule for connection with C.I. water main shall be of plain bent brass tube with coupling, cast in one piece, with C.I. bell mouth cover. Ferrule with stop may be used if specified. The ferrule with stop must be so fitted that no parts shall be left projecting with the main line into which it is fitted.

12.17. Laying and Joining of Pipes.

All pipes and fittings shall be laid truly vertical or along the lines as directed by the Engineer and shall be secured to the wall with M.S holder bat clamps made from M.S flats. The clamps shall be fixed to the wall by embedding it in cement concrete of approved grade. For all cast iron pipes the joints shall be made with spun yarn and molten lead properly caulked with tools as per standard practice. In the case of exposed work, the pipes shall be fixed clear of the wall and for underground work, thye shall be laid strictly in accordance with the 'slope specified'. Traps, heerlrest, bends, gully trap etc. shall be jammed in position with cement concrete of approved thickness. Stoneware pipes shall be jointed with tarred gasket and cement mortar and shall be laid on a base of concrete or shall be embedded in concrete where specified. G.I. pipes and fittings shall be jointed together with red lead paint and fine spun yarn. All joints must be perfectly water-tight when put under maximum test pressure.

12.17.1 All exposed pipes shall be painted with two cats of an approved paint over a coat of approved primer. Underground pipes shall be treated with two coats of an approved bituminous paint.

12.17.2 Rate for Pipe Work.

The rate for all pipe work shall include for supplying, laying and fixing in position including necessary fixtures, jointing, painting, necessary earthwork in excavation in all kinds of soil and rock, refilling in 15cm. layers including watering, consolidation, top dressing, removal of spoils, providing warnings signs and barricading where necessary, making holes and chases, making good all damages and is for the completed work.

12.18. Storage Tank (Overhead)

This shall be of galvanished iron sheets of 2.032mm. thickness minimum (14 grauges) riveted to M.S angle iron framework unless otherwise specified. The sheets must be riveted or welded together with angles at the corners. The tank shall be provided with an inspection hole with hinged water-tight cast iron cover with locking arrangement, a ball cock, coupling for inlet, outlet, and overflow land washout pipes. The surface shall be given two coats of an approved paint over a coat of approved primer.

12.19. Cement Concrete (1:4:8)

The rate shall include for providing and laying all the necessary materials, labour and tools land plant required for the same. It shall consist of 50kg. of cement to 14cum. of clean washed coarse sand and 28cum. of well graded washed aggregate 20 to 40 gauge. It shall include cost of laying from work, rough moulds, boxing and curing. The rate shall include the cost of laying of concrete to grade or to shapes as required.

12.20. Cement concrete (1:3:6)

The rate shall include for providing and laying all the necessary materials and providing labour, tools land plants required for the same.

It shall consist of 210 kg. of cement 0.44m^3 of clean washed sand and 0.88m^3 of well graded aggregate 20mm to 40mm. It shall include cost of laying, framework, rough moulds, boxing and curing. It shall include the cost of laying of concrete to grades or to shapes as required.

12.21. Cement Concrete (1:2:4)

The rate shall include for providing and laying all the necessary materials land providing labour, tools and plants required for the same. It shall consist of 300kg. of cement to 0.41 m^3 of hard stone aggregate 10mm to 25mm gauge. It shall include cost of laying, boxing, mixing in mixer frame work and curing. The rate shall include the cost of laying of concrete to grades or to shapes as required.

12.22. Brick Work

The rate shall include for providing and laying all the necessary materials, labour, tools, and plants required for the work. It shall be in 1st class bricks in a mortar consisting of 425 kg. of cement and 0.9m^3 of clean washed sand or in the proportion as in the schedule of quantities. It shall include the cost of scaffolding and curing.

12.23. 20mm/12mm Thick cement Plaster

The rate shall include for providing and laying all necessary materials, labour, tools and plants required for the work. The plaster shall be 20mm/12mm thick and shall consist of 425 kg. cement to 0.9m^3 of clean washed sand or in the proportion as in schedule of quantities. 1mm thick floating coat of neat cement will be given on the plaster. It includes the cost of raking out the joints of brick masonry, finishing smooth the floating.

12.24. R.C.C 1:2:4

The rate shall include for providing and laying all the necessary materials labour tools and plants required for the work. It shall consist of 300 kg. of cement to 0.41 m^3 of clean washed sand and 0.82m^3 of hard stone aggregate 10 mm to 25mm gauge and M.S. reinforcement up to 110 kg. M^3 of concrete. The rate shall include the cost of cleaning, cutting, bending, binding and scaffolding. The rate shall also include rendering and finishing of all exposed surfaces and edge smooth, with neat cement.

SEWERS, MANHOLES AND STORM WATER DRAIN

12.25. Scope of Work

The work covered by these specifications consists of furnishing labour, materials, tools, plant, equipment necessary for the proper execution of work and installation of drains/sewers in strict accordance with the stipulations and applicable drwings.

12.26. General

The general arrangement of drainage sewers and all related works shall be as indicated in drawings. If actual field conditions or any other causes necessitated any modifications to the arrangements detailed in the drawings, the contractor shall submit to Engineer details information, report and drawings, showing such proposed modifications, for approval, prior to the commencement of the works. The contractor shall carefully examine all related drawings, sketches, specifications, schedules and shall be responsible for proper installation and workmanship.

Contractor shall be responsible for the provision of all materials fittings and also for the workmanship which shall be of the highest standard. All materials forming part of the installation work shall be submitted by the contractor to Engineer for approval prior to the commencement of works. The contractor shall submit all technical literature and other information in regard to the proposed materials, if required and asked for by Engineer.

The contractor shall investigate all actual conditions and other details affecting the planning and execution of his work and shall arrange the work accordingly, so as to procure and furnish all materials, plant and workmanship to meet such conditions and to meet the demands of the work.

Dismantling and cutting of any constructed work shall be undertaken by the contractor, after receipt by him, of a written permission by Engineer. Any damage to the buildings, piping, wiring, other installations in the area, surroundings, property, road, lawns, etc. caused as a result of the contractor's dismantling or cutting of the existing construction work or as a result of his opening trenches for drainage works, shall be made good by him at his own cost by employing skilled tradesmen for such repair.

12.27. Alignment and Grades

a) S.W. drains and sewers shall be laid to the alignment and grades as shown on drawing, subject to such modifications as shall be required by Engineer form time to time, to meet the requirements of the works. No deviations from the lines, depths of cutting, gradients of drains and sewers shall be permitted except by the specific prior approval of Engineer in writing.

b) Before commencement of work, accurate surveys and levels of the ground proposed to be excavated of filled up, shall be taken jointly by the representative of Engineer and the contractors. These surveys and levels shall then be plotted and drawings prepared. These drawings/ sketches and information shall be signed by the contractors and Engineer quantities and measurements, to the extent applicable, obtained from these signed and accepted documentary basis, shall eb final and binding on both parties, subject however to the powers of Engineer to vary the works. If the contractor or his agent shall fail to present himself at the time of such survey and levels, the same shall be done by engineer through any suitable agency, at the cost of the contractor. Quantities and measurements to the extent applicable, drawn out of such surveys and levels shall be binding on the contractors.

c) All lines, levels, surveys referred to above, shall be based on bench marks and other related data which shall be informed by Engineer. The contractor shall make his own arrangements to obtain for use at site such instruments necessary for surveys and levels, as may be indicated by Engineer. These instruments unless permitted otherwise, shall be kept and shall be made available for use for works, whenever asked for by Engineer.

d) The contractor shall provide all materials required for the construction and maintenance of all bench marks and other reference points that would be required and determined by Engineer to be established at site, for the execution of the work. All pegs, iron rods, pipes, indicators, concrete, brick pillars, paints etc. shall

be so provided by the contractor in accordance with the direction of Engineer.

12.28. Setting out works.

1 a. S.W drains and sewers shall be laid in accordance with the lines and grades and at such inverts as shown on drawings and as instructed by Engineer. The drains/sewers shall be laid and constructed with a true grade and innstraight lines between chambers with the aid of suitable boning rods and sight rails, which shall be fixed to suit the requirements of work as determined by Engineer at intervals of not exceeding 25m.

2 b. All sight rails and boning rods shall be provided fixes and maintained by the contractor. Necessary surveys and leveling instruments in a accurate order, shall be provided and maintained as site by the contractor.

3 c. The contractor shall set out the alignment position and levels of the S.W drains/sewers according to the drawings given and/or as per instructions given by Engineer and he shall be responsible for the accuracy and correctness of the same throughout the work. The contractor shall, at his own cost, provide all labour, materials, and instruments to Engineer to enable Engineer to check the levels and dimensions of the work.

4 d. All sight rails and posts shall be of well seasoned timber and of such sizes as would be required by Engineer Sight rails and boning rods shall be accurately planned. No warped or otherwise defective timber shall be used. All posts shall be fixed sufficiently away from the edges of trenches, shall be properly embedded in concrete and shall be truly vertical.

Sight rails shall be fixed to posts by heavy wrought steel clamps so that they are rendered immovable with respect to the correct lines and levels. All boning rods shall be suitably shod with iron. The sight rails and boning rods shall have the centre line accurately marked thereon by a thin saw cut and shall be painted black and white.

1 e. At any time, at least four separate sight rails shall be always maintained in correct level and alignment along the centre line of pipes/drains/sewers. Wherever required the contractor shall provide, erect and maintain such additional sight rails as Engineer would require. The contractor shall at all times, see that his workmen/agent or other unauthorized persons do not accidentally or otherwise tamper with or interfere with site rails, alignment and level marks etc.

2 f. At every place where the work is proceeding, the alignment levels and centers of site rails shall be checked at least twice a day in order to ensure that no disturbances or inferences of the alignment levels and centers has occurred.

3 g. Location of sight rails, additional sight rails, posts etc, number of sight rails, construction of sight rails and boning rods, manner of securing sight rails to posts, type and sizes of timber to be used for sight rails and boning rods shall be as approved by Engineer.

4 h. All bends and changes in the directions of the alignment shall be set out in a manner as directed by Engineer. To avoid kinks.

12.29. Excavation.

a) Excavation for S.W drains/sewers and for other works shall normally be in open cutting, unless otherwise directed by Engineer in writing. Engineer may order excavation to be made partly in open cutting and partly by tunneling, if necessary. On the merits of location, Engineer may order the contractor to remove excavated spoil at once and to bring it back for refilling. Under such circumstances, the Contractor shall be paid extra on the basis of mutually agreed rates. The contractor shall be responsible to provide and maintain during the progress of works, at all times, all necessary traffic diversion arrangements, barriers along trenches across

roads, danger signals, red light, watch and ward and personnel to guide traffic, to the requirements of Engineer.

b) Dimensions of excavation shall be approved in advance by Engineer. Unless permitted otherwise not more than 20 meters of any trench in advance of the end of the already laid drains/sewers shall be open at any time. Trenches shall be excavated to their full depth for a distance of at least 5 meters more than the minimum length of pipe drains permitted to be laid in such trenches.

c) Maximum widths of trenches in respect of which payment shall be allowed for excavation in soils shall be as follows:

   i. Trenches not exceeding 2 meters in depth-60 cm. plus the external diameter of barrel of pipe to be laid.

   ii. Trenches exceeding 2 meters but not exceeding 5 meters in depth 67-5. cm. plus the external diameter of the barrel of pipe to be laid.

   iii. Maximum widths of trenches in respect of which payment shall be allowed for excavation in hard rock shall be as decided by Engineer at site. These shall not however be more than those indicated in (c) (i) and (ii) above.

1 iv. Minimum widths of trenches down to the crowns of barrels for pipe drains of 45cm. in diameter or less shall be the external diameter of pipe plus 20 cm. clearance on each side and for pipes above 45 cm in diameter, the clearance on each side shall be 22.5 cm. All such trenches shall have a clear width at the bottom equal to the widths of the cradles of the pipe drains to be laid in them. The minimum clear width of trenches for other pipe drains shall be the greatest external width of structures to be built herein.

2 v. For manholes junctions with junctions chambers, storm water overflows, and such similar works the minimum dimensions of excavation would be that contained in a prism with vertical sides and a horizontal section equal to the smallest rectangle enclosing such structures with their foundations and 30cm of clear working space all around.

Engineer shall have power to order in writing to the contractor, modifying the dimensions of excavation and maximum and / or minimum widths and other dimensions, for excavation in all soils, including bad soils and in rock.

d) During excavation of road surfaces, soiling, road metalling, pavement, kerbs, turf and rock (excavated) shall be stacked as directed by Engineer and preserved for reinstatement. Prior to reinstatement, road metal shall be shifted carefully. All filled up area shall be properly consolidated and surfaces dug shall be properly restored and maintained till the completion of works to the satisfaction of Engineer owners of the roads, accesses and/or owners of other properties using such roads. The contractor shall not cut any fences, cables, pipes, drains, culverts and any other construction in the line of excavation. Such obstructions shall be brought to the notice of Engineer and instructions obtained, as soon as such obstacles are met with or foreseen. All such constructions met with during excavation shall be properly supported, to the requirements of Engineer. Employers and owners of such services, Trees on alignment or nearly shall not be cut unless permitted by Engineer.

   The contractor shall clear the area to be excavated of all shrubs, grass, tree, roots, stumps and other burden affecting the work to keep the area of work clean. During excavation of work, excavates soil shall be sprinkled with water to avoid dust nuisance.

   The contractor shall not occupy or obstruct more than half the road width when working along/across such roads. No vehicular traffic shall be obstructed by the contractor unless specific written permission of Engineer is obtained to that effect. Sturdy foot walks shall be provided whenever a trench crosses accesses, roads, country paths, cart tracks.

e) Any offensive matter (like filth,, night soil, etc.) met with during excavation shall not be deposited along the trench but shall be removed away as directed by Engineer.

f) All excavation shall be taken to required depths, so that inverts are placed at levels given by Engineer. In bad or slushy ground, Engineer may instruct the contractor to excavate deeper than required and to fill up the extra depth with concrete or broken stone or gravel or other materials. In case of such extra work, the contractor shall be paid extra at the rates in Schedule or at rates derived there form. Should the contractor excavate deeper than required by drawings, without specific written order by Engineer he shall fill up the extra excavated portion at his own cost, as directed by Engineer and to the satisfaction of Engineer.

g) The contractor shall at all times, support effectively the sides of the trenches and other excavation by suitable method of timbering, piling sheeting, which shall be close timbered in all loose or sandy strata and below subsoil water level. Cost of timbering, shorting, pilling, planking and any other supporting and protection works shall be borne by the contractor and shall be deemed to have been included in the rates of excavation. All timbering, etc. shall be removed as work proceeds. Any timbering, unless ordered to be left in place, by Engineer in writing, shall be removed. No claim shall be considered if the contractor retains timbering in excavation without written order of Engineer.

Engineer may require any portion of timbering, piling or sheeting to be left in the ground for protection of sides. In such cases, written orders shall be given by Architect/Engineer to contractor detailing sections where such precautionary measures are required, quantity or timber to be left in place etc. Such left in place timber shall be paid for at negotiated rates on the basis of cu. Ft. of timber so left. In soft of water logged ground close planking with tongue and groved joints shall be close driven to such depths below the bed level, as shall be ordered by Engineer and no extra shall be payble to the contractor for such extra work.

All timbering shall be of adequate dimensions and shall be placed at required centers as instructed by Engineer. Timbering shall be fully braced and strutted to avoid any falls, side slips, subsidence and all cavaties shall be solidly filled in. In case of left-in-trench timbering all cavities behind such sheeting and timbering shall be solidly filled in as directed by Engineer. The contractor shall be responsible for sufficiently of all timbering, bracing sheeting, piling, strutting and for all damages to persons, property and surroundings due to improper quality, strength, placement, maintenance and removal of timbering.

The contractor shall shore up all buildings, walls, foundations other structures, stability of which is in the opinion of Engineer is liable to be endangered by the execution of work, the contractor shall be fully responsible for any such damage to persons, properties and surrounding, resulting from any accident to any such structures.

h. The contractor shall resort to blasting operations with prior permission of Engineer. Adherence to regulations regarding blasting, permits storage, upkeep, accounting of blasting materials shall be always observed by the contractor. Blasting shall be carried out by the contractor with all precautions, at appointed times as decided in advance by Engineer in such a manner so as to avoid damages to buildings plant, personnel, workmen and structures at site. Numbers of holes to be blasted, type of blasting materials to be employed, extend of charge per hole, location blasting operations, and names of actual agencies and workmen employed for blasting operations shall be sent to Engineer 24 hours in advance and Engineer orders permitting these operations obtained prior to commencement of work of blasting.

In trenches and other excavation, at locations where blasting is likely to cause damage to surroundings, structures, plant, these operations shall be muffled by use of steel plates of weights and dimensions as required by Engineer or alternatively by the use of close waven solid bamboo matting weighted down by rubble. Blasting shall not be permitted in such areas where these operations, in the opinion of Engineer shall constitute danger, vibrations, injurious to equipment installed in plants and buildings,

danger to traffic or workmen.

The contractor shall be responsible for all claims arising out of his blasting operations land shall keep Architect/Engineer and Employeer indemnified in respects of the same. He shall at his own cost apply for, arrange and be in possession of valid blasting permits and licenses for storage, upkeep and use of blasting materials.

i. At all times during the progress of works, the contractor shall keep the trenches and excavation free of water, which shall be disposed of by him in a manner which shall not cause injury to public health, property accesses, roads as well as to works completed or in progress.

The contractor shall, always provide adequate plant materials, labour, fuel, lubricants, spare parts, other contingent items stores and accessories required for dewatering trenches and excavation. The contractor shall plan in advance such arrangements for dewatering and shall keep at site spare plant to meet any contingency. Particulars of dewatering arrangements shall be periodically reviewed for adequacy and Engineer informed of the same, by the contractor. The contractor shall keep all trenches and excavation free of water at all times, in a safe proper and effective manner; and shall be fully responsible to all risks, damages to neighboring building plants, roads, areas and structures.

The contractor shall take adequate precaution to ensure the safety of trenches and excavation. Under no circumstances shall be dewater the trenches to such an extent as to cause the sand bottom of excavation to flow, thereby endangering nearby buildings, plants, structures and surroundings.

In case any damages to buildings, property, plants assesses and surrounding is caused due to contractor's dewatering and pumping operations, he shall be wholly responsible for the same, and shall pay and satisfy all such claims or otherwise make good all such damages at his own cost. If he fells to do so with diligence Engineer and/or employer shall be at liberty to take such adequate steps as may be considered essential and sufficient by them and Engineer and /or Employer shall be at liberty to pay the costs of such damages and to get the work done by other agencies, and deduct the amount expended from any moneys due or may become due to the contractor. Decision of Engineer and/or Employer in respect of adequacy of action to be taken in respect of such damages and in respect of expenses and costs towards such damages, shall be final.

j. After laying of drains/sewers and completion of construction in parts/in full, after testing for water tightness and after approval of Engineer to commence backfill, the excavation shall be refilled with utmost care to avoid all damages to works constructed, piping and other constructions, Backfill in haunches and upto 75cm. from the crown of piping laid, shall be done with fine selected earth, laid in 15cm. layers each layer being profusely watered and consolidated. The rest of the backfill shall be made, in similar manner, in 15cm, layers, watering and consolidating each layer, using excavates soil after keeping aside rubble, boulders, concrete lumps, etc. During backfilling timbering shall be removed or withdrawn gradually, carefully, in stages, so as to avoid damages. During the withdrawal timbering the same shall be extracted after the refilling is done, in a manner, ensuring that the sides of excavation are not left unsupported.

The contractor shall make his own arrangement at his own costs, for the removal of surplus and for its disposal at places as instructed by Engineer. In case the surplus is not required at site, the contractor shall make his own arrangements at his costs, for removal and dumping at nay place to be selected by him and approved in writing by Engineer. In case the site of disposal is located within the areas, belonging to the Employer or otherwise required by the employer to be filled and reclaimed, the contractor at his own cost make arrangements to fill up the same within surplus soil and

to level up the same at levels order by Engineer. The site of works shall be rendered tidy, clean, even and to original conditions by the contractor.

In the event of the surfacing materials excavated stacked and stored from the excavations, being insufficient to restore surfaces to original conditions, the contractor shall arrange to make up the deficiency with his own materials of identical quality, at his own costs. The contractor shall at his own cost replace all such surfacing or otherwise useful materials, removed/ excavated during the progress of works, land rendered unsuitable on faulty storage or worn out or damaged during the execution of works.

k. The contractor shall, at his own costs and charges, expeditiously, make good, during the complete period of works, any settlement that may occur in surface of roads, berms, footpaths, gardens, open spaces, public or private, caused by his excavations. He shall be liable for any accidents caused thereby. He shall, at his own costs and with his own materials, make good all damages to buildings, roads, gardens, footpaths, and surrounds as required by Engineer and Eomployer. If he fails to make good or to pay and satisfy the expenses of making good such works expeditiously, Engineer and/or employer shall be at liberty to get the work done by any other means, and expenses incurred and paid therefore, shall be recovered from any moneys due or that may become due to the contractor, in any other manner according to the laws of the land.

The rates for excavation shall be deemed to include operations described in V (a) to (k) above.

12.30. Laying and Jointing of Plain and Reinforced concrete pipe Drains.

a. Pipe shall be of class "A" and shall comply with related I.S specification for R.C.C spun pipes. Pipes shall be approved by Engineer in advance. R.C.C spun pipes shall be laid on concrete bed or cradles if specified in the schedule or otherwise directed by Engineer.

1 b. After laying concrete in bed or in cardles as require by Engineer the R.C.C spun pipes shall be lowered gradually and carefully into the trenches, in position. Extra earth shall be scooped and holes made for the collars, depending upon their locations, and length of pipes. Pipes shall be leveled properly so that they are in alignment and grade as required, and they rest on the bed at every point on alignment throughout the length. In cases where concrete bed and or cardles are used, the undersides of pipes shall be grouted with a thin slurry made out of cement mortar and a clean fine sand in the proportion of 1:3 of cement and sand, in order to ensure that the pipes laid and aligned previously rest at all points throughout their lengths.

2 c. The contractor shall take care to see that no dirt, earth or any other foreign matter is allowed over the cardles or concrete beds if provided. After alignment is completed, the contractor shall have the same checked by Engineer and then grouting if required shall proceed if the alignment and levels and gradients are found to be correct. Concrete bedding or cardles shall be cured for three days prior to commencement of laying of pipes. In case of any damages to bedding or cardles, the same shall be made good by repairs/replacement as directed by Engineer by the contractor at his own cost.

Joints shall be made with collars. Connecting space shall be minimum possible. Collars shall have a rough inside face to secure good grip. Adjacent pipe ends shall have concentric grooves or recesses and matching projections so that, the joint of pipes is fitted properly. Cement mortar in the proportion of 1:2 of cement and sand shall be placed in the concentric grooves or recesses and the pipes close-pushed. Cement mortar paste made in the proportion of 1:2 cement and fine sand would then be placed in between the ends of the pipes. Space between the pipe barrels and collars shall then be caulked thoroughly with cement mortar 1:2 made with fine sand. Every joint shall be finished off smooth, at an angle of 45 degree with the longitudinal axis of the pipe on

either sides of the collar. Curing then shall be carried out. Interior of the pipe shall be cleaned of all foreign, loose matter and dirt.

d. After joints are sufficiently cured, and when required by Engineer the pipe drains shall be tested under a head of at least 1:2m. of water above crown of pipes. A strong colour shall be added to the water for testing. Pipes shall also be tested for ingress of subsoil water into the drains. All testing shall be carried out as per Engineer's instructions. Any defective pipes shall be replaced or rendered water right as required by Engineer. All defective joints and leakages shall be made good by cutting out the joints and making them good again. Removal of all defects shall be carried out by the contractor at his own cost. Such joints where leakage persists after repairs shall be rendered water right by embedding the same completely with 1:2:4 cement concrete boxed to required dimensions, laid compacted and sufficiently cured prior to commencement or encasement works or backfilling. The pipe drains shall then be retested to required pressure to ensure their water rightness. The test shall be continued at least for one hour after the application of tests water head. All costs and expenses on account of testing, replacement of defective pipes, collars, joints, dismantling of joints recaulking and rejointing, placing 1:2:4 cement concrete at such joints as are persistently leaking and rejointing, placing 1:2:4 cement concrete at such joints as are persistently leaking and retesting the drains to the satisfaction of Engineer shall be borne by the contractor and shall be included in his rate for the item in contract:
e. If required, by Engineer and if ordered by Engineer in writing, specifying the locations, extent, methods and dimensions of bedding and /or encasement of pipe drains in plain cement concrete of specified proportions, the contractor shall carry out the same in a manner that would ensure proper protection to constructed work.

   Engineer shall have the power to eliminate, reduce, increase or alter the dimensions of the encasement. Rate of pipes shall include all operations (a) to (e) above.

12.31. Manholes and Chamber Etc.

a) The contractor shall build and construct various manholes/chambers etc. at locations and as shown on drawings or at places as directed by Engineer.
b) The floors shall be in cement concrete as per dimensions, thickness and proportions of concrete as detailed in drawings and as instructed by Engineer. Side walls shall be in masonry/concrete as given in drawings. Proper channel shall be formed across the manholes as instructed made with the use of concrete of given proportions and finished with workman like manner, so as to lead the effluent/storm water from one pipe to another without interruption to flow and without kinks, sharp bends. All pipe required for branch pipe drains shall be built into walls at inverts shown in drawings and as instructed by Engineer, when these pipes are to be built in masonry, the contractor shall provide relieving arches in order to prevent any undue load of pipes. All ladders, step irons shall be of such sizes and materials as required by Engineer and they shall be solidly built into walls as instructed by Engineer.
c) i) If Foundation and floors of manholes and chambers shall be in cement concrete, plain or reinforced, and of such dimension and depths as detailed in drawings or as otherwise instructed by Engineer laid at required levels.

   ii) Sides of manholes/chambers shall be in masonry or in concrete. When the sides are to be constructed in concrete relevant specifications of concrete, framework, aggregates, workmanship, mixing, placing, vibrating,

curing and finishing shall be followed.

b) All bricks to be used on construction of manholes/chambers shall be table moulded, of good quality, of a deep red colour, homogeneous in texture, free from flaws, cracks, stone, floats, nodules of lime and such other undesirable blemishes. Bricks shall have sharp edges and uniform size. Bricks shall not be stratified, overburnt, underburnt and soft. Bricks shall not absorb water more than 20% of their own weight, after 24 hours of immersion in water. The contractor shall get the bricks, he proposes to use, tested at an institution approved by Engineer at his own costs, and shall submit test reports to Engineer whenever asked for. Bricks shall be well soacked in water before use, till the bubbles cease to come up.

No half or quarter bricks shall be used except as horizontally placed closures. All bricks work shall be raised uniformly an in plumb. Joints of brick work shall be 10mm thick. Not more than 10 courses of bricks shall be raised in a day. All brick work shall proceed in lines, levels, in plumb and shall be raised uniformly so that no part of brick work is more than three feet above the level of any other part. All joints shall be thoroughly flushed with mortar at every course. Care shall be taken to see that bricks are properly placed and bedded and all joints fully filed in. All brick work shall be constructed with the use of cement mortar as stipulated in the schedule. All joints shall be raked clean to depth of 12mm. to receive plaster. All brick work shall be cured for seven days and shall be watered at least thrice a day. All piping, step irons supports for ladders, etc. shall be built into the brick work at approximate stages.

e) Sand and cement to be used for plaster shall be of the best quality and shall be approved by Engineer. Clean, sharp, siliceous and free from organic and inorganic impurities dust, clay and calcareous matter shall be washed taken for use and mixed with Portland cement in the specified proportions. Mixing shall be done on an approved hard standing and well sot platform. The materials shall be first dry mixed and then clean water shall be added to this mixture so as to bring the mortar mass to the required plastic condition. Use of excessive water shall be avoided. Use of mortar which has commenced setting partially, shall not be permitted. Such mortar shall be removed from site.

Surface to be plastered shall be soaked with sufficient water 24 hours in advanced. Joints shall be raked clean, to a depth of 12mm. Plaster shall be applied in two coats, for the required thickness. First coat shall be of thickness, enough to cover the unevenness of the brick work and shall be floated and well pressed on to the surfaces, and made rough to receive the next coat which shall be applied to make up for the required thickness, while the first coat is still raw. The second coat shall be well floated and firmly pressed to form an even true and plain surface. On completion of the second coat, a floating coat of about 8mm thick, of neat cement, while the second coat is raw, shall be given, traveled and floated and finished smooth.

External cement plaster shall be carried out using cement mortar in the proportion as given in schedule, and shall have the neat cement floating coat is specified. Plaster shall be cured for a period of not less than seven days to the satisfaction of Engineer Mortar fall on floor, during the process of plastering shall not be reemployed for use.

f. Channels inside the manholes and chambers shall be formed to shape sizes and inverts, in 1:2:4 p.c.c as shown on drawings. Width of the channels shall be to the full width of the pipes. Depths and slopes of the channels shall be as detailed in drawings. Where branch drains join in manholes/chambers, to the main channel, suitably curved channels of suitable widths, depths and inverts shall be made, with suitable slopes. All concrete, plain or reinforced, shall be carried out according to relevant specification for concrete.
Sharp bends, kinks, sharp edges, reent-rant angles, etc. shall be avoided. All the

manhole floor shall be suitably sloped to channels. All work in benching and channeling carried out inside manholes chambers shall be finally finished to required level, inverts, with a 8mm. thick floating coat of neat cement floated trowelled and finished smooth. Curing shall be continued at least for seven days.

g. Manhole/ chamber frames and covers shall be of the clear sizes and weights specified. They shall be of cast iron, best foundry metal, close grained, tough, without any flaws, blisters and all other casting defects. They shall be clean and accurately moulded, close fitted. They shall have smooth and even surfaces. Frames and covers, their sizes, weights and quality shall be approved by Engineer. All frames and covers, their sizes, weights and quality shall be approved by Engineer. All frames and covers shall be set to correct levels and alignment and shall be embedded in a layer of cement mortar of 1:2 proportion. All exposed surfaces of embedments shall be finished smooth with neat cement rendering. All frames and covers shall receive three coats of anti corrosive black bitumistic paint to be approved by Engineer.

All manholes shall be water right. To achieve this requirement, all internal surfaces of the manholes shall be neatly plastered, rendered smooth and the floating coat of neat cement 8mm, thick shall be worked to polished faces. Manholes shall be tested along with the pipe drains. During testing the external surfaces shall be checked for any visible signs of leakages. Any leakages found shall be corrected in a manner to be approved by Engineer. All expenses and costs incurred for the testing, inspection, corrective measures, and retesting to satisfaction of job requirements shall be borne by the contractors. On completion of the testing, the excavation shall be refilled and portions of drains between two adjacent manholes shall b e flooded with water. The manholes shall be examined from inside for any leakage into the manholes. If any such spots are observed, the same shall be redone in a manner to be approved by Engineer. Rate for manhole/ chambers shall include all operations (a) to (h) above.

12.32. Stone warepipe

a) S.W pipe shall be of the best quality stone ware, salt glazed thoroughly burn throughout the whole piece and thickness, free from air holes, fire blisters, cracks and other blemishes. They shall be of a close land even texture. They shall be of the manufacture approved by Engineer.

b) Pipes shall be properly stacked and protected against all damage, stacking and laying shall be done without inconvenience to public, traffic and other works, cracked pipes at barrels and / or sockets shall be rejected. All pipes shall be fitted on ground to ensure a close fittings, before lowering.
Barrels, spigots, sockets shall then be cleaned scrapped and brushed.
Pipes shall be carefully lowered by hand to the bottom and placed on the bottom of trench carefully.

c) Pipes shall be laid carefully, to be alignments, levels and gradients as given in drawings, care being taken to prevent any foreign matter, earth, sand and mortar entering into the pipes during laying. Pipes between manholes shall be laid to correct line and slopes without undulations, vertical or horizontal. All inverts shall be laid and fixed from the sight rails, with the help of boning rods. S.W pipes shall be laid, sockets facing up the gradient, beginning at the lower end up and all sockets laid to levels in the holes or scoops cut of the purpose. Each pipe shall be laid singly and brought upto the exact placement.

d) Jointing shall be commenced after the alignment is made, gradient and inverts checked by Engineer. A gasket of tarred hemp yarn shall be placed around the joint, between the annular space between the spigots and sockets and the same shall be inserted by suitable tools. Additional strands of yarn shall be

added if necessary and the yarn rammed home. The additional yarn shall be moistened to avoid aborption of water from cement mortar.

After full and complete caulking operations cement mortar in the proportion of 1:1 of cement and sand, or as otherwise specified in the schedule, shall be made in suitable small quantities and shall be packed with wooden caulking tools to fill up the annular space completely and fully. On finishing of caulking of cement mortar, each joint shall be struck off at 45^0 to the longitudinal axis of drain using the same mortar and finishing the joint with neat cement rendered smooth. Depths of sockets, yarn depths, mortar depths shall be as follows:

Depth of Depth of Depth of Dia of pipe Internal clear Socket Yard mortar

100 mm. 50 mm. 22 mm. 29 mm.

150 mm 57 mm. 29 mm. 29mm.

230 mm. 62 mm. 29 mm. 35 mm.

300 mm. 75 mm. 32 mm. 45 mm

Each joint shall be adequately cured by placing wet gunny bags or canvas, wrapped around the joints and kept wet continuously. After the joints are completed the pipe drain shall be tested, to a water head of 1.8m. in a manner to be approved by Engineer.

Testing shall be deemed to be satisfactory if the water level does not fall by more than 1.2m. in a length of 100m. of piping filed with water, to a head of 1.6m. kept standing for at least one hour. Upon application of test head, all joints shall be inspected for any leakages and leakages if any shall be corrected after the water is drained off. Final retest shall than be made. On satisfactory completion of testing, further works such as embedment, filling with selected fine earth, etc. shall proceed; after Engineer orders in writing to the contractor to do so.

Rate for pipes shall be inclusive of provision, laying, jointing and testing and all other operations detailed in (a) to (d) above.

Depths of manholes shall be measured from the top of the C.I. cover to the top of the foundation concrete. For the purposes of classification for payments on the basis of depths of 0.15 m. and above, shall be taken as 0.30m. and depths of 0.0 to 0.15m shall be taken as 0.0m.

13. ELECTRICAL INSTALATION / ILLUMINATION OF OFFICE BUILDING.

13.1. Internal Wiring

13.2. System of Wiring

The system of wiring shall consists of single core PVC insulated copper conductor wires shall confirm in all respects to relevant Indian Standard in polythene conduits concealed in the wall/roof and wherever required.

13.3 General

Laying of conduit/Polythese pipe

Prior to laying and fixing conduits, carefully examine the drawings indicating the layout of conduits about the sufficiency of the number and size of conduits, location of junction boxes, sizes and locations of switch boxes and other relevant details.

13.4. Drawing and conductors.

The drawings and jointing of 650/1100 volts grade single core PVC insulated copper wires of IS standard shall be executed with due regard to the following precautions. While drawings insulated wires into the conduit, care shall be taken to avoid scratches and link which cause breaking of conductor. There shall be no sharp bends. Insulation should be shaved off like sharpening of a pencil. Oxide inhibiting grease shall be applied at all terminal points. All the ends of wires and cables shall be properly soldered with ALCOPIN solder and CYRE soldering flux. Stands of wires and cables shall not be cut for connecting at terminals and only shall have flat ends. Conductor having nominal cross sectional area exceeding 10 sqm. shall always be providing with

cable sockets. At all bolted terminals, brass flat washers of large area and approved steel spring washers shall be used. Brass nuts and bolts shall be used for all connecting. No joints shall be done in the length of conductors. The minimum size and the copper conductor wires for all sub-circuit fan/light points shall be 1.5 sqm. or 3/22 swg. In case of power circuit no more than 2 nos. of power outlets shall be carried out with 6 sqm. PVC insulated copper conductor wires. All power outlets shall be provided with 2mm. dia OR 16swg. Copper earth wire.

Only certified wiremen and cable jointers shall be employed to do jointing work. All wires and cables shall bear the manufacture's label and shall be brought to site in new and original packages.

13.5. Connections.

All joints shall be fully water tight. Joints between conduit and iron clad distribution board and control gear shall be effected by means of conduit couplers in to each of which will be coupled by smooth PVC bushes from the inside of board or case.

Conduit system shall be erect and straight as far as possible. To avoid traps where water may accumulate from condensation, unless unavoidable, suitable provision for draining the water shall be made. Separate conduit shall be run for 15 Amps power outlet wiring. Connection between screws conduit and sheet metal boxes shall be by means of brass hexagon smooth brass buds inside the box and connected through a coupler to the conduit. The joints in conduits shall be free of burrs to avoid damage to insulation of conductors while pulling them through the conduits. All the panel Boards main distribution Boards which will not of concealed type should be connected with M.S. conduits shall be screwed metal to meal and be painted with one coat of self etching Zinc chromate primer and two coats of enamel paint. The threads and sockets shall be free from grease and oil. All other conduits which will be in open air should be M.S conduit instead of polythene pipe.

13.6. Projection.

To minimize condensation or sweating inside the conduit pipes, all outlets of conduits systems shall be adequately ventilated. All screwed and sockets connections shall be made fully water tight by use of proper joining compound. White lead shall be used for metal conduit.

13.7. Bunching of Wires.

Wires carrying current shall be so bunched in the conduit that the out going end return cables are drawn into the same conduit. Cables originating from two different phases shall not be run in the same conduit.

13.8. All joints shall be made at main switch, Distributions, socket outlets, lighting outlets and switch boxes only no. joints shall be made in conduits. Conductors shall be continuous from outlet to outlet. Joints where un avoidables, shall be made to conform to approved standards.

13.9. Balancing of circuits in three phase installation shall be planned before the commencement of wiring and shall be strictly adhered to. Colour code shall be maintained for the entire wiring installations. Red, Yellow, Blue for three phases, Black for newtral and green for earth.

13.10 Mains and submains.

Every mains and sub main shall be drawn into an independent adequately sized conduit. Adequately size of draw boxes shall be provided at convenient locations to facilitate easy drawing of the sub mains and main cable. An independent earth wire of proper rating shall be provided for every single phase sub main. The earth wire shall be fixed to conduit by means of suitable copper clips at not more than 30 cm. distance.

13.11. Switch-outlets and junctions boxes and inspection boxes.

All outlets for switch and other receptacles shall be equipped with rust proof outlet boxes of MS as called for, having external and internal surface true to finish. Outlet boxes for switch, socket and regulators shall be fabricated to approved sizes and shall have adequate number of knock out holes of required diameter and an earthing terminal screw and covered with approved white polycarbonate modular coverplates screwed to the box with brass counter sunk screws. Outlets exposed to the weather shall be fully water tight, complete with rubber gasket cover; glass where used shall be of heat resitant. Rust proof inspection boxes of coat iron and of required size, having smooth external and internal finish shall be provided to permit periodically inspection and to facilitate replacement of wires when required. The wall thickness of the boxes and spouts shall be of 2 mm. thick and depth of the boxes shall be 50mm.

13.12. Telephone and Inter com System

Conduits, junction Boxes, Draw boxes, outlet boxes and cover plates of all boxes for the telephone system shall be at least : 100mm. for boxes and 75mm. for the conduits. The telephone conduits/wiring shall be at least 300 mm. away from the electrical wiring. The

0.6 mm. thin core single strand copper conductor shall have no joints from the main distribution box/exchange to end outlets.

13.13. Switches, Receptacles and Fixtures.

13.13.1 All 5 amps, switches shall be enclosed type flush mounted switches of 250 V AC grade. All switches shall be fixed inside the switch boxes on adjustable M.S strips/plates with tapped holes and brass machine screws, leaving ample space at the back and sides for accommodating wires. Where two or more switches are installed together, they shall have gang plates, unless otherwise called for.

13.13.2. The plug sockets shall be erected approximately 450 mm above floor level, unless otherwise specified. The controlling switch shall be on the phase wire. The earth terminal of the socket shall be connected to the earth terminals provided inside the box by means of PVC insulated copper conductor earth wire.

13.13.3. The light fixtures and fans shall be assembled and installed in position complete and ready for service in accordance with the detailed drawings, manufacturer's instructions. Fixtures shall be suspended to alignment plumb level and cable resisting of all lateral and vertical forces and shall be fixed and as required. This shall be done at the appropriate stage of construction / civil work.

13.13.4. Exhaust fans, Air conditions, Geyzers, shall be fixed at the locations shown on the drawings. They shall be wires to plug sockets at a convenient location near the fixtures. Wires brought out form junction boxes shall be encased in all flexible pipes for connecting to fixtures concealed in suspended ceiling/finished wall.

13.13.5. All tube light fittings are of reputed make with ISI mark and shall be of box type fitting with acrylic sheet cover and all toilets and balconys shall be lighted with 2' x 20 w single box type fittings and all other placed of the area should be lighted (where tube light fittings shall be used) with 2 x 40 w box type fitting with acrylic cover and with all accessories including tube.

13.13.6. All 20 amps. Industrial sockets with starters shall be used to run the Air conditioner machines and 20 A Industrial socket shall be used in kitchen to energize electric cooking range this provision shall be made for future requirements with Conductor size 7/20 PVC insulated copper wire. No more than 2 nos. of this type of points shall be looped.

13.13.7. All 5 Amp/15 Amps. Plug points shall be of 5 in one type fixtures which shall be connected directly from BDB with 7/20 PVC insulated copper wire as power point. Maximum 2 nos. power points can be connected by looping.

13.13.8.ELCB/RCCB shall be used as preventive materials land only reputed Firm's materials with ISI marked materials shall be used and rating should be 63A Amps. 4 pole system with 10 MA accuracy with 30 Milli-seconds sensitivity.

13.13.9. BDB shall be used for proper distribution and MCBs shall be used in place of cutouts and all MCBs shall be of reputed make with ISI mark.

13.13.10.Junction Box, switch Box shall be made out form 2 mm. M.S sheet duly painted with 2 coats of anti corrosive metal primer with 3 coats of B.S gray spray paint. All knock holes should be properly pressed as the shape of the box should not be hampered during knocking out the time of fixing and connection.

13.14. Main distribution Board/Panel Board.

13.14.1.The distribution Board/Panel shall be suitable for operation on 3 phase/single phase 415/230 volts, 50hZ, neutral grounded at transformer and short circuit level not less that 31MVA at 415 volts and shall comply with the latest addition of relevant Indian Standards and Indian electricity rules and regulations. The distribution panel board shall be metal enclosed, sheet steel cubical, indoor, dead front, floor mounting type. The board shall be completely dust and vermin proof. Gaskets between all adjacent units and beneath all covers shall be used to render the joints dust proof. All doors and covers shall be duly gasketed with foam rubber and shall be lockable. All MS sheet used in the construction of panel board shall be 2mm. thick and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded and should be wiped smooth with plumber metal. Fixing screws shall be entered into holes topped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction and a base channel of 75mm x 75mm x 9mm. thick shall be provided at the bottom and back.

Knockout holes of appropriate size and number shall be provided in the board in conformity with the locations of incoming and outgoing cable and removal sheet steel plates shall be provided at top and bottom to drill holes for cable entry at site if required.

13.14.2. Bus Bar and Interconnections.

The Bus bar and interconnections shall be electrolytic copper and of rectangular cross sections suitable for full load current for phase bars and half rated currents for neutral bars and shall be extensible on either side. All bars and inter connections shall be insulated with insulation non adhesive tapes and colour coded. The bus bars shall be supported on unbreakable non-hygroscopic insulated supports at regular intervals to withstand the forces arising from short circuit in the system. All bus bars shall be provided in separate chambers and properly ventilated. All connections between bus bar and switches shall through solid copper strips of proper size to carry full rated current and insulated with non adhesive insulating tapes of colour coded.

13.14.3. Circuit compartment

Each switch fuse units shall be housed in separate compartments and shall be enclosed on all sides. Lockable doors shall be duly interlocked with the SFU in 'ON' and 'OFF' position.

13.14.4. Instrument compartment.

Separate and adequate compartment shall be provided for accommodating instruments, indicating lamps, control fuses etc. These shall be accessible for testing and maintenance without danger of accidental contract with live parts of SFU, Bus bar and connections.

13.14.5. Cable compartment

Cable compartment of adequate size shall be provided in the distribution panel board for easy termination of all incoming and outgoing cables entering from bottom. Adequate supports shall be provided in cable compartments to support cable.

13.14.6. Switch Fuse Unit.

The switch fuse units shall be 3 pole double break type and a separate neutral link shall be provided in the switch. SFUs shall be provided with hinged doors duly interlocked with operating mechanism, so as to prevent operating of the door when the switch is in 'ON' position and also to prevent closing of the switch when the door is not properly secured. Fuses shall be High Repturing capacity (HRC) fuse links and shall be in accordance with IS: 2208-1962 and having repturing capacity of not less than 31 MVA at 415 volts.

13.14.7.All sheet shall undergo a process of degreasing, pickling in acid, cold rinsing phosphating, passivating and then sprayed with a high currossive resistant primer. The finished treatment shall be by application of two coats of synthetic enamel paint of approved colour and stoved.

13.15. Earthing

13.16. Main earth shall be 50mm. diameter of heavy gauge wall thickness and 10' long and a copper plate of 12" x 12"x ¼" shall be attached vertically with the G.I pipe by Gas welding and nut and bold. The GI pipe shall be duly perforated with 10mm drill and distance shall be maintained 15cms. From hole to hole A 20gauge wire messed funnel shall be attached on the top of the pipe and all flange will not be used except 2 nos of saddle clamp with adjusting nut and bolt.

2 nos. of earthings shall be done in either sides of the funnel board at least 10' away from the wall of the main building and 12' part from each other and 2 nos. of no 4 copper wire shall be run separately from the panel board to earth electrode and also the 2 nos. of earth electrodes shall be interconnected with each other by No.4 copper wire.

A layer of 15cm. charcoal land a layer of 15cm. salt shall be laid 50cm. height from bottom of the earth electrodes to 180 cm (6 layers of charcoal and 6 layers of salt) in the earth pit. The earth pit shall be 50 cm x 50 cm x 10mtr. depth and refilled with charcole sand and balance in soft soil.

A No. 4 copper wire shall be connected from bottom of the electrode an another 4 copper wire shall be connected from the clamp to the panel board separately for each other. All the copper earth wire shall be connected with approved sized copper sockets duly bolted with brass washer and nut and bolt. The maximum earth resistance shall be 0.5hm. tested with 1000v earth 4 pole earth tester.

13.17. Cable.

13.17.1.MV cables of relevant Indian Standard Specifications and cable manufacture's instruction shall be laid and no joints shall be made except 2 terminals/end points. The cables shall be PVC insulted aluminum 4 core conductor armoured cable conforming to IS: 1554-1972 (Part-I) laid in trenches, ducts, cable trays or and underground as required or otherwise call for. All cables shall be inspected upon receipt at site and checked for any damage.

13.17.2 Cable shall be laid by skilled and licensed workman using adequate rollers to minimize stretching of the cable. Great core shall be exercised in laying cable to avoid forming kinks. Cable shall be laid at a depth of 0.75. mtrs. Below ground level. A cusion of sand not less than 0.8 mtrs. shall be provided both above and below the cables. Cable shall not be laid in the same trench or alongside a wter main. The cable shall be protected by bricks on the top layer of the sand in the full length of the underground cables and distribution cables shall be laid inside the GI pipes duly clamped with G.I saddles and required bends as required. Prior to laying the cable it shall be duly inspected and tested for insulation test, continuity test and high voltage test.

13.18 Two nos. of lightening arrestors shall be installed at the highest level of the building to prevent the electrical as well as the entire building from damage, due to lightening, The sensitivity of the arrestor shall be 31 MV of 415 V grade as per IS specification.

13.19. Change over switch

13.19.1. One no of 4 pole change over switch of required rated current with high ruptured current fuses shall be installed near panel board to operate D.G sets when required.

13.20. List of main materials and points and makes

G.L.S Lamp/Decorative light point. Ceiling light	Philips, Crompton Graves
2'20 W tube light fittings (box type with cover)	Philips, Crompton Graves
s x 40 w 4' Tube light fittings (box type with cover)	Philips, Crompton Graves
Switch Board with 5A Socket.	Reputed firms as per IS and duly approved & inspected by company representative.
5/15 Amps (5 in one type)switch socket combined	-do-
Ceiling Fan	Usha
Exhaust fan	Crompton Graves
Large Decorative light	Philips, Crompton Graves
20 AMP, industrial plug socket with starter,BDB with main switch (MCB shall be fixed in place of cutout)	
Air conditioner	Cosmos
150 watt SV lamp comble fitting	Philips, Crompton Graves
Gizzer	Crompton Graves
ELCB or RCCB	Reputed firms as per IS and duly approved & inspected by company representative.
Pannel board & changeover	-do-
Earthing 2" x 10" with earth plate cable	-do-
Polythene pipe conduit, M.s conduit	Universal

14.21. Distribution of System.

3 phase distribution system shall be so distributed that the lighting system should not be affected by the power lines due to high current draining at the time of starting of Air Conditioner or any power systems. Hence this system shall be distributed like all light, fan and 5A plug points loads to be connected with 'RED' phase and 'YELLOW' phase shall be connected with Air conditioner and kitchen room. YELLOW phase shall be connected with Air conditioners and Gyzers and 'BLUE' phase shall be connected with Air conditioners and kitchen room. YELLOW and BLUE phases are properly balanced by calculating load.

14.22. List of I.S codes for Electrical Installations.

1. Electrical wiring installation (system voltage not exceeding 650 v) IS: 732-1963 2
2. Graphical symbols used in Electrotehcnology. Part-II
   Electrical installation in building 2032-1969
   3. P.V.C Insulted cables 694-1964
   4. P.V.C Insulted cables (heavy duty) 1554-1964

Contractor Senior Manager (Civil)

5.	5A Flush Switches	1987
6.	15A Flush Switches	2120
7	3 pin plugs and sockets	2193
8	Aluminium conductors for insulated cables	1753-1967
9	Recommended current ratings for cables	3961-1967
10	Installation and maintenance of paper insulated power cables	1255-1967
11	Earthing	3043-1967
12	Rigid steel conduits for electrical wiring	1653-1964
13	Fittings for conduits for electrical wiring	2067-1964
14	AC circuit breakers.	2516-1972 (and BS 3659)
15	AC isolators and earthing switches	1818-1972
16	General requirements for switch gear and control gear for voltage not exceeding 1000 v.	4237-1967
17	Installation and maintenance of switch gear.	3073-1965
18	Enclosed distribution fuse boards and cutouts for voltage 1000v.	2675-1964
19	Selection, installtion & maintenance of fuses (voltage not exceeding 650 v)	3106
20	General and safety requirements for electrical lighting fitting	1913-1969
21	Lighting public through fares.	1944-1970
22	Waterproof electric lighting fares.	3528-1966
23	Water right electric lighting fitting	3553-1966
24	Luminaries for street lighting	2149-1970
25	Ceiling fans.	374-1951

TECHNICAL SPECIFICATION OF CIVIL PORTION OF WORK

Materials of following specification are to be used in work. The Tenderer are expected to possess and be well conversant with the following IS standard and code of practice.

1. Cement Will be as per I.S. 269/455 (However the grade of cement to be selected by the Engineer-in-Charge of work and complex cube test before commencement of work in each batch).
2. Steel I.S. 2062 and IS: 1786 (SAIL / TATAMake)
3. Vibrator I.S. 7246
4. Aggregate I.S. 383, I.S. 515
5. Water for mixing and curing Shall be clean, free from injurious amount of oil, salt, acid, vegetable materials and other substances and harmful to concrete in conformity to I.S. 456 and I.S. 3025.
6. Sand / Fine Aggregate I.S. 2116, 383
7. Binding wire I.S. 280 (galvanised minimum 1 mm)

8. Rain water pipe I.S. 2527

9. Construction joints I.S. 3414

10. Steel Window Frame I.S. 1038/83

11. Steel Door Frame I.S. 4351/75

12. Fitting & Fixtures for journeyworks Conforming to I.S. 7452/82 strictly conform to I.S. specification and as per direction of Engineer-in-Charge.

Note : For road work (Approach Road) specification as per road and bridges (latest edition) published by

I.R.C & M.O.R.T..&.H. shall be followed. In case of any doubt and absence of provision, regarding specification I.S. shall be referred (Indian standard).

ITEM OF WORK

1. Concrete shall be with conformity to I.S.456.
2. Foundation shall be with conformity to I.S.1080.
3. Stone masonry (R.R.) shall be with conformity to I.S.1597 (Part-I)
4. C.R. Masonry shall be with conformity to I.S.1597.
5. Brick masonry shall be with conformity to I.S.2212.
6. Cement plastering shall be with conformity to I.S.9103 & 6925.
7. Mortar shall be with conformity to I.S.2250
8. White and colour washing shall be with conformity to I.S.6278.
9. CC in foundation shall be with conformity to I.S.2571.
10. Anti-Termite Treatment shall be with conformity to I.S.6813. (Part – I & Part – II)
11. Painting to all surfaces shall be with conformity to I.S.2395 (Part – I & Part – II)
12. DPC shall be with conformity to I.S.3067
13. Tarfelt treatment shall be with conformity to I.S.1346
14. Mosaic flooring with conformity to I.S.2114
15. Steel painting shall be with conformity to I.S.1477 (Part – I & Part – II) I.S.1661

C O D E S (ELECTRICAL)

Codes shall mean the following including the latest ascendants and / or replacement if any.

a) Indian Boiler Act, 1923 and Rules and Regulations made their under

b) Indian Electricity Act, 1923 and Rules and Regulations made there under

c) Indian Factories Act, 1948 and Rules and Regulations made there under

d) The minimum wages Act

e) The Women's Compensation Act

f) The Payment of Wages Act

g) The Fatal Accident Act

h) The Industrial Employment Act

i) The Employment provident Fund Act

j) Indian Explosive Act 1984 the Rules and Regulations made there under

k) Indian Petroleum Act 1934, and Rules and Regulations made there under

l) A.S.M.E. Test Codes

m) AIRE Test, Codes

n) American Society of Materials Testing Codes

o) Standards of the Indian Standards Institution

1) Low Tension Circuit Breakers : IS 2516-1955 Part I Sec.1

2) Switchgear Bus Bars IS 375-1963

3) HRC fuse links IS 2208-1962

4) Distribution fuse boards IS2675-1966

5) Enclosure for Low Voltage switchgear IS214701962

6) PVC Cables IS1554-1975

7) Tabular fluorescent lamps for Cameral lighting service IS2418-1963

8) Tungsten Filament Lamps for cameral service IS415-1963

9) Ceiling Fans IS274-1966

10) Flood lights IS1947-1961

11) Wall Glass flame-proof electric light fittings IS2206-1962 (Part 1)

12) Water Tight Electric Light Fittings IS3553-1956

13) Steel Boxes for Enclosure of Electrical Accessories IS5133-1969

14) Fittings for Rigid Steel conduit IS2667-1979

15) Rigid steel circuits for electrical wiring IS3837-1966

16) Accessories for Rigid Steel Conduits for Electrical Wiring IS3837-1966

17) Switch Socket Outlets IS3837-1966

18) PVC Wiring IS694-1977

19) Switches for domestic and similar purpose IS3854-1966

20) PVC wiring IS694-1977

21) Call Bell and Buzzers IS2268-1966

22) Straight through joint boxes and leads sleeves or

paper insulated cables- EID-0032-1964

23) Earthing IS3043-1966

24) Electrical Wiring installations IS732-1963

25) Switchgear IS3072-1965(Part I)

26) Lighting protection IS2309 –1969

27) Public Address system IS1882-1962

28) Low Tension switch use units IS4064-1978

29) Code of Practice for Automatic FIRE ALAM system IS2189-1970

30) Specification for Heat Sensitive Fire Detectors IS2175-1977

31) Guide for Safety procedure in Electric work IS5216-1969

32) Rubber Mats for Electric works IS5424-1969

p) Other internationally approved standards and / or Rules and Regulations touching the subject matter of the contract

TECHNICAL SPECIFICATIONS OF P.H. PORTION OF WORK

1. WATER SUPPLY & SANITARY INSTALLATIONS :

Materials of following standard manufacturers are to be used in the work. The contractor shall indicate, in the offer, the brand or make of the materials, for which the rates are quoted.

2. Sanitary fixtures :

To be of best quality vitreous ware of porcelain.

3. Indian water closet

(i) Foot Rests

4. Wash Hand Basin

(i) Kitchen Sink Hindware/Parry

(ii) Urinals Ware / Neycer/ ISI marked

(iii) Drain Board

(iv) Orissa Closet

(v) European Water Closet &

(a) Low Level Flushing Cistern.

(b) C.I. High Level Flushing Cisterns : Sushila Industries Prabhat Iron Foundry/

East India Steel / I.S.I. marked. "

(c) H.C.I. Soil Waste Pipes: Confirming to I.S.I. 1729-1954, having

I.S.I.Mark.

(d) C.P. Bath Room Fittings: Plaza/ / Jaquar I.S.I. marked &

confirming to-latest ISS

(e) Brass Fittings : Shakti/Anupama /Luster/1.S.I.Marked.

(f) Gunmetal Valves : Anupama / Leader / B.S.I.S.l. marked.

(g) G.I. Pipes (Medium Class): Manufactured by TATA / JINDAL / B.ST.

having I.S.I. Mark.

(h) Galvanised Iron fittings : I.S.I. marked C/R brand.

Contractor Senior Manager (Civil)

(i) Paints: Asian / Berger / Jonson/Confirming to l.S.S

(j) Cast Iron Manhole cover frame: Sushila Industries / Prabhat Iron Foundry /

East India Steel make confirming to l.S.S. 7.26

(k) Stone Ware Pipes & Fittings : Manufactured by Orissa Ceramic Industries

/ Orissa industries / Keshab Ceramic confirming to I.S.S. Specification No.651 /

1980 {Grade A)

(I) P.V.C. (S.W.R.) & Manufactured by the Supreme Industries P.V.C (Rigid.) Pipe/Fittings: Ltd., Bombay / Oriplast, Balasore Duroplastconfirming to I.S. Specification No. 4985/81

(Class IV)

(**B) BUILDING MATERIALS:**

(a) Bricks:

Bricks shall be of locally available best quality kiln burnt. Bricks shall be well burnt, uniform deep red,

cherry or copper colored, free from cracks and flows, well shaped, uniform in size,

homogeneous in textures and shall omit a clear metallic sound when struck, bricks shall have a

minimum crushing strength 75 Kg/Cm2 and shall not absorb water more than 20% by weight.

(b) Cement Mortar:

Mortar shall be well mixed to a uniform colour and consisting in the proportion as specified in the items of work. Sand shall be measured on the basis of its dry volume and the quantity shall be adjusted for bulking of damp sand. Cement shall be mixed, taking 50 kg. Or 0.035 Cum. In volume only required quantity that can be consumed within 30 minutes of adding water shall be mixed at one time.

(c) Cement:

Cement should confirm to IS-269/IS-455.

(d) Sand:

Locally available best river sand medium size.

4. Course Aggregates:

The course aggregate shall be of hard granite stone and shall generally confirm to I.S. 389. Porous Course aggregate shall not be used. The aggregate shall be free from clay films and other adherent coatings. Aggregate containing clay films over the stone materials shall be thoroughly washed. The aggregate shall be from approved quarry and crusher broken. Course aggregates shall be composed of particles ranging between the sizes 2.36 to the maximum size as may be specified in the relevant item of work, within the range, the aggregates shall be well graded soas to produce a dense concrete.

5. Reinforcements:

Mild steel Round Bars, coild twisted and deformed bars of steel of medium tensile strength will be used as reinforcement as per drawing and design and directions. Mild steel bars shall confirm to I.S.;226/1962 standard quality or IS:432/1966 – Grade-l. Black annealed wire (Not thinner than 24 gauge for tying the reinforcements shall be used).

TECHNICAL SPECIFICATION FOR SANITARY & PLUMBING WORKS

(A) Sanitary ware & allied fittings :

1. General:

All Sanitary fixtures and their allied fittings, should be of first quality, manufactured by Hindustan Sanitary Ware / Parryware / Nycer, These should be approved by the Engineer-in-charge of the G.P.H. Wing before use.

6. Squatting Pattern W.C. (pan) (Orissa Pattern Closets):

The water closet shall be of vitreous China of specified size and pattern, with an integral flushing rim. It shall have the flushing inlet at the back. The Orissa closet should be of approved quality confirming to I.S.S.-2656 (Part-Ill).The squatting type Indian Water Closet (Orissa Closet) shall be sunk in floor sloped towards the pan in a workmanship like manner. The closet shall be fixed on a proper cement concrete base of 1.3.6 proportion, taking care that the cushion is uniform and even, without closet, to receive the specified thickness of the floor finishing. The joint between the Closet and the P.V.C. (S.W.R) trap shall be made with W.C. ring and rubber lubricant and shall be leak proof.

7. Flushing Cistern:

The flushing of the Indian water closet (Orissa Closet) shall be done by C.I. or Polyaterine High Level low level porcelain valve-less uried d flushing cistern of approved brand and quality I.S.I. Marked and capacity as specified. The connection between the cistern and water closet shall be made by 32 dia O.l. flush pipe, made from G.I. Pipe (Light Quality) or 32 dia P.V.C, Pipe as specified in the tender schedule. The flush pipe with an offset should be fixed to wall by using C.I. Holder Bat Clamps. The capacity of the cistern should be 10 Ltrs. As per I.S.S. 15 Ltrs. In case of low-level cisterns. The Cistern shall be fixed on cast Iron or Rolled Steel Cantiliver Brakets (Bulltin type), which shall be firmly embedded in the wall, with C.C. 1.2.4. The Cistern shall be provided with 20mm dia P.V.C. Overflow Pipe with fittings, which shall terminate into mosquito proof coupling secured in a manner that will permit it to be readily cleaned or renewed. The 32mm dia Flush Pipe shall be connected to the Water Closet by means of approved type joint. The Flush Pipe shall be fixed to wall by using C.I. Holder Bat Clamps. The bend and the Offset as required in the Flush pipe shall be made cold. The inside of the Cistern shall be painted with two coats of approved black bitumen paint. The Outer face of the Cistern, Brackets Overflow pipe and Flush Pipe etc., shall be painted with two coats of any synthetic enamel paint of approved shade and make, over a coat of priming. The cost of the rate quoted for the flushing cistern. The inlet connection to the Cistern shall be made with 450 mm 1 cmg 15 mm dia P.V.C. Heavy type connection Pipe.

8. Wash Hand Basin :

The Wash Hand Basin shall be of the White Vitreous China of approved quality, make and brand I.S.I, marked. It shall be one-piece construction with an integral combined overflow. The size of the basin shall be as specified. Each basin shall be provided with one 15 mm dia C.R Brass Pillar Tap, 32mm dia C.R Waste, C.R. Chain and Rubber Plug, Unions, Joints, C.P Bottletrap cast complete in all respects of approved quality. The Basin shall be supported on a pair of R.S. or C.I. Cantilever brackets (built in type) embedded and fixed in wall with cement concrete, 1.2.4. These brackets shall be painted to the required shade with two coats of approved synthetic enamel paint over a coat of priming. The waste of the Basin shall discharge into a floor trap or Channel through bottle traps as specified. One 32mm dia C.P. Bottle Trap is to be fixed to the Waste of the Basin & the outlet of the bottle trap is to be connected to the waste pipe to discharge the waste to the Pipe, to discharge the waste to the aforesaid floor trap. The inlet connection to the Basin shall be made with 450mm Long 15mm dia Heavy type P.V.C. connection pipe.

9. Kitchen Sink:

Unless otherwise mentioned the Kitchen Sink and drain board (if used) shall be of white Vitreous China or fire clay as specified and approved quality, make a brand, confirming to T.S.S, It shall be of one piece construction with integral combined overflow. The size of the sink and Drain Board shall be as specified. Each Sink shall be provided with one 15mm dia C.P. brass, Bib Cock, long body, 40mm C.P. Waste with overflow C.P. Chain & Rubber Plug, unions etc., complete in all respects as specified and of approved quality. The sink shall be supported on a pair of M.S. or C.I. Cantilever Brackets (Built in type) embedded or fixed in position in the wall by Cement Concrete 1.2.4. The brackets shall be painted to required shade with two coats of approved synthetic enamel paint over a coat of priming. The waste should discharge into a floor Trap or Channel. The waste pipe should be 40mm dia P.V.C. Pipe jointed to the waste of the Sink with a Brass union nut.

10. Standing Urinals :

The Urinals shall be flat pattern lipped front basin of required dimension of White Vitreous China and one piece construction with internal flushing box rim of an approved make and brand as specified. It shall be fixed in the position by*using wooden plug embedded in the wall with screws of proper size. Each Urinal shall be connected to a 40mm dia RV.C. Waste Pipe, which shall discharge into a channel of floor trap. The lip of Urinals shall be kept at 525mm from floor level, while fixing the Urinal on wall.Where no. Of Urinals are fixed in a line, the distance between the centre to centre of each Urinal shall be kept 750mm. And each Urinal should be separated from one to other by a partition plate. The centre to centre of partition plates shall be kept 750mm apart. The partition plate shall be of one-piece25mm thick marble plates, cut to size and front corners rounded. The partition plates shall be embedded in wall with cement concrete and finished smooth. The bottom of the partition plate should be kept 350mm above floor level and top should be kept at 1250mm above floor level. The plates should project 600mm from wall surface. The width of the plates to be embedded inside the wall should not be less than 100mm. The thickness of the plates shall be minimum 25mm. For flushing the Urinals each Urinals shall be connected with one 20mm dia G.I. Pipe (Medium Class), One of this pipe shall be inserted into the inlet of the Urinal and jointed with Jute and putty where as the other end is connected either with a Tee or Bend with the 25mm dia size Water Pipe Line fixed on the wall horizontal above the Urinals. In each 20mm dia flush pipe one 20mm dia cum-metal Gate value, the water will flow to thermal of Urinal through the inlet pipe and flush the Urinal. After flush, the valve can be closed to avoid wastage of water. One 40mm dia P.V.C. Waste Pipe shall be connected to the waste of each Urinal, to discharge the Waste into the Channel of Trap. One end of this Waste pipe shall be made a cup size to fit into the projected waste and tightened with screws.

11. Squatting Urinal Plates :

The Urinal Plates shall be of White Glazed Vitreous China with integral flushing rim of size 450 X 350mm of approved make and brand as specified. There shall be white vitreous channel with stop and outlet pieces in front. These plates shall be fixed on C.C. at 75mm to 100mm above floor level. For flushing arrangement, one 25mm dia G.I. Common Water Pipeline (minimum size) shall be fixed on the wall parallel to floor. For each urinal one 20mm dia G.I. Branch Pipe shall be taken down up to t200mm from floor level just at the centre of each plate, in which one 20mm dia Gate Valves is fixed at 350mm above floor level. At 1200mm height, the 20mm dia flush pipe shall be divided into two branches shall be taken downward and connected to the inlets of the urinals plate at floor level. By operating the valve as above, the water will rush into the rims of the urinal plate and flush it. Where there are number of urinals fixed in a line, each urinal should be separated by a partition plate fixed in the centre of two urinal plates. The centre-to-centre distance of the partition plates shall be kept 750mm.The partition plates shall be of one-piece marble plate, 25mm thick, cut to sizes and front corners rounded. The plates are to be embedded in wall with cement concrete and finished smooth. The bottom of the partition plates shall be kept flushed to urinal top level and the top level of partition plate shall be kept at 1200mm from

the urinal plate top and the projection from the wall shall be 600mm. The width of the plate to be embedded inside the wall should not be less than 100mm.

(B) Soil and waste pipes and fittings

12. H.C.I. Pipe Fittings

The Cast iron Soil, Waste and design pipes (spigot & socket joints) shall be of make and brand as specified (under specification of materials), confirming to I.S.S. 3989-1970 and ISI marked with approved clamps are to be used. The pipes and fittings shall be free from cracks, laps, pinholes, and other imperfection and carefully cited. The access door fittings shall be designed and made so as to avoid dead space in which filth may accumulate and door shall be provided with 3mm thick rubber insertion packing when closed and bolted.

WEIGHT OF HCI PIPES

2. **Dia of Pipe in mm Thickness in mm Length of pipe & width piece**

1.8mtr. D/s 1.8mtr. 50 mm 5mm 16.00kg.
15.00kg.
75 mm 5mm. 13.83kg.
16.52kg.
100 mm 8mm 24.00kg.
22.00kg.
150mm 8mm 26.70kg.
31.82kg.
Tolerance 10%

3. The jointing should be done with pig lead confirming to I.S. 782-1966 – grade 99.94.The spigot and of Pipes and Fittings should enter into the socket end. The annular space shall be packed with spun yarn gasket, compacted so as to leave a depth for receiving required quantity of lead in a continuous pouring from ladder. After pouring lead in the joints in full, caulking is to be done three times round with the caulking chisels, so that the joints may be sealed with lead. The depth of lead in a point should be 35mm and the rest depth of the joint should be packed with spun yarn Gasket.

4. Requirement of lead and Gasket cement for jointing H.C.I. Pipes (Each Joint)

Dia of pipe in mm. Lead in kg. Gasket in kg. Cement kg.

(same for lead & cement joint)

1001.2kg. 0.13kg. 0.12kg.

500.36 kg. 0.06 kg. 0.06 kg.

5. The inside of the pipes and fittings shall be well coated with special tar or bitumen solution of approved quality. Where the pipe and fittings are laid below the ground, the outer surface of the pipes and fittings shall also to be painted with two coats of black anticorrosive paint of approved quality. On completion of the work, the exposed pipes and fittings are to be painted with two coats of synthetic enamel paint of approved colour & quality over a coat of red oxide primer. The cost of paint should includein the rates.

6. Soil pipes for ventilation Is to be connected to the sewer at its floor and without a trap and be carried to such a height, at least above roof level, to prevent damage to health by commission of foul air, The pipe shall terminate as open and protected by a cowl.

7. The waste water pipe shall be connected with the nearest yard gully or a surface drain.

8. The traps should be of hard cast iron and should have a water seal at least 50mm deep.

9. All the soil and waste pipes and fittings, after laid and fixed shall be smoke tested, to the entire, satisfaction

of the Engineer-in-charge. The Cost of testing is to be included in the offer. For smoke-test the materials usually burat greases cotton waste, which gives out a clear pungent smoke, which is easily detected by sight and small. Smoke shall be pumped to the drains from the lower end from a smoke machine, which consists of lower, and burner.

(e) P.V.C (S.W.R.) & P.V.C. (Rigid) Pipes & Fittings

9.01 The P.V.C. (S.W.R.) and P.V.C. (Rigid), soil Waste & Vant Pipes (Spigot & Socket, & couples joints), shall be of make & brand as specified (Under Specification of materials) confirming to I.S.S., B.S.S. & DIN are tube used.

The main specification of P.V.C. Soil & Waste pipes and fitting are as below.

a) Materials – Un-plasticised Poly Vinyl-Chloride (UPVC).

b) Colour - Grey

c) Dimensions -

(i)Diameter - Fittings - 75mm/110mm/63mm & 63mm.

Pipes - 75mm, 110mm, on lengths of 3.or 6 mtr.

d) Wall thickness - Fittings – Minimum 3.2mm at any port.

Pipes - As per application

For Rainwater - 75mrn-1.8. to 2.2.mm, 11 Omm-2.5. to 3mm

Waste & Soil - 75mm -1.8 to 2.2mm, 110mm -2.5 to 3 mm,

63mm – Underground drainage with

light/NIL Traffics - 110mm – 2.5 to 3mm

Light/Nil in Heavy traffic - 110mm 3.7 to 4.3mm

e) Standard Confirming to Attributes Confirms to Standard No.

i) Fittings & Wall B.S.4514, DIN 10531

Thickness - DIN 19534 I.S.7834 – PVC (Rigid)

ii) Pipe Wall thickness - IS 4905

iii) Rubber ring - IS 5382

iv) Fitting dimensions - DIN 19531 – P.V.C.,

DIN 19534-S.W.R.

IS – 7834 V.C. (Rigid)

v) Pipe Dimensions - IS 4985

(a) Laying instructions & Jointing Procedure

a-1 Jointing of P.V.C. (S.W.R.) Pipes & Fittings

Clean the outside of the pipes spigot and the inside of the sealing groove of the fitting. Apply the rubber lubricant, to the spigot end, sealing ring and pass the spigot end into the socket, containing sealing ring, until fully homed. Mark and position of the Socket edge with pencil on the pipe, then withdraw the pipe from the socket by approx. 10mm towards thermal expansion gap.

a-2. Fixing of the Pipes and fittings on wall surface.

P.V.C. pipes both (S.W.R.) & (Rigid), fixed on wall surface, are to be supported by P.V.C. pipe clips, specially made for these pipes, with horizontal runs, the pipe clips should be spaced at intervals of more than 10 times the outside diameter of the pines. In vertical lines the clips are to be spaced at intervals of one meter to a maximum of two metres according to pipe diameter. •

a-3 Jointing of P.V.C. (Right) Pipe Fittings

Clean the Outside of the pipes and inside of the socket of a fitting of the inside of the couplers (where 2 plain ended pipes are jointed) of. Apply solvent cement solution, evenly and smoothly on the outer surface of the pipe end and inside surface of either the coupler of the socket and pass the pipe end into the socket of the fittings. Up to full depth of socket. In case of jointing 2 plain-ended pipes 1st. Push the coupler up to half depth on the end of one pipe and the outer half of the coupler should be pushed to the end of other pipe and thus, both pipes are jointed.

a.4 Fixing of P.V.C. pipes and Fittings through holes of Walls or Chajja of roofs etc.

The Walt/concrete slots should allow for a stress free installation, Pipes and fittings to be inserted into the slots, without a cement base, have to be applied first with a thin coat of P.V.C. Solvent cement, followed by sprinkling of dry sand (medium size). Allow it to dry. This process gives a sound base for cement concrete fixation, around the pipes/fittings while mending the damages.

a-5 Anti syphonage Pipes

All the antisyphonage pipes and fittings to be used are of 63mm. If these are not available under the items of P.V.C. (S.W.R.) materials, 63mm pipes and fittings, manufactured under P.V.C.(right) materials can be used, since the raw materials for both is same.

a-6 All traps should have a minimum water seal of 50mm as per I.S. 5329 and IS 2556 (Part XIII). Where antisyphonage connection is required, the traps to be supplied and used should have a 50mm antisyphonage gent horn on the outlet side. All the Traps used with the closets, should be of the size 125mm X 110mm i.e. Inlet (Socket end) of 125mm & outlet (spirot end) of 110mm only.

a-7 Installation of Water Closet

Determine the correct Location of the P/S Trap & set on a firm base, relative to the floor finish by pouring concrete on a slab. Bedding can be carried out by pouring concrete around the trap, ensuring that the traps outlet is left clear of concrete. Place the W.C. Connector ring to the socketed end of 125/110mm R/S

trap. Apply rubber lubricant on W.C. Connector ring as well as outer side of water closet (connection point) and now complete the joint by pushing the W.C. to home of 125rnm socket of the trap.

a-8 P.V.C. (Rigid) Pipes and Fittings

63mm (O.D.) P.V.C. Pipes to be used for these work either in antisyphonage system or else where, should be of "Quick Fit" Pipes Class 2 (4kg. F/Cm2), Quick Fit, Pipes have one and socketted.

The P.V.C. (Rigid) fittings, such as 63mm elbow, 63mm equal Tees 110mm x 63mm reducer etc. Used in the work, should be of injection-moulded fittings.

a-9 One –'jointing rubber ring will be available, with each P.V.C. (S.W.R.) pipe and fitting and hence, the cost of therein will not be added in the joint.

149. Measurement

All pipes shall be measured not/length as laid or fixed and shall be measured over all fittings such as bends, junctions, traps etc. The length shall be taken along the counter line of the pipes and fittings. Fittings will be counted extra over.

11. Before fixing and painting, the pipe shall be tested hydraulically to pressure Q.4Kg/Cm2 for pipes under I.S.- 1729/1964 and at a pressure 0.7 Kg/Cm2 for pipes under I.S. 3989-1970 without showing any sign of leakage, sweating of or her defect of any kind. The pressure should be applied internally and shall be maintained for not less than 15 seconds.

(c) Water Supply Pipes and Fittings :

1. Materials.

All galvanised Iron Pipes are to be of mild steel continuous welded, screwed tubes, medium quality confirming to I.S.S. and bearing ISI Marks manufactured by reputed Firms and approved brands as specified. The pipes shall confirm to LS.1239 (Part-!) -1975.

All G.I. Fittings shall be of 'R' Brand manufactured by M/s. R.M. Engineering Ltd., Ahemadabad and 'C' brand manufactured by Present Engineering works or equivalent best quality.

150. Laying of Pipes- The layout of the mains and service pipe set etc., will be done in accordance with the drawings. The contractor is to mark out the exact position of the pipes and fittings at site and take approval of the Engineer In-charge, before taking up the work.

151. Where the Pipes are laid, underground these must not be laid less than 450mm below ground level and coated with one coat of approved black bituminous paint. For laying the G.I. pipes and fittings below ground level, the width and the depth of the trenches for different dimensions for the pipes shall be given as below :

Dla of Pipe Width of Trench Depth of Trench

15mm to 50 mm 300 mm 600 mm

65mm to 100mm 450 mm 750 mm

The pipes shall be laid on a layer of 75mm thick sand and filled up with sand up to 75mm above pipes and the remaining portion of the trench shall then be filled up with proper ramming as described in "Excavation and refilling". The surplus earth shall be disposed of as directed. Thrust or anchor blocks of cement concrete 1.2.4 in hard granite chips shall be constructed on all bends or branches to transmit the hydraulic pressure without impairing the ground and spreading it over a sufficient area. Pipes shall not be laid to pass through manholes, catchpit, drain, where, it is unavoidable the pipes shall be carried in sleeve pipe of M.S./G.I., as approved by the Engineer-in-charge. The rate should include such a situation.

152. Where Pipes run along walls, the same are to be fixed to the wall with holder bat clamps /M.S. Hooks as below:

Dia of pipe in mm 15 20 25 32 40 50

Horizontal line 2m 2.50m 2.50m 2.50m 3m 3m

Vertical line 2.5m 3m 3m 3m 3.5m 3.5m

Where the pipes are passing through the R.C.C. / Masonry wall / Column / beam or pillars, these must pass through the appropriate higher sizes of C.I/G.I Sleeve Pipes and are to be included in the rates. In case the pipes are embedded in walls and floors it should be painted with one coat of anticorrosive paint of approved quality. ,

All pipes should be fixed horizontal and vertical. For taking the pipes through the walls and floors & roof slabs etc. The holes shall be made by filling with chisels or jumper and not by

dlsmentling the brickwork or concrete. After fixing, the holes shall be made good with cement concrete 1:2:4 and properly finished with

C. Plaster 1.4 to match the adjacent surface.

Union Nuts are to be provided in each of the vertical riser or drop on and from G.l. Tank and near the Valve and as and where necessary. The long screw fittings of 3 mtrs. For long horizontal lines and inside the lavatory / Kitchen etc.

5. After laying and jointing the pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking pipes should be removed and replaced without extra cost. The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg/Cm2. The test pressure should maintain without loss of for at least half an hour.

6. Painting

On completion of the test, the exposed pipes and fittings are to be painted with two costs of synthetic enamel paint of approved colour and brand over a coat of priming.

7. Measurement

The length shall be measured in running meter. Correct to centimetre for the finished work, which shall include the pipes and fittings such as Bends, Tees, Elbows, etc., but excludes brass or Gun-metal fixture like tap, Cooks, Valves, PVC connection pipes etc.

8. Ball Valve

The ball valve shall be high or low pressure class as stipulated in the Tender Schedule and shall confirm to I.S. 1703-1968, The nominal size of ball valve shall be that corresponding to the size of Pipe for which it is used. The Bal valve shall be of brass or gun-metal and the float for low pressure polyethylene and for high pressure in copper.

Each and every ball valve while in closed position shall withstand and internally applied hydraulic pressure of 20 Kg/Cm2 for a minimum period of two minutes without leakage or sweating.

Every high pressure ball valve when assemble in working condition, with the float immersed to not more than half its volume shall remain closed against a test' pressure of 10.5Kg/Cm2 and a low pressure ball valve against a test pressure of 5.3 Kg/Cm2.

Polyethylene floats shall be watertight and non-absorbent and shall not contaminate water and with do jointing adhesive jointing parts. The minimum thickness of the copper sheet used for making copper floats shall be of 0.45 mm. The

thickness of materials of the float shall be uniform throughout.

153. Ferrule

The ferrules for connection with C.I. main shall generally confirm to I.S. 2692-1964 and shall be of nominal bore as specified. The ferrule shall be fitted with 3 screw and 1 plug or valve capable of complete cutting off the supply to the connected pipe as and when required. For fixing the ferrule, the C.I. main shall be drilled and tapped during non-supply hour at 45 to the connected Pipe as that when required. The ferrule must be so fitted, that no portion of the sunk shall be left projecting within the main on which it is fitted. After the ferrule is connected, one C.I. bell mouth cover or with bricks (as specified) shall be kept over the ferrule to cover the ferrule to protect it and the cost thereof is to be included in the item, even if there is no mention.

154. Non-return Valve (Check Valves)

The non-return valve shall be of Brass or Gunmetal and shall be of horizontal or vertical flow type and of the size as specified and confirm to I.S. 7810-1959 and I.S. 778-1957. The approximate weights of the valves are given below.

Dia Horizontal type (in kg) Vertical type (in kg)

15 0.30 0.25
20 0.55 0.25
25 0.90 0.75
32 1.25 0.90
40 1.70 1.20
50 2.90 1 .45
65 5.25 2.15
80 7.70 4.10
±Tolerance 5%
155. Foot Valve
Foot valve is generally placed at the lower end of the suction pipe of the centrifugal pump to prevent the suction pipe from empting. On vertical non-return valve may also be fixed in place of foot-valve. The foot valve shall confirm to I.S.038-1967.

156. Water meters (Domestic types) Water meter up to 50m nominal size shall confirm to I.S.-779-1968.The meter body shall be of bronze/

Gun-metal and marked to read in liters complete with registration box and lid. The water meters shall be provided with Strainers. Strainers shall be of material, which is not susceptible to electrolyte, clean and shall be fitted on the inlet side of water meter. It shall be possible to remove and clean the strainer and not permit disturbing the registration box. The offer should include the same. The water meters shall bear ISI Mark.

157. Bibcock & Stopcock

These shall confirm to I.S.781-1967 and bear ISI Mark. The bibcock is a draw off tap with a horizontal inlet and free outlet and stopcock is a valve with a suitable means of connection for Insertion in a pipeline for controlling or stopping the flow. This shall be of screw down type. The cock shall open in anti-clockwise direction. The stopcocks should be of C.P open type/concealed type/angle valves type as specified in tender schedule. Bibcock should be also C.P Brass bibcock.

158. Full way Valve (Brass)

Full way valve is a valve with suitable means of connection for insertion in a pipeline for controlling or stepping the flow. The valve shall be of brass fitted with a cast-iron wheel and shall be of gate valve type confirming to I.S, 780-1960, opening Full way and of the size as specified.

Dia Flanged End Valves in kg Screwed End Valve in kg

15 1.021 0.567
20 1.503 0.680
25 2.498 1.077
32 5.232 1.559
40 6.082 2.268
50 6.691 3.232
65 10.149 6.840
80 13.281 8.845
159. Gun Metal Full way Valve
This shall be of the Gun-Metal fitted with wheel and shall be of Gate-Valve type opening full way. This shall confirm to I.S, 778-1971. Class I. The Valves should bear ISI Mark.
TECHNICAL SPECIFICATION FOR STONEWARE PIPE ETC.

160. Stoneware Pipes (Materials)

The S.W. pipes & fitting should be of Grade 'A' confirming to I.S 651/1965.The pipes shall be sound, free from visible defects such as fire crack or hair crack and flow or blister. The pipes shall give a sharp clear line when struk with a light hammer and should be perfectly salt glazed.

Internal dia of Pipe in m.m. Thickness of the Barrel in m.m. Weight of each pipe in kg.

100	12	14
150	16	23
200	17	33
230	19	44
250	20	52
300	25	79
350	30	100
400	35	125
450	38	147

The length of pipes is 600mm exclusive of the internal depth of socket.

161. Excavation of Trench for laying Sewer Pipes

The trenches for the pipes shall be excavated to the lines & level as directed. The bed of the trench shall have to be evenly dressed throughout from one change of grade to the next. The gradient is to stout by means of sight rails and boning rods and required depth be excavated at any point. The depth of the trench shall not less than one metre, measured from top of the pipe to the surface of the ground underroads and not less than 0.75mm elsewhere. The width of the trench shall be the nominal diameter of the pipe plus 350m. The bed of the trench if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions if any shall be properly filled with sand and consolidated in 200mm layers. Depending on soil condition, piling may even be necessary if so desired by the Engineer In-charge. If rock is met with, it shall be removed 150 mm below the level of the pipe and the trench will be refilled with sand and consolidated.

The excavated materials shall not be placed within One Mtr. Or half of the depth of the trench whichever is greater from the edge of the trench.The trench shall be kept free from water. Shoring and shuttering shall be provided wherever required.Excavation below water label shall be done after dewatering the trenches. After the excavation of the trench is completed, foundation of cement concrete 1.4.8 in hard granite metal (size 40mm) shall be laid with proper level all along under the length of the pipe with launching on all around concrete as per drawing.

162. Laying, Jointing, hunching of the Pipes and fittings.

Drain Pipes (S.W. pipe & other pipes used for drain and Sewer) shall be laid in straight lines and to the even gradients as shown in the layout drawings. The socket and of the pipes shall face stream. Adequate care shall be exercised in setting out and determining the level of the pipes and the contractor shall provide suitable instruments, templates, sight rails, boning rods and other equipments necessary for the purpose. In the case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid. In those joints, a tight ring of twisted tarred jute soaked in cement mortar filling to ensure proper alignment and prevent. Cement entering the pipes, Cement compound joints is to be finished with proportion 1.1 with 45 beveling. The joints are to be kept wet with wet bag until the same are properly set with. The cement mortar joints shall be cured at least for 7 (Seven) days. In the case of S.W. Pipe joints (socket & spigot), they should be caulked first with tarred jute (Spun) of required diameter, almost quarter depth of the socket, after which cement mortar 1:1 is pushed in with wooden chisel and finishing uried d at outside at 45 degree. Instead of jute of hump rubber gasket of proper size may also be used. The whole joint must be cured for not less than three days. In case of pipes less than 250m dia, joints should be made at ground level with three pipes at a time and for larger ones two pipes at a time and after curing they should be soiled in foundation with the help of the ropes. All pipes should be properly launched with cement concrete 1.3.6 with washed gravel where the pipes are crossing the drain or all round concrete 1.3.6 with washed gravel is to be done to 150 mm thick over the barrel of the pipe. The whole of the drain work shall be tested when laid, and at the completion of the contract, to the satisfaction of the Engineer-in-charge and shall be retested if necessary until found satisfactory. The test shall be made by means of water under pressure at the highest point of the Section under test and providing an air pipe at the lower and of the line. Maximum head of 5 (five) fact (1.5m) must be maintained.

163. Excavation and refilling.

Excavation for drain and pipe trenches shall be straight and to correct depth and gradient. The trench bottom shall be of required width as per specification to allow working space for pipe jointing. Excavated materials shall be dumped away from the site as directed by Engineer-in-charge. Suitable precautions are to be taken to prevent in flow of water into the excavated area, during construction. The contractor at his own expense shall pump out or otherwise remove any or all water which during the continuance of contract may be found in the excavated trenches to keep the trench clear of water duringthe work under progress. The pipeline shall not be refilled and covered, until the line therein has been passed and tested.

5. Burried Services

All pipes, cable mains and other services exposed by the excavations shall be effectively supported by timbering or other means for which no extra payment will be allowed. The contractor shall be responsible for any damage occurring to uried services and make good the same at his own cost to the satisfaction of the Engineer-in-charge.

6. Trench condition:

Where a trench is excavated and refilled after laying the pipe, settlement of the earth in the refilled trench take place. The filling above the top of pipe, settles relatively, more than the sides of the trench, thereby developing frictional resistance. The contractor is required to take special precaution against this, while refilling the trenches. Procedure for backfilling as stipulated earlier should be strictly followed.

7. Inspection Chambers/Manholes

At every change of alignment, gradient or diameter of a drain there shall be a manhole or Inspection Chamber. The maximum distance between man hole chamber shall be 30 metres for the linelaid straight. All manhole and inspection chamber shall have internal dimension as shown in drawing and B.O.Q. The depth of invert shall be fixed to the gradient. The foundation for Manhole shall be 175mm thick & with cement concrete 1.3.6 in hard stone metal / granite metal of 40mm size. The concrete shall project 150mm beyond the external faces of the brickwork. The brick masonry shall be done in cement mortar in the proportion of 1:4 and thickness of the brick wall should be 250mm thick up to 1200mm depth from Ground Level and beyond that the wall thickness shall be maintained 375mm.The inside surface of the walls of the chamber, shall be finished with cement plaster 1.3 and out side with cement pointing 1.3. In addition to this, the inside surface should also be provided with cement punning. On the top of base concrete channelling on C.C. 1.2.4 with granite chips is to be done keeping the diameter equal to the dia of drain pipe and depth equal to half of the dia of pipe. The channel, 'should1 be done longitudinally at the centre, connecting both the ends of the pipe. The channel is to be hunched up with concrete 1.2.4 with hard granite chips of size 12mm sloping upwards from the edge of channel to meet the side of chamber at gradient of 1.6. The channel and benching are to be finished smooth and cement mortar 1.3 and punning unless it is unavoidable. The branch should deliver sewerage in the Manhole in the direction of main flow and the junction must be made with care so that the flow in the main is not impeded. Channels for drains coming from the side of the Manhole Chamber, shall be curved to meet the main drainage channels. The Manhole and Inspection Chambers shall be covered with R.C.C. cover slab of thickness 100mm to 150mm according to the requirement at site. One C.I. Manhole cover of diameter and weight as stipulated in the tender schedule shall be fixed, on the cover slab. Unless otherwise mentioned the C.I. Cover and Frames and shall confirm to I.S. 1726/1960. Heavy duty covers etc., under heavy vehicular traffic condition and capable of bearing wheel loads up to 11.25 tons, are to be used and medium duty under light type wheel traffic loads and light duty for domestic premises are to be used. Covers and Frames shall be clearly cast, double water seal type and they shall be free from all and sand holes. The cover shall beg as tight and water tight with proper water-seal. The C.I. Cover and frame shall be coated with two coats of black bituminous paint. The frame of Manhole cover shall be fixed on the slab while the slab is cast. R.C.C.M.H. covers of 50cm dia and 100mm thickness shall be fitted in line of C.I.M.H. cover if stipulated in the bill of quantity of the tender schedule.

Contractor Senior Manager (Civil)

8. Gully Trap Chamber

The size of chamber for 100mm HCI yard gully shall be of 300mm X 300mm (Inside). Foundation with 100mm thick cement concrete 1.3.6 with hard granite metal of size 40mm from outer surface of wall and Brick work in cement mortar 1.4,125rnm thick, depth up to 600mm maximum. The finishing of masonry wall both inside and outside should be done in cement mortar 1.4 cement punning should be provided on the inner surface the trap should be uried in cement concrete 1.2.4 in H.G. chips up to the mouth and one hinged C.I. Grating of size 300mm x 300mm are to be fixed on the top of mouth of Gully trap to arrest rubbishes shall be provided. The foundation, should project 75mm from outer.

164. Kota/Marble Stone flooring

The Kota/Marble stones shall be of thickness specified but not less than 20mm and of uniform with edges absolutely square & straight. They shall be laid in Cement Mortar (1.4) over masonry or concrete base. The sides of the stones shall be arranged to butt against each other truly so as to came the joints practically invisible and certainly not more than 0.8mm in width any where. The joints shall not be filled with mortar but may afterwards be grouted with neat white cement mixed with matching colour pigment. When the floor has completely set, it, should be polished with pumice stone and finally with pads of felt.

165. Glazed tile dado

The glazed porcelain tiles shall be of approved size and thickness 5mm to 6mm with edges absolutely straight & surface accurately plain. They shall be fixed in 6mm. Thick cement mortar 1.3 using cement slurry over pre-cement plastered base. The sides of the tiles shall be arranged to but against each other truly so as to make the joints practically invisible. However, the joints may be granted with white cement mixed with colouring materials to match the tiles and neatly cleaned leaving no trace of excess grouting materials. The tiled surface and edges should be perfectly vertical and straight. The corner points must be normally right angled unless the site condition demands otherwise

FORMS & ANNEXURES

FORM – A
STRUCTURE AND ORGANISATION

1. Name of Tenderer ……
2. Nationality of Tenderer ……
3. Office Address ……
   ……..
4. Telephone No.
   Land phone ……
   Mobile ……
   Fax No ……

   e-mail id ……
5. Location of establishment ……
6. The tenderer is

a. An individual

b. A proprietary firm

c. A limited company or limited corporation

d . A member of a group of companies (If yes, give names, address and present description of other companies.

e. A subsidiary of large organization

(If yes, give names, address of the present organization)

f. If the company is subsidiary state what involvement if any, will the parent company have in the project.

Attach the organization chart showing the structure of the organization including the names of the Directors position of officer.

7. Number of year of experience

a. As a prime Contractor

   I In own country

   II Other country (specify country)

Contractor Senior Manager (Civil)

ANNEXURE-A

(AFFIDAVIT)

(To be submitted in original in legal stamp paper duly registered)

1. The undersigned hereby certifies that, all the statements made in the required attachments are true and correct.

2. The undersigned also hereby certify that, neither our firm _____ nor any of its construction partners have abandoned any project work in India nor any contract awarded to us for such works have been rescinded during the last five years prior to the date of this bid.

3. The undersigned hereby authorized and request (s) bank, firm or Corporation to furnish pertinent information as deemed necessary and as requested by the Corporation to verify this statement or regarding my (our) competency and general reputation.

4. The undersigned understands and agrees that further qualifying information may be requested and agree to furnish any such information at the request of the Corporation.

(Signed by an Authorized of the firm)

Title of Officer

Name of Firm

Date.

Contractor Senior Manager (Civil)

ANNEXURE-B

CERTIFICATE OF NO-RELATIONSHIP

I/We hereby certify that I/We am/are not related to any officer of Govt. of Odisha/OCC Ltd of the rank of Asst. Executive Engineer and above and any officer of the rank of Under Secretary and above in the W.R. Department. I/We am/are aware that if the facts subsequently proved to be false my/our contract will be rescinded with forfeiture of EMD & security deposit and I/We shall be liable to make good the loss or damage resulting from such cancellation.

I/We also note that, non- submission of this certificate will render my/our tender liable for rejection.

Signature of the Contractor

Name _____

Address _____

_____

Date :_____

Contractor Senior Manager (Civil)

ANNEXURE-C

BANK GUARANTEE FOR ADDITIONAL PERFORMANCE SECURITY (APS)

To

---------- (name of Employer)

WHEREAS the bid of ---------- (name and address of Contractor) (hereinafter called "the Contractor") has been accepted vide letter of acceptance (LoA) No. _____ dated _____ of Odisha Construction Corporation Ltd., ---------- to execute the work _____ [name of work] (hereinafter called "the contract")

AND WHEREAS it has been stipulated by you for the said Contract that the Contractor shall furnish you with a Bank Guarantee by a Nationalized/Scheduled Bank in India, counter guaranteed by its local branch at Bhubaneswar towards Additional Performance Security (APS), for compliance with his obligations in accordance with the conditions of Contract.

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

NOW THEREFORE we hereby affirm that we are the Guarantors and responsible to you, on behalf of the Contractor, up to a total of Rs _____ [amount of guarantee] _____ [in words], such sum being payable in the types and proportions of currencies in which the contract price is payable, and we undertake to pay you upon your first written demand declaring the Contractor to be in default under the contract and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee] 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 or addition to or other modification of the terms of the Contract or of the Works to be performed there under 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 such change, addition or modification.

Contractor Senior Manager (Civil)

This guarantee shall be valid up to _____ day of _____ 20 _____ i.e. up to 3 (three) months beyond the date stipulated for completion of work. We also agree for extension of this guarantee for a further period in response to the Employer's written request for such extension, which should be presented to us before the expiry of the guarantee.

We _____ (Name of Bank) hereby also undertake to have it counter guaranteed by our local branch at Bhubaneswar, _____ (name and address of Local Branch at Bhubaneswar, Odisha).

(Signature of the authorized officer of the Bank)

……..

……..

Name and designation of the officer

……..

Seal, name & address of the Bank and address of the Branch

We_____ (name and address of Local Branch at Bhubaneswar, Odisha) are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee depending on the filing of claim and only if it is served upon to us by the employer at our Bhubaneswar Branch by a written claim or demand and received by us at our Bhubaneswar branch on or before Dt. _____(subject to further extension on the Employer's written request for such extension before expiry of this guarantee), otherwise bank shall be discharged of all liabilities under this guarantee thereafter.

(Signature of the authorized officer of the Bank)

……..

……..

Name and designation of the officer

……..

Seal, name & address of the Bank and address of the Branch

Contractor Senior Manager (Civil)

ANNEXURE-D

UNDERTAKING TO PAY ROYALTY

We do hereby undertake that, Royalty for stone products, sand, moorum and Borrow earth etc. are to be recovered from work bills as per prevailing Govt. Notification during the time of execution.

Signature of the Bidder

Name _____

Address _____

_____

Date :_____

Contractor Senior Manager (Civil)

ANNEXURE-E

UNDERTAKING TO PAY MINIMUM WAGES

We do hereby undertake that, we shall pay wages of each labour at the rate not less than the wages as per Minimum Wages Act in force during the time of execution and as may be amended from time to time. The "Engineer-in-Charge" has the right to enquire into and decide on any complaint of the Labourers relating to non-payment or less payment of wages to them and his decision will be final and binding on us.

Signature of the Bidder

Name _____

Address _____

_____

Date :_____

Contractor Senior Manager (Civil)

ANNEXURE-F

FORMAT OF BID SECURITY DECLARATION FROM BIDDERS IN LIEU OF EMD

I/We the authorised signatory of M/s_____ participating in the tender for the work "_____" vide Tender Call Notice No. _____ do hereby declare:

That, in the event we withdraw/modify our bid during the period of validity Or I/We fail to execute formal contract agreement within the given timeline Or I/We commit any breach of Tender Conditions/Contract which attracts penal action of forfeiture of EMD and I/We will be suspended from being eligible for bidding/award of all future contract(s) of Odisha Construction Corporation Limited/ Government of Odisha for a period of three years from the date of committing such breach.

Signature and seal of Authorised signatory of the Bidder

Name of authorised signatory_____

Company Name_____

Address _____

_____

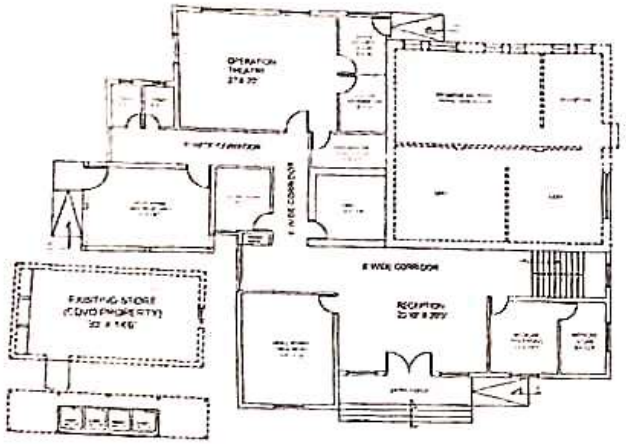
Date :_____/2022

Contractor Senior Manager (Civil)

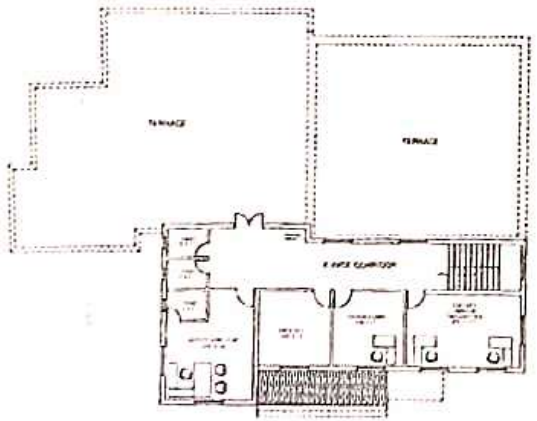
DRAWINGS

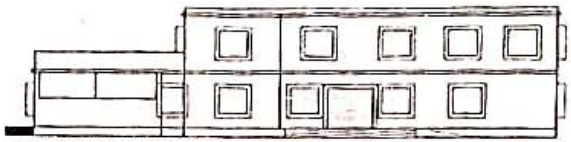
DISTRICT VETERINARY HOSPITAL, JAJPUR

PROPOSED GROUND FLOOR PLAN

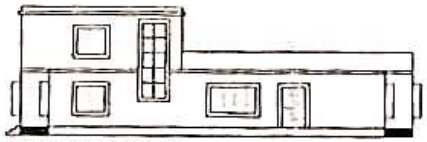


PROPOSED FIRST FLOOR PLAN

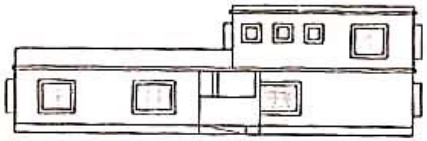




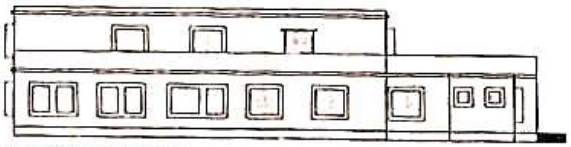
FRONT SIDE ELEVATION



RIGHT SIDE ELEVATION



LEFT SIDE ELEVATION



REAR SIDE ELEVATION

Approved
Addl. Secretary to Govt.
Admn., HRD & Plan,
AH & VS, Odisha, Cuttack

EXISTING STRUCTURE
PROPOSED STRUCTURES

AREA STATEMENT
EXISTING BUILDING AREA = 5354.545 Square ft
NEW CONSTRUCTION AREA = 5638.400 Square ft
TOTAL AREA = 10993.345 Square ft

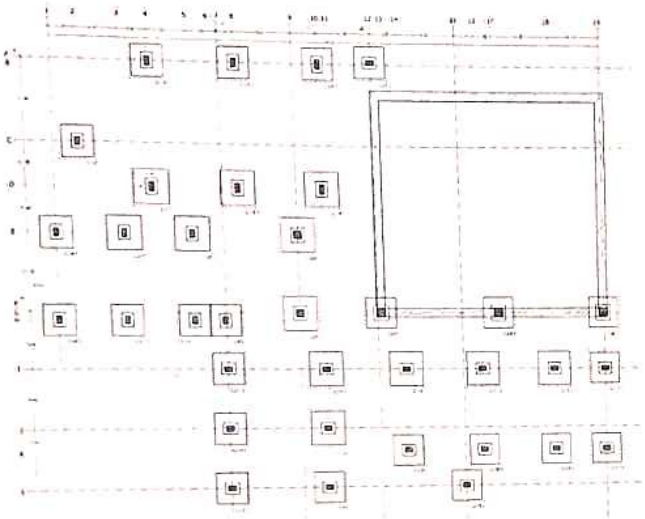
CLIENT	DIRECTORATE OF ANIMAL HUSBANDRY & VETERINARY SERVICES
CONSULTANT	ODISHA CONSTRUCTION CORPORATION LTD
TITLE	INFRASTRUCTURE UPGRADATION OF DISTRICT VETERINARY HOSPITAL - JAJPUR
DRAWING NO.	

SIZE	SCALE	DATE	PREPARED	CHECKED	APPROVED	REVEY
			Architect			

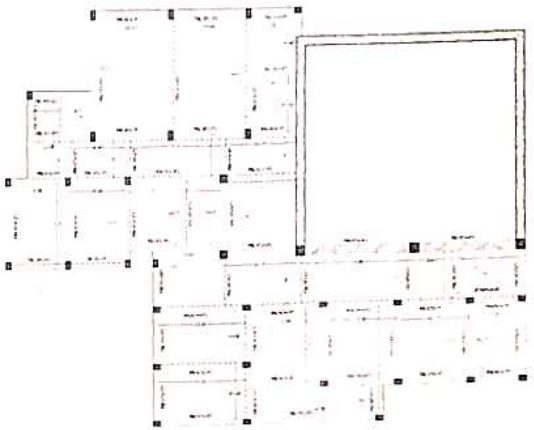
Contractor

Senior Manager (Civil)

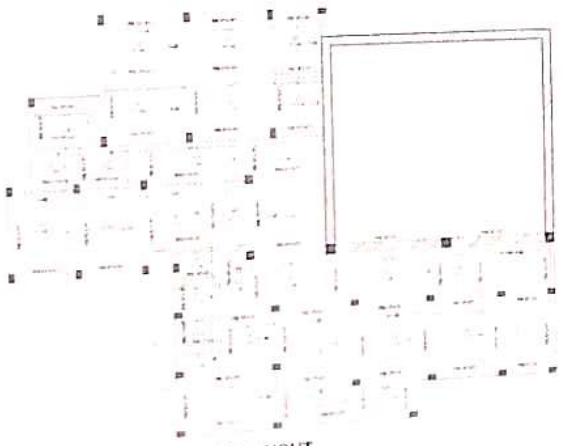
DISTRICT VETERINARY HOSPITAL, JAJPUR



FOUNDATION LAYOUT

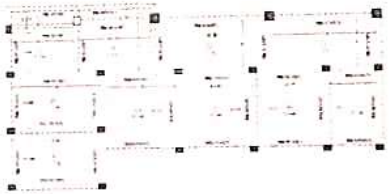


PLINTH BEAM LAYOUT



GROUND FLOOR ROOF BEAM LAYOUT

EXISTING STRUCTURE WALL



FIRST FLOOR ROOF BEAM LAYOUT

AREA STATEMENT

EXISTING BUILDING AREA = 5354.945 square ft.
NEW CONSTRUCTION AREA = 5671.376 square ft.
TOTAL AREA = 11026.321 square ft.

CLIENT	DIRECTORATE OF ANIMAL HUSBANDRY & VETERINARY SERVICES.
CONSULTANT	ODISHA CONSTRUCTION CORPORATION LTD.
TITLE	STRUCTURAL DRAWING OF DISTRICT VETERINARY HOSPITAL- JAJPUR
DRAWING NO.	

SIZE	SCALE	DATE	PREPARED	CHECKED	APPROVED	REV

Senior Manager (Civil)

113

Contractor

SECTION-VI

PRICE ADJUSTMENT/PRICE VARIATION

GOVERNMENT OF ODISHA
WORKS DEPARTMENT

OFFICE MEMORANDUM

File No -375/[illegible]/2019- 15847 /W. dt. 19-11-19

Sub:- Codal / contractual provisions regarding Price Adjustment in works contract.

Codal / contractual provisions regarding Price Adjustment in works contract was under active consideration of Government. After careful consideration, Government have been pleased to make the codal/ contractual provisions regarding Price Adjustment clause due to increase or decrease in rate and price of labour, materials, fuels & lubricants and plant & machineries spare component to be incorporated in DTCN / condition of Contract as per Annexure-'A'.

1- This Office Memorandum shall be a part of the relevant clauses of DTCN and Agreement and shall take effect from the date of issue.

2- This has been concurred in by Finance Department vide their File No. FIN-WF1-MISC-0031-2019 (OSWAS) dt.23.10.2019 and Law Department vide their UOR No.2218/L dt.28.10.2019.

Commissioner - cum- Secretary to Government

Memo No. 15848 /W, dated, 19-11-19

Copy with copy of endosure forwarded to Principal Secretary to Hon'ble Chief Minister, Odisha for information and necessary action.

FA - cum- Addl. Secretary to Government

Memo No. 15849 /W, dated, 19-11-19

Copy with copy of endosure forwarded to P. S. to Hon'ble Minister, Works, Odisha / P. S. to Hon'ble Minister, Finance, Odisha for information and necessary action.

FA - cum- Addl. Secretary to Government

(P.T.O)

Contractor Senior Manager (Civil)

Memo No. 15850 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to OSD to Chief Secretary, Odisha / Sr. P.S. to Development Commissioner-cum-Additional Chief Secretary, Odisha / Sr. P.S. to Principal Secretary, Finance Department for information and necessary action.

FA - cum- Addl. Secretary to Government

Memo No. 15851 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to the Principal Accountant General (A&E), Odisha, Bhubaneswar / Principal Accountant General (E & S R Audit), Odisha, Pun Branch, Puri for information and necessary action.

FA - cum- Addl. Secretary to Government

Memo No. 15852 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to All Departments / Managing Director, CB & CC Ltd., Bhubaneswar / Managing Director, OCC Ltd., Bhubaneswar / Chief Architect, Odisha, Bhubaneswar for information and necessary action.

FA - cum- Addl. Secretary to Government

Memo No. 15853 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to DC (Civil), Odisha / All Chief Engineers, Odisha / All Superintending Engineers / All Executive Engineers (under Works Department) for information and wide circulation among subordinate offices.

FA - cum- Addl. Secretary to Government

Memo No. 15854 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to OSWAS Control Room with a request to upload it in the web-site of Works Department.

FA - cum- Addl. Secretary to Government

Memo No. 15855 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to the Director, Printing, Stationery & Publication, Odisha, Cuttack by e-mail (gpsdirectorop@gmail.com) for publication of this Office Memorandum in the next issue of Odisha Gazette and supply 20 (Twenty) copies to this Department for official use.

FA - cum- Addl. Secretary to Government

Memo No. 15856 /W, dated. 19-11-19

Copy with copy of enclosure forwarded to AC-I Section / AC-II Section / Road Section / Plan Section / Building Section / Budget Section / A.Hs. Section / EC & AA Section / CAP Cell / Legal Cell, Works Department for information and necessary action.

FA - cum- Addl. Secretary to Government

2

Contractor Senior Manager (Civil)

ANNEXURE-A

Clause 31 :- Price Adjustment

31.1 : Contract price shall be adjusted for increase or decrease in rates and price of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given in following Paras.

(a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer and shall not apply to the work carried out beyond the stipulated time for reasons attributable to the contractor.

(b) The price adjustment shall be determined during each month from the formula given in following Paras

(c) Following expressions and meanings are assigned to the work done during each month:

R= Total value of work done during the month. It would include the amount of secured advance granted, if any, during the month, less the amount of secured advance recovered, if any during the month. It will exclude value for works executed for extra items under variations.

31.2 : To the extent that full compensation for any rise or fall in costs to the contractor is not covered by the provisions of this or other clauses in the contract, the unit rates and prices included in the contract shall be deemed to include amounts to cover the contingency of such other rise or fall in costs.

The formula (e) for adjustment of prices are:

31(a) (i): Adjustment of Other Materials Component

Price adjustment for increase or decrease in cost of local materials other than cement, steel, bitumen , pipe and POL procured by the contractor shall be paid in accordance with the following formula:

V_M = $0.85 \times P_m/100 \times R \times (M_1 - M_0)/M_0$

V_M = Increase or decrease in the cost of work during the month under consideration due to changes in rates for local materials other than cement, steel, bitumen and POL.

M_0 = The all India wholesale price index (all commodities) on 28 days preceding the date of opening of Bids, as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

M_1 = The all India wholesale price index (all commodities) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_m = Percentage of local material component (other than cement, steel, bitumen and POL) of the work.

19.7.19

Contractor Senior Manager (Civil)

31(a)(ii): Adjustment for Cement Component

Price adjustment for increase or decrease in the cost of cement procured by the contractor shall be paid in accordance with the following formula:

V_c = $0.85 \times P_c/100 \times R \times (C_1 - C_0)/C_0$

V_c = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for cement.

C_0 = The all India wholesale price index for Ordinary Portland Cement (OPC) on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

C_1 = The all India wholesale price index for Ordinary Portland Cement (OPC) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_c = Percentage of Cement Component of the work

31(a)(iii): Adjustment for Steel Component

(iii) Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with the following formula:

V_s = $0.85 \times P_s/100 \times R \times (S_1 - S_0)/S_0$

V_s = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for steel

S_0 = The all India wholesale price index for steel (Mild Steel long products) on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

S_1 = The all India wholesale price index for steel (Mild Steel long products) for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_s = Percentage of steel component of the work

Note: For the application of this clause, index of (Mild Steel long products) has been chosen to represent steel group.

Contractor Senior Manager (Civil)

31(a)(iv): Adjustment of Bitumen Component

Price adjustment for increase or decrease in the cost of bitumen shall be paid in accordance with the following formula:

$V_b = 0.85 \times P_b/100 \times R \times (B_1 - B_0)/B_0$

V_b = Increase or decrease in the cost of work during the month under consideration due to changes in the rate for bitumen.

B_0 = The official retail price of bulk bitumen at the IOC / BPCL depot at nearest center on the day 28 days prior to date of opening of Bids.

B_1 = The official retail price of bulk bitumen at IOC / BPCL depot at nearest center for the 15th day of the month under consideration.

P_b = Percentage of bitumen component of the work

31(a)(v): Adjustment towards differential cost of Pipes.

Price adjustment for increase or decrease in the cost of pipe shall be paid in accordance with the following formula:

$V_{pi} = 0.85 \times P_{pi}/100 \times R \times (P_{i1} - P_{i0})/P_{i0}$

V_{pi} = Differential cost of pipe i.e. amount of increase or decrease in rupees to be paid or recovered during the month under consideration.

P_{pi} = Percentage of pipe component of the work

P_{i1} = All India Whole sale price index of pipe for the period under consideration as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

P_{i0} = All India Whole sale price index of pipe on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry , Government of India, New Delhi.

18/11/19

Contractor Senior Manager (Civil)

31(b): Adjustment of Labour Component

Price adjustment for increase or decrease in the cost due to labour shall be paid in accordance with the following formula:

V_L = 0.85 x P_l/100 x R x $(L_1 - L_0)/L_0$

V_L = Increase or decrease in the cost of work during the month under consideretion due to changes in rates for local labour.

L_0 = The minimum wages for unskilled labour as Notified by Government of Odisha as prevailed on the last stipulated date of receipt of tender including extension, if any.

L_1 = The minimum wages for unskilled labour as Notified by Government of Odisha as prevailed on the last date of the Month previous to the one under consideration.

P_l = Percentage of labour component of the work.

31(c): Adjustment of POL(fuel and lubricant) Component

(v) Price adjustment for increase or decrease in cost POL (fuel and lubricant) shall be paid in accordance with the following formula:

V_f = 0.85 x P_f/100 x R x $(F_1 - F_0)/F_0$

V_f = Increase or decrease in the cost of work during the month under consideration due to changes in the rates for fuel and lubricants.

F_0 = The official retail price of High Speed Diesel (HSD) at the existing consumer pumps of IOC / BPCL/ HPCL at nearest center on the day 28 days prior to the date of opening of Bids.

F_1 = The official retail price of HSD at the existing consumer pumps of IOC / BPCL/ HPCL at nearest center for the 15th day of the month under consideration.

P_f = Percentage of fuel and lubricants component of the work

Note : For the application of this clause, the price of High Speed Diesel oil has been chosen to represent fuel and lubricants group.

18.11.

Contractor Senior Manager (Civil)

31(d): Adjustment for Plant and Machinery Spares Component

(vi) Price adjustment for increase or decrease in the cost of plant and machinery spares procured by the Contractor shall be paid in accordance with the following formula:

V_P = 0.85 x P_p/100 x R x (P_1 - P_0)/P_0

V_P - Increase or decrease in the cost of work during the month under consideration due to changes in the rates for plant and machinery spares

P_0 - The all India wholesale price index for manufacture of machinery for mining, quarrying and construction on 28 days preceding the date of opening of Bids as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_1 - The all India wholesale price index for manufacture of machinery for mining, quarrying and construction for the month under consideration as published by the Ministry of Commerce and Industry, Government of India, New Delhi.

P_p - Percentage of plant and machinery spares component of the work

Note : For the application of this clause, index of manufacturing of machinery for mining, quarrying and construction has been chosen to represent the Plant and machinery Spares group.

Regarding wholesale price Index (WPI) for appropriate commodity for payment of price adjustment, due to change of base year of WPI from 1993-94 to 2004-05 & 2011-12, it is observed that, the commodity 'Bars and Rod', 'Cement', 'Heavy machinery and parts' included in the list of WPI 1993-94 series are not mentioned as such in the WPI 2004-05 & 2011-12 series. Therefore, the following items in the WPI 2004-05 & 2011-12 series shall be considered corresponding to items in WPI 1993-94 series:

Sl. No.	Item in WPI 1993-94 series	Item in WPI 2004-05 series	Item in WPI 2011-12 series
1.	Cement	Grey Cement	Ordinary Port land cement
2.	Bars & rods	Rebars	Mild steel long products
3.	Heavy Machinery & parts	Construction Machinery	Manufacture of machinery for mining, quarrying & construction.

19.8.19

31(e): APPLICATION OF ESCALATION CLAUSE:

The contractor shall for the purpose of availing reimbursement/refund of differential cost of steel, bitumen, cement, pipe, POL and wages, keep such books of account and other documents as are necessary to show that the amount of increase claimed or reduction available and shall allow inspection of the same by a duly authorized representative of Government and further, shall at the request of the Engineer-in-Charge, furnish documents to be verified in such a manner as the Engineer-in-Charge may require any document and information kept. The contractor shall within a reasonable time of 15 days of his becoming aware of any alteration in the price of such material, wages of labour and /or price of P.O.L. give notice thereof to the Engineer-in-Charge stating that the same is given pursuant to this condition along with information relating to there to which he may be in a position to supply.

Percentage Table

Sl No.	Category of works		% Component (cost wise)		
			Labour (P_l)	POL (P_f)	Steel (P_s)+ Cement (P_c)+ Bitumen (P_b) +Pipes (P_p) + Plant & Machinery Spare &Component(P_m) + Other Materials*
1	R&B works (% of component)	Road Works	5	5	90
		Bridge works	5	5	90
		Building works	5	5	90
2	Irrigation works (% of component)	Structural work	5	5	90
		Earth, Canal & Embankment work	5	5	90
3	P.H. Work	Structural work	5	5	90
		Pipeline Work	5	5	Pipe- 70% *Machinery + Other material -20%
		Sewer Line	5	5	*Pipe- 70% *Machinery + Other material -20%

*Note:- Further break up may be worked out considering the consumption of Cement, Steel, Bitumen, pipe and Plant & Machinery Spare Component in the concerned works and shall be provided in the bid document in shape of "Schedule of Adjustment Data" as an "Appendix to Bid". (enclosed herewith)

(signature) 16.11.19

Contractor Senior Manager (Civil)

Schedule of Adjustment Data

[For all works, adjustment factor for Labour and POL shall be considered @ 5% each. Steel, Cement, Pipes other Materials and Machinery all contribute to 100% of Price Adjustment, the shall be calculated for each work separately during preparation of estimate, shall be approved by the authority during technical sanction as a 'Schedule of Adjustment Data' and shall form part of the Bid Document]

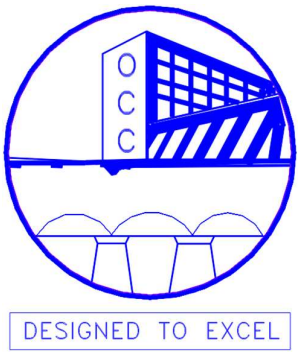
Cl. No-31 of F2/ P1 Contracts Sl. No	Index description	Source of Index	Base value*	Base Date*	Weightage of Item**
31 (a)(i)	Other Materials	All India Whole sale price index (all commodities) as published by the Economic Adviser to the Govt. of India, Ministry of Commerce and Industry.			
31 (a)(ii)	Cement	Whole sale price Index for Cement (Ordinary Portland Cement) as published by the office the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31 (a)(ii)	Steel	Whole sale price index for Steel (Mild Steel-Long Products) as published by the office of the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
31 (a)(iv)	Bitumen (VG-30)	Official retail price of bulk bitumen at the nearest IOC/ HPCL depot			
31 (a)(v)	Pipes	Whole sale price index for the type of Pipe under consideration, as published by the office the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry			
31 (b)	Labour	Minimum Wage notified by the Labour and Employee's State Insurance Department of Government of Odisha, India			5%
31 (c)	POL	Official retail price of HSD at nearest IOCL/ HPCL/ BPCL Consumer pump depot.			5%
31 (d)	Plant and Machinery	Whole sale price index for Manufacture of Machinery for Mining, Quarrying and Construction as published by the office the Economic Advisor to the Govt. of India, Ministry of Commerce and Industry.			
			Total		100%

*Values to be filled up at the time of draw of contract
**Values to be filled up in the bid document

18/7/19

Contractor Senior Manager (Civil)

Standard Bidding Document for Double Cover off-line tender
(value more than Rs. 50 Lakhs)



ODISHA CONSTRUCTION CORPORATION LTD.
(A Govt. of Odisha Undertaking)

Jajpur Group of Project, Jajpur

COVER – II

(PRICE BID)

Tender Call Notice
No. 01/2022-23/SM/OCCL/JGP, dt. 13.07.2022

NAME OF WORK

Extension of district veterinary hospital of Jajpur.
Last date of submission of Tender : 27.07.2022(Up to 5.00 PM)

Contractor Senior Manager (Civil)

Percentage Bill of Quantity as per the sanctioned/approved estimate to be inserted

ODISHA CONSTRUCTION CORPORATION LTD.

Jajpur Group of Project, Jajpur

NAME OF THE WORK :- "EXTENSION OF DISTRICT VETERINARY HOSPITAL OF JAJPUR.

PERCENTAGE RATE BILL OF QUANTITIES

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
1	**Clearing & grubbing shrub, jungles including uprooting stumps of trees and trees below 1.0 m. girth and thick bushes including bamboo clamps based on pre-measurement disposing the debris away from the work site with all leads,lifts and delifts with cost of all labour,T & P, hiring and running charges of all machineries, cess complete as per direction of Engineer-in-Charge.**	SQM	360.000	19.60	7,056.00
2	**Earthwork in all kinds of soil in excavation of foundation trenches with initial lead and lift including rough dressing in layers not exceeding 0.3 mt in depth and the earth transported by transport vehicle including moorum, hard stoney earth and earth mixed with boulders except sheet rocks and boulders requiring blasting with initial lead and lifts including dressing and levelling the bed sides upto required depth and depositing the excavated materials at places away from the work site with all leads and lifts, T & P for shoring, shuttering, dewatering if required, T & P etc as required for the work complete as directed by the Engineer-in-Charge.**	CUM	345.591	188.80	65,247.62
3	**Filling at all depth with available river sand in trenches, plinth, sides of foundations etc. in layers not exceeding 15cm in depth. Consolidating each deposited layer by ramming and watering complete (lead upto 100m) as directed by the Engineer-in-Charge.**	CUM	230.394	388.20	89,439.01
4	**Supplying and filling the foundation & plinth with clean coarse river sand of approved quality from approved quarry, laying in layers not exceeding 150cm thick watering & ramming including cost, conveyance, royalty and taxes of all materials, cost of all labours, T & P etc as required for the work complete as per direction of the Engineer-in-Charge.**	CUM	108.092	388.20	41,961.45
5	**Providing & laying plain cement concrete 1:3:6 (1 cement: 3 sand: 6 stone aggregate 20mm nominal size) as levelling course in foundation & plinth etc including tampering, curring, shuttering etc. complete all depth and height including cost, conveyance, royalty and taxes of all materials, cost of all labour, T & P etc as required for the work complete and as direction of Engineer-in-Charge.**	CUM	32.089	4,620.60	1,48,269.69

Contractor Senior Manager (Civil)

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
6	**Providing & laying plain cement concrete 1:2:4 (1 cement: 2 sand: 4 stone aggregate 20mm nominal size) as levelling course in foundation & plinth etc including tampering, curring, shuttering etc. complete all depth and height including cost, conveyance, royalty and taxes of all materials, cost of all labour, T & P etc as required for the work complete and as direction of Engineer-in-Charge.**	CUM	31.701	5,962.00	1,89,001.72
7	**Providing and laying Cement Concrete M20 using 20mm size down graded Black H.G. crusher brocken chips for R.C.C. works including cost, carraige, rayality of all materials and machinaries and labours with all leads, lifts etc complete as per approved drawings & specification & direction of the Engineer-in-charge.**				
	Ground Floor	CUM	152.268	4,744.50	7,22,437.72
	First Floor	CUM	55.571	4,817.350	2,67,703.73
8	**Rigid and smooth centering and shuttering for R.C.C. works including false works and dismantling then after casting including cost of materials complete in R.C.C. footing, column, slab, stair case, landing, lintel including cost, conveyance, royalty and taxes of all materials, cost of all labour etc as required for the work complete and as direction of Engineer-in-Charge.**				-
	a) FOOTING F1	SQM	92.735	103.10	9,561.00
	b) Plinth Beam	SQM	120.588	103.10	12,432.62
	c) Columns				
	Ground Floor	SQM	172.375	731.40	1,26,074.93
	First Floor	SQM	20.091	831.900	16,713.95
	d) Roof Beams				
	Ground Floor	SQM	190.460	731.40	1,39,302.37
	First Floor	SQM	116.083	474.300	55,058.02
	e) Roof Slab				
	Ground Floor	SQM	335.665	427.40	1,43,463.27
	First Floor	SQM	125.105	681.200	85,221.39
	f) Staircase				
	Ground Floor	SQM	35.004	596.80	20,890.45
	First Floor	SQM	32.889	287.000	9,439.17
	g) Lintel				
	Ground Floor	SQM	108.048	262.40	28,351.80
	First Floor	SQM	68.289	831.900	56,809.62
	h) Chajja W				
	Ground Floor	SQM	18.249	427.40	7,799.62
	First Floor	SQM	13.230	474.300	6,274.99

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
9	**Cutting, straightening colled or bent up M.S. rods, HYSD steel or Tor steel or grade Fe-415 confirming to I.S.-1786 - 1985 welding or jointing if necessary, bending, binding, tying the grills as required for RCC works, and hoisting, lowering and placing in proper position according to approved designs and drawings including cost, conveyance, loading, unloading, taxes of m.S. rods, HYSD steel or Tor steel and binding wires of 18 to 20 gauge required for the work and cost of all labour, sundries, T&P and scaffolding complete in all respect as directed by the Engineer-in-Charge (payment will be made according to the actual weight of M.S. rod, HYSD steel or Tor steel consumed in the work and no separate payment will be made towards weight of binding wires which is to be borne by the contractor at his own cost).**				
	Ground Floor	QNTL	170.135	8,359.70	14,22,277.15
	First Floor	QNTL	65.563	8,380.300	5,49,440.89
10	**Fly Ash brick masonary in Sub structure in cement mortar (1:6) in using Fly ash Bricks of 25cm x 12cm x 8 cm having crushing strength not less than 75 Kg/Cm2 including watering, curing and cost, conveyance, royality of all materials & cost of labour charges etc complete.**	CUM	21.261	4,147.80	88,188.20
11	**Fly Ash brick masonary in Supper structure in cement mortar (1:6) in using Fly ash Bricks of 25cm x 12cm x 8 cm having crushing strength not less than 75 Kg/Cm2 including watering, curing and cost, conveyance, royality of all materials & cost of labour charges etc complete.**				
	Ground Floor	CUM	49.121	4,181.10	2,05,381.80
	First Floor	CUM	41.076	4,411.400	1,81,201.25
12	**Fly Ash brick masonary in Super structure in cement mortar (1:4) in using Fly ash Bricks of 25cm x 12cm x 8 cm having crushing strength not less than 75 Kg/Cm2 including watering, curing and cost, conveyance, royality of all materials & cost of labour charges etc complete.**				
	Ground Floor	CUM	5.847	4,384.70	25,638.71
	First Floor	CUM	9.502	4,615.000	43,849.94
13	**6mm cement plaster on RCC surfaces at ceiling/slab soffit and other locations with cement mortar of mix 1:4 (1cement : 4 fine sand) including necessary scaffolding, curing etc. all complete at all floors and all heights including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labour, scaffolding, sundries, T & P required for the works etc. complete in all respect as directed by the Engineer-in-Charge.**				
	Ground Floor	SQM	501.648	154.40	77,454.44
	First Floor	SQM	275.955	157.700	43,518.15

Contractor Senior Manager (Civil)

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
14	**Providing 12 mm thick cement plaster with cement mortar of mix (1:6) with screened and washed sharp sand for mortar and finished smooth to the rough surface of walls in all heights after racking out joints including watering and curing, rounding of corners, providing grooves where ever necessary with cost, conveyance, royalties and taxes of all materials with cost of all labour,labour cess, T&P, and scaffolding required for the work etc. complete in all respect as directed by the Engineer in charge.**				
	Ground Floor	SQM	704.258	137.80	97,046.74
	First Floor	SQM	340.091	140.700	47,850.76
15	**Providing 16 mm thick cement plaster with cement mortar of mix (1:6) with screened and washed sharp sand for mortar and finished smooth to the rough surface of walls in all heights after racking out joints including watering and curing, rounding of corners, providing grooves where ever necessary with cost, conveyance, royalties and taxes of all materials with cost of all labour,labour cess, T&P, and scaffolding required for the work etc. complete in all respect as directed by the Engineer in charge.**				
	Ground Floor	SQM	232.871	196.80	45,828.99
	First Floor	SQM	159.990	201.100	32,173.99
16	**Providing and laying vertified floor tiles 600x600 mm. 1st quality laid on 25mm thick cement mortar 1:6 (1cement:6coarse sand) including pointing the joints with white cement and matching pigments, etc. complete design/drawings including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labourrequired for the works etc. complete in all respect as directed by the Engineer-in-Charge.**				
	Ground Floor	SQM	460.102	934.30	4,29,873.11
	First Floor	SQM	155.680	942.800	1,46,775.39
17	**Providing and laying Anti-skid ceramic floor tiles 300x300 mm approved make conforming to IS:13755 1st quality laid on 20 mm thick cement mortar 1:4 (1cement:4coarse sand) including pointing the joints with white cement and matching pigments, etc. complete design/drawings including cost, conveyance, loading, unloading, royalties and taxes of all materials, cost of all labourrequired for the works etc. complete in all respect as directed by the Engineer-in-Charge.**				
	Ground Floor	SQM	10.919	664.50	7,255.81
	First Floor	SQM	9.713	673.000	6,536.71

Contractor Senior Manager (Civil)

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
18	**Providing and fixing 1st quality ceramic glazed wall tiles conforming to IS :13755 (thickness to be specified by the manufacturer) minimim thickness 5mm of make in all colours, shades except burgundy, bottle green, black of size 300x300 in skirting and dados over 12 mm thick bed of cement mortar 1:3 (1 cement:3coarse sand) and jointing with grey cement slurry @ 3.3 kg per sqm including pointing in white cement mixed with pigment of matching shade complete as per direction of EIC, In all floors and all heights.**				
	Ground Floor	SQM	34.800	1,068.60	37,187.28
	First Floor	SQM	41.265	1,068.600	44,095.78
18A	**Fixing Ceramic glazed wall tiles in steps on 12 mm thick cement**				
	Ground Floor	SQM	43.673	988.70	43,179.20
	First Floor	SQM	17.771	1,015.100	18,039.34
19	**Finishing wall surface of walls with Acrylic wall putty (water based) of approved make and finished smooth and even surface to receive painting including cost of scafolding staging charges with cost of all materials, taxes, labour, T. & P. etc complete.**				
	Ground Floor	SQM	734.519	104.00	76,389.96
	First Floor	SQM	435.945	105.200	45,861.45
20	**Painting two coats with plastic emlusion paint over a coat of water as per the direction of Engineer-in-Charge at all floors and all heights including all material & labour complete.**				
	Ground Floor	SQM	734.519	81.10	59,569.47
	First Floor	SQM	435.945	82.500	35,965.49
21	**one coats to wall with any approved primer of approved shade including cost, carriage, taxes of paints, brush, putty, scaffoldind charges, labour charges, cess etc. complete as per direction of Engineer-in-Charge.**				
	Ground Floor	SQM	1,438.777	60.00	86,326.60
	First Floor	SQM	776.036	61.300	47,571.01
22	**Providing and applying to outside walls with two or more coats of -Fungal weather coat water proofing paint including scaffolding and cleaning the surface before application of approved colour and manufacture as per specification, and direction of Engineer-in-Charge at all elevations including all material labour complete.**				
	Ground Floor	SQM	704.258	66.20	46,621.87
	First Floor	SQM	340.091	66.800	22,718.06

Contractor Senior Manager (Civil)

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
23	**Supplying,fittting,fixing of window(Sliding Type) made of Aluminium section 9778 as window frame,section No 4095,4096 and 9777,3994 as shutter frame with 5 mm thick black glass as panel fitted with rubber bidding including locking arrangement, including all fitting ,including cost of materials, all taxes/labour,T&P etc complete as per direction of Engineer -in- Charge**				
	Ground Floor	SQM	29.939	5,556.60	1,66,358.49
	First Floor	SQM	21.529	5,556.600	1,19,629.71
24	**Galvanised Iron work wrought and put up in grated doors, windows and cage latrines etc all complete as per direction of EIC**				
	Ground Floor	kg	752.498	132.10	99,404.99
	First Floor	kg	497.786	132.100	65,757.53
25	**Providing & painting with synthetic enamel paint of approved brand and manufacture to give an even shade as per the direction of Engineer-in-Charge at all floors and all heights including all material & labour complete.**				
	Ground Floor	SQM	37.625	137.60	5,177.19
	First Floor	SQM	24.889	140.600	3,499.44
26	**Priming One Coat Red Oxide with approved shade of new Steel work including cost of materials, labour, T&P all comp.**				
	Ground Floor	SQM	37.625	58.60	2,204.82
	First Floor	SQM	24.889	60.700	1,510.78
27	**Supplying fitting and fixing of stainless steel of 304 grade in hand railing using 50mm dia of 2mm thick circular pipe with balustrade of size 32mm x 32mm x 2mm @ 0.90 mtr C/C and stainless square pipe bracing of size 32mm x 32mm x 2mm in 3 rows in staircase as per approved design and specification buffing, polysing etc with cost conveyance taxes of all materials labour T&P require for the work complete in respect.**				
	Ground Floor	RMT	6.000	3,499.50	20,997.00
	First Floor	RMT	6.300	3,499.500	22,046.85
28	**Supply, diluting and injecting chemical emulsion for PRE-CONSTRUCTIONAL anti termite treatment and creating a continuous chemical barrier under and alround the column pits, wall trenches, basement excavation, top surface of plinth, junction of wall and floor, along the external perimeter of building, expansion joints, topsurface of consolidated earth on which apron is to be laid, surroundings of pipes and conduits etc., complete as per specifications (Plinth area of building at ground floor only shall be measured for payment).**	SQM	478.397	110.00	52,623.67

Sl. No.	Item Description	Units	Qnty.	Estimated Rate	Amount
29	**Providing, fitting and fixing of of false ceiling with Aluminium anodised T section No. 3215 with 2'-0" centre to centre L section No. 1705 upto 15 micron on 4 walls to be fixed by means of steel screw and PVC plug Aluminium grid 2'-0" x 2'-0" with prelaminated particle board suspended from ceiling etc. complete as per direction by the Engineer-in-Charge.**				
	Ground Floor	SQM	460.102	1,693.95	7,79,389.44
	First Floor	SQM	78.532	1,693.950	1,33,029.62
30	**Providing, fitting and fixing of alluminium door with alluminium door section of 9202 as vertical member 9201 as top member and 9200 as bottom and middle member and with 12mm thick glass fixed on door frame by means of tapered clip no. 4660 and the frame to be completed by means of jointing angle no. 1855 including all cost of labour and T & P hire charges of drilling mechine, labour charges etc. as per the direction of Engineer- In- Charge.**				
	Ground Floor	SQM	35.826	5,888.90	2,10,975.73
	First Floor	SQM	25.680	5,888.900	1,51,226.95
				TOTAL	**80,96,159.89**

Rate quoted in figure
Rate quoted in words

Percentage excess/ less (in figure)
Percentage excess/ less (in words)

Signature of the Bidder

Contractor Senior Manager (Civil)