



**Indian Institute of Science Bangalore
560012**

Website : www.iisc.ac.in/opportunities/tenders

Contact: 080-2293 2765/2202/2203

**TENDER DOCUMENT
(e-Procurement)**

For

**“Rehabilitation/Replacement of Electro-Mechanical and
Instrumentation Equipment in identified Pumping Stations including
Regular Management of Water Supply System in IISc Campus”**

Tender No: IISc/Tender No.6/2018-19, dated:24th May2018

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SECTION 1: Invitation for Tenders

Tender Notification

Scope of Work	"Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus
Estimated Value of work	Rs 4,64,00,000/-
Period of Work Completion	12 (Twelve) Months from the date of Work Order for rehabilitation and 3 years of O&M including the period of rehabilitation
Name of the Client	Indian Institute of Science, Bangalore
Address of the Client	The Registrar Indian Institute of Science Bangalore – 560 012 Tel No. 080-2293 2765/2202/2203 e-Mail: estate@admin.iisc.ernet.in
Tender Processing Fee	As per e-procurement portal
Submission of Tender Document	e-procurement portal- https://eproc.karnataka.gov.in Helpline no: 080-25501216/25501227
Amount of Earnest Money to be deposited with the Tender	Rs. 6,96,000/-
Last date and Time for on line submission (uploading) of tender	25.06.2018 at 15.00 hrs.
Date and Time of opening of Tender (Technical Bid)	26.05.2018 at 15:30 hrs.
Date and Time of opening of Tender (Financial Bid)	Shall be intimated to technically qualified bidders.
Pre-bid Meeting	on 19.06.2018 at 16.30 hrs.
Place of Pre-bid meeting, opening of Technical bid and Finance bid	Centre for Campus Management and Development Indian Institute of Science Bangalore – 560 012

SECTION 2: INSTRUCTIONS TO BIDDERS

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A. General

1. Scope of Tender

The REGISTRAR, Indian Institute of Science invites tenders from eligible Bidders, for **“Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus.** (as defined in these documents). The eligible Bidders may submit tenders”

2. Eligibility Criteria

- 2.1 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of India or any State Government of Union of India. (authorized signatory should provide an undertaking).
- 2.2 Tenders from Joint ventures are not acceptable.
- 2.3 All Bidders shall provide the required information accurately and sufficient detail in Section 3: Qualification Information.
- 2.4 Any reputed Individual / Company registered with CPWD / KPWD / Railways / MES / BWSSB / State Water Supply & Sewerage Board of Class I Contractors are eligible to apply.
- 2.5 The Tenderer shall have executed and completed successfully in the last five years i.e., between 2012-13 to 2016-17 a single work of similar nature of value **not less than Rs. 3,71,20,000/-**.
- 2.6 The Tenderer shall have achieved in at least two consecutive financial years a minimum sum of turnover not less than **Rs. 9,28,00,000/-in the last five years i.e. 2012-13 to 2016-17**.
- 2.7 Work completion certificate for having completed at least one work of similar nature of value not less than the estimated value of contract certified from the competent authority not below the Rank of Executive Engineer or equivalent shall be uploaded. The work completion certificate shall mention the nature of work, items of work executed and the date of commencement and date of completion of the work.
- 2.8 The tenderers shall upload the valid and present certificate copies of PAN, GST, Contractor's Registration pass book in technical bid, **failing which the tender will be rejected**. If necessary bidder shall produce all the original documents for verification.
- 2.9 If the rate quoted by the Contractor for each category of works is below the estimated value of the work, the contractor should pay the difference of amount in favour of The Registrar, IISc in the form of DD or Pay order or FDR (Fixed deposit receipt) as an additional security deposit before entering into Agreement. The same will be refunded only after satisfactory completion of the work.
- 2.10 The work shall be carried out as per the directions of the Project Engineer cum Estate Officer and Engineer-in-charge.
- 2.11 Black listed contractors/in govt/Quasi govt/boards/BBMP/BWSSB/State Water Supply& Sewerage Board etc., are not eligible to quote, if found such tenders will be rejected
- 2.12 The successful Bidder shall execute an Agreement within 10 days from the date of Receipt of intimation from this office, The Tender Document will form the part and parcel of the agreement, failing which the tender will deem to be get cancelled.

“Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus”

- 2.13 The material shall be got approved by the Project Engineer cum Estate Officer, IISc before execute the work.
- 2.14 Further details of the work can be obtained from this office.
- 2.15 The rates quoted in the schedule shall be inclusive of all applicable taxes (inclusive of GST).
- 2.16 The IISC. reserves the right to accept / reject any or all the tenders without assigning any reasons.
- 2.17 The work shall be commenced with all men and machinery within 10 days from the date of work order, failing which it would be presumed that the successful tenderer is not interested in the work and action will be taken to get the work executed through alternate agency at the risk and cost of the former Tenderer.
- 2.18 Conditional tenders will not be accepted.
- 2.19 Bidders who meet the above specified minimum qualifying criteria, shall be eligible.
- 2.20 Even though the Bidders meet the above criteria, they are subject to be disqualified if they have:
 - Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
 - Record of poor performance such as abandoning the works, not properly completed the contract, inordinate delays in completion, litigation history, or financial failures etc.
3. Site visit:

The Bidder at his own responsibility is encouraged to visit and examine the Site of Works and its surroundings and obtain all information that may be necessary for preparing the Tender and entering into a contract for the Works. The cost of visiting the Site shall be at the Bidder's own expense.

B. Tender documents (Two bid system – Technical & Financial)

The Tender document can be downloaded from e-procurement website:
<https://www.eproc.karnataka.gov.in>.

It may be noted that all subsequent notifications, changes and amendments on the project/document would be posted only on the same website: <https://www.eproc.karnataka.gov.in>.

The bidders will be required to register themselves with the centre for e-governance to participate in the bidding. Necessary details could also be obtained over telephone at 080-25501216/25501227.

4. Content of Tender documents

The bidders should go through the Tender Document and submit online response through e-procurement portal only.

5. Amendment of Tender documents

- 5.1 Before the deadline for submission of tenders, the IISC. may modify the tender documents by issuing corrigendum / addendum.
- 5.2 Such corrigendum/ addendum thus issued shall be part of the tender documents and shall be published online in e-Procurement portal.
- 5.3 To give prospective Bidders reasonable time in which to take corrigendum/ addendum into account in preparing their tenders, the IISC. shall extend as necessary the deadline for submission

of tenders.

C. Preparation of Tenders

6. Documents comprising the Tender

6.1 **The technical bids** submitted by the Bidder shall contain the documents as follows:

- (a) Earnest Money Deposit & Tender processing fee paid in any of the payment modes specified in e-Procurement platform.
- (b) Qualification Information as per formats to comply the task created in the e-Procurement Portal under General Terms and Conditions and Technical parameters and Documents required from Bidder.
- (c) Any other documents / materials required to be completed and submitted by Bidders in accordance with these instructions. The required documents shall be filled in without exception.

6.2 **The financial bids** submitted by the Bidder shall contain the documents as follows:

Priced Bill of Quantities; online through e-procurement portal, no hardcopy of commercials should be attached or disclosed.

7. Tender prices

7.1 The contract shall be for category of works / whole works based on the priced Bill of Quantities submitted by the Bidder.

7.2 The Bidder shall fill in rates for all items in each category of Works described in the Bill of Quantities. Items for which no rate or price is entered by the Bidder will not be paid for by the IISC. when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.

7.3 All prevailing duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Bidder.

8. Tender validity

8.1 Tenders shall remain valid for a period not less than **180 days** after the deadline date for tender submission. A tender valid for a shorter period shall be rejected by the IISC. as non-responsive.

8.2 In exceptional circumstances, prior to expiry of the original time limit, the IISC. may request that the Bidders may extend the period of validity for a specified additional period. The request and the Bidders' responses shall be made in writing or by email. A Bidder may refuse the request without forfeiting his earnest money deposit. A Bidder agreeing to the request will not be required or permitted to modify his tender, but will be required to extend the validity of his earnest money deposit for a period of the extension, and in compliance with Clause 9 in all respects.

9. Earnest money deposit

9.1 Earnest Money Deposit/ Bid security

The Bidder shall furnish, as part of his tender, earnest money deposit (EMD) of **Rs. 6,96,000/-**.

The Bidder can pay the Earnest Money Deposit (EMD) in the e-Procurement portal using any of the following payment modes:

- Credit Card

- Direct Debit
- National Electronic Fund Transfer (NEFT)
- Over the Counter (OTC)

EMD amount will have to be submitted by the bidder taking into account the following conditions:

- EMD will be accepted only in the form of electronic form and not through Demand Draft or Bank Guarantee and will be maintained in E-procurement Bank account until the finalization of the Tender.
- The entire EMD amount for a particular tender has to be paid in a single transaction

9.2 The earnest money deposit of unsuccessful Bidders will be returned after awarding the contract to the successful bidder.

9.4 The earnest money deposit may be forfeited:

- If the Bidder withdraws the Tender after tender opening during the period of tender validity;
- If the Bidder fails within the specified time limit to
 - Sign the Agreement; or
 - Furnish the required Security deposit

10. Format and signing of Tender

Bidder shall sign all the pages of the tender document as a token of acceptance of all the terms and conditions of the contract and uploaded in the e-Procurement portal.

D. Submission of Tenders

11. Tenders must be submitted on-line in the e-Procurement portal by the Bidder before the notified date and time.

12. Deadline for submission of the Tenders

The Bidder shall submit a set of hard copies of all the documents in a sealed cover to IISC., required as a pre-qualification bid (Technical bid) which were uploaded through e-procurement portal. In the event of any discrepancy between them, the original uploaded document in e-procurement shall govern.

The IISC. may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause 5, in which case all rights and obligations of the IISC and the Bidders previously subject to the original deadline will then be subject to the new deadline.

13. Late Tenders

In e-procurement system, Bidder shall not be able to submit the bid after the bid submission time and date as the icon or the task in the e-procurement portal will not be available. IISC will not be liable (or) responsible for any delay due to unavailability of the portal and the Internet link.

14. Modification and Withdrawal of Tenders

14.1 Bidder has all the time to modify and correct or upload any relevant document in the portal till last date and time for Bid submission, as published in the e-procurement portal.

- 14.2 The Bidder may withdraw his tender before the notified last date and time of tender submission.
- 14.3 No Tender may be modified after the deadline for submission of Tenders.
- 14.4 Withdrawal or modification of a Tender between the deadline for submission of Tenders and the expiration of the original period of Tender validity specified in Clause 8.1 above or as extended pursuant to Clause 8.2 may result in the forfeiture of the earnest money deposit pursuant to Clause 9.

E- Tender opening and evaluation

15. Tender Opening:

- 15.1 The IISc will open all the Tenders received in the presence of the Bidders or their representatives who choose to attend on the specified date, time and place specified. In the event of the specified date of Tender opening being declared a holiday for the IISC. the Tenders will be opened at the appointed time and location on the next working day.
- 15.2 The IISC. will evaluate and determine whether each tender meets the minimum qualification / eligibility criteria.
- 15.3 Bidder to submit all the Original Documents, which are submitted in e-procurement portal, to the IISC. for verification at the time of opening of Tender.
- 15.4 The IISC record the Tender opening

16. Process to be confidential

- 16.1 Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process until the award to the successful Bidder has been announced.

17 Clarification of Tenders

- 17.1 To assist in the examination, evaluation, the IISC. may, at his discretion, ask any Bidder for clarification of his Tender. The request for clarification and the response shall be in writing or by e-mail along with the section number, page number and subject of clarification, but no change in the price or substance of the Tender shall be sought, offered, or permitted.
- 17.2 Subject to sub-clause 17.1, no Bidder shall contact the IISC. on any matter relating to its Tender from the time of the Tender opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the IISC., he should do so in writing.
- 17.3 Any effort by the Bidder to influence the IISC. in the IISC.'s Tender evaluation, or contract award decisions may result in the rejection of the Bidders' Tender.

18. Examination of Tenders and determination of responsiveness

- 18.1 Prior to the detailed evaluation of Tenders, the IISC. will determine whether each Tender (a) meets the eligibility criteria defined in Clause 2; (b) has been properly signed; (c) is accompanied by the required earnest money deposit and; (d) is substantially responsive to the requirements of the Tender documents.
- 18.2 A substantially responsive Tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material

deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the Tender documents, the IISC.'s rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Tenders.

- 18.3 If a Tender is not substantially responsive, it will be rejected by the IISC., and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

19. Correction of errors

- 19.1 Tenders determined to be substantially responsive will be checked by IISC. for any arithmetic errors. Errors will be corrected by the IISC. as follows:
- (a) Where there is a discrepancy between the rates in figures and in words, the lower of the two will govern; and
 - (b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will govern.
- 19.2 The amount stated in the Tender will be adjusted by the IISC. in accordance with the above procedure for the correction of errors and, with the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount the Tender will be rejected, and the earnest money deposit may be forfeited.

20. Evaluation and comparison of Tenders

- 20.1 Opening of the Financial bid will be preceded by the evaluation of the Pre-qualification Offer (Technical bid), vis-a-vis the capability, capacity and credibility of the Bidder. Evaluation of the Pre-qualification Offer will be done by the Evaluation Committee constituted for the purpose. After evaluation is completed, all the Bidders who are qualified will be notified and will be intimated at the time of opening of the Financial bid. Financial bid will be opened in the presence of those who choose to be present or even in the absence of any Bidder.

The IISC. will evaluate and compare only the Tenders determined to be substantially responsive in accordance with Clause 18.

- 20.2 In evaluating the Tenders, the IISC. will determine for each Tender the evaluated Tender Price by adjusting the Tender Price as follows:
- (a) Making any correction for errors pursuant to Clause 19 and
 - (b) Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Sub Clause 14.5.
- 20.3 The IISC. reserves the right to accept or reject any variation, deviation, or alternative offer. Variations, deviations, and alternative offers and other factors which are in excess of the requirements of the Tender documents or otherwise result in unsolicited benefits for the IISC. shall not be taken into account in Tender evaluation.
- 20.4 **NEGOTIATIONS**
- The Bidder though technically qualified and who's financial offer is the lowest, fails to convince the Tender Evaluation Committee of his capability, capacity, credibility, his offer may be rejected and the Bidder intimated accordingly. In such case, the Bidder, who has quoted the second lowest price, may be considered and his price may be negotiated.

F. Award of Contract

21. Award criteria

- 21.1 Subject to Clause 22, the IISC. will award the Contract to the Bidder whose Tender has been determined to be substantially responsive to the Tender documents and who has offered the lowest evaluated Tender Price, provided that such Bidder has been determined to be (a) eligible in accordance with the provisions of Clause 2, and (b) qualified in accordance with the provisions of Clause 3.

22. IISC.'s right to accept any Tender and to reject any or all Tenders

- 22.1 Notwithstanding Clause 21, the IISC. reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the IISC.'s action.

23. Notification of award and signing of Agreement

- 23.1 The Bidder whose Tender has been accepted will be notified of the award by the IISC. prior to expiration of the Tender validity period by e-mail or confirmed by letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the IISC. will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").
- 23.2 The notification of award will constitute the formation of the Contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause 24.
- 23.3 The Agreement will incorporate all agreements between the IISC. and the successful Bidder / Bidders. It will be kept ready for signature of the successful Bidder in the office of IISC. following the notification of award along with the Letter of intent. The successful Bidder will sign the Agreement and deliver it to the IISC.
- 23.4 Upon the furnishing by the successful Bidder of the Security deposit, the IISC. will issued formal work order

24. Further Security deposit (FSD)

- 24.1 6% on the running bills and final bill in addition to Earnest Money Deposit. When the FSD deducted from R.A Bills of the contractor @ 6% of the bill amount exceeds Rs.1.00 Lakh, the amount in excess of Rs. 1.00 Lakh may, at the request of the bidder, be released to him against the production of the bank guarantee issued from a Nationalised Bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the period.
- 24.2 If the security deposit is provided by the successful bidder in the form of a Bank Guarantee, it shall be issued either by a Nationalized/Scheduled bank
- 24.3 Failure of the successful Bidder to comply with the requirements of Sub-Clause 24.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the earnest money deposit.

25. Corrupt or Fraudulent practices

- 25.1 The GoK requires that the Bidders observe the highest standard of ethics during the procurement

and execution of such contracts. In pursuance of this policy, IISC.:

- (a) will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question;
- (b) will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a GoK/IISc contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing, a GoK/IISc contract.

SECTION 3: QUALIFICATION INFORMATION

The information to be filled in by the Bidder hereunder will be used for purposes of computing Tender capacity as provided in Clause 2 of the Instructions to Bidders. This information will not be incorporated in the Contract.

- 1.1 Name of Agency as registered :
- Postal Address for communication :
- Principal Place of business :
- Name of the Owner :
- Nature of Company/individual/partnership/firm etc :
- Telephone / Mobile No. :
- E-Mail Address :
- Name of the authorized person with contact details :
- Constitution or legal status of Bidder:
- Place of Registration : [Attach self attested photo copy]
- Labour Regn. No. (Attach Attested Copy) :
- Service Tax Regn. No. (Attach Attested Copy) :
- E.P.F. Regn. No. (Attach Attested Copy) :
- E.S.I. Regn. No. (Attach Attested Copy) :

- 1.2 Total value of similar works executed and payments received in the last five years
(In Rs. Lakhs)

2012-13 _____
2013-14 _____
2014-15 _____
2015-16 _____
2016-17 _____

- 1.3 (a) Details of Works performed as a Prime Contractor (in the same name) on works of similar nature over during the five years specified in 1.2 above.

Project Name	Name of Employer	Description of work	Contract number	Value of Contract	Stipulated Period of completion	Actual date of completion	Remarks (Reason for delay)

[Attach satisfactory certificate and date of completion from the concerned Engineer-in-charge not below the rank of Executive Engineer or Competent Authority]

(b) Details of single Govt / Semi Government / Reputed Organization similar nature of works costing **80%** of the amount put to tender & above carried out during the five financial years specified in 1.2 above.

Project Name	Name of Employer	Description of work	Contract number	Value of Contract	Date of work order	Stipulated Period of completion	Actual date of completion	Remarks (Reason for delay)

[Attach satisfactory certificate and date of completion from the concerned Engineer-in-charge not below the rank of Executive Engineer or Competent Authority]

1.4 Information on works for which Tenders have been submitted and works which are yet to be completed as on the date of this Tender.

(A) Existing commitments and on-going works:

Description of work	Place & state	Contract Number And Date	Name & Address of the Costomer	Value of contract Rs. Lakhs	Specified period of completion	Value of work remaining to be completed (Rs. Lakhs)	Anticipated date of completion
1	2	3	4	5	6	7	8

[Details to be furnished with necessary work order signed from concerned Engineer-in-charge not below the rank of Executive Engineer or Competent Authority. Work order/Testimonials will be verified, if required]

(B) Works for which Tenders already submitted:

Description of work	Place & state	Name & Address of the Costomer	Estimated value of work Rs in lakhs	Stipulated period of completion	Date when decision is expected	Remark If any
1	2	3	4	5	6	7

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1.5 Details of Works performed as a Prime Contractor (in the same name) on works similar nature of **SCADA** based operating system over during the five years specified in 1.2 above.

Project Name	Name of Employer	Description of work	Contract number	Value of Contract	Date of work order	Stipulated Period of completion	Actual date of completion	Remarks (Reason for delay)

1.6. Reports on the financial standing of the tendered, such as profit and loss statements and auditor's reports (audited balance sheet) and Annual Turn Over for the last five years to be uploaded as per the format below:-

Sl.No	Year	Turn Over Amount	Remark
1	2	3	7
2	2012-13		
3	2013-14		
4	2014-15		
5	2015-16		
6	2016-17		

[Report on the financial standing of the tendered, such as profit and loss statements and auditor's report (Audited balance sheet) for the last five years to be uploaded]

1.6 Evidence of access to financial resources to meet the qualification requirement specified in ITT Clause 3.3 (b): Cash in hand, Letter of Credit etc. List them below and attach certificate from the Banker in the suggested format as under:

BANKER'S CERTIFICATE

This is to certify that M/s. is a reputed company with a good financial standing. If the contract for this work, namely (name of the work) is K/W – 3 Works /Open awarded to the above firm, we shall be able to provide overdraft/credit facilities to the extent of Rs. ----- (30% of the estimated value) to meet the working capital requirements for executing the above contract

Sd/-

Name of the Bank, Senior Bank Manger

Address:.....

Name, address, and telephone, telex, and fax numbers of the Bidders' bankers who may provide references if contacted by the IISC..

Income tax clearance certificate to be uploaded duly signed by competent Authority

SECTION 4:

Scope of the work

- a. Rehabilitation/Replacement of Electro-mechanical and instrumentation equipment in identified pumping stations to achieve a **SCADA** based operating system which includes rehabilitation in the following pumping stations and the work has to be carried out for provision of new panels, cabling, replacement of motors (wherever required), earthing, lighting and instrumentation equipment's, pressure gauges, water level controllers and other appurtenances as per details in BOQ and as per instructions from the consultants/PE-cum-EO.
1. TPS pump house.
 2. Main Pump House near Dept. of Biochemistry.
 3. Library Pump House.
 4. Old Aerospace Pump House – to be eliminated
 5. Housing Colony (Old) Pump House.
 6. New A-Type Housing Colony Pump House.
 7. New Housing Colony Pump House near D-Gate.
 8. Housing Colony ND Type Pump House.
 9. Housing Colony NE Type Pump House.
 10. Housing Colony E-60 Qrtrs Pump House.
 11. E-Block Hostel Pump House.
 12. Sump near New Girls Hostel.
 13. Sump near New Boys Hostel.
 14. Pump House of Tunga Apartments.
 15. R-Block Pump House.
 16. A-Mess Pump House.
 17. B-Mess Pump House.
 18. ICE Pump House.
 19. K-Block Pump House.
 20. P-Block Pump House.
 21. PD-Block Pump House.
 22. Pump House in Yeshwanthpura Quarters premises.
 23. Bhaskara Apartments-Sump cum Pump House.
 24. Aryabhata Quarters Pump House.
 25. Kendriya Vidyalaya Pump House.
 26. HMT Quarters Pump House.
 27. Krithika Hostel-Sump cum Pump House.
 28. Bharani Hostel Pump House.
 29. New Staff Quarters Pump House.
 30. Biological Science Department Pump House.
- b. Management of Water Supply System including **Management & Maintenance of water supply** lines, GLSR's and Overhead tanks, pumping stations, valves, etc., required for

supply of 24/7 supply of water to the residents, students, departments and other community in IISc campus.

- c. **Management & Maintenance** of Pumps connected to rain water collection sump tanks & rain water harvesting pumps.
- d. Maintenance of Re-cycled water pipe line and their fittings, valves, etc.
- e. Establishment, **Management & Maintenance of water supply system** of complaint cell (of call center type) for recording & attending complaints from quarters, departments, Hostels, Guest Houses, centers and central facilities related to Institute Water supply system and the responsibility of the agency will be up to the inlet of the overhead tank including all matters concerning the overflow of these tanks.

The Management of Water Supply System envisages all the required tasks to ensure

- a) Maximum system availability.
- b) Most efficient, effective and optimum usage of water supply system.
- c) Enhance the life expectancy of equipment's.
- d) Regular **Management & Maintenance of** equipment's+.
- e) Compliance of safety rules and regulations.
- f) Preventive maintenance/scheduled maintenance.
- g) Breakdown maintenance.
- h) Maximum service to consumers for maintaining uninterrupted water supply.
- i) Maintenance of proper records of **Management & Maintenance of** (Log book, registers, check list etc., shall be approved by IISc).
- j) Assistance to IISc in expansions and modification.

Management & Maintenance of Pumping Stations

- a) Switching ON and Switching OFF of pumps as and when required according to requirements, instructions from IISc.
- b) Maintaining records of all the operations and records of water received, water supplied, energy consumption on hourly/daily/weekly/fortnightly/quarterly/half yearly and yearly basis.
- c) Maintaining records of water supply failures with reasons.
- d) Observing the pumping stations continuously and reporting any problem or faults to the IISc which require major/minor improvements.
- e) Maintaining records of maintenance.
- f) Interchanging the pumps as and when required.
- g) Co-ordination with operators in BWSSB pumping stations for efficient reliable operation of Water Supply System.
- h) Attending the faults and restoration of the Water Supply without delay.
- i) Following distribution system and maintaining a book to facilitate system maintenance without interruptions.

Taking preventive maintenance such as maintenance of defective pumps, starters, Valves, etc. Contractor has to maintain a check list for preventive maintenance & upkeep the system

accordingly. However, contractor has to prepare a detailed check list covering all the required items and submit for IISc approval before being implemented.

The Management of Water Supply System involves deployment of right persons as mentioned above for operation and these persons would be responsible for the work contracted for this purpose. The main jobs will include:

- a. Routine Surveillance of Pumping stations, water supply distribution lines, sump tanks & over head tanks.
- b. Filling up of Approved Data Sheets for the different equipments of pumping stations, raising deficiency reports and communicating to IISc Engineers and maintenance staff.
- c. Recording all tripping of pumps and other events that occur in the order of sequence with the time of occurrence correctly and record them in Log Book.
- d. Carrying out operations correctly and accurately and recording the same in the relevant Log Books.
- e. Strictly following operating instructions given by the IISc.
- f. Observing all safety precautions and ensure safety to men and material and the equipment during the contract period.
- g. Attending to all emergencies which may arise during the contract period such as equipment failure, fire accidents, etc., shall get acquainted with the operations of all equipments covered under the contract.
- h. Attending to all Telephone Calls and issue receipt message promptly.
- i. Preparing daily reports and periodic returns in the prescribed format in duplicate and submit to the concerned IISc authority.
- j. Assuming responsibility for the equipment & other materials for any damages that occur due to mal-operation of equipment and shall make good the loss suffered by IISc.
- k. To be alert in attending to all operations and events promptly without delay.
- l. Updating of interruptions Register, Call register, Data Book. Apart from the above, the contractor shall carry out the checks in the document during the contract period daily.
- m. Ensuring routine, preventive and breakdown maintenance works for the Maintenance of Water Supply System involves all the routine.
- n. Housekeeping of the pump houses including electrical system in the condition handed-over.

Co-ordination with BWSSB

- a. Co-ordination with BWSSB officials for all related works and giving reports to IISc regarding, information from BWSSB and Co-ordination with Engineers and staffs of IISc in all relevant activities.

Terms and Conditions

1. All disputes that may arise shall be referred to the Director of IISc, whose decision in this regard shall be final.
2. All maintenance and repair works involved shall be carried out by the agency. The labour cost involved for maintenance and repair works should be borne by the agency. The cost involved for earth work, spares and fixtures will be reimbursed by the Institute as per actuals.
3. All major faults and problems shall be reported to IISc within half a day of occurrence through a memo. After inspection by IISc, procedures for rectification shall be got approved by the agency.
4. Any damage or loss due to failure to carry out prescheduled maintenance work shall be to the risk and cost of the agency.
5. Any other work covered under respective terms and conditions, if required or insisted by any regulatory body including tests and calibrations, etc., shall be undertaken by the agency.
6. The necessary salary and other allowances due to the employees by the contractor shall be paid by him and shall strictly comply with all rules and regulations of statutory bodies and other labour laws. All employees engaged by the contractor shall be comprehensively insured for accidents and injuries.
7. The duration of the contract initially is for a period of three years – likely to be extended for another two years after assessing the performance of the agency.
8. The monthly service charges for the **Management & Maintenance of water supply system** work shall be paid to the contractor on monthly basis.
9. The payment to the successful contractors are subject to all statutory deduction like Security Deposit, Income Tax, Tax, etc., as are applicable at the time of payment.
10. All materials and tools used for replacement, repairs, testing, etc., shall be approved by IISc.
11. The annual service maintenance of the accessories shall be carried out as per the manufacturer's manual applicable from time to time. The work shall be carried out through authorized personnel. The service charges shall be paid by the agency.
12. The contractor shall note that they shall have to carry out their work in close co-ordination with other contractors/agencies working in the same premises.
13. In the event of contractor showing lack of attendance to the work, negligence or unfair performance in the opinion of IISc, then the contract may be terminated at any stage without prejudice to the right by action under any other relevant clause of the contract.
14. The contractor shall follow all security rules framed by IISc from time to time regarding removal of materials from site, issue of identity cards, control of entry of persons and other similar matters.
15. The contractors' personnel shall not disclose any information or drawings furnished to him by IISc. Any drawings, records and other information's prepared by the contractor or by IISc or jointly by both for the execution of the works shall not be disclosed without the prior approval of the IISc. No photograph of the Pumping station or any other place within the premises of IISc shall be taken without the prior approval of the IISc.
16. The contractor shall keep his work spot, site office and surroundings neat, clean and tidy. It should be free from dust, rubbish, scrap, surplus materials and unwanted tools and equipment's. All scaffolding and temporary structure including the tools and

equipment's shall be removed as soon as the job for which they are intended are completed. All equipment and material to be taken inside the plant building shall be cleaned thoroughly before taking them inside. The contractor shall employ adequate housekeeping staff for above purpose. The Engineer-in-charge has the right to stop the work, if the contractor fails to improve upon the house keeping after having been notified.

17. IISc will have the right to withdraw the works permit for any of the workmen for reasons of misconduct, incompetence in work, violation of safety and fire rules, negligence on duty etc.
18. Cost of damages caused due to bad workmanship shall be recovered from the contractor.
19. The knowledge/Information of availability of manpower on daily basis shall be responsibility of contractor himself and not by IISc. Contractor should ensure availability of his representative throughout the contract period who shall be responsible for manpower availability and their record keeping.
20. The contractor shall depute staff to ensure round-the clock for maintenance services on all days in a Month as per requirement.

SECTION 5:

Form of Tender

Description of the Works: **“Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus and Additional three years of Comprehensive Annual Maintenance Contract (AMC). ”**

To

The Registrar,
Centre for Campus Management and Development
Indian Institute of Science
Bengaluru – 560 012

Dear Sir,

We offer to execute the Works described above in accordance with the Conditions of Contract

This Tender and your written acceptance of it shall constitute a binding contract between us. We understand that you are not bound to accept the lowest or any Tender you receive.

We undertake that, in competing, if the award is made to us, in executing the above contract, we will strictly observe the laws against fraud and corruption in force in India namely “Prevention of Corruption Act 1988”.

We hereby confirm that this Tender complies with the Tender validity and Earnest money deposit required by the Tender documents.

We hereby authorized IISc and its authorized representatives to conduct any enquiries or investigations to verify the statements, documents and information submitted (uploaded) for this tender.

We attach herewith our current income-tax clearance certificate.

Yours faithfully,

Authorized Signature:

Name & Title of Signatory: _____

Name of Bidder
Address:

THE ARTICLES OF AGREEMENT

Articles of Agreement made at Bangalore, this between the INDIAN INSTITUTE OF SCIENCE, BANGALORE 560 012, (hereinafter referred to as the OWNER or EMPLOYER which expression shall include its successors and assigns and all the persons for the time being in the Management of the Institute) represented by its REGISTRAR of the ONE PART, andhereinafter referred to as the "CONTRACTOR", (which expression shall include their partners, their respective heirs, executors, administrators and assigns) on the OTHER PART.

WHEREAS the Employer is desirous of getting the work of **"Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus"**(hereinafter called the work) executed by the Contractor at the rates quoted by him amounting to **Rs.____/-(Rupees _____ Only)** which is the estimated amount put to tender.

AND WHEREAS the Contractor has agreed to execute the aforesaid work on terms and conditions mentioned herein and subject to Tender Conditions of Contract and in accordance with the particular specifications, general notes and the schedule of quantities, schedule of rates, payment and penalty condition.

AND WHEREAS the contractor has deposited a sum of **Rs 6,96,000/- (Rupees Six Lakh Ninety Six Thousand Only)** with Employer as security for the due performance of this Contract.

NOW it is hereby agreed and declared by and between the parties hereto as follows;

1. In consideration of the payment to be made to them as hereinafter provided, the contractor shall, subject to the terms, conditions, specifications, schedule of quantities, drawings, etc., more particularly stated in the Schedules aforesaid, execute and complete the work within **12 (Twelve) Months for rehabilitation and 3 years of Management & Maintenance of water supply system including the period of rehabilitation** starting after 10 days of issuance of work order or from the date of handing over of site, whichever is later.
2. The Employer shall pay to the contractor such sums as shall become payable hereunder at the time and in the manner specified in the conditions contained in the schedule aforesaid.
3. The time allowed for carrying out the work as entered in the tender Agreement shall be strictly observed by the contractor and shall be deemed to be the essence of the contract on the part of the contractor and shall be reckoned from 10 days after the date on which the order to commence the work is issued to the Contractor or the date of handing over of site, whichever is later. The work shall throughout the stipulated period of the contract be proceeded with all due diligence and the Contractor shall pay as compensation an amount equal to one percent, or such smaller amount, as the Director, Indian Institute of Science (whose decision in writing shall be final) may decide on the amount of estimated cost of the whole work as shown in the tender for every day that the work remains uncommenced or unfinished, after proper dates.
4. The contractor shall to ensure good progress during the execution of the work the contractor shall be bound in all cases in which the time allowed for any work exceeds one month (save for special jobs) to complete one-eighth of the whole work before, one-fourth of the whole time allowed under the contract has elapsed, three-eighths, of the work before one-half of such time has elapsed, and three-fourths of the work before three-fourths of such time has elapsed.

However for special jobs if a time schedule has been submitted by the contractor and the same has been accepted by the Architects/ Project Engineer-cum-Estate Officer, CCMD the contractor shall comply with the said schedule. In the event of the Contractor failing to comply with the conditions he shall be liable to pay as compensation an amount equal to one percent or such smallest amount, as the Director, Indian Institute of Science (Whose decision in writing shall be final), may decide on the said estimated cost of the whole work for every day that the due quantity of work remains incomplete; provided always that the entire amount of compensation to be paid under the provisions of this clause shall not exceed seven and a half (7 ½) percent of the estimated cost of the work as shown in the tender.

5 The Director of the Indian Institute of Science, without prejudice to his rights under the contract in any respect of any delay or inferior workmanship or otherwise, or to any claim for damages in respect of any breaches of the Contract and without prejudice to any rights of remedies under any of the provisions of this contract or otherwise and whether the date of completion has or has not elapsed, by notice in writing absolutely determine the contract in any of the following cases:-

- (i) If the contractor having been given by the Architects/Project Engineer-cum-Estate Officer, CCMD a notice in writing to rectify reconstruct or replace any defective work or that the work is being performed in any inefficient or otherwise improper or un workmanlike manner, shall omit to comply with the requirements of such notice for a period of seven days of such notice thereafter or if the contractor shall delay or suspend the execution of the work so that in the judgment of the Project Engineer-cum-Estate Officer, CCMD (which shall be final and binding) either he will be unable to secure completion of the work by the date for completion of the work or he has already failed to complete the work by that date.
- (ii) If the Contractor being a company passes a resolution or if the Court passes an order to wind up the company or if a receiver or a manager is appointed on behalf of the creditors of the company or under circumstances which entitles the Court or the creditors to appoint a receiver or manager which would entitle the Court to make a winding up order.
- (iii) If the Contractor commits breach of any of the terms or conditions of this contract;
- (iv) If the contractor assigns or sublets without written approval of the Project Engineer-cum-Estate Officer, CCMD or becomes insolvent.
When the Contractor has made himself liable for action under any of the cases aforesaid, the Project Engineer-cum-Estate Officer, CCMD on behalf of the Director of the Institute shall have powers:
 - (a) To determine or rescind the Contract as aforesaid (in which termination or recession notice in writing to the Contractor under hand of the Project Engineer-cum-Estate Officer, CCMD shall be conclusive evidence) Upon such determination or recession the security deposit of the Contractor shall be liable to be forfeited and shall absolutely be at the disposal of Institute.
 - (b) To employ labor paid by the Institute and supply materials to carry out the work or any part of the debiting the Contractor with the cost of the labor and the price of the materials (of the amount of which cost and price certified by the Project Engineer-cum-Estate Officer, CCMD shall be final and conclusive against the Contractor) and crediting him with the value of the work done in all respect on the same manner and at the same rates as if it has been carried out by the contractor under the term of his contract. The certificate of the Project Engineer-cum-Estate Officer, CCMD as to the value of the work done shall be final and conclusive against the contractor, provided always that action under the sub-section shall only be taken after giving notice in writing to the contractor. Provided also that if the expenses incurred by the Institute are less than the amount payable to the contractor at his agreement rates, the difference shall not be paid to the Contractor.
 - (c) After giving notice to the contractor to measure up the work of the contractor and to take such part thereof as shall be un-executed out of his hands and to give it to another contractor to complete in which case any expenses which may be incurred in excess a sum of which would have been paid to the original contractor if the whole work had been

executed by him (of the amount of which excess the certificate in writing of the Project Engineer-cum-Estate Officer, CCMD shall be final and conclusive) shall be borne and paid by the original contractor and may be deducted from any monies due to him from the Institute under this contract or any other account whatsoever, of from his security deposit or the proceeds of sales thereof, or a sufficient part thereof as the case may be.

In the event of any one or more of the above courses being adopted by the Project Engineer-cum-Estate Officer, CCMD, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased or procured any materials or entered into any engagements or made any advances on account or with a view to the execution of the work or the performance of the contract. And in case action is taken under any of the provisions, aforesaid, this contractor shall not be entitled for recover or be paid any sum for work thereto/for actually performed under this contract unless the Architect/ Project Engineer-cum-Estate Officer, CCMD has certified in writing the performance of such work and the value payable in respect thereof and he shall only be entitled to be paid the value so certified.

6. The schedules above mentioned including the General Rules and Directions to Contractors and the following documents, viz.,

- i) Letter of Intent
- ii) Letter of Acceptance
- iii) Conditions of Contract – Volume I
- iv) Contractor's Bid – Bill of Quantities – Volume II
- v) Technical Specifications – Volume III
- vi) Drawings
- vii) The pre-Bid meeting proceedings and corrigendum
- viii) Any other document listed in the Contract Data as forming part of the contract

shall form an integral part of agreement and the decision of the Project Engineer-cum-Estate Officer, CCMD in reference to all matters of dispute as to material and workmanship shall be final and binding on both the parties.

7. The employer reserves to himself the right of altering the drawings of the works and of adding to or omitting any item of work from or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall not vitiate this agreement.

8. This agreement comprises the work aforesaid and all subsidiary works connected therewith even though such works may not be shown on the schedule appended hereto.

9. Notwithstanding anything contained in the tender submitted by the contractor, all the clauses of this agreement shall be binding on both the parties.

10. Where counter terms and conditions, printed or copied, are offered by the contractor, the same shall not be deemed to have been accepted by the Employer, unless specific written acceptance thereof is furnished by the Employer. Notwithstanding the foregoing, no verbal agreement or inference from conversation with any office members/representatives/employees of

the Employer before, during or after the execution of the agreement, shall in any way affect or modify any of the terms/obligations contained herein.

11. In the event the contract is terminated by the Employer due to any afore mentioned act/omission on the part of the contractor, or for any reason whatsoever, the Employer shall be entitled to engage the services of any other person, agency or Contractor to meet its requirement, without prejudice to its rights including claim for damages against the Contractor.

12. The Employer shall be indemnified for all losses due to commissions and omissions of persons deployed by the contractor. If any loss or damage is caused to the Employer on account of any negligence, carelessness, acts of omissions. commissions of contractors, his employees or staff, the same shall be made good by the contractor. The contractor shall defend, indemnify and hold the Institute harmless from any liability or damage, law suits, penalties imposed by any State of Central Government Department or statutory body or by a third party for reasons of violation of any of statutory provisions or requirements by the contractor. The Employer shall not be liable for any damage or compensation payable to any workmen or to any person as a consequence of this work and the Employer shall be completely indemnified accordingly.

13. In case of disputes s including all questions relating to the performance of the obligations under this agreement and all the dispute and differences which shall arise either during or after the agreement period or other matters arising out of or relating to this agreement or payments to be made in pursuance thereof shall be decided by the Director of IISc whose decision shall be binding on the contractor. The Contractor hereby agrees to be bound by the decision of the Director.

IN WITNESS WHEREOF the parties hereto have set their respective hands the day and the year here in above written.

In the presence of:

Signed by for and on behalf of the said Contractor.

In the presence of:

Signed by for and on behalf of the said Employer.

REGISTRAR
INDIAN INSTITUTE OF SCIENCE
BANGALORE-12

Indian Institute of Science, Bangalore-12

ITEM RATE TENDER FOR WORK

I/We, hereby tender for the execution for the Indian Institute of Science, Bangalore-12 of the works specified in the under mentioned memorandum within the time specified in such memorandum at the rates specified therein and in accordance, in all respects, with the specifications, designs, drawings and instructions in writing which have been read by me/read and explained to me and with such materials as provided for by and in all other respects in accordance with such conditions as for as possible.

MEMORANDUM OF WORK

1.	GENERAL DESCRIPTION	"Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus"
2.	ESTIMATED COST	Rs 464,00,000/-
3.	EARNEST MONEY	Rs.6,96,000/-
4.	FURTHER SECURITY DEPOSIT	6.0% on the running account bills and final bill in addition to Earnest Money Deposit. When the F.S.D. deducted from the RA bills of the Contractor @ 6.0% of the bill amount exceeds Rs.1.00 lakhs, the amount in excess of Rs.1.00 lakh may, at the request of the Contractor, be released to him against the production of a bank guarantee issued by a Nationalised Bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the period mentioned in page 3 (period of work completion)
5.	TIME ALLOWED FOR THE COMPLETION OF WORK IN ALL RESPECTS FROM THE DATE OF COMMENCEMENT OF WORK	12 (Twelve) Months for rehabilitation and 3 years of Management & Maintenance of water supply system including the period of rehabilitation
6.	BILLS OF QUANTITIES.	Enclosed.
7.	SPECIFICATIONS.	The work shall be carried out strictly in accordance with the enclosed specifications and wherever items are not covered by those specifications in accordance with specifications/drawings/designs/requirements and directions of the Project Engineer-cum-Estate Officer, CCMD or his representatives.

I/We hereby agree to abide by and fulfill all the terms and provisions of the conditions contained in the articles of agreement, which have been read by me/us or in default thereof to forfeit and pay to the Registrar, Indian Institute of Science or his successors the sums of monies mentioned in the said conditions.

The sum of **Rs.6,96,000/- (Rupees Six Lakh Ninty Six Thousand Only)** has been deposited in cash/Bank draft as Earnest Money the full value which is to be absolutely forfeited to the Registrar or his successors in Office should I/We fail to commence the work specified in the above memorandum and complete the same.

Dated this

Signature of the Contractor/s

Witness to Contractor/s Signature:

NAME

ADDRESS

OCCUPATION

The above tender is hereby accepted by me on behalf of the Indian Institute of Science, Bangalore-12.

**REGISTRAR
INDIANINSTITUTE OF SICENCE
BANGALORE.**

Indian Institute of Science, Bangalore-12

APPENDIX

1.Name of the work	"Rehabilitation/Replacement of Electro-Mechanical and Instrumentation Equipment in identified Pumping Stations including Regular Management of Water Supply System in IISc Campus"
2.Date of commencement of work	Within Ten days from the date of issue of work order or the date of handing over the site whichever is later
3.Time of Completion	12 (Twelve) Months for rehabilitation and 3 years of Management & Maintenance of water supply system including the period of rehabilitation
4.Frequency of interim Certificate and payment	Once every month.
5.Further Security deposit	6.0% on the running bills and final bill in addition to earnest money deposit. When the F.S.D. deducted from the R.A. Bills of the contractor @ 6.0% of the bill amount exceeds Rs.1.00 Lakhs, the amount in excess of Ra.1.00 Lakh may, at the request of the contractor, be released to him against the production of bank guarantee issued from a Nationalised Bank only for an equal amount in the prescribed form. The bank guarantee should be valid till the completion of the period
6. Defects liability period / retention amount from the final bill/release of balance of deposit.	The security deposit lodged/paid by a contractor shall be refunded to him after the final bill is paid or after twelve months from the date of completion of the work, during which period the work so executed should be maintained by the contractor in good order, whichever is later.
7. Penalty for delay	In respect of the shortfall in progress, assessed as due to the delay on the part of contractor as per clause 2(b) and 2(c), the contractor shall be liable to pay as penalty an amount equal to one percent of the estimated cost of the balance work assessed according to the programme, for every day that the due quantity of work remains incomplete, provided always that the total amount of penalty to be paid under the provisions of this clause shall not exceed 7 ½ percent of the estimated cost of the entire work as shown in the tender, provided further that in the event of the contractor making up the shortfall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the contractor.
8. Period for payment of Running Bill.	Three weeks from the date of submission of each Running account bills by the Contractor.
9. Period for submitting the final Bill.	One month from the date of virtual completion of the work by the Contractor.

GENERAL RULES AND DIRECTIONS TO CONTRACTORS

1. A Schedule of Quantities (Bill of Quantities) is attached herewith. It should however, be clearly understood that these quantities are liable to alterations by omission, addition or variation, at the discretion of the Architects/Project Engineer Cum Estate Officer..
2. The tenderer shall insert all rates and amounts and the totals in the schedule of quantities. Rate for alternative items, when asked for, shall be entered in red ink and shall not be included in the total.
3. The drawings together with specifications and conditions of contract are enclosed. These should be studied carefully by the intending tenderers. In the absence of specifications for any item of work, material or ingredient in the specifications, PWD specifications shall be followed and in the absence of specification for any item, materials are ingredient shall be fixed in all respects in accordance with the instructions and requirements of the Project Engineer Cum Estate Officer, the work will be the best of the kind.
4. The tenderer is expected to inspect the site and acquaint himself with the local conditions and will be deemed to have so done before submitting the tender.
5. The successful tenderer is required to sign an agreement for the due fulfillment of the contract and start the work immediately on of the acceptance of his tender. A draft of the Articles of the Agreement is enclosed. The Earnest Money referred to in item No.3 of Memorandum contained in the "Item Rate Tender for Works", will be forfeited and at the absolute disposal of the Employer if the Contractor defaults from signing the Agreement of in starting the work.
6. The rates quoted shall be for finished work and shall include for all necessary incidental work. Sales or any other tax on materials in respect of this contract will be payable by the Contractor. The Contractors cannot presume any details regarding the contract.
7. Water supply: The Contractor has to make his own arrangement for water supply. However,, if water supply to the site at one convenient point is made available by the Institute, the charges for the consumption of water will be borne by the Contractor at 1.50% of the value of the work.
8. Supply of Electricity-electricity required for construction shall be arranged by the contractor itself. Electricity if supplied to the contractor by the institute will be metered and amounted will be recovered in the bills as per actual at rate fixed by the Institute. Supply of electricity from the institute is not mandatory. Non supply of electricity by the institute cannot be held as reason for short fall in progress.

9. The duration of the work is **12 (Twelve) Months for rehabilitation and 3 years of Management & Maintenance of water supply system including the period of rehabilitation.**
10. Institute reserves the right to accept or reject any tender without assigning reasons thereof. He further reserves the right of deleting any item of work in this contract at his discretion.
11. The tenders are valid for a period of 3 (three) months from the date of opening.
12. This “General Rules and Directions to Contractors” shall also form part of the tender document.
 - 12.1 Cement to be procured by contractor only, adhering to the following conditions.
 1. Only 53 grade OPC cement is to be used for the projects.
 2. The cement shall conform to IS 8119-1976.
 3. ACC, L&T, Coromandel, Birla brands only to be used.
 4. Test certificate is to be produced for every procurement made for.
13. This contract comprises:
 - a)General Builders work (Civil works).
 - b)Water supply and Sanitary installations.
 - c)Electrical Installations.
 - d)Sump and overhead tanks.
14. The General Builder should get the water supply and sanitary installations and the Electrical installations executed through licensed sub-contractor having good experience and qualified and competent tradesmen in the respective fields and approved by the Project Engineer Cum Estate Officer.
15. It is entirely the responsibility of the Contractor to arrange for and provide all materials required for successful completion of the work except such special materials that may be supplied if any.
16. The Brand, size and colour of vitrified/ceramic/glazed tiles shall be got approved from the Competent authority before procurement of materials.

Brands recommended are Johnson, Naveen, Kazaria.

17. Water supply/Sanitary fixtures like Bibcocks, pillarcocks, Health-faucet, anglecock, bottle traps, EWC, IWC, urinal basins shall be as per approval from competent authority.
18. Tenders determined to be substantially responsive will be checked by the Employer for any arithmetic errors. Errors will be corrected by the Employer as follows
 - a) Where there is discrepancy between the rates in figures and in words, the lower of the two will be governed and
 - b) Where there is a discrepancy between the unit rate and the line item total resulting from multiplying the unit rate by the quantity, the unit rate as quoted will be governed.
 - c) Where there is a discrepancy in entries of unit rate between the Original and Duplicate, the lower will govern.
19. Tol tax, Octrai, Royalty for collecting earth, gravel, sand stone etc., Excise duty, GST, Sales tax or any other tax payable on account of this contract will have to be met from contractors account.
20. The Contractor should make his own arrangements to cover the all-round construction area, by providing polyester net/polythene sheet/barricading to avoid inconvenience to other surrounding departments, as directed by the Engineer-in-charge of the work.
21. The debris arise during the period of construction will have to be cleared then and there to keep the surroundings clean and tidy. Such debris shall, if not cleared, be cleared at his risk and cost.
22. Work done as a sub- contractor under a prime contractor will not be considered for qualification.
23. "Prime Contractor" means a firm that performs a construction work itself and that the work is directly entrusted to the firm by the owner/ government/ local body/ quasi government/ Government undertaking bodies.
24. The contractor shall vacate the campus premises with all his men/ materials immediately after completion of the project.

GENERAL SPECIFICATIONS

PART -1 Specifications for Civil Works

1.0 EXCAVATION

- 1.1 The places where excavation is directed to be done shall be cleared of all shrubs, weeds, grass and vegetation including roots, where necessary and if so directed, the excavated earth must be deposited in layers of 15 cms and the clods broken. During excavations, if so directed, 'dead-man' (of volume not more 5% of the excavation volume shall be left at the places directed for verification of the dimensions of excavation). These 'dead-man' shall be removed and earth deposited at places shown before full rate is paid, Alternatively or in addition to 'dead-man', block level at intervals as directed will be jointly taken and recorded by the contractors representative and employer's representative before starting of excavation and after completion. Recording of – block levels or leaving of 'dead-man' may be avoided in the case of narrow foundations and trenches, if so directed.
- 1.2 The rate quoted shall include bailing or otherwise removing all water which may accumulate in the excavation from all causes and removing of swish, trimming of all sides plumb or otherwise as directed, dismantling removing and stacking as directed any existing water pipes and or soil pipes etc., encountered within the excavation.

2.0 CONCRETE WORKS

- 2.1 Proportion of ordinary cement concrete will be expressed as 1:4:8, 1:3:6, 1:2:4 etc., The first figure will be quantity of ordinary Portland cement by volume, the second figure will be dry coarse sand (fine aggregate) by volume and the third figure will be the quantity of coarse aggregate by volume. Cement shall be measured by weight. The weight is to be derived on the basis that one cubic meter will weigh 1440 kg or one full bag of 50kg will be assumed to be 35 lts. When the sand is wet or moist suitable corrections for bulking is to be given while proportioning. The clerk of works may allow measuring cement by volume.
- 2.2 Unless otherwise specified, the rates for all RCC will be exclusive of reinforcements but including from work, Reinforcements will be measured and paid separately.
- 2.2.1 Unless otherwise stated for all RCC work the size of coarse aggregate will be 20MM and down size.
- 2.2.2 Concrete proposed for roof slab and roof beams is ready mixed concrete. The contractor should quote, his rate keeping in view that the rate should include for ready mixed concrete all as per specifications and directions of Engineer-in-charge.

2.3 READY MIXED CONCRETE (RMC) IS: 4926-1976

- a. The RMC from suppliers of ACC/L & T/Fletcher challenge should only be used.
- b. The rates are inclusive of all lead and lift. Additional lead and lift charges.
- c. The rate is inclusive of all necessary form work, centering and scaffolding capable of withstanding pumping of concrete.
- d. The rates are applicable to the materials with a maximum radius of 25 km from the city center.
- e. Test results of concrete for 28 days strength be obtained from the concerned RMC supplying firm.

2.4 MATERIALS.

2.4.1 Cement:-

2.4.1.1 Cement shall comply in every respect with the requirements of the latest publication of IS: 269 and unless otherwise specified, ordinary Portland cement shall be used. No other make of cement but that approved by the Architects/ Employers will be allowed on works and the source of supply shall not be changed without approval of the Architects/Employer in writing test certificates to show that the cement used fully complies with the relevant IS specifications shall be submitted to the Architects/ Employer and notwithstanding this the architects may at their discretion order that the cement brought to site and which they may consider damaged or of doubtful quality for any reasons whatsoever shall be rested in an approved testing laboratory and fresh certificate of its soundness shall be produced, Cement ordered for retesting shall not be for any work pending results of retest.

2.4.1.2 Cement shall be stored neatly packed in piles not exceeding 10 bags high in weather-proof sheds with raised wooden plank flooring to prevent deterioration by dampness or intrusion of foreign matter. It shall be stored in such a way as to allow the removal and use of cement in chronological order of receipt, i.e., the first received being first used. Cement deteriorated and/or clotted shall not be used on work but shall be removed at once from the site daily record of cement received and consumed shall be maintained by the contractor in an approved form and a copy submitted to the employer once a month.

2.4.2 Fine Aggregates:

2.4.2.1 Sand shall conform to IS: 383 it shall pass through IS sieve 4.75mm (3/ from a 16" B S) test sieve, leaving a residue not more than 5%. It shall be from a natural source or crushed stone screenings it shall be washed, if directed, to reduce the percentage of deleterious substances to acceptable-limits. Sand

shall not contain any trace of salt and sand containing any trace of salt shall be rejected.

2.4.2.2 The fine aggregate for concrete shall be graded within limits as specified in IS: 383 and the fineness modules shall range between 2.60 to 3.20 the fine aggregates shall be stacked. Carefully, on a clear hard dry surface so that will not get mixed up with deleterious foreign materials. If such a surface is not available, a platform of planks or corrugated sheets or brick floor or concrete floor shall be prepared. Sand shall be added in the desired proportion as required for the strength specified, with suitable correction for “bulking”.

2.4.2.3 Coarse aggregates: Coarse aggregate shall conform to IS:383. It shall consist of crushed or broken stone, 95% of which shall be retained on 4.75 mm IS test sieve. It shall be obtained from crushed granite, trap, basalt or similar approved stones from approved quarry. Coarse aggregate shall be chemically inert when mixed with cement and shall be angular in shape and free from soft friable thin porous laminated or flaky pieces. It shall be free dust and other foreign matter. – Gravel/shingle of desired grading may be permitted as a substitute in part or full in plain cement concrete if the Architect/Employer is otherwise satisfied about the quality of aggregate.

2.5 MIXING OF CONCRETE:

2.5.1 Machine mixing:- Aggregates shall be accurately measured out in boxes and mixed dry along with required cement. Water shall then be added in measured quantity and mixing shall be continued until there is uniform distribution of the materials and the mass is uniform in colour and consistency but in no case shall the mixing be done less than two minutes. Only hopper loading mixer shall be used.

2.5.2 Hand mixing: when hand mixing is permitted with the approval of the Project-Engineer – Cum – Estate Officer, CCMD, it shall be carried out in water tight, mixing platform and care shall be taken to ensure that mixing is continued until the mass is uniform in colour and consistency. If required by, the architect/consultant 10% extra cement has to be used at the contractor's cost if hand mixing is done.

2.5.3 Consistency:

2.5.3.1 Only sufficient water giving due allowance for the moisture content of aggregate shall be added to the cement and aggregate during mixing to produce a mixture of sufficient workability to enable it to be well consolidated to be worked in to corners of the shuttering and around the reinforcements (where there is reinforcements) to give the specified finish and to have the specified strength.

2.5.3.2 Normally for every 50 kg of cement in the concrete in the mix, total water including moisture content of aggregate should not be more than 34 lts for 1:3:6 mix, 32 lts for 1:2:4 mix 30 lts for 1:1 ½ :3 and 27 ltrs for 1:1:2 mix

2.5.3.3 If difficulty be experienced in placing concrete of specified mix and approved consistency between and below reinforcement bars, in the bottom of beams and similar situations, the concrete shall have improved workability by increasing the proportion of water with corresponding additional quantity of cement using aggregates of smaller size than specified as directed by the Architect/ Employer for which extra will be paid.

2.5.3.4 The consistency shall be determined by making trial mixtures with dried aggregates, or. When so instructed by test laboratory made test cubes under the direction of Architect/ Employer by slump – Test using a standard cone or the Architect/Employer may direct the use of any other means of testing the consistency.

2.5.3.5 If the apparatus used for the slump test is a standard cone, the cone when filled, shall be raised vertically – clear of the concrete: The ‘slump’ shall be 300mm minus the height of the slumped cone of concrete. Care shall be taken to prevent vibration of the samples being tested. The following slumps shall be adopted for different kinds of works:

		With Vibrator	Without Vibrator
A	Mass concrete in RCC foundations, footings and retaining walls	10 to 25mm	80 mm
B	RCC beam, slabs and columns	25 to 40 mm	100 to 125 mm
C	Thin RCC section or section with congested steel	40 to 50mm	125 to 150mm

2.5.4 Placing and Compacting

2.5.4.1 Method of placing concrete shall be such as to preclude segregation and as far as practicable the placing shall be continues.

2.5.4.2 Special care shall be taken in accordance with 18:456 while laying concrete under extreme weather. Concrete, during the operation of placing shall be thoroughly worked around the reinforcements, embedded fixtures, spaded against comers of the form work by punning, rodding or by any other approved means and thoroughly compacted by mechanical vibrators. The number and type of vibrator to be used, and in general immersion type vibrators shall be used.

2.5.4.3 Consolidation by using immersion vibrator will be in accordance with Is: 3558 sufficient number of reserve vibrators in good working condition shall be kept

on hand at all times, so as to ensure that there is no slacking or interruption in compacting.

2.6 ADMIXTURE

The use of admixtures may be allowed only if approved by the Architect/Consultant their decision in this regard shall be final.

2.7 TRANSPORTING

Concrete shall be conveyed from the place of mixing to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of any of ingredients? If segregation does occur during transport the concrete shall be remixed before being placed, normally not more than 30 minutes shall lapse between mixing and consolidation in position.

2.8 CURING:

All cement concrete after laying shall be protected from damages, till it sets and shall be cured thereafter for not less than ten days. The work shall be protected from direct wind and direct sun, rays. Water used for curing shall be free from sediments of any kind and generally fit for drinking.

2.9 STRENGTH OF ORDINARY CONCRETE:

2.9.1 The Contractor has to ensure that proper- materials in specified proportion are used and the correct water cement ratio, just sufficient for the workability is maintained to see that the minimum strength of concrete as provided under paragraph 3.9.2 (below) are obtained. To verify this, test cubes from the concrete pours should be made and tested. The frequency of testing and the acceptability criteria will be according to IS: 456.

2.9.2 Compressive strength of 15 cm cubes at 28 days after mixing shall be as follows: same as para 3.13.2

2.9.3 Six cubes shall be taken from any mix selected at random as directed by Engineer-in-charge three of these should be tested after 7 days and three after 28 days. The strength at 7 days must be 2/3 of the strength at 28 days. The criteria for acceptance are only the strength at 28 days.

2.10 FORMWORK AND CENTERING

2.10.1 The formwork shall conform to the shape, lines and dimensions of the faces of concrete shown on the drawings and be so constructed as to remain sufficiently rigid the placing and compacting of the concrete and shall be sufficiently water tight to prevent loss of cement slurry from the concrete. Formwork shall be constructed of steel or timber or marine plywood and adequately designed to support the full weight of wet concrete (deflection

limited to 3mm) and retain its form during laying, consolidation and setting of concrete. Timber used shall be properly seasoned so as to prevent deformation when wetted.

- 2.10.2 Props shall be straight and of full height and no joints shall be allowed. Props shall be braced with bamboo's or wooden battens or other means in both directions at intervals of 1500mm and where additional staging is necessary, extra care shall be taken to use bigger size props with bracing at necessary levels. All the props shall be supported on sole plates double wedged. At the time of removing props these wedges shall be gently eased and not knocked out.
- 2.10.3 All rubbish, chipping, shavings, sawdust etc., shall be removed from the interior of the forms before concrete is placed. The form work in contact with the concrete shall be cleaned and thoroughly wetted and treated with non staining mineral oil or any other approved material. Care shall be taken that "oil or such similar material is kept out of contact with the reinforcement.
- 2.10.4 Officer, GGMD at convenient places for washing down all the rubbish. These are to be closed before concreting.
- 2.10.5 All form work shall be removed without shock or vibration and shall be eased off carefully in order to allow the structure to take up its load gradually. Forms shall not be disturbed until concrete has adequately hardened to take up its own weight and superimposed load coming on it and in no circumstances shall forms be struck until the concrete reaches its strength of at least twice the stress to which the concrete may be subjected to at the time of striking. The said forms shall be so fixed that while removing them the supporting forms and props are not disturbed.
- 2.10.6 In the case of folded plates and shell roofs the contractor should take prior approval of the pattern of centering and shuttering along with programme for deshuttering.
- 2.10.7 The tolerance of shuttering and stripping time will be as set forth in IS : 456 if directed, forms shall be given an upward camber to ensure that the beams do not have any sag. No honey combing will be permitted, however any honey combing of minor nature as specifically allowed by the clerks of works shall be repaired neatly with cement mortar 1:2
- 2.10.8 Any work showing signs of damage through premature or careless removal of centering or shuttering, shall be reconstructed by the contractor at his own cost. Surface that has to remain exposed after removal of forms shall be carefully examined and any fins, burrs, projections etc., that are detected shall be removed.
- 2.10.9 Centering and shuttering is specified to be paid for separately, measurement of such centering and shuttering will be taken according to IS: 1200

2.11 Steel Reinforcement

- 2.11.1 Reinforcement for all works shall be TMT steel bars, as specified in the drawings. TMT steel bars shall be of tested quality conforming to grade I of IS : 432 and high yield strength (of 550 N/sqmm) TMT bars shall be of IS:1786 or 1139 as appropriate. Reinforcement where called for shall be kept clean and free from pitting, loose rust millseale- oil, grease- earth paint or any material which may impair the bond between concrete and reinforcement or which may cause high corrosion of the reinforcement or deterioration of the concrete.
- 2.11.2 Reinforcement shall be accurately done to the dimensions, spacing and minimum cover as per structural drawings. The contractor shall submit to the clerk of work bar bending schedules, prior to the commencement of fabrication. All joints in TMT reinforcement upto and including 16mm dia shall be overlapped. The length of overlap for tension and compression joints in TMT steel reinforcement above 16mm dia may be welded subject to the approval of the project Engineer- cum estate officer.
- 2.11.3 Wherever specified and / or approved, welded laps shall be provided subject to the following.
- 2.11.3.1 Random samples of typical – welded joints shall be made and got tested in an approved laboratory at the contractor's expenses.
- 2.11.3.2 If the cold twisted deformed bar has an untwisted end at lapping joint, such portion – shall be cut off prior to welding.
- 2.11.3.3 bars shall be free from rust at the joints to be welded.
- 2.11.3.4 Bars can be aligned and kept in proper axis in order to minimize crookedness in bar welding.
- 2.11.3.5 Nothing extra shall be payable towards lap welding of joint unless specifically mentioned or agreed otherwise.
- 2.11.4 Reinforcement shall be rigidly held in place inside the form work using chairs (bent from steel bars) spacer bars and cement concrete blocks each block shall be secured to the reinforcement with wire or clip embedded in the center of block so that it shall not be in contact with form work. Insterctions of reinforcement shall be bound together with 18 guage annealed soft iron binding wire.
- 2.11.5 Before proceeding to place reinforcements the contractor shall ensure that appropriate cover between the bars and or the form work is available. Should any difficult arise during the placing of steel in obtaining the required cover the contractor shall immediately draw the attention of the architect/

consultant to the difficulty and shall carryout such corrective measures as the architect/ consultant may instruct.

2.11.6 Reinforcement left projecting from newly placed concrete shall be supported in a way there is no risk of disturbance, which would cause damage to newly placed concrete.

2.11.7 The contractor shall ensure that movement of men and material subsequent to fixing in position of the reinforcement is organized such that displacement of the reinforcement will not occur.

2.11.8 The measurements recorded for reinforcements shall be including all laps and wastages as approved by the project Engineer- cum Estate officer's representative.

2.12 INSERTS IN CONCRETE

The contractor shall fix all necessary inserts such as steel – plates, pipes, sleeves, bolts etc., and shall make provisions in the form work for holes, pockets dowels, etc., at no extra cost (unless otherwise specified) to enable, subsequent fixing of supports, brackets or similar items. He shall also ensure that all conduits, inserts etc., are in position before placing concrete.

2.13 CONTROLLED CONCRETE

2.13.1 Controlled concrete shall be taken to mean that there shall be full field control of(a) predetermined grading of all aggregates that go into concrete and (b) Predetermined proportion of coarse aggregate, fine aggregate, cement and water for the required strength.

2.13.2 Strength shall mean the acceptable field strength after 28 days of curing on the tests conducted on 15 cm cubes from concrete taken during concreting in the manner set if forth in IS 456. A statement to acceptable minimum field strength is noted below.

Compressive Strength		
Grade	Preliminary test (Kg/ Sq Cm)	Work Test (Kg/Sq Cm)
M10	135	100
M15	200	150
M20	260	200
M25	320	250
M30	380	300
M35	440	350
M40	500	400

- 2.13.3 Arrive at the proportion to be adopted to obtain the grade of concrete, the mix should be based on laboratory tests conducted using the aggregate actually available at site which would be used for making/ concrete. The design mix should give suitable workability to enable it to be well consolidated to be worked into the corners of the shuttering and around the reinforcement.
- 2.13.4 Where difficulty is likely to be encountered in placing and compacting concrete and where there is crowding of reinforcements a separate mix is to be designed for required strength and used without extra cost, the mix design along with the workability obtainable with the designed mix should be furnished to the architect/employer before hand approval obtained. A laboratory is to be established at site to assess the moisture content of aggregate as frequently as necessary and as instructed by the Architect/employer based on which corrections is to be applied to the quantity of water to be used for mixing.
- 2.13.5 All aggregates are to confirm strictly to IS: 383. The aggregates will be tested as frequently as directed by the Architect/Employer to see that their specifications is the same as adopted in the mix design they must be stored on clean plat form made for the purpose.
- 2.13.6 Concrete shall be weigh batched, Dials of weigh batching unit to be used shall be checked with standard weights periodically. The conversions of weights volume will be allowed by Project Engineer cum Estate Officer, under special circumstances. Despite the design for several, mixes the following quantities of cement are the minimum to be used per cubic meter of the different grades of concrete.

Sl No	Grade of Concrete	Cement/ Cum (Bags)
1	M5	3.20
2	M7.5	3.60
3	M10	4.40
4	M15	4.80
5	M20	6.40
6	M25	6.80
7	M30	7.20

3.0 SIZE STONE MASONRY

- 3.1 Size stone shall be hard granite, basalt or trap stone obtainable from approved quarry, the stones shall be clean and wetted before they are used
- 3.2 Height of each course shall not be less than 15cm and all courses shall be of uniform height.
- 3.3 No face stone shall be less in depth than in height or shall tail into the work to a length less than the height stone shall break joints at least half the height of course faces of stones shall be hammers dressed such that the buildings are not more than 25mm thickness of joints shall not be more than 20mm. Edges of face stones of exposed faces shall be chiseled true to both longitudinal and vertical lines exposed faces of corner stones are to be two lines dressed 50mm wide.
- 3.4 Bond or through stones shall be provided not exceeding 2.0m apart in each course and shall be staggered bond stone shall be from the front to back of the walls fro walls upto 60cms thick; they shall either be in one piece (if available locally) or be in the series of headers; each header overlapping the adjoining one by not less than 150mm bond or through stones shall be marked as directed to enable easy detection even after having been built in position. The interior (or filling) shall be with flat bedded stones laid in mortar joints and shall not exceed 10% of the quantity of stone masonry. Care is to be taken that no dry work or hollow spaces shall be left anywhere in the masonry.
- 3.5 The work shall include.
 - 3.5.1 All scaffolding – platforms, staging etc.,
 - 3.5.2 Hacking and roughening of concrete or other surfaces for binding of the masonry.
 - 3.5.3 Raking out joints for plastering and / or pointing.
 - 3.5.4 Levelling up and preparing and pointing.
 - 3.5.5 Building in holdfasts or similar inserts.
 - 3.5.6 Keeping (the work) in damp condition for two weeks
 - 3.5.7 Construction watery situation.

4.0 BRICK MASONRY:

4.1 GENERAL

- 4.1.1 All brick work should be carried out as shown on the drawings with set backs, projections, cuttings, toothings etc., wherever the proportion of cement mortar has not been specifically mentioned, cement mortar in the proportion of 1:6 shall be used. Flat brick arches shall be provided, wherever required, without any extra cost. Brickwork shall be kept wet while in progress till mortar has properly set. On holidays or when the work is stopped top of all unfinished masonry shall be kept wet, should the mortar be dry, white or powdery, due to lack of curing work shall be pulled down and rebuilt at the contractors expense.
- 4.1.2 Table moulded bricks shall be locally available or brought from outside first quality having a minimum crushing strength of 40kg per sqcm and water absorption not more than 20% by weight. Bricks shall be thoroughly cleaned and well wetted. Table moulded bricks shall be soaked for atleast 12 hours in fresh water before being used on the work.
- 4.1.3 Unless otherwise specified, brickwork shall be done in English bond with frog upwards. The bricks shall be bedded and joined with mortar in such a manner as not to leave voids. Each brick shall be correctly into position by tapping with the handle of trowel. Grouting of mortar slurry will not be allowed except where necessary for special reasons and in such cases, prior permission of the Architect/ Employer shall be obtained.
- 4.1.4 A care shall be taken that each course of brick work is truly horizontal and perfect in bond and the face of the wall is straight, plumb and even. The mortar joints shall be 10mm in thickness, except where extra thickness is required for the purpose of bringing the work to the required height or level. Halfbricks or bats shall not be used except for obtaining the bond and where absolutely necessary.
- 4.1.5 Brickwork in 239 mm wall: If bricks are of size such that the width of the header course does not come equal to the width of the stretcher course, the difference shall be made up during construction of brickwork itself by same mortar as used for construction of masonry to provide a plane vertical surface. The surface should also be scarified to receive plaster.
- 4.1.6 All junctions of wall shall be carefully bonded into the main walls. The rate of laying masonry will be upto a height of 100cm per day if cement mortar is used greater heights may be built only if permitted by the Project Engineer-Cum Estate Officer.
- 4.1.7 During rains, the work shall be carefully covered to prevent mortar from being washed away. Should any mortar or cement be washed away the work shall be removed and rebuilt at the contractors expense.

4.2 HALF BRICK WORK:

This shall be set in cement mortar as specified. Unless otherwise specified, the walls be reinforced with 2 nos of 6mm mild steel bars with tie bars at 1m interval on the top of the first course and at every fifth course thereafter. The cost of the half brick work shall include the cost of reinforcement where reinforcement of half brick walls is specified.

5.0 Wood Works:

5.1 GRP Door shutters as per the Engineer-in-charge/ Architects approval

5.2 GLAZING WORKS

All glass shall be specified in the drawings and schedule of quantities and free from air bubbles, specks and scratches or other defects. All glass shall be cut to fit the sashes or other members as required. All glass, shall be properly bedded, securely fixed and finished as indicated on the drawings. T.W beading moulded as specified shall be provided for fixing the glass. No glazing shall be complete until all the stains and marks have been removed from the surface of glass.

6.0 ALLUMINIUM DOOR, WINDOWS ETC.,

6.1 GENERAL

6.1.1 These shall be custom-built units of approved established manufacturer using standard aluminum alloy extruded sections generally conforming to the relevant basic concept drawings of the Architects and Schedule of quantities including necessary glazings, fittings, fastenings, locking arrangements polysulphide sealants etc., to ensure water tightness.

6.1.2 Based on the Architects concept drawings, the contractor shall submit detailed fabrication/ assembly/ erection drawings for the approval of the Engineer-in-charge. Samples of each unit, based on the approved fabrication and assembly drawings shall be made by the contractor and got approved by the Engineer-in-charge before bulk fabrication and assembly of each unit.

6.2 STORAGE AND HANDLING:

The contractor shall take particular care to stack the fabricated frames etc., on the site under cover. These shall be handled with care and stacked on edge of level bearers and supported evenly.

6.3 Before erecting- the frames coming in contact with concrete, masonry, plaster or dissimilar metals, shall be treated with a coat of zinc chromate. The contractor shall cover the work with transparent lacquer based or methacrylates or cellulose butyrate, tithe surface from wet cement during installation. This coating shall be removed on completion. Before handing over,

the aluminium work shall be washed with mild solution of non-alkali soap and water.

- 6.4 The colour of anodizing shall be uniform mat natural finish otherwise stated and its sample shall be submitted for the Engineer-in-charge, approval before work commences. The section shall be anodized to a minimum thickness of 20 microns. The contractor must submit necessary evidence to the satisfaction of the Engineer-in-charge that the thickness of the anodisation is not less than 20 microns. In case of doubt the Engineer-in-charge may reject the materials.

6.5 TOLERANCE ON SIZE.

Frames should be made to fit the actual openings with not more than 5mm clearance all round. Discrepancies in overall width or height exceeding 5mm will not be allowed and frames will be rejected in such cases. Minor discrepancies acceptable to the Architect/ Employer shall have the gaps suitably filled. The sizes of frames, if noted in the drawings/ schedule of quantities, may vary up to plus or minus 50mm beyond which the rate payable will be increased or decreased proportionate to the changes, where the rate quoted is for one unit number, if the rate quoted is for superficial area, such area will be net finished size of the opening.

7.0 STEEL WORK:

The fabrication, supply and erection of the steel (Fe 500 N/mm²) work consists of accomplishing all related jobs like providing all labour, tools and plant, all materials and consumables such as welding electrodes, bolts and nuts, oxygen and acetylene gases, oils for cleaning etc., All of approved quality, the work shall be executed. In an expeditious and workmanlike manner, as contemplated in the drawings and to the complete satisfaction of the project Engineer-cum – Estate Officer, CCMD, representative. The work shall also include providing shop primer coat of paint and grouting of hold down bolts.

8.0 PLASTERING- WORKS:

8.1 EXTENT AND INTENT

The contractor shall furnish all materials, labour, scaffolding, equipment, tools, plant and incidentals necessary as required for the completion of all plaster and wall finishes, subject to approval by the Project Engineer-cum- Estate Officer, CCMD.

8.2 GENERAL

- 8.2.1 Plaster as here in specified shall be applied to all internal and external surfaces where called for. Flazed tile dado, terrazzo dado and wall finishes other than plaster shall be provided where indicated on drawings and schedule of finishes. Areas called for on drawings and typical shall be considered to apply to appropriate adjoining area whether shown on same drawings or not whether indicated or not.

- 8.2.2 All plaster works and other wall finishes shall be executed by skilled workmen in a workman like manner and shall be of the best workmanship and in strict accordance with the dimensions on drawings subject to the approval of the project Engineer-Cum-Estate Officer, CCMD.
- 8.2.3 The primary requirement of plaster work shall be to provide absolutely water tight enclosure, dense, smooth, and hard and devoid of any cracks on the interior and / or exterior. The contractor shall do all that is necessary to ensure that this objective is achieved. All plastering shall be finished to the true plane, without any imperfections and shall be square with adjoining work and form proper foundation for finishing materials such as paints etc.,
- 8.2.4 Masonry and concrete surfaces, which call for applications of plaster, shall be clean, free from efflorescence, damp and sufficiently rough and keyed to ensure proper bond, subject to the approval of the Project Engineer-Cum- Estate Officer.
- 8.2.5 Wherever directed by the Project Engineer-cum-Estate Officer, CCMD, or other representative, all joints between concrete frames and masonry infilling shall be expressed by a groove cut in the plaster. The said groove shall coincide with the joints beneath as directed. Where grooves are not called for the joints between concrete members and masonry infilling shall be 24 guage galvanized chicken mesh strip 400mm wide or as called for on drawings/documents which shall be in position before plastering.

8.3 CHASING AND CUTTING:

All chasings, installations of conduits, insert boxes etc., shall be completed before any plastering or other wall finish is commenced on a surface. No chasing or cutting of plaster or other finish on a surface shall be permitted. Broken corners shall be cut back not less than 150mm on both sides and patched with plaster of paris as directed. All corners shall be rounded to a radius of 8mm or as directed by the Project Engineer-Cum-Estate Officer, CCMD.

8.4 SAMPLES:

Samples of each, type of plaster and other wall finish shall be prepared well in advance of undertaking the work for approval by the Project Engineer-Cum-Estate Officer, CCMD.

8.5 PROPORTIONS:

The materials used for plastering shall be proportioned by volume by means of gauge boxes.

8.6 PREPARATIONS OF SURFACES.

The joints in all walls, both existing and freshly built shall be raked to a depth of 15 cleaned with wire brushes, dusted and thoroughly wetted before starting plastering work. Concrete surfaces to receive plaster shall be roughened by hacking over the

entire surface so that the skin of the concrete is completely removed, as approved by the Architect/ Employer to ensure proper key for the plaster.

8.7 PLASTER TO WALLS:

Unless otherwise specified, all works shall be plastered and finished as follows:

Internal faces : 20mm thick with cement mortar 1:6 (one part of cement and six parts of fine river sand) finished smooth with lime rendering.

External faces: 12mm thick base coat with cement Mortar 1:4 (one part of cement and four part of fine river sand) finished rough to receive the final coat and 6mm thick final coat with cement mortar 1:3 (one part of cement and three parts of coarse river sand) sponge finished.

8.8 MORTAR MIXING

Mortar shall be prepared as specified in small quantities as required and applied within fifteen minutes of mixing.

8.9 Plaster application shall be commenced only after the preparatory work is approved by the Project Engineer- Cum- Estate Officer, CCMD. Correct thickness of plaster shall be obtained by laying plaster screeds (gauges) at intervals of 1.5 m as directed. Mortar shall be firmly applied, well pressed, into the joints, rubbed and finished to give a smooth and even surface to the satisfaction of the Project Engineer-Cum-Estate.

8.10 CURING

Finishing Plaster shall be kept wet for at least ten days after completion in hot weather, walls exposed to such shall be screened with matting kept constantly wet or by other approved means.

8.11 CLEANING PLASTERING:

Plaster to ceiling, so fits of stairs flight slabs and similar locations, where called for, shall be 12 mm thick comprising of one part cement and three parts of clean fine sand unless otherwise specified. The surface shall be brushed, swept clean and thoroughly wetted before plastering. Mortar shall be applied firmly pressed to the surface, rubbed and finished smooth evenly subject to the approval of the Project Engineer-Cum-Estate Officer, CCMD.

8.12 CEMENT MORTAR:

8.12.1 Cement mortar shall be of proportion specified for each type of work. It shall be composed of Portland cement and sand. The ingredients shall be accurately gauged and shall be evenly mixed together in a mechanical mixer. Care should be taken not to add more water than necessary. If hand mix is allowed, it shall be done on pucca waterproof platform. The gauged materials shall be put on platform and thoroughly mixed dry. Water shall then be added and the whole

mixed thoroughly until the mix is homogeneous and of uniform colour. Quantity of mortar mixed should not be more than what can be consumed within half an hour of mixing.

8.12.2 Cement mortar mix are specified in 1:2, 1:3, 1:4, 1:5 etc., the first figure will mean one part of Portland cement by volume and the second will mean so many parts of sand by volume. For example cement mortar 1:4 would mean

One part of cement and four parts of sand.

8.12.3 Cement and sand must conform to relevant I.S specification.

8.13 LIME RENDERING:

This will be prepared out of best quality fat lime slaked at site with fresh water not less than one week or not more than two weeks before use. All impurities, ashes and improperly burnt stuff shall be screened and picked out before slackening. Slaked lime shall be screened through to remove all unslaked materials, stones etc., so that only a fine creamy paste is available for rendering. Slaked lime is to be diluted with just sufficient water to give a thick consistent pulp suitable for effective covering of base surface. Before the base coat sets, the lime rendering is applied and finished smooth and the entire plastered surface is made truly plane.

9.0 FLOORING:

9.1 GRANOLITHIC FLOORING

9.1.1 General: The flooring shall be of specified thickness and shall consist of 1:2:4 concrete base or as specified and 12mm thick granolithic wearing coat. The granolithic flooring shall be laid in alternate panels. The size of panels shall be as decided by the Project Engineer-Cum-Estate Officer, CCMD

9.1.2 Laying of 1:2:4 concrete base:

9.1.2.1 The 1:2:4 concrete shall be of graded coarse aggregate of maximum size 10mm, coarse sand and cement. The ingredients shall be thoroughly mixed with sufficient water to obtain the required plasticity.

9.1.2.2 The free water on the surface of the base shall be removed and a coat of cement slurry of the consistency of thick cream shall be brushed on the surface.

9.1.2.3 The prepared 1:2:4 concrete shall be laid immediately after mixing on the fresh grouted base. The concrete shall be spread evenly and leveled carefully. Low places shall be filled, humps removed and the whole surface again leveled. The layer shall be compacted by ramming trowel led and allowed to set.

9.1.2.4 Mixing and laying of wearing coat: one part of cement in dry state shall be mixed with 1.5 parts by volume of well graded/crushed granite chips of

6mm maximum size. The ingredients shall be then mixed with sufficient water so for ordinary concrete. The wearing coat shall be laid 12mm thick over the base concrete immediately after it has set, compacted and leveled with a steel trowel. Just sufficient trowel ling shall be made to give a level surface. The surface should not be over trowelled as excessive trowelling will bring the cement to the surface which shall be strictly avoided. When the initial set takes place, further compaction by steel trowelling shall be done and final brushing shall be made before the topping becomes too hard.

9.1.3 Curing as soon as the surface is hard enough, it shall be covered with sacking or sand and kept continuously wet for a period of at least one week.

9.2 A bed of cement mortar 1:4 shall be laid and properly leveled to average thickness of 20mm and the surface kept slightly rough 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 slab shall be then fixed as per approved pattern with thin coat of cement paste applied on back of each slab and tapped with a wooden mallet till it is properly bedded in level with adjoining slabs. Joints shall be not more than 1:5 mm 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 pigment to match the shade of the slab. The flooring shall be cured for 14 days. Then it shall be polished according to IS: 1443, and pointed with cement mortar: 1:1 (1 part of cement and 1 part of fine screened sand) mixed with matching colour pigment.

9.3 GRANITE SLAB WORK:

9.3.1 General: The slab must be of uniform thickness as specified, the variation in the thickness not exceeding 12 mm and must be from the same source. They shall be of uniform texture and colour free of any veins and streaks. All the edge shall be chiseled true to line, square and shape. The surface should be rough dressed/ one line dressed. Three line dressed pulman dressed/mirror polish as specified.

9.3.2 Rough Dressing: The stone surface to be chisel dressed to one plane by removing all bushings so that the maximum depression is not more than 6 mm.

9.3.3 One Line Dressing: This is done after the rough dressing is completed by point chiseling so that the variations are not more than 4mm. Work includes rough dressing also.

9.3.4 Two Line Dressing: This is done after, one line dressing is done by chiseling so that variations are not more than 2.5mm work includes rough and one line dressing also.

- 9.3.5 Three Line Dressing: This is done after two lines dressing is over by chiseling so that variations are not more than 1.5mm work includes rough, one line dressing also.
- 9.3.6 Pulmane Dressing: After the three line-dressing is over, the surface is smoothened by using a special pulmane tool to further even out three line dressed surface so that the maximum variation in surface evenness is not more than 1.0mm work includes rough, one line, two line and three line dressing also unless otherwise stated.
- 9.3.7 Mirror polishing: The surfaces are to be polished by grinding using manual or mechanical process to give a smooth even perfect plane surface or as may be directed. The polished surface should reflect light like a mirror and must be free from scratches and depressions.

9.4 GLAZED TILING

- 9.4.1 Glazed tiles shall be from an approved manufacture conforming to IS.777 of specified size, thickness and colour, All specials viz coves, internal and external angels, 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 each tile being gently tapped with wooden mallet till it is properly bedded and in level with the adjoining tiles. The joints should be kept as thin as possible and in straight lines or to suit the required pattern after tiles have been laid surplus cement grout shall be cleaned off the depth of % mm and all dust and loose mortar removed joints shall then be flush pointed with white cement if necessary mixed with pigment to match the colour of the tile. The floor / dado shall 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 wooden mallet, the rate will include the cost of under layer of cement mortar.

10.0 PAINTING

- 10.1 The specifications covers the various types of all surfaces thought the interior and exterior of the building the number of coats required in various situations and also the type of finish required for the several items of work such as cement based paint, plastic emulsion point, oil bound distemper etc., are specified in the schedule of quantities and specifications.
- 10.2 Before commencement of the work, the contractor shall provide sample panels of painting at this own cost for the approval of the Project Engineer-Cum-Estate Officer-CCMD, to enable him to keep an accurate check on the materials supplied and final shade to be painted. It is however, the responsibility of the contractor to provide any deviations and defects shall have to be Rectified by the contractor at his own cost.
- 10.3 Contractor shall protect not only his own work at all times but also all the adjacent work and materials by suitable covering, protection or other methods

acceptable to the Project Engineer-Cum-Estate Officer, CCMD during progress of painting, it is of painting work to remove all paint and varnish spots from floors, walls, glass panes and other surfaces and restore them to original conditions. The work generally touched up shall be attended to after all workmen have left. Accumulated – material, rubbish etc., have to be cleared and the premises left in clean, orderly and acceptable conditions.

- 10.4 Contractor shall provide scaffolding wherever necessary erected on double supports tied together by horizontals. No ballies, bamboos or planks shall rest on or touch the surface, which is being painted. Contractor is demand to have considered the following while tendering and no extra claim on account of these will be entertained.
- 10.4.1 Supplying the paint and other materials required of approved colour and brand.
- 10.4.2 Preparing the surfaces to be painted.
- 10.4.3 Providing and erecting scaffolding and removing the same after completion of the
- 10.4.4 Lifting of materials to any height and painting at all levels.
- 10.4.5 Applications of painting as per the specification and to manufactures instruction.
- 10.4.6 Curing, protecting the painted surfaces and adjacent work and thoroughly cleaning of premises.
- 10.5 The paint shall generally conform to the chemical composition and other characteristics laid down in the relevant Indian standard specification. The entire materials required for painting work shall be obtained direct from approved manufactures or their authorized agents and brought to site in original manufactures containers with seals unbroken.
- 10.6 Paint shall be ready mixed of quality of the approved brand and manufacture. Mixing of paint by the contractor at site will not be allowed, except preparation and their quality shall be strictly maintained as per manufacture's instruction and all as directed by the Project Engineer-cum-Estate Officer, CCMD. All the materials shall be kept properly protected when not actually in use. Lids of containers shall be kept closed. Materials which have become stale or flat (in opinion of the project Engineer-Cum-Estate Officer, CCMD) shall not be permitted to be used on the works and shall be removed from site forthwith. Any materials found not conforming to the relevant specifications shall have to be removed by the contractor from the site at his own expenses.
- 10.7 Providing two coats of synthetic enamel paint of approved make colour over one coat of primer on plastered surfaces, wooden surfaces and steel surfaces: A fully putty coating has to be given after primer coat in the case of wooden

surfaces. The putty shall be made from pure whiting mixed to the proper consistency with new linseed oil, a little white lead being mixed to help hardening of putty. On no account putty is to be used before primary coat. Primers to be used shall be according to the manufacture specifications.

10.8 The manner of taking measurements will be in accordance with ISI: 1200.

11.0 WHITE WASHING

White wash shall be prepared from fat lime or shell lime slaked on site mixed with just enough water to make a thick paste and allowed to remain for atleast 7 days before use. At the time of using the paste shall be diluted with just sufficient water and strained through cloth. 4 kg of gun dissolved in hot water shall be added to each cubic meter of cream (115 GMS per cft). Ultra marine blue or other approved locally available colour pigment shall be added to give required whiteness. The number of coats as specified in the bill of quantities shall be added to give required whiteness. The number of coats as specified in the bill of quantities shall be applied by using flat brushes or spray pimps, on surface prepared. Each coat shall be allowed to dry before next coat is applied.

12 TREATMENT FOR SUNKEN FLOOR SLAB:

- A. Brick bat aggregate shall be from well burnt bricks. The proprietary water proofing compound and the quantity to be used shall be as per para 15.1
- B. The surface shall be thoroughly cleaned with wire brushes. All loose scales shall be removed and dusted off. The surface (bottom as well as sides) shall be treated with cement slurry admixed with proprietary water proofing compound to penetrate interstices and fill the pores in the surface.
- C. After the slurry coat is laid, a layer of well burnt brick bats/ aggregates of about 40mm size shall be laid in cement mortar of mix as specified by the specialist firm but not leaner than 1:5 (a cement : 5 coarse sand) admixed with proprietary water proofing compound the mortar being filled to half the depth of the aggregate. The brick bat/aggregate layer shall be rounded off at junctions with the beam all etc., and tapered towards top to a height of 100mm long beams/ wall, etc., curing of this layer shall be done for 3 days.
- D. After curing the surface shall be applied with a coat of cement slurry admixed with proprietary water proofing compound.
- E. Joints of brick bat/ aggregate shall be filled fully with cement mortar of mix as specified by the specialist firm but not leaner than 1:4 (1 cement. 4 coarse sand) admixed with proprietary water proofing compound and top finished with average 20mm thick layer of some water. This layer of mortar shall be continued to the sides of beam. Wall etc., the height upto which this treatment is to be extended on the sides shall be as directed by the Engineer-in-charge.

The surface shall be finished smooth with cement slurry admixed with proprietary water proofing compound.

- F. While the water proofing treatment is 3qrie it shall be ensured that the outlet pipes are properly fixed arid the gap between the wall and pipes are properly filled with brick/stone aggregate and cement mortar admixed with proprietary water proofing compound and grouted with cement slurry admixed with proprietary water proofing compound by injection process.
- G. Water proofing treatment shall be cured for 10 days
- H. Measurements: measurements for the floor treatment shall be taken on plain area of floor treated nothing extra shall be paid for rounding off at junctions and taking the treatment along sides of beams and walls for about 100mm sides of beam/wall etc., where the treatment is only with mortar shall be measured and paid separately , length and breadth shall be measured correct to once centimeter and area calculated correct to 0.01 sqm
- I. Rates: The rates shall include the cost of all labour and material involved in all the operations described above. Base treatment and sides treatment will be paid separately under respective items.

PART II: SPECIFICATIONS FOR WATER SUPPLY AND SANITARY WORKS

1.0 GENERAL

1.0 SCOPE OF WORK:

The general character and the scope of work to be carried out is illustrated in the drawings and specifications. The contractor shall carry out and complete the said work under this contract in every respect in conformity with the rules and regulations of the local authority. The contractor shall furnish all labour, supply and install all materials, appliances, tools, equipments etc., necessary for the complete provision and testing of the whole plumbing services installation as specified here as per the relevant ISI codes as shown on the drawings. This also includes any material, appliances, equipment not specifically mentioned herein or noted on the drawings as being furnished or installed but which are necessary and customary to make a complete installation as shown on the drawings or described herein, properly connected and in working order.

In general, the work to be performed under this contract shall comprise of the following:

- 1.1 All incidental jobs connected with water supply services installation, such as excavation in trenches and back filling, cutting chases in concrete, brick etc., and making good cutting drilling holes through walls, floors and grouting for embedding of fixtures, equipment and fixing of valves, pumps etc.,
- 1.2 Furnish and install a complete workable, service installation as shown on the drawings and as per the latest ISI specifications including all that which is reasonably inferred.
- 1.3 Complete installation of internal water supply system.
- 1.4 Complete installation of the sewerage and sewerage appurtenances internally and around the building.
- 1.5 Complete installation of all sanitary and plumbing fixtures.
- 1.6 Co-operation with other crafts in putting the installation in places. Any work without regard or consultation with other trades, shall be removed by the contractor without any traditional cost to the employer, to permit the proper installation of all other work, as prescribed by the architects.
- 1.7 Repair all damages done to the premises as a result of this installation and remove all debris arising there from to the satisfaction of Project- Engineer – cum- Estate Officer.

- 1.8 Cleaning of all plumbing “fixtures, testing and showing satisfactory performance all the fixtures at the time of handing over to the Project Engineer-cum-Estate Officer.
- 1.9 It is the responsibility of the contractor to safe guard and takes care of all the fixtures fitted until the time handing over to the Project Engineer-cum-Estate Officer.
- 1.10 Painting of all concealed and exposed pipes as specified.
- 1.11 Assume full responsibility of all statutory requirements.
- 1.12 At the completion of the work, furnish necessary information like invert levels and layout of pipeline etc., and prepare final completion drawings to the Project-Engineer-cum-Estate Officer.

2.0 REGULATIONS AND STANDARDS:

2.1 The installations shall conform in all respects to the following board list of standards in general:

- | | | |
|----------------|---|---|
| IS 3114 – 1965 | : | Code of practice for laying of CI pipes. |
| IS 1230-1968 | : | Specifications for mild steel tube, tubular and other steel |
| | | pipe fittings part I |
| IS 1536 – 1980 | : | Centrifugally cast (spun) cast iron pressure pipes for water, gas and sewerage. |
| IS 780 – 1980 | : | Sluice valve for water works purposes. |
| IS 1520 – 1980 | : | Horizontal centrifugal – pumps. |

2.2.1 The installation shall also be in conformity with the byelaws and requirement of the local authority in so far as these become applicable to the installation wherever this “specification calls for a higher standard of materials and / or workmanship than those required by any of the above regulations and standards then this specification shall take precedence over the said regulations and standards. Wherever the specification require something which will violate the regulations, the regulations shall govern.

3.0 PERMITS AND TESTS:

On completion of the work, the Contractor shall obtain and deliver to the Project Engineer-cum-Estate Officer, CCMD certificates of final inspection and approval by the local authority as may be applicable. The Project Engineer-cum-Estate Officer, CCMD shall have full power to require the materials or work to be tested by any independent agency at the contractors expenses in order to prove their soundness and adequacy.

4.0 DRAWINGS AND SPECIFICATION

The drawings and specification shall be considered as part of this and any work or materials shown on the drawings and not called for in the specifications or vice versa shall be executed as if specifically called for in both. The contract drawings shall indicate the extent of general, arrangement of the fixtures, drainage system etc., and essentially diagrammatic. The drawings indicate the points of supply and termination of pipe runs and broadly suggest the routes to be followed. The work shall be installed as indicated on the drawings, however, any changes found essential to coordinate, this work with other trades shall be made without any additional cost. The data given herein and on the drawings is as exact as could be secured but its complete accuracy is not guaranteed. The drawings and specifications are of the assistance and guidance to the contractor and exact location distance and levels will be governed by the individual building and site condition, therefore approval of the Project Engineer-cum – Estate Officer, CCMD on tracing cloth.

5.0 MANUFACTURERS INSTRUCTIONS:

Where manufacturers have furnished specific instructions, relating to the materials used in this job, covering points not specifically mentioned in job, covering points not specifically mentioned in these documents. These instructions shall be followed in all cases.

6.0 CHANGE IN DIMENSION

If the size of the fixture mentioned is not available, then the nearest available size shall be fixed with due consent of the Engineer-in-chief, CCMD.

7.0 MATERIALS:

- 7.1 Materials shall be of the best quality obtainable and unless otherwise specified they shall conform to the respective Indian Standards Specification.
- 7.2 Samples of all materials shall be as per the list of approved branch manufacture. The samples shall be got approved before placing order and the approved samples shall be deposited with the Engineer-in-chief, CCMD.
- 7.3 In case of non availability of materials in merits, sizes, the nearest size of EPS units shall be provided with prior approval of the Engineer-in-chief Project Engineer-Cum-Estate Officer, CCMD, for which no extra will be paid.

8.0 TRENCHES FOR PIPE DRAINS:

- 8.1 Opening out trenches: In excavating the trenches etc., the road metalling pavement curbing etc., are to be placed on one side and preserved for reinstatement when the trench or other excavation shall be filled up at no extra cost.

Before any road metal is replaced, it shall be carefully shifted, the surface of all trenches and holes shall be restored and maintained to the satisfaction of the Architects. The contractor shall not cut or break down any live fence of trees in the one of proposed works but shall tunnel under them unless the Architects shall order to the contrary. The contractor shall scrub up and clear the surface over the trenches and other excavations of all stumps, roots and all other encumbrances affecting execution of the work and shall remove them from site to the approval of the Project Engineer-Cum-Estate Officer, CCMD.

- 8.2 Cutting of roads: All works across the roads, shall be carried out as per the directions of the Project Engineer-Cum Estate Officer, CCMD.
- 8.3 Excavation to be taken to proper depth: The trenches shall be excavated in all conditions of soil and to such a depth that the pipelines shall rest as described in the several clauses relating there to and so that the inverts may be at the levels given the drawings. In loose soil, the Project Engineer-cum-Estate Officer, CCMD. May order the contractor to excavate to a great depth than shown on the drawings to fill up the extra excavation with concrete, sand, gravel or other materials. For such authorized filling of materials the contractor shall be paid extra at the rates laid down under clause 20.0 of the general conditions of contract, if the extra work was ordered by the Project Engineer-Cum-Estate Officer, CCMD. If the contractor should excavate the trench to a greater depth than is required without a specific order to that effect in writing, the extra depth shall have to be filled up with concrete at the contractor's own cost to the requirements and satisfaction of the Project Engineer-Cum- Estate Officer, CCMD.
- 8.4 Refilling: After the pipes or other fittings has been laid and proved to be water tight, the trench or other excavation shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the pipes and other permanent works. Filling in the trenches and upto 50cm above the pipes shall consist of the finest selected materials placed carefully and consolidated. After this has been laid, the trench and other excavation shall be refilled carefully in 15cm layers with materials taken from the excavation each layer being watered and consolidated.
- 8.5 Settlement and Damages : The contractor shall, at his own cost make good promptly, during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, beams, footpaths, gardens, open spaces, etc., whether public or private caused by his trenches or by his other excavations and he shall be liable for any accidents caused thereby. He also shall at his own expenses and charge, repair and make good any damage to the buildings and other properties.
- 8.6 Disposal of surplus soil: The contractor shall at his own cost and charge, dispose within the site all surplus excavated material not required to be used on the works to within a distance of 50cm.
- 8.7 Timbering of pipe line and trenches: The contractor shall at all times support efficiently and effectively the sides of the pipe trenches and other excavations by suitable timbering, piling, sheering etc., without any extra cost. All timbering, sheeting and piling with their wallings and supports shall be of adequate dimensions and strength and fully braced and strutted so that there is no risk of collapse or subsidence of the walls of the trench. The contractor shall be held accountable and responsible for the sufficiency of all timbering, bracing, sheeting and piling used and for all damages to persons and property

resulting from the improper quality, strength, placing, maintenance or removing of the same.

- 8.8 Removal of water from pipeline, trenches etc., : The contractor shall at all times during the progress of work keep the trenches and excavations free from water which shall be disposed of by him in a manner as will neither cause injury to the public health nor to the work completed or in progress nor to the surface of any roads or streets nor cause any interference with the use of the same.
- 8.9 The width of the excavated trench shall be as per the table given below width at bottom

Excavation upto 90cms depth	33cm	33cm
90 to 150cm depth	60cm	60cm
150 to 300cm depth	75cm	75cm
300 to 500cm depth	90cm	100cm

- 8.10 Protection of existing services : All pipes, water mains, cables etc., met in the course of excavation shall be carefully protected and supported.
- 8.11 Concreting: All pipes at shallow road crossings and made up ground shall be laid on a bed of 15cm concrete with one part of cement, 4 parts of sand and 8 parts of 40mm gauge stone metal property consolidated. Concrete shall be laid to the full width of the trench and also in haunches.

8.12 CAST IRON PIPES AND FITTINGS

- 8.12.1 Cast – iron soil, waste and vent pipes and fittings shall be of heavy quality conforming to IS 1536-1967 and fittings to IS 1537-1960
- 8.12.2 Claying and Jointing: The pipes shall be laid, underground, under the floors, or on walls either buried or exposed as the case may be as shown on the drawings.
- 8.12.3 Cast Iron, Pipes: Cast iron pipes shall be laid and jointed in conformity with the code of practice for laying of cast iron pipes. Cast iron pipes shall be jointed by best quality caulking lead free from all impurities in wet trenches, joints shall be made with lead wool. The spigot shall be centered in the adjoining socket by tightly caulking in sufficient turns of tarred gaskin to leave unfilled the required depth of socket for lead. Where the gaskin has been caulking tightly home, a jointing ring shall be placed round and barrel and against the face of the socket. Molten lead shall then be poured into fill the remainder of the socket in one with suitable tools by hammering right-round the joint, to make up for the shrinkage of the molten metal on cooling and shall preferably finish 3mm behind the socket face. Lead for caulking shall conform to IS 782-1966. The quantity of lead to be filled per joint in various sizes of cast iron pipes. Shall be as follows:

Water main pipes: Lead /joint (Kg)

80mm (3") pipe	1.8
100mm (4") pipe	2.2
125mm (5") pipe	2.6
150mm (6") pipe	3.4
200mm (8") pipe	5.0

8.12.4 The joints and pipes laid for water supply systems shall be tested to a pressure of 12kg.sqcm for two hours without developing leaks/fall in pressure. The drainage pipelines and joints shall be tested to a head of 150cm for two hours without developing leaks/fall in pressure. In case of leaks the piping shall be redone in such portion and the test repeated till achieving satisfactory results.

8.12.5 Under ground piping shall be of CI tyton type confirming to IS class A 1536 the piping shall be laid not less than 1Mt below the ground level. Suitable masonry/ PCC support anchor blocks shall be provided at change in direction with soil conditions are unsatisfactory.

8.12.6 All fittings shall be CI flanged confirming to IS 1538. The flanges shall be drilled as per relevant Indian Standards Flanges shall be faced and cleaned and shall have jointing of rubber insertion or asbestos compound. In case of tytron pipes the joint shall be made by using rubber gaskets as per manufactures specification. The joint shall be capable of withstanding a pressure of 10.5 Kg/Sqcm.

9.0 SLUICE VALVES

Sluice valves shall conform to IS: 780 valves shall be of right hand type. Only flanged valves shall be used . Valve wheel shall have an arrow engraved or cast thereon showing the direction of turning open or close operation.

10.0 NON-RETURN VALVES

Non return valve shall be of cast iron with gun metal seat. Non return of valves shall be of flanged type. Spring loaded valves shall not be used. The valves shall be suitable for a test pressure of 21 kgs/Sqcm.

11.0 MODE OF MEASUREMENT

11.1 Excavation (General): the width of excavation shall be limited to as said earlier.

11.2 Cast iron pipes: Cast iron pipes shall be measured along the center line of the pipe including all specials in Rmt. The quoted rate for respective item shall be Rmt, and shall include the following:

- A. Cost of respective pipes and specials and jointing materials etc.,
- B. Laying fixing and jointing with necessary clamps, brackets, bolts, nuts and washers.
- C. Making good all damages to the parts of the building to suit the surroundings and making good the defects if any.
- D. Testing and making good the defects if any

Valves: Valves shall be per number only and shall include the following:

- A. Cost of valve and jointing materials
- B. Fixing and jointing with necessary bolts, nuts, rubber insertion etc.,
- C. Testing and making good the defects if any:

11.4 GI Pipes and Fittings:

The pipes shall be of the medium quality (class B) unless otherwise specified and shall be of galvanized iron, screwed socketed and shall conform to IS: 1239. They shall be manufactured by a firm of repute. All fittings shall be malleable iron galvanized fittings of approved best Indian make.

11.4.1 LAYING AND FIXING

11.4.1 Where pipes have to be cut or re-threaded, ends shall be carefully out so that no obstruction to bore is offered. For internal work all pipes and fittings shall be fixed truly vertical and horizontal either by means of standard pattern holder bat clamps keeping the pipes (12mm) clear of the wall everywhere or concealed as re-directed.

11.4.1.2 For external work, G.I pipes and fittings shall be laid in trenches. The width of the trench shall be the minimum width required for working. The pipes laid underground shall not be less than 60cms. From the finished ground level. The work of excavation and refilling shall be done as specified elsewhere or concealed as directed.

11.4.2 Painting : The burred pipes shall be painted with two coats of bit mastic paint.

11.4.3 Testing: Before any pieces are painted or covered, they shall be tested to a hydrostatic pressure of 7 kg/sqcm pressure shall be maintained for atleast eight hours without appreciate drop in pressure, in addition to the sectional testing of water supply pipes, the contractor shall test the whole installation to the entire satisfaction of the Project Engineer-Cum – Estate Officer, CCMD. He shall rectify any leakages, failure of fittings or valves.

11.4.4 Mode of measurements: G.I pipes above and below ground shall be measured along the center line of the pipes and fittings the quoted rate for respective item shall be per Rmt and shall include the following:

- a) Cost of respective pipes and specials
- b) Laying, fixing and jointing with necessary clamps
- c) Cutting hole and chases in walls floors, etc., and making good the same
- d) Testing and making good the defects if any.

PART III: SPECIFICATIONS FOR ELECTRICAL INSTALLATION

1.0 LEGEND:

- 1.1 Internal electrification (general lighting and power) is for general lighting for fans, lugs, lights etc.

2.0 GENERAL

- 2.1 The electrical installation shall comply in all respects with the requirements of the Indian electricity act, 1916 as amended from time to time and the Indian Electricity rules and Regulations currently in force.
- 2.2 Materials, fittings and appliances shall be of the best quality and of approved make/ manufacture; conforming to the relevant Indian Standard Specifications. Samples must be attached to Project Engineer-Cum-Estate Officer, CCMD for their approval well in advance, atleast prior to execution of work, (tenderers tenders may specify the name of makers/manufactures of the materials, fittings and appliances which they propose to use, while tendering)
- 2.3 Workmanship shall be I Class, conforming to the requirements of the I.E Rules and regulations currently in force. 2.4 it shall be the contractors responsibility to prepare the necessary drawings/ chart, and submit the same through proper channel to the concerned authorities for approval of the installations:

3.0 GENERAL LIGHTING:

- 3.1 The wiring is to be done in concealed conduit for full unless otherwise specified. The distribution of circuit distribution boards and main board are as indicated in the layout.
- 3.2 The circuit distribution boards are all to be completely embedded in walls to make them flush to the surface.
- 3.3 The main control board to be fixed in position as indicated in the layout and in the manner indicated by the Project Engineer-Cum-Estate Officer, CCMD, the power supply is so be drawn from the existing overhead line through an underground cable system, using necessary size G.I pipe at the wall entry. The cable jointing work should be done by an experience person specially trained for such jobs. The scope of this work includes laying cables in trenches (the trenches to be prepared by the contractor himself) and the cable jointing using necessary compounds.
- 3.4 The scope of this work covers the supply and installation of fittings like lighting fixtures, ceiling fans, exhaust fans, complete in all respects like mounting accessories lamps, wiring etc.,

- 3.5 The wiring for lights, plugs, fans etc., shall be of “looping-in-system” and in each and every switch box a neutral point shall be made available for testing purpose.
- 3.6 Not more than two power socket outlets should be connected in the same circuit and the power plugs be wired with PVC insulated conductor wires drawn in conduit.

4.0 POWER:

- 4.1 Power wiring in conduits shall unless otherwise specified, also be of concealed type run on walls independent of general lighting wiring based on the principle of overhead bus bar systems.
- 4.2 The mains will be terminated and connected through immediate junction boxes as shown in the layout and type of termination shall be as detailed in the layout: The tapping connections to load circuit boards shall be from the individual intermediate junction boxes, which will be at suitable capacity fuse units. The neutral connection shall be direct without fuse.
- 4.3 The tapping connections to load circuit boards shall be from the individual intermediate junction boxes, which will be at suitable capacity fuse units. The neutral connection shall be direct without fuse.
- 4.4 The control boards for the load outlets shall be fixed at a height of not more than 5 ft from the floor level and shall be in such a position as will be indicated by the Project Engineer-cum-Estate Officer at the time of execution.
- 4.5 All the intermediate junction boxes and the load control boards shall be suitable for flush mounting on the walls.
- 4.6 A portion of the power main pipes shall be possible to run the same on walls.

5.0 EARTHING:

- 5.1 Earthing in the case of power wiring shall be with soft drawn bars copper wire of size not less than 10 SWG, in double run suitably fixed on to the surface of the conduit by means of copper earth clips to ensure perfect electrical contact and the earthing wire shall run throughout the length of the conduit. At the main board level of individual earth wire runs shall be suitably interconnected firmly by means of earth clips to ensure proper continuity of earth connections, as well as full electrical contacts with the conduit pipes of the intermediate junction box and the load control boards and any other metal works in the wiring system shall all be suitably connected for perfect earth connections with insulated copper wire of size not less than 22G interconnections to the main earth loads. All the above works shall be in conformity with IS 732-1963

Code of practice for electrical wiring installation (system voltage not exceeding 650v)

6.0 GENERAL LIGHTING:

- 6.1 Insulated copper wire of not less than 22 G shall be used for the running of continues earth wire all along with conduits and shall be firmly bounded by means of suitable size earth clips, externally in order to have good electrical contact Bare copper wire sizes not less than 4 SWG shall be used for the main earthing connections.
- 6.2 These two earthing point outside the building shall be according to the I.S specifications for pipe earthing (IS 732-1963) provision shall be made at the light and fan outlets for earthing connections, so that they can be used wherever found necessary instruction from the Project Engineer-Cum-Estate Officer, CCMD.

7.0 Materials:

- 7.1 The conduit pipes to be used shall be heavy guage not less than 2mm thick of PVC conduit and good quality. The minimum size of conduit to be used shall be $\frac{3}{4}$ " dia. The conduit fittings like bends, junction boxes etc., should be of standard quality and shall be with good deep matching threads to suit the conduit pipes and shall be free from burs etc.,
- 7.2 The switch boxes etc., shall be metal clad out of M.S Sheets not less than 16SWG either square or oblong in shape and in suitable sizes as per requirements and shall be provided with earthing terminal screws for body earthing connections. The depth of the boxes shall be such that they should fully be embedded in the wall, flush with the finished wall surfaces.
- 7.3 The top covers of these boxes be of either laminated sheets of thickness between 1/8" to 1/4" as required for perpex sheets.
- 7.4 The control switches for lights shall be hush type as specified 7.5 the 5 amps plugs and socket shall be 3 pin flush type
- 7.5 The 15 amps 3 pin power plugs shall be preferably flush mounting type with a combined switch and shall be controlled by a fuse or a miniature circuit breaker single pole type.

8.0 PARTICULAR SPECIFICATIONS:

- 8.1 Type/system of wiring : only loop in system of wiring with PVC in conduit (surface as per details in schedule) and junction boxes where absolutely necessary and only at the places approved by the Engineer-in-Chief, CCMD.
- 8.2 Wires: Single core multistrand copper PVC of approved make and conforming to ISI only should be used.

- 8.3 Conduit: Heavy gauge of 2mm thick PVC conduit pipe. Conduit drops must be laid to plumb. PVC bushings should be provided at all ends of conduits.
- 8.4 Workmen: All work must be executed by licensed electrical wiremen possessing valid licences.
- 8.5 Switches: All 5 amps switches and 3 pin wall plugs must be of good quality or equivalent approved make.
- 8.6 Florescent Fittings: Light fittings should be complete in all respects including clamps reflectors, tubes, chokes, condensers, starters and internal wiring, extras on this account not admissible. The rate quoted must include these elements as well. Any damage to these fittings during erection/ installation should either be made good or fitting replaced totally.
- 8.7 Cables: Cables shall be with aluminium conductor, PVC insulated conforming to IS specification.
- 8.8 The contractor should enclose the pamphlets, catalogues of various materials offered while submitting the tender. The tenderers are required to submit along with their tender the list of makes of all equipments, fittings, fans, lamps, switches, gear, fuse gear, conduits and accessories, wiring materials and accessories. Non compliance to this will subject to their tender for disqualification or rejection.
- 8.9 Earthing: All machine parts, metal covers, switches, panels, fittings should be I/P earthed as given in the schedule and this has to be approved by the electrical inspector. The procedure should be strictly from L.E.E Regulations and Indian Electricity Act. Earthing in continuity for conduit pipes throughout and at junction boxes should be maintained by check nuts on either side and earthing clamps where necessary.
- 8.10 Boards: The main board and the sub distribution boards should be metal clad. The M.S sheet used for the box should be 3 mm thick and holes of the required diameter for incoming and outgoing pipes should be drilled in it.
- 8.11 Wiring diagrams: The contractor shall, on completion of electrical works executed in the budding furnish in duplicate the wiring diagrams indicating the light, power, fan points/outlets etc., indicating the colour code also so as to enable easy identification of circuits.

I.S SPECIFICATIONS

A general list of IS Specifications applicable to this contract is appended here with

IS CODE NO

SP 7-1970	National Building Code
1885	Symbols
4648	Guide for electrical layouts
5578	Marketing of insulated conductors
5216	Guide for safety in installations
374	Ceiling fans
5077	Decorative light fitting
1913	Safety requirement of fittings
1536 & 6616	Ballasts
3323	Bi-pin lamp holders
2215	Starters for fittings
2418	Flourescent lamps
1569	Discharge lamps
3324	Holders
5513	Boxes for enclosures for Ele Accessories
Sp-7-2675	Fuse distribution boards
371	Ceiling roses
2667 & 3387	Metal conduits – fittings and accessories
1653	Rigid metal conduits
3854	Switches for lighting circuit control
1293	Three pin plugs
2351	Danger Board
3106	Instalation and selection of fuses
3043	Earthing
2147	Degree of protection by switch and control gear
4237	Requirement for switch and control gear
40437	Heavy duty air break switch and Sf units
2208	HRG fuses
375	Switch gear bus bars
2607	Air break isolators
1951	PVC sleeveings
1255	Code of practice for laying cables.
1694	PVC insulated cables.
1554	PVC cables.
3961	Current rating of cables.

LIST OF APPROVED MAKES FOR CIVIL WORKS

	Item	Make
1	WINDOWS	
2	ALUMINIUM	JINDAL/INDAL/HINDAL CO
3	STEEL	TATA/ SAIL
4	DOORS	SAL WOOD DOOR WITH FLUSH SHUTTER, GRP LAMINATED DOORS
5	GLAZING	JOHNSON, KAJARIA
6	GLAZED TILES	JOHNSON, KAJARIA, NAVEEN
7	CERAMIC TILES	JOHNSON, KAJARIA, NAVEEN
8	PAINTS AND DISTEMPER	ASIAN BRAND, APEX BRAND
9	SYNTHETIC ENAMEL	ASIAN BRAND
10	WATER PROOFING COMPOUND	FOSROC, DR.FIXIT
11	VITRIFIED FLOORING	JOHNSON, KAJARIA
IF THE ABOVE BRAND IS NOT AVAILABLE THE EQUIVALENT MATERIAL TO BE APPROVED BY THE ENGINEER-IN-CHARGE BEFORE FIXING		
ALL MATERIAL SHALL HAVE TO BE GOT APPROVED FROM THE ENGINEER-IN- CHARGE BEFORE BEING USED.		

<u>List of approved makes – Plumbing and sanitary Works</u>		
1	VITREOUS CHINA SANITARY WARE	HINDUSTAN SANITARY WARE/ PARRY WARE
2	C.P FITTINGS	JAQUAR CONTINENTAL
3	PVC PIPES (SWR QUALITY)	ORIPLAST
4	G.I FITTINGS	R BRAND
5	G.I PIPES	TATA B CLASS A GRADE
6	BALL VALVE (15MM TO 150MM DIA)	ZOLOTO/AM
7	GUN METAL GATE VALVE	ZOLOTO/LEADER
8	STONE WARE PIPES AND GULLY	NECO/TSL/ANDHRA
9	MAN HOLE COVERS	NECO
10	EWG SEAT COVER TO LID	COMMANDER/PRINCE
11	FLOAT GLASS MERCURY COATED	MODI/KONICA
12	PVC CONNECTION PIPE	KOHINOOR
13	PVC SWR PIPE	SUPREME
14	FLUSHING CISTREN	SLIMLINE
15	CP BOTTLE TRAP	JAQUAR
16	MIRROR	ATUL/MODIGUARD
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

List of approved makes – Electrical works		
A	PVC CONDUITS	UNIVERSAL/UNI PLAST
B	UG CABLES	UNIVESAL /CCI/ANCHOR/GLOSER/FINO LEX
C	COPPER WIRES	WINCAP/FINOLEX/ANCHOR
D	DP SWITCHES, SP SWITCHES AND SOCKETS	ANCHOR/ROMA
E	MCB/ELCB	MDS/L&T HAGER
F	SWITCH FUSE UNITS/FISE LINK	GEC/EE/L&T/SCHNIEDER
G	FLOURESENT /CFL TUBE FITTING	PHILIPS/CROMPTON
H	LAMPS	PHILIPS/CROMPTON
I	EXHUST FANS	GEC/CROMPTON
J	TELEPHONE CABLES	DOORAVANI/DELTON
K	MAIN MCB-DB (MDB)	L&T HAGER/ABB/SCHNIEDER
L	DB-KIOSK	L&T HAGER/MDR/ABB/SCHNIED ER
M	CT	L&T HAGER/ABB/SCHNIEDER
N	VOLT METER – ANALOGUE METER	L&T HAGER/ABB/SCHNIEDER
O	AMMETER-ANALOGUE METER	L&T HAGER/ABB/SCHNIEDER
P	INDICATING LAMPS	L&T HAGER
Q	GRIMMING LUNGS	DOWELS MAKE ONLY
R	CEILING FAN	CROMPTON GREAVES
S	GEYSER	RACOLD/BAJAJ
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

List of approved makes – Electrical works		
S1	DESCRIPTION	MAKE
1	GI PIPES	TATA/JINDAL
2	PUMPS	KIRLOSKAR
3	PRESURE GAUGE	H GURU
4	PRESSURE SWITCH	INDFOSS
5	MOTOR CONTROL PANEL	MICRO POWER SYSTEM/ SUBRAMANYAM INDUSTRY
6	CABLES	TOSHIBA/HAVELLS/UNIVERSAL
7	BUTTERFLY VALVE	INTERVALVE/ADVANCE
8	NON RETURN VALVE	INTERVALVE/ADVANCE
9	Y-STRAINER	ANIL/LEADER/SAMSUNG
10	HYDRANT VALVE	ISI MARKED
11	HOSE BOX	GURAD FIRE/ SUBRAMANYA INDUSTRIES
12	CP HOSE	ISI MARKED
13	BRANCH PIPE	ISI MARKED
14	BALL VALVE	ITAP/R BRAND
15	FIRE HOSE REEL DRUM	OMEX
16	FIRE EXTINGUISHERS	ISI MARKED
If the above brand not available the Equivalent Material to be approved by the Engineer-in-charge before fixing		
All materials shall have to be got approved from the Engineer-in-charge before being used.		

SECTION 7: SPECIAL CONDITIONS

- **No Labour Camp inside the Indian Institute of Science Campus**
- **Bill Of Quantities or commercial bid has been disabled in the e-procurement portal of GoK, which is as per the Government Orders vide FD/165/EXP-12/2017 dated 21/03/2017 and FD/539/EXP-12/2017 dated 02/06/2017. Uploading the BOQ scanned document shall lead to disqualification of the bid. Whereas the prices of all the line items are to be entered on the e-procurement portal inclusive of taxes.**
- **Excavated earth/debris shall be removed from the work site at the end of the day.**
- **Only 53 Grade OPC cement of brand Birla Super / ACC / Ultra tech shall be used.**
- **The reinforcement steel used shall be of Grade Fe 500 tar steel of brand TISCO / SAIL / JSW.**
- The agency should employ men/women aged above 18 (Verifiable) (and preferably below 45), who have good health and clean (verifiable) conduct records.
- The agency should employ personnel who can converse well in English and local language.
- The agency should provide Uniforms to all personnel employed by them.
- The agency should provide necessary tools and equipments that are necessary for the **Management & Maintenance of Water supply system.**
- The bidder/Company/Firm/Agency should have experience in operating an automated Water Supply System in a reputed organization.

MANAGEMENT & MAINTENANCE OF WATER SUPPLY SYSTEM CONTRACT, TERMS AND CONDITIONS

General

1. The **Management & Maintenance** charges will be paid by the IISc on monthly basis, provided the bidder produce the necessary document as detailed in the conditions
2. The contract is for a duration of THREE years & will be evaluated at the end of each year for assessing the performance. The contract will be reviewed yearly, and extended until the duration of the contract. However the requirement of manpower will also be reviewed and curtailed/retained/enhanced yearly.
3. The contract can be extended further by the mutual consent of contracting agency and IISc at mutually agreed rates.
4. The contract may be terminated before the contract period owing to deficiency in service or substandard quality of the service provided by the selected company/Firm/Agency. Further, IISc reserves the right to terminate the initial contract at any time after giving two months notice to the successful bidder.
5. The bidder shall not be allowed to transfer, assign, pledge or sub-contract its rights and liabilities under the contract to any other agency without the prior written consent of IISc.
6. The bidder will be bound by the details furnished by him/her to IISc, while submitting the bid or at subsequent stage. In case, any of such documents furnished by the firm is found to be false at any stage, it would be deemed to be a breach of terms of contract making the firm liable for legal action besides termination of contract.
7. The bidder shall ensure that the manpower deployed in IISc, conforms to the technical specifications of age and language skills prescribed in the section on Scope of Work of the Tender Document.
8. The successful bidder shall furnish the following documents in respect of the individual manpower who will be deployed in IISc, before the commencement of the work.
 - (i) List of manpower shortlisted by agency for deployment at IISc, containing full details ie., date of birth, marital status, address, etc.
 - (ii) Bio-data of the persons.
9. In case, the person employed by the successful bidder commits any act of omission/commission that amounts to misconduct/indiscipline/incompetence/security risks, the successful bidder will be liable to take appropriate disciplinary action against such persons, including their removal from work, immediately after being brought to notice, failing which it would be assumed as breach of contract which may lead to cancellation of contract.
10. The selected agency shall provide identity cards to the personnel deployed in this office carrying the photograph of the personnel and personal information such as name, date of birth, age and identification mark, etc.
11. The selected agency shall ensure that any details of office, operational process, technical knowhow, security arrangements, and administrative/organizational matters are not divulged or disclosed to any person by its personnel deployed in this office.
12. The selected agency shall ensure proper conduct of his personnel in office premises, and enforce prohibition of consumption of alcoholic drinks, paan, smoking, loitering without work, etc.
13. The selected agency shall designate a coordinator, out of the deployed personnel, who would be responsible for immediate interaction with this office, so that

optimal services of the persons deployed by the agency could be availed without any disruption.

- 13 The selected agency shall immediately provide a substitute in the event of any person leaving the job due to his/her personal reasons. **The delay by the agency in providing a substitute beyond three working days shall attract liquidated damages @ Rs 5,000/- per day (per such case) on the service providing agency, besides deduction in payment on pro-rata basis.**
- 14 It will be the responsibility of the contractor to meet transportation, food, medical and any other requirement of contractor's manpower for carrying out the contract works. IISc will have no liability in this regard at any stage.
- 15 Payment shall be made only to the contractor and on a monthly basis as per actual services. The contractor has to raise invoices in the first week of the next month for the services rendered in the month.
- 16 IISc reserves the right to amend or withdraw any of the terms and conditions contained in the Tender Document or to reject any or all tenders without giving any notice or assigning any reason. The Director, IISc is the final authority for settling any disputes and the decision of the Director in this regard shall be final and binding on all.

LEGAL

1. For all intents and purposes, the bidder shall be the "Employer" within the meaning of different Labour Legislations in respect of manpower so employed and deployed at IISc, for contractual services.
2. The selected agency shall be solely responsible for the redressal of grievances/resolution of disputes relating to persons deployed. IISc, in no way, be responsible for settlement of such issues whatsoever. IISc shall not be responsible for any damages, losses, FINANCIAL or other injury claims to any person deployed by service providing agency in the course of their performing the functions/duties, or for payments towards any compensation.
3. The manpower deployed by the contractor shall not have any claims of Master and Servant relationship vis-à-vis IISc nor have any principal and agent relationship with or against the IISc.
4. The manpower deployed by the contractor for the contract shall not be entitled for claim, pay, perks and other facilities which may be admissible to casual, ad-hoc regular/confirmed employees of IISc, during the currency or after expiry of the contract. In case of termination of the contract also, the persons deployed by the contractor shall not be entitled to or and will have any claim for absorption or relaxation for absorption in the regular/otherwise capacity in IISc. The contractor should communicate the above to all the manpower deployed in IISc by the contractor.
5. **The selected agency will be required to pay minimum wages as prescribed under the Minimum Wages Act of Central Government.** The bidder will maintain proper record as required under the Law/Acts.

6. The selected agency will be responsible for compliance of all statutory provisions relating to Provident Fund, and Employees State Insurance etc., in respect of the persons deployed by it at IISc.
7. The selected agency shall also be liable for depositing all taxes, levies, Cess, etc. on account of services rendered by it to IISc & income tax to concerned tax collection authorities from time to time as per extant rules and regulations on the matter.
8. The selected agency shall maintain all statutory registers under the applicable Law. The agency shall produce the same on demand to the concerned authority of IISc or any other authority under Law.
9. The Tax Deduction at Source (T.D.S) shall be deducted as per the provisions of the Tax Department, as amended from time to time and a certificate to this effect shall be provided to the agency by IISc.
10. In case, the service provider fails to comply with any statutory / taxation liability under appropriate law, and as a result thereof IISc is put to any loss/obligation, monetary or otherwise, IISc will be entitled to get itself reimbursed out of the outstanding bills or the Performance Security Deposit of the agency, to the extent of the loss or obligation in monetary terms.
11. The selected agency will indemnify IISc from all legal, FINANCIAL, statutory, taxation, and associated other liabilities.

FINANCIAL

1. The proof of remittance of statutory deductions of PF, ESI to the appropriate agency, for those employed at IISc, must be provided by the selected agency to IISc every (previous) month along with the claim bill, failing which the claim bill shall not be settled.
2. In case of breach of any terms and conditions attached to this contract, the Performance Security Deposit of the agency will be liable to be forfeited besides annulment of the contract.
3. The agency shall raise the bill, in triplicate, along with attendance sheet (duly verified by Project Engineer cum Estate Officer, CCMD) in respect of the persons deployed and submit the same through the respective departments to Accounts Section, IISc in the first week of the subsequent month. As far as possible the payment will be released within two weeks from the date of submission of bills.
4. The claims in the bills regarding Service Tax etc., should be necessarily accompanied with documentary proof pertaining to the concerned month bill. A requisite portion of the bill/whole of the bill amount shall be held up till such proof is furnished, at the discretion of IISc.

SECTION 8: CONDITIONS OF CONTRACT

Clause 1. Security Deposit

- (a) The person/persons whose tender may be accepted (hereinafter called the contractor which expression shall unless the context otherwise requires, include his heirs, executors, administrators and assigns) shall pay Earnest Money Deposit indicated in Column (ii) of the table given below and shall permit Institute (a) to deduct FSD at the percentage mentioned in Column (iii) of the table given below of all moneys payable for work done under the Contract, at the time of making such payments to him/them and (b) to hold such deductions as Further Security Deposit (FSD).

Estimated cost of the work	E.M.D Percentage	F.S.D Percentage
(i)	(ii)	(iii)
Upto Rs.20,00,000/-	2 ½%	5%
Rs.20,00,000/- upto Rs.1.00 Crore	2%	5 ½%
Rs.1.00 crore upto Rs.10 crores	1 ½%	6%
10 crores and above	1%	6 ½%

(b) **Addition or Reduction in Security Deposit.**

The EMD for the tendered work and additional amount of Security Deposit at the rates mentioned in **Sub-clause 1(a)** above should be, paid by the contractor. If a portion of the work is withdrawn from the Contractor under the provisions of Clause 12(a), the Project Engineer cum Estate Officer(CCMD), Indian Institute of Science(hereinafter referred to as the Project Engineer cum Estate Officer) may allow a proportionate reduction in the amount of the Security Deposit.

(c) **Dues to Institute, to be set off against Security Deposit.**

All compensation or other sums of money payable by the Contractor to Institute under the terms of this contract may be realized or deducted from any Security Deposit payable to him or from any sums which may be due or may become due by Institute to the Contractor on any account whatsoever and in the event of his security deposit being reduced by reason of any such realization or deduction as aforesaid, the Contractor shall, within ten days thereafter, make good in cash any sum or sums which have been deducted from, or raised by sale of his security deposit or any part thereof.

(d) **Refund of Security Deposit (EMD & FSD):**

The Security Deposit lodged/paid by a Contractor shall be refunded to him after the final bill is paid or after twelve months from the date of completion of the work, during which period the work should be maintained by the Contractor in good order, whichever is later.

Clause 2. PENALTY FOR DELAY

(a) Written Order to Commence Work

After acceptance of the tender, The Project Engineer cum Estate Officer, CCMD shall issue a written order to the successful tenderer to commence the work. The Contractor shall enter upon or commence any portion of work only with the written authority and instructions of The Project Engineer cum Estate Officer, CCMD. Without such instructions the Contractor shall have no claim to demand for measurements of or payment for, work done by him.

(b) Programme of work

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor. It shall be reckoned from the date of handing over the site to the Contractor not less than 75 percent of work site area comprising a continuous block. The work shall throughout the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the essence of the contract on the part of the Contractor). To ensure good progress during the execution of the work, the contractor shall be bound (in all cases in which the time allowed for any work exceeds one month) to comply with the time schedule according to the programme of execution of the work as agreed upon and enclosed to the agreement.

(c) Review of progress and responsibility for delay etc.,

The Project Engineer cum Estate Officer, CCMD shall review the progress of all works with the contractor during the first fortnight of every month. Such a review shall take into account the programme fixed for the previous month, obligations on the part of the Contractor.

(d) Apportioning of responsibility for delay between Contractor and Institute.

In case the progress achieved falls short by more than 25 percent of the cumulative programme, the reasons for such shortfall shall be examined and a record made thereof apportioning the responsibilities for the delay between the contractor and the Institute. This record should be signed in full and dated both by The Project Engineer cum Estate Officer, CCMD and the Contractor.

(e) Shortfall in progress made up subsequently.

To the extent the shortfall is assessed, as due to the delay on the part of the contractor, a notice shall be issued to him by The Project Engineer cum Estate Officer, CCMD to make up the shortfall. If the shortfall is not made up before the progress of the work is reviewed during the second month succeeding the month in which the shortfall was observed, the Contractor shall be liable to pay penalty as indicated in **Clause 2(h)** below.

(f) Settlement of dispute regarding shortfall in progress.

In case of dispute between The Project Engineer cum Estate Officer, CCMD and Contractor regarding the responsibility for the shortfall in progress, the matter shall be referred to the Director, IISc., who shall thereupon give a decision within fifteen days from the date of receipt of reference. The decision of the Director shall be final and binding on the contractor and The Project Engineer cum Estate Officer, CCMD.

(g) Penalty for delay

In respect of the shortfall in progress, assessed as due to the delay on the part of contractor as per **Clause 2(b)** and **2 (c)**, the contractor shall be liable to pay as penalty an amount equal to one percent of the estimated value of the balance work assessed according to the programme, for every week that the due quantity of work remains incomplete; provided always that the total amount of penalty to be paid under the provisions of this clause shall not exceed 7 ½ percent of the estimated cost of the entire work as shown in the tender, provided further that in the event of the contractor making up the shortfall in progress within the stipulated or extended time of completion, the penalty so recovered may be refunded on an application in writing by the contractor.

Note: *If The Project Engineer cum Estate Officer, CCMD considers it necessary he shall be entitled to take action as indicated in **Clause 3 (d)** also.*

(h) Adjustment of excess/over payments.

Excess/over payments as soon as they are discovered should be adjusted in the next running account bill of the contractor and in case the final bill has already been paid, the excess/over payment made shall be recovered from the Security Deposit of the contractor together with interest at such percentages as Institute may decide from time to time, from the date of such excess or over payment to the date of recovery.

Clause 3 ACTION WHEN WHOLE OF SECURITY DEPOSIT IS FORFEITED

In any case in which under any clause or clauses of this contract the contractor shall have rendered himself liable to pay compensation and/or penalty amounting to the whole of his security deposit including the amount deducted in installment from his bills as Further Security Deposit, The Project Engineer cum Estate Officer, CCMD on behalf of the Director, IISc., shall have power to adopt any of the following courses as he may deem best suited in the interest of Institute.

(a) Forfeiture of Security Deposit

Without prejudice to Institute's right to recover any loss from the Contractor under **sub-clauses (b) and (c) of Clause 3** of the Contract, to rescind the contract (of which rescission notice in writing to the contractor under the hand of The Project Engineer cum Estate Officer, CCMD shall be conclusive evidence). And in that case, the security deposit of the contractor including whole or part of the lump sum deposited by him and also the amount deducted from his bills as Further Security Deposit, shall stand forfeited and be absolutely at the disposal of the Institute.

(b) Debiting cost of labour and materials supplied.

To employ labour paid by the Institute and to supply materials to carry out the work or any part of the work, debiting the contractor with the cost of the labour and the price of the materials (as to the correctness of which cost and price the certificate of the The Project Engineer cum Estate Officer, CCMD shall be final and conclusive against the contractor) and crediting him with the value of the work done; in all respects in the same manner and at the same rates as if it had been carried out by the contractor under terms of this contract, and in that case the certificate of the The Project Engineer cum Estate Officer, CCMD as to the value of the work done shall be final and conclusive against the contractor.

(c) Recovery of extra cost on unexecuted work

To measure up the work of the contractor and to take such part thereof as is remaining unexecuted out of his hands and to give it to another contractor to complete it in which case any expenses which may be incurred in excess of the sum which would have been paid to the original contractor, if the whole work had been executed by him (as to the amount of which excess expenses the certificate in writing of the The Project Engineer cum Estate Officer, CCMD shall be final and conclusive) shall be borne and paid by the original contractor and shall be deducted from any money due to him by Institute under this contract.

(d) Action against unsatisfactory progress

If the contractor does not maintain the rate of progress as required under **Clause 2** and if the progress of .any particular portion of work is unsatisfactory even after taking action under **Clause 2(c)** and **2(d)**, the The Project Engineer cum Estate Officer, CCMD shall be entitled to take action under **Clause 3(b)** or **3(c)** at his discretion in order to maintain the rate of progress after giving the contractor 10 days notice in writing whereupon the contractor will have no claim for any loss sustained by him owing to such actions .

(e) No compensation for loss sustained on advance action

In the event of any of the above courses being adopted by the Project Engineer cum Estate Officer,CCMD, the contractor shall have no claim to compensation for any loss sustained by him by reason of his having purchased, or procured any materials, entered into any agreements or made any advances on account of, or with a view to the execution of the work or the performance of the contract. And in case the contract shall be rescinded under the provision aforesaid the contractor shall not be entitled to recover or be paid any sum for any work thereof actually performed by him under his contract, unless and until the Project Engineer cum Estate Officer,CCMD shall have certified in writing the performance of such work and the amount payable in respect thereof, and he shall only be entitled to be paid the amount so certified.

Clause 4. CONTRACTOR TO REMAIN LIABLE TO PAY COMPENSATION IF ACTION IS NOT TAKEN UNDER CLAUSE-3.

(a) In any case in which any of the powers conferred upon the the Project Engineer cum Estate Officer, CCMD by **Clause 3** thereof shall have become exercisable and the same shall not have been exercised, the non-exercise thereof shall not constitute a waiver of any of the conditions hereof and such powers shall notwithstanding be exercisable in the event of any future case of default by the contractor for which under any clause hereof he is declared liable to pay compensation or penalty amounting to the whole of his security deposit and the liability of the contractor for past and future compensation or penalty shall remain unaffected.

(b) Power to take possession of or require removal of or sell contractor's properties.

In the event of the The Project Engineer cum Estate Officer, CCMD taking action under **sub-clause (a)** or **(c) of Clause 3**, he may, if he so desires, take possession of all or any tools, plant, materials and stores, in or upon works or the site thereof or belonging to the contractor, or procured by him and intended to be used for the execution of the work or any part thereof, paying or allowing for the same in account at the contract rates; or in the case of contract rates not being applicable, at current market rates, to be certified by the The Project Engineer cum Estate Officer, CCMD whose certificate thereof shall be

final. In the alternative, the Project Engineer cum Estate Officer, CCMD may after giving notice in writing to the contractor or his clerk of the works, foreman or other authorised agent, require him to remove such tools, plant, materials or stores from the premises within a time to be specified in such notice; and in the event of the contractor, failing to comply with any such requisition, the Project Engineer cum Estate Officer, CCMD may remove them at the contractor's expense or sell them by auction or private sale on account of the contractor and at his risk in all respect, and the certificate of the Project Engineer cum Estate Officer, CCMD as to the expense of any such removal; and the amount of the proceeds and expense of any such sale shall be final and conclusive against the contractor.

Clause 5. GRANT OF EXTENSION OF TIME

- (a) If the contractor shall desire an extension of the time for completion of the work, on the ground of his having been unavoidably hindered in its execution or on any other ground, he shall apply in writing to the Project Engineer cum Estate Officer, CCMD before the expiry of the period stipulated in the tender or before the expiry of 30 days from the date on which he was hindered as aforesaid or on which the cause for asking for extension occurred, whichever is earlier and the Project Engineer cum Estate Officer, CCMD or other competent authority may if in his opinion, there are reasonable grounds for granting an extension, grant such extension as he thinks necessary or proper. The decision of such competent authority in this matter shall be final.
- (b) The time limit for completion of the work shall be extended commensurate with its increase in cost occasioned by alterations or additions and the certificate of the Project Engineer cum Estate Officer, CCMD or other competent authority as to such proportion shall be conclusive.

Clause 6. ISSUE OF FINAL CERTIFICATE – CONDITIONS REGARDING

- (a) On completion of the work the contractor shall report in writing to the Project Engineer cum Estate Officer, CCMD the completion of the work. Then he shall be furnished with a certificate by the Project Engineer cum Estate Officer, CCMD of such completion, but no such certificate shall be given nor shall the work be considered to be complete until the contractor shall have removed from the premises on which the work shall have been executed, all scaffolding, surplus materials and rubbish, and shall have cleaned thoroughly all wood work, doors, windows, wall, floor or other parts of any building, in or upon which the work has been executed, or of which he may have had possession for the purpose of executing the work, nor until the works shall have been measured by the Project Engineer cum Estate Officer, CCMD or other competent authority, or where the measurements have been taken by his Engineer-in-charge until they have received the approval of the Project Engineer cum Estate Officer, CCMD or other competent authority, the said measurements being binding and conclusive against the contractor. If the contractor shall fail to comply with the requirements of this clause as to the removal of scaffolding, surplus materials and rubbish, and cleaning on or before the date fixed for the completion of the work the Project Engineer cum Estate Officer, CCMD or other competent authority may, at the expense of the contractor, remove such scaffolding, surplus materials and rubbish, and dispose of the same as he think fit and clean off such dirt etc., as aforesaid and contractor shall be liable to pay the amount of all expenses incurred but shall have no claim in respect of any such scaffolding or surplus materials as aforesaid except for any sum actually realized by the sale thereof.
- (b) **CLOSURE OF CONTRACT PENDING COMPLETION OF MINOR ITEMS.**

In cases where it is not desirable to keep the building contract open for minor items, such as flooring in the bath rooms, etc., which can be carried out only after installation of sanitary work the main contract may be finalized after getting a supplementary agreement executed in the prescribed form by the same contractor for doing the residual work.

Clause 7. Contractor to submit bills monthly in printed form

- (a) A bill shall be submitted by the contractor on or before 15th of each month for all items of work executed in the previous month as required by IISc.
- (b) All bills shall be prepared in the prescribed printed or electronic form in PDF format in quadruplicate and handed over to the Engineer-in-charge in charge of the work/ the Project Engineer cum Estate Officer, CCMD's Office and acknowledgment obtained.
- (c) The charges to be made in the bills shall always be entered at the rates specified in the tender in full or in part as the case may be, in the case of any extra work ordered in pursuance of these conditions, and not mentioned or provided for in the tender, the charges in the bills shall be entered at the rates hereinafter provided for such work.

(d) Scrutiny of Bills and measurement of work

The details furnished by the Contractor in the bill should be completely scrutinized and the said work should be measured by the Engineer-in-charge in the presence of the Contractor or his duly authorised agent. The countersignature of the contractor or the said agent in the measurement book shall be sufficient proof to the correctness of the measurements, which shall be binding on the contractor in all respects. If the contractor does not submit the bills within the prescribed time, the Project Engineer cum Estate Officer, CCMD may depute within seven days of the prescribed date, an Engineer-in-charge to measure up the said work. The countersignature of the contractor shall be obtained in the Measurement Book concerned with reference to which the Institute may prepare the bill.

(e) Filing of objections to measurement by contractor

Before taking any measurement of any work as has been referred to in **Clause 7(d)** above the Project Engineer cum Estate Officer, CCMD or a Engineer-in-charge deputed by him shall give reasonable notice to the contractor. If the Contractor fails to attend at the measurements after such notice or fails to countersign or to the difference, within a week from the date of measurement in the manner required by the Project Engineer cum Estate Officer, CCMD, then in any such event, the measurements taken by the the Project Engineer cum Estate Officer, CCMD or by the Engineer-in-charge deputed by him as the case may be, shall be final and binding on the contractor and the contractor shall have no right to dispute the same.

- (f) One copy of the passed bill shall be given to the Contractor without any charge.

Clause 8. PAYMENT PROPORTIONATE TO WORK APPROVED AND PASSED.

- a) No payment shall be made for any work estimated to cost rupees five thousand or less until after the whole of the work shall have been completed and certificates of completion given. But in the case of works estimated to cost more than Rs. 5,000 the contractor shall on submitting the bill and after due verification by the Engineer-in-charge as per

Clause 7(d) entitled to necessary payment proportionate to the part of the work then approved and passed by The Project Engineer cum Estate Officer, CCMD or other competent authority whose certificate of such approval and passing of the sum so payable shall be final and conclusive against the contractor.

b) Payment at reduced rates

The rates for several items of works agreed to within shall be valid only when the items concerned are accepted as having been completed fully in accordance with the stipulated specifications. In cases where the items of work are not accepted as so completed, the Project Engineer cum Estate Officer, CCMD or other competent authority may make payment on account of such items at such reduced rates as he may consider reasonable in the preparation of final or on account bills.

c) Payment or intermediate certificates be regarded as advances:

All such intermediate payments shall be regarded as payments by way of advance against the final payments only and not as payments for work actually done and completed, and shall not preclude the Project Engineer cum Estate Officer, CCMD or other competent authority from requiring any bad, unsound imperfect or unskillful work to be removed or taken away and reconstructed or re-erected nor shall any such payment be considered as an admission for the due performance of the Contract or any part thereof in any respect or the accruing of any claim, nor shall it conclude determine or affect in any other way the powers of the Project Engineer cum Estate Officer, CCMD or other competent authority as to the final settlement and adjustment of the accounts, or otherwise or in any other way vary or affect the contract.

d) Submission of Final bill and its settlement

The contractor shall submit the final bill within one month of the date of actual completion of the work in all respects. His claims shall be settled (except those under dispute) within two months thereafter in respect of works costing up to Rs. 1 lakh and within five months thereafter in respect of works costing more than Rs. 2 lakhs.

e) Disputed items

Note: The contractor shall submit a list of the disputed items within 30 days from the disallowance thereof and if he fails to do this, his claim shall be deemed to have been fully waived and absolutely extinguished.

Clause 9. Definition of Work :

(a) The expression 'Work' or 'Works' where used in these conditions, shall unless there be something in the subject or context repugnant to such construction, be construed to mean the work or works contracted to be executed under or in virtue of the contract, whether temporary or permanent and whether original, altered, substituted or additional.

(b) Work to be executed in accordance with specifications, drawings, orders etc.

The contractor shall execute the whole and every part of the work in the most sound and substantial and workmanlike manner, and in strict accordance with the specifications both as regards materials and workmanship. The contractor shall also conform exactly, fully and faithfully to the designs, drawings and instructions in writing relating to the work signed by the Project Engineer cum Estate Officer, CCMD or other competent authority and lodged in his office and to which the contractor shall be entitled to have

access at such office, or on the site of the work for the purpose of inspection during office hours. The contractor shall also be responsible for the delivery of structure in sound conditions and the execution of the work strictly in accordance with the specifications of the work.

(c) Action where there is no specification

In the case of any class of work for which there is no such specification, then in such a case of the work shall be carried out in all respects in accordance with the instructions and requirements of the Project Engineer cum Estate Officer, CCMD or other competent authority.

(d) Work as per Specifications and IS Codes.

The detailed specification, which forms a part of contract, accompanies the tender document. In carrying out the various items of work as described in Schedule B of the tender documents and the additional, substituted, altered items of work these detailed specification shall be strictly adhered to, supplemented by relevant provisions of the Indian standard specifications, the code of practice; etc., The Indian standard specification and the code of practice to be followed shall be the latest versions of those listed in the detailed technical specifications. Any class of work, not covered by the detailed technical specifications, shall be executed in accordance with the instructions and requirements of the engineer and the relevant provisions of the Indian standard specifications.

**Clause 10. Alteration in quantity of work, specifications and designs,
Additional work, deletion of work**

- (a)** The Project Engineer cum Estate Officer, CCMD shall have power to make any alternations in, omissions from additions to or substitutions for the original specification, drawings, designs and instructions that may appear to him to be necessary or advisable during the progress of the work. For that purpose or if for any other reason it shall in his opinion be desirable, he shall have power to order the Contractor to do and the contractor shall do any or all the following: -
- (b)** Increase or decrease the quantity of any work included in the contract.
- (c)** Omit any such work.
- (d)** Change the character or quality or kind of any such work,
- (e)** Change the levels, lines, positions and dimensions of any part of the work,
- (f)** Execute additional work of any kind necessary for the completion of the works and
- (g)** change in any specified sequence, methods or timing of construction of any part of the work.

10.a) Contractor bound by Project Engineer cum Estate Officer, CCMD's instructions

The Contractor shall be bound to carry out the work in accordance with any instructions in this connection which may be given to him in writing signed by the Project Engineer cum Estate Officer, CCMD or other competent authority and such alteration shall not in any way vitiate or invalidate the contract.

Orders for variations to be in writing

- (i)** No such variations shall be made by the Contractor without an order in writing of the Project Engineer cum Estate Officer provided that no order in writing shall be required for increase or decrease in the quantity of any work where such increase or decrease is the result of the quantities exceeding or being less than those stated in the 'Schedule B'

provided also that if for any reason the Project Engineer cum Estate Officer, CCMD shall consider it desirable to give any such order verbally, the Contractor shall comply with such order without any confirmation in writing of such verbal order given by the Project Engineer cum Estate Officer, CCMD, whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of the clause; provided further that if the Contractor shall within seven days confirm in writing to the Project Engineer cum Estate Officer, CCMD and if such confirmation is not contradicted in writing within fourteen days by the Project Engineer cum Estate Officer, CCMD, it shall be deemed to be an order in writing by the Project Engineer cum Estate Officer, CCMD.

- (ii) Any additional work which the contractor may be directed to do in the manner above specified as part of the work shall be carried out by the Contractor on same conditions in all respects on which he agreed to do the main work and same rates as are specified in the tender for the main work. However, change in the unit rates tendered and accepted shall be considered in respect of items under which the quantity of work performed exceeds tendered quantity by more than 25 percent and this actual change in rate will be restricted only to such excess quantity (i.e. beyond 125 percent of the tendered quantity).

(b) Rates for additional, substituted, altered items of work

If the additional, substituted or altered work includes any class of work for which no rate is specified in the contract, then such work shall be carried out at the rates specified for or derived from similar item of work in the agreement. In the absence of similar items in agreement, rate shall be as specified for or derived from similar items in the schedule of rates of KPWD prevalent at the time of execution of such additional substituted or altered items of works, plus or minus the overall percentage of original tendered rates over the current schedule of rates of (KPWD) the year in which tender is accepted as mentioned in sub clause (b) above. With regard to the question whether the additional, substituted or altered item/items of work/works is / are similar or not, to that/those in the agreement / in the Schedule of Rates of KPWD and the decision of the Director shall be final and binding on the contractor.

(c) Determination of rates for items not found in Estimate or Schedule of Rates

If the rates for additional, substituted or altered work cannot be determined in the manner specified in sub **clauses (b) and (c)** above, then the contractor shall within 7 days of the date of receipt by him of the order to carry out the work, inform The Project Engineer cum Estate Officer, CCMD of the rates which it is his intention to charge for such class or work, supported by analysis of the rate or rates claimed. Thereupon the Project Engineer cum Estate Officer, CCMD shall determine the rate or rates on the basis of observed data and failing this, on the basis of prevailing market rates. Under no circumstances the contractor shall suspend the work on the plea of non-settlement of rates for items falling under this clause. In the event of any dispute regarding the rates for such items the decision of the Director, IISC shall be final.

Clause 11. TIME LIMITS UNFORSEEN CLAIMS

Under no circumstances whatever shall the contractor be entitled to any compensation from Institute on any account unless the contractor shall have submitted claim in writing to the Project Engineer cum Estate Officer, CCMD or other competent authority

Clause 12. NO CLAIM TO ANY PAYMENT OR COMPENSATION FOR

DELETION OF WHOLE OR PART OF WORK

- a) If at any time after the execution of the contract documents, the Project Engineer cum Estate Officer, CCMD or other competent authority shall, for any reason whatsoever, require the whole or any part of the work as specified in the tender, to be stopped for any period or require the whole or part of the work (i) not to be carried out at all or (ii) not to be carried out by the tendered contractor, he shall give notice in writing of the fact to the contractor who will thereupon suspend or stop the work totally or partially as the case may be. In any such case, except as provided hereunder, the contractor shall have no claim to any payment of compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not so derive in consequence of the full amount of the work not having been carried out, or on account of any loss that he may be put on account of materials purchased or agreed to be purchased, or for unemployment of labour recruited by him. He shall not also have any claim for compensation by reason of any alterations having been made in the original specifications, drawings, designs and instructions, which may involve any curtailment of the work, as originally contemplated.

(b) Payment for materials already purchased or ordered by contractor.

Where, however, materials have already been purchased or agreed to be purchased by the contractor before receipt by him the said notice the contractor shall be paid for such materials, at the rates determined by the Project Engineer cum Estate Officer, CCMD or other competent authority provided they are not in excess of requirements and are of approved quality, and/or shall be compensated for the loss, if any, that he may be put to, in respect of materials agreed to be purchased by him, the amount of such compensation to be determined by the Project Engineer cum Estate Officer, CCMD or other competent authority whose decision shall be final.

(c) Labour charges during stoppage of work

If the contractor suffers any loss on account of his having to pay labour charges during the period during which the stoppage of work has been ordered under this clause, the contractor shall on application, be entitled to such compensation on account of labour charges as the Project Engineer cum Estate Officer, CCMD or other competent authority, whose decision shall be final, may consider reasonable. Provided that the contractor shall not be entitled to any compensation on account of labour charges if in the opinion of the Project Engineer cum Estate Officer, CCMD or other competent authority, the labour could have been employed in the same locality by the contractor for the whole or part of the period during which the stoppage of the work has been ordered as aforesaid.

(d) Time limit for stoppage of work

The period of stoppage ordered by the Project Engineer cum Estate Officer, CCMD or other competent authority should not ordinarily exceed six months. Thereafter the portion of works stopped may be treated as deleted from this agreement if a notice in writing to that effect is given to the Project Engineer cum Estate Officer, CCMD or other competent authority by the contractor within seven days after the expiry of the above period.

(e) Execution of work deleted

The portion of work thus deleted may be got executed from the same contractor on supplemental agreement on mutually agreed rates, which shall not exceed current Schedule of Rates (KPWD) plus or minus tender percentage,

Clause 13. ACTION AND PENALTY IN CASE OF BAD WORK

If at any time before the security deposit is refunded to the contractor, it shall appear to the Project Engineer cum Estate Officer, CCMD or other competent authority that any work has been executed with unsound, imperfect or unskillful workmanship or with materials of inferior quality, or that any materials or articles provided by him for the execution of the work are unsound or of a quality inferior to that contracted for, or are otherwise not in accordance with the contract, it shall be lawful for the Project Engineer cum Estate Officer, CCMD or other competent authority to intimate this fact in writing to the contractor and then notwithstanding the fact that the work, materials or articles complained of may have been paid for, the contractor shall be bound forthwith to rectify, or remove and reconstruct the work so specified on whole or in part as the case may require, or if, so required shall remove the materials or articles at his own charge and cost and in the event of his failing to do so within a period to be specified by the Project Engineer cum Estate Officer, CCMD or the competent authority in the written intimation aforesaid, the contractor shall be liable to pay a penalty not exceeding one percent on the amount of the estimate for every day not exceeding ten days during which the failure, so continues and in the case of any such failure the Project Engineer cum Estate Officer, CCMD or other competent authority may rectify or remove, and re-execute the work or remove and replace the materials or articles complained of, as the case may be at the risk and expense in all respects of the contractor should the Project Engineer cum Estate Officer, CCMD or other competent authority for any valid reasons consider that any such inferior work or materials as described above is to be accepted or made use of, it shall be within his discretion to accept the same at such reduced rates he may fix thereof.

Clause 14. WORK TO BE OPEN TO INSPECTION - CONTRACTOR OR RESPONSIBLE AGENT TO BE PRESENT

- (a) All works under or in course of execution or executed in pursuance of the contract shall at all time be open to the inspection and supervision of the The Project Engineer cum Estate Officer, CCMD or other competent authority and his Engineer-in-charge, and the contractor shall at all times during the usual working hours, and at all other times at which reasonable notice of the intention of the Project Engineer cum Estate Officer, CCMD or other competent authority Engineer-in-charge to visit the work shall have been given to the contractor, either himself be present to receive orders and instructions or have a responsible agent duly accredited in writing present for the purpose. Orders given to the contractor duly authorised agent shall be considered to have the same force and effect as if they had been given to the contractor himself.

(b) Employment of technical staff

The Contractor shall employ the following technical staff during execution of this work:

- (i) One Graduate Engineer when the cost of the work to be executed is 'Rs. 5 lakhs or more',
- (ii) One qualified Engineering Diploma Holder when the cost of work to be executed is more than Rs. 2 lakhs but less than Rs. 5 lakhs;
- (iii) In addition to (i) and (ii) above, the contractor shall employ different types of such technical personnel as may be required and sufficient for execution of work and directed by the Project Engineer cum Estate Officer, CCMD to ensure efficient execution of work.

The technical staff so employed, should be available at site whenever required by Engineer in-charge to take instructions.

- (c) If the contractor fails to employ the technical staff as aforesaid, he shall be liable to pay a sum of Rs. 10000 (Rupees TEN thousand only) for each month of default in the case of Graduate Engineers and Rs. 5000 (Rupees Five thousand only) for each month of default in case of Diploma Holders.
- (d) If the Contractor himself possesses the required qualification and is available at the site for receiving instructions from the The Project Engineer cum Estate Officer, CCMD and other competent authority vide **sub-clause (a)** above it will not be necessary for the technical staff to be available at site for receiving instructions.

Clause 15. NOTICE TO BE GIVEN BEFORE WORK IS COVERED UP

The contractor shall give not less than five days notice in writing to the Project Engineer cum Estate Officer, CCMD or his Engineer-in-charge in charge of the work before covering up or otherwise placing beyond the reach of the measurement any work in order that the same may be measured; and correct dimensions thereof taken before the same is so covered up or placed beyond the reach of measurement, and shall not cover up or place beyond the reach of measurement, and work without the consent in writing of the Project Engineer cum Estate Officer, CCMD or other competent authority or his Engineer-in-charge in charge of work; and if any work shall be covered up or placed beyond the reach of measurement, without such notice having been given or consent obtained, the same shall be uncovered at the contractor's expense, and in default thereof no payment or allowance shall be made for such work or for the materials with which the same was executed.

Clause 16. CONTRACTOR LIABLE FOR DAMAGE DONE, AND FOR IMPERFECTIONS FOR TWELVE MONTHS AFTER CERTIFICATE OF COMPLETION

If the Contractor or his workmen or servants shall break, deface, injure or destroy any part of a building in which they may be working, or any building, road fence, enclosure or grassland or cultivated ground contiguous to the premises on which the work or any part thereof is being executed, or if any damage shall be done to the work, while it is in progress from any cause whatever or if any imperfections become apparent in it within Twelve months of the grant of a certificate of completion, final or otherwise, by the Project Engineer cum Estate Officer, CCMD or other competent authority the contractor shall make good the same at his own expenses, or in default the Project Engineer cum Estate Officer, CCMD or other competent authority may cause the same to be made good by other workmen, and deduct the expenses (of which the certificate of the Project Engineer cum Estate Officer, CCMD or other competent authority shall be final) from any sums that may be due or may thereafter become due to the contractor, or from his Security Deposit or the proceeds of sale thereof, or of a sufficient portion thereof.

Clause 17. CONTRACTOR TO SUPPLY PLANT, LADDERS, SCAFFOLDINGS, ETC., AND IS LIABLE FOR DAMAGES ARISING FROM NON-PROVISION OF LIGHT, FENCING ETC

The contractor shall supply at his own cost all materials, plant, tools, appliance, implements, ladders, scaffolding, and temporary works required for the proper execution of the work whether in the original, altered or substituted form and whether included in the specification, or other documents forming part of the contract or referred to in these conditions or not, and which may be necessary for the purpose of satisfying or complying with the requirements of the Project Engineer cum Estate Officer, CCMD or other competent authority as to any matter as to which under these conditions he is entitled to

be satisfied, or which he is entitled to require together with carriage therefore, to and from the work. The contractor shall also supply without charge the requisite number of persons with the means and materials necessary for the purpose of setting out works, and counting, weighing and assisting in the measurement or examination at any time and from time to time of the work or the materials. Failing this, the same may be provided by the Project Engineer cum Estate Officer, CCMD or other competent authority at the expense of the contractor and expense may be deducted from any money due to the contractor under the contract or from his security deposit or the proceeds of sale thereof, or of a sufficient portion thereof. The contractor shall provide necessary fencing and lights required to protect the public from accident, and shall also be bound to bear the expense of defense of every suit, action or other legal proceedings, that maybe brought by any person for injury sustained owing to neglect of the above precautions and to pay any damages and costs which may be awarded in any suit, action or proceedings to any person, or which may with the consent of the contractor be paid for compromising any claim by any such person.

Clause 18. Measures for prevention of fire

The contractor shall not set fire to any standing jungle, trees, brushwood or grass without a written permit from the Project Engineer cum Estate Officer, CCMD. When such permission is given, and also in all cases when destroying cut or dug up trees, brushwood grass, etc., by fire the contractor shall take necessary measures to prevent such fire spreading to or otherwise damaging surrounding property.

Clause 19. Liability of contractor for any damages done in or outside Work Area.

Compensation for all damages done by contractor or his men whether in or beyond the limits of Institute property including any damage caused by spreading of fire mentioned in Clause 18 shall be estimated by the Project Engineer cum Estate Officer, CCMD and the estimate of the Project Engineer cum Estate Officer, CCMD, subject to the decision of the Director, IISc on appeal shall be final and the contractor shall be bound to pay the amount of the assessed compensation on demand failing which the same will be recovered from the contractor as the damages in the manner prescribed in clause 1(c) or deducted by the Project Engineer cum Estate Officer, CCMD or other competent authority from any sums that may be due or become due from Institute to the contractor under this contract or otherwise.

The contractor shall bear the expenses of defending any action or other legal proceedings that may be brought by any person for injury sustained by him owing to neglect of precautions to prevent the spread of fire and shall pay any damages and cost that may be awarded by the court in consequence.

Clause 20. EMPLOYMENT OF FEMALE LABOUR

The employment of female labourers on works in the neighbourhood of soldier barracks should be avoided as far as possible.

Clause 21. Work on Notified Holiday

No work shall be done on any notified holiday without the sanction in writing of the Project Engineer cum Estate Officer, CCMD or other competent authority

Clause 22. WORK NOT TO BE SUBLET

- (a) The contract shall not be assigned or sublet by the contractor,. However, any specific portion of the work which is of a specialised nature and normally not executable by a general contractor could be got done by the specialised agencies which are executing such works, after obtaining the specific approval of the Project Engineer cum Estate Officer, CCMD in writing in each case. Such consent to sublet the work, if given, shall not relieve the contractor from any liability or obligation under the contract and he shall be responsible for the acts, defaults and neglects of any sub-contractor or his agents, servants or workmate as fully as if they were the acts, defaults or neglects of the contractor, his agents, servants or workmen.

- (b) **Consequences of subletting work without approval, becoming insolvent, bribing etc., by contractor and action against the contractor.**

If the contractor shall assign or sublet his contract or any portion thereof without the specific approval of the Project Engineer cum Estate Officer, CCMD or attempts to do so or become insolvent or commence any proceedings to get himself adjudicated as insolvent or make any composition with his creditors or attempts so to do or if any bribe, gratuity, or indirectly be given, promised or offered by the contractor or any of his servants or agents to any officer or person in the employ of Institute in any way relating to his office or employment or if any such officer or person in the employment or if any such officer or person shall become in any way directly or indirectly interested in the contract, the Project Engineer cum Estate Officer, CCMD or other competent authority may thereupon by notice in writing rescind the contract and the security deposit of the contractor shall thereupon stand forfeited and be absolutely at the disposal of Institute and the same consequences shall ensure as if the contract had been rescinded under Clause 3 here of and in addition, the contractor shall not be entitled to recover or be paid for any work actually performed under contract.

- (c) **Recovery of excess payments based on excess measurements and action against contractor.**

Whenever it is noticed that excess payments have been made to the contractor based on excess measurements recorded by the Engineer-in-charge in the measurement book and countersigned by the contractor or his duly authorised agent, action shall be taken to recover the excess payments together with interest immediately. Action may also be taken to remove the name of the contractor from the approved list of contractors and also to black-list him.

- (d) **Criminal proceedings against IISc Officers and Contractor for the lapses.**

Institute also reserve the right to initiate criminal proceedings against the concerned Institute Officers who are directly responsible for the lapse and the contractors who have colluded with the officers of the Institute in the lapse and fraudulently received amounts not due to them legitimately.

Clause 23. SUM PAYABLE BY WAY OF COMPENSATION TO BE CONSIDERED AS REASONABLE COMPENSATION WITHOUT REFERENCE TO ACTUAL LOSS.

All sums payable by a contractor by way of compensation under any of these conditions shall be considered as reasonable compensation to be applied for the use of Institute without reference to the actual loss or damage sustained and whether any damage has or has not been sustained.

Clause 24. SETTLEMENT OF DISPUTES -TIME LIMIT FOR DECISION

- (a) If any dispute or difference of any kind whatsoever were to arise between the Project Engineer cum Estate Officer, CCMD and the contractor regarding the following matters namely,
 - (i) The meaning of the specifications designs, drawing and instructions herein before mentioned,
 - (ii) The quality of workmanship or materials used on the work and
 - (iii) Any other question, claim right, matter, thing whatsoever, in any way arising out of or relating to the contract, designs, drawings, specification, estimates, instructions, or orders, or those conditions, or failure to execute the same whether arising during the progress of the work, or after the completion, termination or abandonment thereof, the dispute shall, in the first place, be referred to the Director, IISc. The Director, IISc shall within a period of fifteen days from the date of being requested by the Contractor to do so give written notice of its decision to the Contractor.

(b) Director's decision final.

Subject to other form of settlement hereafter provided, the Director's decision in respect of every dispute or difference so referred shall be final binding upon the contractor. The said decision shall forthwith be given effect to and contractor shall proceed with the execution of the work with all due diligence.

(c) Remedy when Director's decision is not acceptable to contractor

In case the decision of the Director is not acceptable to the contractor, he may approach the Law Court at Bangalore for settlement of dispute after giving due written notice in this regard to the Director within a period of ninety days from the date of receipt of the written notice of the decision of the Director.

(d) Time limit for notice to approach Court of law by contractor

If the Director has given written notice of his decision to the contractor and no written notice to approach the law court has been communicated to him by the contractor within a period of ninety days from receipt of such notice, the said decision of Director shall be final and binding upon the contractor.

(e) Time limit for notice to approach law court by contractor when decision is not given by Director, IISc as at (b).

If the Director fails to give notice of his decision within a period of ninety days from the receipt of the contractor's request in writing for settlement of any dispute or difference as aforesaid, the Contractor may within ninety days after the expiry of the first named period of ninety days approach the Law Courts at Bangalore giving due notice to the Director.

(f) Contractor to execute and complete work pending settlement of dispute.

Whether the claim is referred to the Director or to the Law Courts, as the case may be, the contractor shall proceed to execute and complete the works with all due diligence pending settlement of the said dispute or differences.

- (g) Obligations of The Project Engineer cum Estate Officer, CCMD and contractor shall remain unsettled during considerations of dispute.

The reference of any dispute or difference to the Director or the Law Court may proceed notwithstanding that the works shall then be or be alleged to be complete, provided always that the obligations of the Project Engineer cum Estate Officer, CCMD and the contractor shall not be altered by reason of the said dispute or difference being referred to the Director or the Law Court during the progress of the works.

Clause 25. CONTRACTOR TO PAY COMPENSATION UNDER WORKMEN'S COMPENSATION ACT.

- (a) The contractor shall be responsible for and shall pay any compensation to his own workmen payable under the relevant Workmen's Compensation Act for injuries caused to the workmen. If Institute pays such compensation on behalf of the contractor it shall be recoverable by Institute from the contractor under as per relevant clauses.

(b) Contractor to pay expenses of providing medical aid to workmen.

The contractor shall be responsible for and shall pay the expenses of providing medical aid to any workman who may suffer a bodily injury as a result of an accident. If Institute incurs such expenses, the same shall be recoverable from the contractor forthwith and be deducted without prejudice to any other remedy of Institute, from any amount due or that may become due to the contractor.

Clause 26. CONTRACTOR TO PROVIDE PERSONAL SAFETY EQUIPMENT FIRST AID APPARATUS, TREATMENT Etc

The contractor shall provide all necessary personal safety equipment and first aid apparatus for the use of the persons employed on the site and shall maintain the same in good condition suitable for immediate use, at any time and shall comply with the following regulations in connection therewith: -

- (i) The worker will be required to use the equipment so provided by the contractor and the contractor shall take adequate steps to ensure proper use of the equipment by those concerned.
- (ii) When work is carried on in proximity to any place where there is a risk of drowning; all necessary steps shall be taken for the prompt rescue of any person in danger.
- (iii) Adequate provision shall be made for prompt first - aid treatment of all injuries likely to be sustained during the course of the work.

Clause 27. Minimum age of persons employed by contractor

- (a): No contractor shall employ any person
- (i) who is under age of 18 years.
 - (ii) Who does not produce a valid certificate of vaccination against smallpox in respect of himself/ herself as well as all the members of his/her family.
- (b) The contractor shall provide potable water facilities to the workers. Similar amenities shall be provided to the workers engaged on large works in urban area.
- (c) Removal of persons not satisfying conditions (a) (i) & (ii)

The Project Engineer cum Estate Officer, CCMD or other authority is authorised to direct the removal or to remove through - his own agency, from the work any person referred to in sub-clauses (a) above not satisfying these conditions and no responsibility shall be accepted by the Institute for any delay caused in the completion of the work by such directions for removal.

- (d) Payment of fair and reasonable wages by contractor.

The contractor shall pay fair and reasonable wages, which shall not be less than the minimum wages fixed by Govt. of Karnataka from time to time to the workmen employed by him in the contract undertaken by him. In the event of any dispute arising between the contractor, and his workmen on the ground that the wages paid are not fair and reasonable the dispute shall be referred without delay to The Project Engineer cum Estate Officer, CCMD or other competent authority, who shall decide the same. The decision shall not in any way affect the conditions in the contract regarding the payment to be made by Institute at the agreed tender rates.

Clause 28. METHOD OF PAYMENT OF BILLS

Payment to contractors shall be made by cheques drawn by the Institute

Clause 29. SET OFF AGAINST ANY CLAIM OF INSTITUTE

Any sum of money due and payable to the contractor (including the security deposit refundable to him) under this contract may be appropriated by the Institute and set off against any claim of Institute in respect of a payment of a sum of money arising out of or under any other contract made by the contract with the Institute.

Clause 30. RATES INCLUSIVE OF ALL TAXES.

- (a) The rates to be quoted by the contractor shall be inclusive of all taxes like GST etc., No extra payment on this account will be made to the contractor.
- (b) All quarry fees, octroi dues levied by the state or any local body or authority and ground rent, if any, charged by the The Project Engineer cum Estate Officer, CCMD for stacking materials should be paid by the contractor.

Clause 31 Refund of Security Deposit (EMD & FSD):

The Security Deposit lodged/paid by a Contractor shall be refunded to him after the final bill is paid or after **TWELVE** months from the date of completion of the work, during which period the work should be maintained by the Contractor in good order, whichever is later.

Clause 32. PENALTY FOR DELAY

- (a) **Written Order to Commence Work**

After acceptance of the tender, The Project Engineer cum Estate Officer, CCMD shall issue a written order to the successful tenderer to commence the work. The Contractor shall enter upon or commence any portion of work only with the written authority and instructions of The Project Engineer cum Estate Officer, CCMD. Without such instructions the Contractor shall have no claim to demand for measurements of or payment for, work done by him.

(b) Programme of work

The time allowed for carrying out the work as entered in the tender shall be strictly observed by the contractor. It shall be reckoned from the date of handing over the site to the Contractor not less than 75 percent of work site area comprising a continuous block. The work shall throughout the stipulated period of the contract be proceeded with, all due diligence (time being deemed to be the essence of the contract on the part of the Contractor). To ensure good progress during the execution of the work, the contractor shall be bound (in all cases in which the time allowed for any work exceeds one month) to comply with the time schedule according to the programme of execution of the work as agreed upon and enclosed to the agreement.

(c) Review of progress and responsibility for delay etc.,

The Project Engineer cum Estate Officer, CCMD shall review the progress of all works with the contractor during the first fortnight of every month. Such a review shall take into account the programme fixed for the previous month, obligations on the part of the Contractor.

(d) Apportioning of responsibility for delay between Contractor and Institute.

In case the progress achieved falls short by more than 25 percent of the cumulative programme, the reasons for such shortfall shall be examined and a record made thereof apportioning the responsibilities for the delay between the contractor and the Institute. This record should be signed in full and dated both by The Project Engineer cum Estate Officer, CCMD and the Contractor.

Clause 33 BAR CHART / PERT CHART:

BAR chart /PERT chart shall be produced during agreement by the contractor . According to the bar chart work is to be executed otherwise penalty will be levied for the delay of work

BILL OF QUANTITIES (Cost of Individual Items should be inclusive of taxes)

NOTE :- Item No. 401 in the Portal BOQ is a part of Item No. 400 hence rate to be quoted for item 400 only and for Item No.401 dummy rate of Rs.1 may be quoted for acceptance due to portal limitation

Item No. 429 in the Portal BOQ is a part of Item No. 428 hence rate to be quoted for item 428 only and for Item No.429 dummy rate of Rs.1 may be quoted for acceptance due to portal limitation

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
1	Thermal Pumping Station (TPS)					
1.1	MCC Panel					
A	Incomer Side:					
a	Supplying and fixing Moulded case circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete.					
	200A 4 Pole MCCB, 35 kA	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 518 item-10(Excalation by 4% for 2016-17)
b	Extended Door Mounted Rotary Operator (including handle)	1	No.			L&T, ESP 01.01.2017, Page.34 (inclusive of Excise Duty and VAT / Sales Tax)
c	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17(Excalation by 4% for 2016-17)
d	Supply and erection of 0-100/200/400/600/1000 Analog Ammeter of size 96x96 mm on existing box/panel board including connections etc., complete. Makes: CONZERVE / ELMEASURE / LEGRAND / MECO / HPL.	1	No.			AP Building SoR 2016-17, Item no. ELEC-2.8.7
e	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	1	No.			14,243
f	Supplying, fixing and wiring rotary selector switch suitable for Voltmeter	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-23(Excalation by 4% for 2016-17)
g	R,Y,B Indication - LED type panel board indicating lamp with required colour suitable for 220V, AC 50 Hz 12/24 D.C	3	Set			L&T, Panel Accessories 01.01.2016, Page.30 (inclusive of Excise Duty and VAT / Sales Tax)
h	Multifunction Energy meter of Selec Make MFM 383A-C with RS485 MODBUS Communication	1	Nos.			Selec Controls Pvt Ltd. Price List Effective from 01-01-2016
i	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
B	Motor Outgoing Feeder					
a	50 HP Starter Feeders (With 125A TP MCCB, 140A Star/Delta/Main Contactors, Thermal O/L Relay, Timer, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	2	Nos.			
b	0.75 HP DoL starters for Motorised Valve Actuators	2	Nos.			
c	2-Position (Local - Remote) Selector Switch for motor feeders	4	Nos.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
d	Supply and erection of 0-100 / 200 / 400 / 600 /1000 Analog Ammeter of size 96x96mm on existing box / panel board including connections etc., complete. Makes: CONZERVE / ELMEASURE / LEGRAND / MECO / HPL.	4	no.			AP Building SoR 2016-17, Item no. ELEC-2.8.7
e	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	4	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
f	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	12	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
C	Other Outgoing Feeder					
a	32A TP 3P+E plug & socket with MCB	1	no.			
b	32A TP MCB (For 5 HP Existing Submersible Motor starters)	2	no.			AP Buildings SoR: 2016-17 (Item no. ELEC-2.9.5)
c	16A DP MCB (For lighting & Exhaust Fans)	3	no.			AP Buildings SoR: 2016-17 (Item no. ELEC-2.9.3)
D	The cost for fabrication panel, Copper/Al busbars, interconnecting cables, mounting fasteners, terminal blocks etc. Installation, Commissioning and transportation	-	-			Lumpsum
1.2	1.1kV Cables					
1.2.1	Supplying & fixing of Cables					
a	3Cx35 sq.mm, AL, XLP Arm. Cables (For 50 HP Motors)	40	Mtrs			
b	3Cx4 sq.mm, Al, XLP Arm. Cables (For Motorised Valves)	40	Mtrs			
c	4Cx10 sq.mm, AL, XLPE Arm (for LDB)	20	Mtrs			
d	7Cx1.5 sq.mm, Cu Control Cable (for PLC operation)	15	Mtrs			
1.2.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
a	25 mm (3Cx25/35 sq.mm, 4Cx16/25 sq.mm)	8	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(b)(Excalation by 4% for 2016-17)
b	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	6	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a)(Excalation by 4% for 2016-17)
1.2.3	Supplying and erecting crimping type aluminium lugs conforming to IS suitable for cable as below evenly crimped with high pressure tool and connected to switch gear terminals with brass / cadmium plated nut bolts in an approved manner.					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	upto 16 sq mm	32	Nos.			PWD Maharashtra CSR 2013-14, Item no. 7-10-1(Excalation by 4% for 2016-17)
b	upto 35 sq mm	18	Nos.			PWD Maharashtra CSR 2013-14, Item no. 7-10-3(Excalation by 4% for 2016-17)
1.3	Earthing					
1.3.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC & 50HP Motor)	80	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
1.3.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles & Motorised Valves)	80	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
1.3.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07(Excalation by 4% for 2016-17)
1.4	Lighting					
	Supply, installation, testing & commissioning of Light Luminaires complete with: a) All accessories including mounting for fully functioning of fixture (Indoor & Outdoor). b) Earthing of fittings. c) Lamp of suitable wattage.					
1.4.1	Lighting Luminaries					
a	Indoor Lighting: 18W/20W, 1700 lumens, T5, 1200mm length LED with extruded polycarbonate / white powder coated slim box made of CRCA sheet tube light fixture, input voltage AC 220 - 260 Volts with PF>0.9, Surge protection: 2KV, THD<10%, with inbuilt driver and frosted cover CCT: 3000K - 5700K, minimum CRI>70, .etc., complete as per IS 10322 (Part 5/ Sec 1)..2012 a) Makes: Phillips / GE / Crompton / Wipro / Bajaj / Havells / VIN / Renesola b) LED MAKE : PHILIPS LUMILEDS / CREE / NICHIA / OSRAM / SAMSUNG.	3	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.18

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
b	LED Driver as per IS 15885 (Part 2 / Sec 13)..2012 with input line voltage 120V 270V AC, 50Hz with surge protection more than 2.5 KV, IP20, suitable for 12 / 18 W LED down lighter with 2 YearsWarranty.	3	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.31
1.4.2	Fixing of Fittings					
a)	Fixing all types & all capacities fluorescent/ CFL fittings Indoor on the wall /ceiling/rafters/gridders using 23 / 0.76 " twin twisted PVC insulated wires.	3	Nos.			KPWD Building Items Electrical SR 2014-15 Page 513 item 7 (a)(Excalation by 4% for 2016 17)
1.4.3	Point wiring (for Normal lighting system controlled directly by MCBs from LDB)					
a	<p>Primary Point wiring for light point & ceiling fan circuits, LDB to modular switch box with</p> <p>a) Heavy gauge PVC Open conduit pipe 40mm dia and 2.5mm thick confirming to IS 2509 with suitable size bends, junction boxes,adhesive paste etc, and fixing using inverted wood plugs in case of RCC ceiling and RCC wall stone structure or rawl plugs in case of brick walls and cement plastering damaged portion using heavy gauge saddles at an interval of 700mm using WF screws</p> <p>b) Surface / flush mounting 4-5 way unbreakable PVC modular box suitable for mounting modular switch plates.The box should be firmly/surface/flush mounted after due groove cutting in brick / cc wall, fixing including necessary rawl plugs, Machine/NF screws etc.</p> <p>c) Superior quality 4 module modular switch mounting polycarbonate plate with necessary supporting back plate with required nos. of machine screwws, bolts nuts etc., complete on the existing metal / PVC box.</p> <p>d) Modular 6A one way switch on existing modular switch plate.</p> <p>e) Wiring for lighting/power circuit using 2.5 sq.mm PVC insulated 1100V grade, copper conductor single core cable in open system of wiring. (For Phase & Neutral)</p> <p>f) Wiring for lighting/power circuit using 1.5 sq.mm PVC insulated 1100V grade, copper conductor single core cable in open system of wiring. (For earthing)</p>					
	i) Wiring upto 5M primary length.	2	Nos.			Karnataka PWD Bangalore circle Building Items Electrical SR 2014-15 (Excalation by 4% for 2016-17)
	ii) Wiring upto 10M primary length.	1	Nos.			Karnataka PWD Bangalore circle Building Items Electrical SR 2014-15 (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
b	<p>Primary Point wiring for sockets</p> <p>a) Heavy gauge PVC Open conduit pipe 40mm dia and 2.5mm thick confirming to IS 2509 with suitable size bends, junction boxes, adhesive paste etc, and fixing using inverted wood plugs in case of RCC ceiling and RCC wall stone structure or rawl plugs in case of brick walls and cement plastering damaged portion using heavy gauge saddles at an interval of 700mm using WF screws</p> <p>b) Surface / flush mounting 6-8 way unbreakable PVC modular box suitable for mounting modular switch plates. The box should be firmly/surface/flush mounted after due groove cutting in brick / cc wall, fixing including necessary rawl plugs, Machine/NF screws etc</p> <p>c) Superior quality 8 module modular switch mounting polycarbonate plate with necessary supporting back plate with required nos. of machine screws, bolts nuts etc., complete on the existing metal / PVC box.</p> <p>d) Modular 16A one way switch & 6/16A universal socket on existing modular switch plate on</p> <p>e) Wiring for lighting/power circuit using 4 sq.mm PVC insulated 1100V grade, copper conductor single core cable in open system of wiring. (For Phase & Neutral)</p> <p>f) Wiring for lighting/power circuit using 2.5 sq.mm PVC insulated 1100V grade, copper conductor single core cable in open system of wiring. (For earthing)</p>					
	i) Wiring upto 5M primary length.	2	Nos.			Karnataka PWD Bangalore circle Building Items Electrical SR 2014-15 (Escalation by 4% for 2016-17)
	ii) Wiring upto 10M primary length.	1	Nos.			Karnataka PWD Bangalore circle Building Items Electrical SR 2014-15 (Escalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
c	<p>Secondary Light point (from above primary light point to subsequent points controlled on same circuit. Wiring from 1st light point to next light points)</p> <p>a) Heavy gauge PVC Open conduit pipe 32mm dia and 2.5mm thick confirming to IS 2509 with suitable size bends, junction boxes, adhesive paste etc, and fixing using inverted wood plugs in case of RCC ceiling and RCC wall stone structure or rawl plugs in case of brick walls and cement plastering damaged portion using heavy gauge saddles at an interval of 700mm using WF screws.</p> <p>b) Wiring for lighting/power circuit using 4 sq.mm PVC insulated 1100V grade, copper conductor single core cable in open system of wiring. (For Phase & Neutral)</p> <p>c) Wiring for lighting/power circuit using 2.5 sq.mm PVC insulated 1100V grade, copper conductor single core cable in open system of wiring. (For earthing)</p>					
a)	Short point (not exceeding 3m)	3	Nos.			Karnataka PWD Bangalore circle Building Items Electrical SR 2014-15 (Excalation by 4% for 2016-17)
b)	Medium point above 3m and up to 6m	2	Nos.			Karnataka PWD Bangalore circle Building Items Electrical SR 2014-15(Excalation by 4% for 2016-17)
1.4	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing Cable	1	Lumpsum			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.69
c	Supplying Electrical rubber mat tested to 22kV, with grooved ISI mark, 1.82 x 0.91 x 0.021m	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-3 (Excalation by 4% for 2016-17)
d	Supplying rubber gloves of 15KV conforming to IS	1	pairs			ESCOM Common SR 2014-15 Page no. 12 Of 17 , Item.No. 585, Sr.No. 75.4 for Material (Excalation by 4% for 2016-17)
e	Supplying fire extinguisher with connected accessories complete, water CO2 type 4.5 litres	1	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-4 (Excalation by 4% for 2016-17)
f	Supplying and fixing of danger board made out of MS sheet metal with two coats of non corrosive enameled paint	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 544 item-9(Excalation by 4% for 2016-17)
	Total for TPS					
2	Main pump house (Near Bio-Chemistry)					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
2.1	MCC Panel					
A	Incomer:					
a	Supplying and fixing Moulded case circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete.					
b	200A 4 Pole MCCB, 35 kA	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 518 item-10(Excalation by 4% for 2016-17)
c	Extended Door Mounted Rotary Operator (including handle)	1	No.			L&T, ESP 01.01.2017, Page.34 (inclusive of Excise Duty and VAT / Sales Tax)
d	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17(Excalation by 4% for 2016-17)
e	Supplying, fixing and wiring 0 to 100 amps Direct reading AC analog type Ammeter.	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-20(Excalation by 4% for 2016-17)
f	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
g	Supplying, fixing and wiring rotary selector switch suitable for Voltmeter	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-23(Excalation by 4% for 2016-17)
h	R,Y,B Indication - LED type panel board indicating lamp with required colour suitable for 220V, AC 50 Hz 12/24 D.C	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-35-a(Excalation by 4% for 2016-17)
i	Multifunction Energy meter of Selec Make MFM 383A-C with RS485 MODBUS Communication	1	Nos.			Selec Controls Pvt Ltd. Price List Effective from 01-01-2016(Excalation by 4% for 2016-17)
j	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
B	Motor Outgoing Feeder					
a	20 HP Starter Feeders (With 32A TP MPCB, 32A Star/Delta/Main Contactors, Timer, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	3	Nos.			
b	10 HP Starter Feeders (With 16A TP MPCB, 18A Star/Delta/Main Contactors, Timer, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	2	Nos.			
c	0.75 HP DoL starters for Motorised Valve Actuators	2	Nos.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
d	2-Position (Local - Remote) Selector Switch for motor feeders	7	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
e	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	7	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17(Excalation by 4% for 2016-17)
f	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	7	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
g	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	15	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
C	Other Outgoing Feeder					
a	32A TP 3P+E plug & socket with MCB	1	no.			Legrand Price List Feb 1 st 2017 (inclusive of all taxes)
b	16A DP MCB (For lighting)	3	no.			AP Buildings SoR: 2016-17 (Item no. ELEC-2.9.3)
D	The cost for fabrication panel, Copper/Al busbars, interconnecting cables, mounting fasteners, terminal blocks etc. Installation, Commissioning and transportation	-	-			Lumpsum
2.2	1.1kV Cables					
2.2.1	Supplying & fixing of Cables					
a	3Cx10 sq.mm, AL, XLP Arm. Cables (For 20 HP Motors)	90	Mtrs			
b	3Cx4 sq.mm, AL, XLP Arm. Cables (For Motorised Valves & 10 HP Pumps)	60	Mtrs			
c	4Cx10 sq.mm, AL, XLPE Arm (for LDB)	20	Mtrs			
2.2.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
b	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	16	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a)
2.2.3	Supplying and erecting crimping type aluminium lugs conforming to IS suitable for cable as below evenly crimped with high pressure tool and connected to switch gear terminals with brass / cadmium plated nut bolts in an approved manner.					
a	upto 16 sq mm	48	Nos.			PWD Maharashtra CSR 2013-14, Item no. 7-10-1
2.3	Earthing					
2.3.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC)	25	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
2.3.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
c	4 SWG (Motors above 15 HP upto 30 HP)	30	mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
2.3.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
2.4	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing Cable	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
c	Supplying Electrical rubber mat tested to 22kV, with grooved ISI mark, 1.82 x 0.91 x 0.021m	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-3 (Excalation by 4% for 2016-17)
d	Supplying rubber gloves of 15KV conforming to IS	1	pairs			ESCOM Common SR 2014-15 Page no. 12 Of 17 , Item.No. 585, Sr.No. 75.4 for Material (Excalation by 4% for 2016-17)
e	Supplying fire extinguisher with connected accessories complete, water CO2 type 4.5 litres	1	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-4 (Excalation by 4% for 2016-17)
f	Supplying and fixing of danger board made out of MS sheet metal with two coats of non corrosive enameled paint	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 544 item-9 (Excalation by 4% for 2016-17)
	Total for Main pump house (Near Bio-Chemistry)					
3	Library pump house					
3.1	MCC Panel					
A	Incomer:					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	Supplying and fixing Moulded case circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete.					
	125A 4 Pole MCCB, 25 kA	1	No.			
b	Extended Door Mounted Rotary Operator (including handle)	1	No.			
c	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17(Excalation by 4% for 2016-17)
d	Supply and erection of 0-100 / 200 / 400 / 600 /1000 Analog Ammeter of size 96x96mm on existing box / panel board including connections etc., complete. Makes: CONZERVE / ELMEASURE / LEGRAND / MECO / HPL.	1	no.			AP Building SoR 2016-17, Item no. ELEC-2.8.7
e	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
f	Supplying, fixing and wiring rotary selector switch suitable for Voltmeter	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-23(Excalation by 4% for 2016-17)
g	R,Y,B Indication - LED type panel board indicating lamp with required colour suitable for 220V, AC 50 Hz 12/24 D.C	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-35-a(Excalation by 4% for 2016-17)
h	Multifunction Energy meter of Selec Make MFM 383A-C with RS485 MODBUS Communication	1	Nos.			
i	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
B	Motor Outgoing Feeder					
a	20 HP Starter Feeders (With 32A TP MPCB, 32A Star/Delta/Main Contactors, Timer, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	2	Nos.			
b	10 HP Starter Feeders (With 16A TP MPCB, 18A Star/Delta/Main Contactors, Timer, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	1	Nos.			
c	2-Position (Local - Remote) Selector Switch for motor feeders	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
d	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	3	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17(Excalation by 4% for 2016-17)
e	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	3	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
f	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	6	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
C	Other Outgoing Feeder					
a	63A TPN MCCB - Spare	2	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
b	32A TP 3P+E plug & socket with MCB	1	no.			
c	16A DP MCB (For lighting)	3	no.			AP Buildings SoR: 2016-17 (Item no. ELEC-2.9.3)
d	The cost for fabrication panel, Copper/Al busbars, interconnecting cables, mounting fasteners, terminal blocks etc. Installation, Commissioning and transportation	-	-			Lumpsum
3.2	Earthing					
3.2.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC)	25	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
3.2.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
c	4 SWG (Motors above 15 HP upto 30 HP)	30	mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
3.2.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07(Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
3.3	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing Cable	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
c	Supplying Electrical rubber mat tested to 22kV, with grooved ISI mark, 1.82 x 0.91 x 0.021m	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-3 (with (Excalation by 4% for 2016-17)
d	Supplying rubber gloves of 15KV conforming to IS	1	pairs			ESCOM Common SR 2014-15 Page no. 12 Of 17 , Item.No. 585, Sr.No. 75.4 for Material (Excalation by 4% for 2016-17)
e	Supplying fire extinguisher with connected accessories complete, water CO2 type 4.5 litres	1	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-4 (Excalation by 4% for 2016-17)
f	Supplying and fixing of danger board made out of MS sheet metal with two coats of non corrosive enameled paint	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 544 item-9 (Excalation by 4% for 2016-17)
	Total for Library pump house					
4	Pump House (Housing Colony)					
4.1	MCC Panel					
A	Incomer:					
a	Supplying and fixing Moulded case circuit Breaker (MCCB) over the existing wood/panel board using necessary screws, bolts, nuts and wiring complete.					
	200A 4 Pole MCCB, 35 kA	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 518 item-10(Excalation by 4% for 2016-17)
	Extended Door Mounted Rotary Operator (including handle)	1	No.			
b	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	1	No.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17(Excalation by 4% for 2016-17)
c	Supply and erection of 0-100 / 200 / 400 / 600 /1000 Analog Ammeter of size 96x96mm on existing box / panel board including connections etc., complete. Makes: CONZERVE / ELMEASURE / LEGRAND / MECO / HPL.	1	no.			AP Building SoR 2016-17, Item no. ELEC-2.8.7
d	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
e	Supplying, fixing and wiring rotary selector switch suitable for Voltmeter	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-23(Excalation by 4% for 2016-17)
f	R,Y,B Indication - LED type panel board indicating lamp with required colour suitable for 220V, AC 50 Hz 12/24 D.C	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-35-a(Excalation by 4% for 2016-17)
g	Multifunction Energy meter of Selec Make MFM 383A-C with RS485 MODBUS Communication	1	Nos.			Selec Controls Pvt Ltd. Price List Effective from 01-01-2016
h	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
B	Motor Outgoing Feeder					
a	15 HP Starter Feeders (With 16A TP MPCB, 18A Star/Delta/Main Contactors, Timer, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	2	Nos.			
b	5 HP Starter Feeders (With 10A TP MPCB, 12A, 1-Ph preventor, On/Off/Trip Indications, Start-Stop PB)	1	Nos.			
c	2-Position (Local - Remote) Selector Switch for motor feeders	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
d	Supply and erection of 0-100 / 200 / 400 / 600 /1000 Analog Ammeter of size 96x96mm on existing box / panel board including connections etc., complete. Makes: CONZERVE / ELMEASURE / LEGRAND / MECO / HPL.	1	no.			AP Building SoR 2016-17, Item no. ELEC-2.8.7
e	Supplying, fixing and wiring rotary selector switch suitable for Ammeter	3	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-22(Excalation by 4% for 2016-17)
f	Supplying, fixing and wiring 50/5 to 400/5 amps 5 VA Burden Current transformer, class 0.5 accuracy	6	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-31-a(Excalation by 4% for 2016-17)
C	Other Outgoing Feeder					
a	16A TP MCB (For Motorised Valves)	2	no.			AP Buildings SoR: 2016-17 (Item no. ELEC-2.9.5)
b	32A TP 3P+E plug & socket with MCB	1	no.			
c	16A DP MCB (For lighting)	3	no.			AP Buildings SoR: 2016-17 (Item no. ELEC-2.9.3)
d	The cost for fabrication panel, Copper/Al busbars, interconnecting cables, mounting fasteners, terminal blocks etc. Installation, Commissioning and transportation	-	-			Lumpsum

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
4.2	1.1kV Cables					
4.2.1	Supplying & fixing of Cables					
a	3Cx10 sq.mm, AL, XLP Arm. Cables (For 15 HP Motors)	120	Mtrs			
b	3Cx4 sq.mm, AL, XLP Arm. Cables (For Motorised Valves & 10 HP Pumps)	80	Mtrs			
c	4Cx10 sq.mm, AL, XLPE Arm (for LDB)	20	Mtrs			
4.2.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
b	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	14	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a) (Excalation by 4% for 2016-17)
4.2.3	Supplying and erecting crimping type aluminium lugs conforming to IS suitable for cable as below evenly crimped with high pressure tool and connected to switch gear terminals with brass / cadmium plated nut bolts in an approved manner.					
a	upto 16 sq mm	42	Nos.			PWD Maharashtra CSR 2013-14, Item no. 7-10-1 (Excalation by 4% for 2016-17)
4.2	Earthing					
4.2.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (LDBs & 415V DBs)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
4.2.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas.spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	50	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
4.2.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia.	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
4.3	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
b	Supply of Saddle / Clamps suitable for fixing Cable	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
c	Supplying Electrical rubber mat tested to 22kV, with grooved ISI mark, 1.82 x 0.91 x 0.021m	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-3 (Excalation by 4% for 2016-17)
d	Supplying rubber gloves of 15KV conforming to IS	1	pairs			ESCOM Common SR 2014-15 Page no. 12 Of 17 , Item.No. 585, Sr.No. 75.4 for Material (Excalation by 4% for 2016-17)
e	Supplying fire extinguisher with connected accessories complete, water CO2 type 4.5 litres	1	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 543 item-4 (Excalation by 4% for 2016-17)
f	Supplying and fixing of danger board made out of MS sheet metal with two coats of non corrosive enameled paint	2	Nos.			KPWD Bangalore Circle Building Items Electrical SR 2014-15 Page 544 item-9 (Excalation by 4% for 2016-17)
Total for Pump House (Housing Colony)						
5	Housing Colony (New 'A' Type)					
5.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
5.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			
5.3	MCB DB, Starter Panels					
	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
5.4	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
5.4.1	For 10 HP Starter Panels					
a	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	4	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a) (Excalation by 4% for 2016-17)
5.4.2	For MCB DB					
a	25 mm (3Cx25/35 sq.mm, 4Cx16/25 sq.mm) - Main Incomer	1	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(b) (Excalation by 4% for 2016-17)
b	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm) - Outgoings	4	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a)(Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
5.4.3	Aluminium conductor Three core, XLPE / PVC insulated & armoured cable					
a	3C x 4 Sq.mm (For 10 HP Starter panel)	2	Mtrs.			
5.5	Lighting					
	Supply, installation, testing & commissioning of Light Luminaires complete with: a) All accessories including mounting for fully functioning of fixture (Indoor & Outdoor). b) Earthing of fittings. c) Lamp of suitable wattage.					
5.5.1	Lighting Luminaries					
a	Indoor Lighting: 18W/20W, 1700 lumens, T5, 1200mm length LED with extruded polycarbonate / white powder coated slim box made of CRCA sheet tube light fixture, input voltage AC 220 - 260 Volts with PF>0.9, Surge protection: 2KV, THD<10%, with inbuilt driver and frosted cover CCT: 3000K - 5700K, minimum CRI>70, .etc., complete as per IS 10322 (Part 5/ Sec 1)..2012 a) Makes: Phillips / GE / Crompton / Wipro / Bajaj / Havells / VIN / Renesola b) LED MAKE : PHILIPS LUMILEDS / CREE / NICHIA / OSRAM / SAMSUNG.	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.18
b	LED Driver as per IS 15885 (Part 2 / Sec 13)..2012 with input line voltage 120V 270V AC, 50Hz with surge protection more than 2.5 KV, IP20, suitable for 12 / 18 W LED down lighter with 2 Years Warranty.	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.31
5.5.2	Fixing of Fittings					
a)	Fixing all types & all capacities fluorescent/ CFL fittings Indoor on the wall /ceiling/rafters/gridders using 23 / 0.76 " twin twisted PVC insulated wires.	1	Nos.			KPWD Building Items Electrical SR 2014-15 Page 513 item 7 (a) (Excalation by 4% for 2016 17)
5.6	Plug & Sockets					
5.6.1	Supply and Fixing of 16 A, 240V, 1 ph, Metra Plug Socket with DP MCB. (Preferred Make: Legrand / Havells)	1	Nos.			
5.7	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing Cable	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
5.8	Earthing					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
5.8.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
5.8.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas.spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
5.8.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia.	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
Total for Housing Colony (New 'A' Type)						
6	Housing Colony New Pump House					
6.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
6.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng main incomer)	5	Mtrs.			
6.3	MCB DB, Starter Panels					
	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
Total for Housing Colony New Pump House						
7	Housing Colony (New 'D' Type Pump House)					
7.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
7.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng main incomer)	5	Mtrs.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
7.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	6-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016- 17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lightng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	5	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
7.4	Starter Panels					
a	DoL starters for 3.5 HP motors (L&T make Type MK1)	4	Nos.			
7.5	LV Cables					
7.5.1	Aluminium conductor Three core, XLPE / PVC insulated & armoured cable					
a	3C x 4 Sq.mm (For 3.5 HP Starter panel & motors)	30	Mtrs.			
7.5.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
a	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	8	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a) (Excalation by 4% for 2016- 17)
7.5.3	Supplying and erecting crimping type aluminium lugs conforming to IS suitable for cable as below evenly crimped with high pressure tool and connected to switch gear terminals with brass / cadmium plated nut bolts in an approved manner.					
a	upto 16 sq mm	24	Nos.			PWD Maharashtra CSR 2013-14, Item no. 7- 10-1
7.6	Earthing					
7.6.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016- 17)
7.6.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas.spacers etc.					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
7.7	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for New 'D' Type Pump House					
8	Housing Colony (New 'E' Type Pump House)					
8.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
8.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			
8.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoings.					
a	6-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lightng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	5	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
8.4	Starter Panels					
a	DoL starters for 3.5 HP motors (L&T make Type MK1)	4	Nos.			
8.5	LV Cables					
8.5.1	Aluminium conductor Three core, XLPE / PVC insulated & armoured cable					
a	3C x 4 Sq.mm (For 3.5 HP Starter panel & motors)	30	Mtrs.			
8.5.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
a	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	8	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a) (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
8.5.3	Supplying and erecting crimping type aluminium lugs conforming to IS suitable for cable as below evenly crimped with high pressure tool and connected to switch gear terminals with brass / cadmium plated nut bolts in an approved manner.					
a	upto 16 sq mm	24	Nos.			PWD Maharashtra CSR 2013-14, Item no. 7-10-1
8.6	Earthing					
8.6.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
8.6.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas.spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
8.7	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
Total for New 'E' Type Pump House						
9	Housing Colony (New 'E' Type 10th Block)					
9.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
9.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng main incomer)	5	Mtrs.			
9.3	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
9.4	Starter Panels					
a	Star-Delta starters for 10 HP motors with MPCB, Star/Delta/Main contactors, 1-Phase preventer	1	Nos.			
9.5	Lighting					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
	Supply, installation, testing & commissioning of Light Luminaires complete with: a) All accessories including mounting for fully functioning of fixture (Indoor & Outdoor). b) Earthing of fittings. c) Lamp of suitable wattage.					
9.5.1	Lighting Luminaries					
a	Indoor Lighting: 18W/20W, 1700 lumens, T5, 1200mm length LED with extruded polycarbonate / white powder coated slim box made of CRCA sheet tube light fixture, input voltage AC 220 - 260 Volts with PF>0.9, Surge protection: 2KV, THD<10%, with inbuilt driver and frosted cover CCT: 3000K - 5700K, minimum CRI>70, .etc., complete as per IS 10322 (Part 5/ Sec 1)..2012 a) Makes: Phillips / GE / Crompton / Wipro / Bajaj / Havells / VIN / Renesola b) LED MAKE : PHILIPS LUMILEDS / CREE / NICHIA / OSRAM / SAMSUNG.	2	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.18
b	LED Driver as per IS 15885 (Part 2 / Sec 13) 2012 with input line voltage 120V-270V AC, 50Hz with surge protection more than 2.5 KV, IP20, suitable for 12 / 18 W LED down lighter with 2 Years Warranty.	2	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.31
9.5.2	Fixing of Fittings					
a)	Fixing all types & all capacities fluorescent/ CFL fittings Indoor on the wall /ceiling/rafters/gridders using 23 / 0.76 " twin twisted PVC insulated wires.	2	Nos.			KPWD Building Items Electrical SR 2014-15 Page 513 item 7 (a) (Excalation by 4% for 2016 17)
9.6	Plug & Sockets					
9.6.1	Supply and Fixing of 16 A, 240V, 1 ph, Metra Plug Socket with DP MCB. (Preferred Make: Legrand / Havells)	1	Nos.			
9.7	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no.			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no.			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
9.8	Earthing					
9.8.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
9.8.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
9.8.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Banglore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
Total for New 'E' Type 10th Block						
10	'E' Block Pump House					
10.1	MCB DB, Starter Panels					
a	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
b	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			
b	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
10.2	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
Total for 'E' Block Pump House						
11	Sump near New Girls Hostel					
11.1	MCB DB, Starter Panels					
a	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
b	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			
c	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
11.2	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Sump near New Girls Hostel					
12	Sump near New Boys Hostel					
12.1	MCB DB, Starter Panels					
a	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
b	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			
c	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
12.2	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Sump near New Boys Hostel					
13	Tunga Pump House					
13.1	MCB DB, Starter Panels					
a	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
b	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
c	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
13.2	Miscellaneous					
13.2.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
13.2.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Tunga Pump House					
14	R' Block Pump House					
14.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			ESCOM SR 2016-17, Item No. 67.10
14.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng main incomer)	5	Mtrs.			
14.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	4-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lightng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
14.4	Starter Panels					
a	R,Y,B Indication - LED type panel board indicating lamp with required colour suitable for 220V, AC 50 Hz 12/24 D.C	6	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 523 item-35-a
b	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	2	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17 (Excalation by 4% for 2016-17)
c	Supplying, fixing and wiring 0 to 100 amps Direct reading AC analog type Ammeter.	2	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-20 (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
d	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
14.5	Miscellaneous					
14.5.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
14.5.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for 'R' Block Pump House					
15	'A' Mess Pump House					
15.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
15.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng main incomer)	5	Mtrs.			
15.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	6-Way DB	1	Nos.			KPWD Banglore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lighitng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	5	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
15.4	Earthing					
15.4.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a)
15.4.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
15.4.23	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Banglore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
15.5	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
Total for 'A' Mess Pump House						
16	'B' Mess Sump					
16.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
16.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng main incomer)	5	Mtrs.			
16.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	6-Way DB	1	Nos.			KPWD Banglore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lighitng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	5	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
16.4	Starter Panels					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	10 HP FULLY AUTOMATIC AIR BREAK STAR DELTA STARTER WITH SINGLE PHASING PREVENTOR WITH AMMETER CONFIRMING TO IS 13947/2004 WITH AUTO RESTART FACILITY	2	Nos.			TWAD Board SR 2016-17
b	7.5 HP 3 PHASE PANEL BOARD-STAR DELTA WITH TWO LEVEL GUARD AND AUTO START	1	Nos.			TWAD Board SR 2016-17
16.5	Earthing					
16.5.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
16.5.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
16.5.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
Total for 'B' Mess Pump House						
17	ICE Pump House					
17.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
17.2	4x1Cx10 sq.mm Al. Cables (Connecting from LT Meter to exisitng main incomer)	5	Mtrs.			
17.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoings.					
a	6-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
b	125A, 4P, MCCB (Incomer)	1	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 518 item-13 (A-a) (Excalation by 4% for 2016-17)
c	10A, SP, MCB (Outgoings for lighitng & exhaust fans)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-10 (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	5	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
17.4	15 HP with Submersible starter Makes: Crompton / L&T / Siemens.	2	Nos.			
17.5	12.5 HP with Automatic Star Delta Starter. Makes: Crompton / L&T / Siemens.	2	Nos.			
17.6	LT Power Cables:					
17.6.1	Aluminium conductor Three core, XLPE / PVC insulated & armoured cable					
a	3C x 10 Sq.mm (15 HP & 12.5 HP pumps)	60	Mtrs.			
b	3Cx4 sq.mm, AL, XLP Arm. Cables (For Motorised Valves)	30	Mtrs			
17.6.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
b	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	8	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a) (Excalation by 4% for 2016-17)
17.5	Earthing					
17.5.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC)	25	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
17.5.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
17.5.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
Total for ICE Pump House						
18	'K' Block Pump House (Near Govt. School)					
18.1	MCB DB, Starter Panels					
a	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
18.2	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
Total for 'K' Block Pump House (Near Govt. School)						
19	P Block Pump House					
19.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
19.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng incoming MCB DB)	5	Mtrs.			
19.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoings.					
a	4-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lighitng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
d	32A,TPN, MCB (Outgoings to motor starter panels)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
19.4	CONTROL PANEL BOARD FOR MOTORS					
a	Fabrication , transportation and supply of suitable size panel board for single phase submersible motor above 2 HP to 3 HP consisting of relay, Contactor, starting and running capacitors, Voltmeter, Ammeter, indicator lamps, MCB , on/off switch. Makes; LT / LK / BCH / Crompton/ Siemens.	2	Nos.			AP Bldgs SR 2016-17, Item No. ELEC-5.4.65
19.5	LT Power Cables:					
19.5.1	Aluminium conductor Three core, XLPE / PVC insulated & armoured cable					
a	3C x 4 Sq.mm	30	Mtrs.			
19.5.2	Supplying and fixing of heavy duty cable glands suitable for UG cable of 1.1 KV class (metal only)					
b	19/20mm (upto 3Cx16 sq.mm & 4Cx10 sq.mm)	4	Each			KPWD Bangalore Circle SR 2014-15, Page No. 549 Item No.17-(a) (Excalation by 4% for 2016-17)
19.6	Earthing					
19.6.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC)	25	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
19.6.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
19.6.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
19.7	Miscellaneous					
19.7.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
19.7.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for P Block Pump House					
20	PD Block Pump House					
20.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
20.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng incoming MCB DB)	5	Mtrs.			
20.3	MCC Panel					
a	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17 (Excalation by 4% for 2016-17)
b	Supplying, fixing and wiring 0 to 100 amps Direct reading AC analog type Ammeter.	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-20 (Excalation by 4% for 2016-17)
c	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
20.4	Earthing					
20.4.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC)	25	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
20.4.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
20.4.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Banglore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
20.5	Miscellaneous					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
20.5.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
20.5.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for PD Block Pump House					
21	Yeshwantpura Quarters					
21.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
21.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng incoming MCB DB)	5	Mtrs.			
21.3	MCB DB, Starter Panels					
a	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
21.4	Miscellaneous					
21.4.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
21.4.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Yeshwantpura Quarters					
22	Baskar Apartments (Sump cum Pump House)					
22.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
22.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng incoming MCB DB)	5	Mtrs.			
22.3	MCB DB, Starter Panels					
	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	4-Way DB	1	Nos.			KPWD Banglore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lighitng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
d	32A,TPN, MCB (Outgoings to motor starter panels)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
22.4	CONTROL PANEL BOARD FOR MOTORS					
	Fabrication , transportation and supply of suitable size panel board for single phase submersible motor above 2 HP to 3 HP consisting of relay, Contactor, starting and running capacitors, Voltmeter, Ammeter, indicator lamps, MCB , on/off switch. Makes; LT / LK / BCH / Crompton/ Siemens.	2	Nos.			AP Bldgs SR 2016-17, Item No. ELEC-5.4.65
22.5	Earthing					
22.5.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
22.5.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
23.5.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
23.4	Miscellaneous					
23.4.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
23.4.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Baskar Apartments (Sump cum Pump House)					
24	Aryabatta Quarters					
24.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
24.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng incoming MCB DB)	5	Mtrs.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
24.3	MCB DB, Starter Panels					
a	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
24.4	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
24.5	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Banglore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
Total for Aryabatta Quarters						
25	Kendriya Vidyalaya Pump House					
25.1	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	4-Way DB	1	Nos.			KPWD Banglore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lighitng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
25.2	CONTROL PANEL BOARD FOR MOTORS					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
a	Fabrication , transportation and supply of suitable size panel board for single phase submersible motor above 2 HP to 3 HP consisting of relay, Contactor, starting and running capacitors, Voltmeter, Ammeter, indicator lamps, MCB , on/off switch. Makes; LT / LK / BCH / Crompton/ Siemens.	2	Nos.			AP Bldgs SR 2016-17, Item No. ELEC-5.4.65
25.3	Earthing					
25.3.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
25.3.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
25.3.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
25.4	Miscellaneous					
25.4.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
25.4.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
Total for Kendriya Vidyalaya Pump House						
26	HMT Quarters					
26.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
26.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng incoming MCB DB)	5	Mtrs.			
26.3	MCC Panel					
a	Supplying fixing and wiring 0 to 600 Volts 96x96mm AC voltmeter on existing panel/wood board.	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-17. (Excalation by 4% for 2016-17)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
b	Supplying, fixing and wiring 0 to 100 amps Direct reading AC analog type Ammeter.	1	no.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 522 item-20. (Excalation by 4% for 2016-17)
d	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2.
26.4	Earthing					
26.4.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCC)	25	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
26.4.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
26.4.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Banglore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
26.5	Miscellaneous					
26.5.1	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
26.5.2	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for HMT Quarters					
27	Krithka Hostel (Sump cum Pump House)					
27.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
27.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng incoming MCB DB)	5	Mtrs.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
27.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	4-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lightng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
27.4	CONTROL PANEL BOARD FOR MOTORS					
a	Fabrication , transportation and supply of suitable size panel board for single phase submersible motor above 2 HP to 3 HP consisting of relay, Contactor, starting and running capacitors, Voltmeter, Ammeter, indicator lamps, MCB , on/off switch. Makes; LT / LK / BCH / Crompton/ Siemens.	2	Nos.			AP Bldgs SR 2016-17, Item No. ELEC-5.4.65
27.5	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	8 SWG (Motors upto 15 HP)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
27.6	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
27.7	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Krithka Hostel (Sump cum Pump House)					
28	Bharani Hostel					

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
28.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
28.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng incoming MCB DB)	5	Mtrs.			
28.3	Distribution Board -Supply & Fixing of regular MCCB distribution panel on Wall/ Flush mounting with provision for fixing of suitable type capacity MCCB as an incomer and Single/Three phase MCCB/MCBs as outgoing.					
a	4-Way DB	1	Nos.			KPWD Bangalore Circle SR 2014-15, Page No. 519, Item No.12(B) (Excalation by 4% for 2016-17) (Excalation by 4% for 2016-17)
b	63A, 4P, MCCB (Incomer)	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-2.8.5
c	10A, SP, MCB (Outgoings for lightng & other loads)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (A-a) (Excalation by 4% for 2016-17)
d	32A,TPN, MCB (Outgoings to motor starter panels)	3	Nos.			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 520 item-13 (E-a) (Excalation by 4% for 2016-17)
28.4	CONTROL PANEL BOARD FOR MOTORS					
a	Fabrication , transportation and supply of suitable size panel board for single phase submersible motor above 2 HP to 3 HP consisting of relay, Contactor, starting and running capacitors, Voltmeter, Ammeter, indicator lamps, MCB , on/off switch. Makes; LT / LK / BCH / Crompton/ Siemens.	3	Nos.			AP Bldgs SR 2016-17, Item No. ELEC-5.4.65
28.5	Earthing					
28.5.1	Supplying and running of GI strips for grounding connections, using necessary fixing materials as required					
a	25 x 3 mm GI (MCB DB)	25	Mtrs			KPWD B'lore circle Bldg Electrical SR 2014-15 Page 547 item-09 (I-a) (Excalation by 4% for 2016-17)
28.5.2	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
28.5.3	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm alround the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
28.6	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
	Total for Bharani Hostel					
29	New Staff Quarters					
29.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
29.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to exisitng incoming MCB DB)	5	Mtrs.			
29.3	Supply and delivery of wall mounted control panel board of size 600x600x250mm made of 18 SWG CRCA sheet steel enclosure, 14 SWG mounting plate for cable entry fabricated, painted with two coats of Red oxide primer and two coats of Grey paint, lock and key arrangements two side louvers with weld mesh inside etc., complete consisting of the following equipment with all internal wiring using L&T/ Finolex copper FRLS cables of suitable size and capacity and cable clamp etc complete for 3 phase motor pump sets with Voltmeter, Ammeter, Single phase preventor, TP MCB, Indicating lamps, Selector switches for voltmeter & ammeter, required capacitor banks.					
a	Upto 7.5 HP with DOL Starter. Makes: Crompton / L&T / Siemens	1	No.			AP Bldg SR 2016-17, Item No. ELEC-5.4.77
29.4	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	30	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
29.5	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2mm dia	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
29.4	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
c	Panel Internal Wiring, point wiring for lighting including conduit, switches etc. with all required accessories for complete installation of the system	1	Lumpsum			
Total for New Staff Quarters						
30	Biological Sciences Dept.					
30.1	LT AC Three Phase 4 wire, 5-30A Static whole unidirectional complaint energy meter, Class – 1.0 Accuracy	1	Nos.			BESCOM SR 2016-17, Sr. No. 67.10
30.2	4x1Cx16 sq.mm Al. Cables (Connecting from LT Meter to existng incoming MCB DB)	5	Mtrs.			
30.3	Starter Panels/MCB DB					
30.3.1	Carryout routine maintenance and servicing of LT.Cubical pannel board having approximately 15 to 22 Nos of switches cleaning with power blower and servicing the contacts, tightning the connection of incoming and outgoing cables, and checking the operating machanism for smooth functioning of switches and putting them in smooth working condition.	1	Nos.			AP Bldgs SR 2016-17, Item ELEC-6.4.2
30.3.2	Push Buttons (Start & Stop) Set (for Starter Panels)	2	Set			
30.3.3	On/Off Indication - LED type panel board indicating lamp with required colour suitable for 220V, AC 50 Hz 12/24 D.C (for Starter Panels)	4	Nos.			

Sr. No.	Description	Qty	Unit	Unit Rate (in INR)	Total Cost (in INR)	Reference
30.4	Indoor Lighting: 18W/20W, 1700 lumens, T5, 1200mm length LED with extruded polycarbonate / white powder coated slim box made of CRCA sheet tube light fixture, input voltage AC 220 - 260 Volts with PF>0.9, Surge protection: 2KV,THD<10%, with inbuilt driver and frosted cover CCT: 3000K - 5700K, minimum CRI>70, .etc., complete as per IS 10322 (Part 5/ Sec 1)..2012 a) Makes: Phillips / GE / Crompton / Wipro / Bajaj / Havells / VIN / Renesola b) LED MAKE : PHILIPS LUMILEDS / CREE / NICHIA / OSRAM / SAMSUNG.	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.18
30.5	LED Driver as per IS 15885 (Part 2 / Sec 13) 2012 with input line voltage 120V-270V AC, 50Hz with surge protection more than 2.5 KV, IP20, suitable for 12/18 W LED down lighter with 2 Years Warranty.	1	Nos.			AP Building SoR 2016-17, Item no. ELEC-3.9.31
30.6	Miscellaneous					
a	Supply of suitable Nylon Cable Ties	1	100 no			ESCOM Common SR 2016-17, 11 kV Material, Item no. 53.38
b	Supply of Saddle / Clamps suitable for fixing 4 Core 10 & 16 Sqmm Cable.	1	100 no			AP Bldgs. SoR Rates 2015-16, (Elec) Item no. ELEC-8.1.66
c	Panel Internal Wiring, point wiring for lighting including conduit, switches etc. with all required accessories for complete installation of the system	1	Lumpsum			
30.7	Supplying and running of GI wire for grounding and (along with other wires in conduit system of wiring) using necessary suitable size clamps, nails, guttas, spacers etc.					
a	12 SWG (Lighting and Receptacles)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
b	8 SWG (Small motors, Starter panels)	20	Mtrs			AP Buildings SoR: 2016-17 (Item no. ELEC-8.1.41)
30.8	Supplying fixing and wiring earth electrode for grounding conduits, I.C.cutouts and other equipments on the meter board using 40 mm dia 2.9 thick GI pipe 2.5 meter long buried in a pit. The pit should be filled with equal proportion of salt charcoal 150mm around the pipe to complete depth. The connection from the pipe to the conduit etc, is to be established through GI wire of size as per ISI specification 7.3.3 of IS 732 using 12mm dia bolts, nuts washers and check nuts etc, the pipe shall have 16 through holes of 12.2 mm dia.	1	No.			KPWD Bangalore circle Building Items Electrical Schedule of rates 2014-15 Page 546 item-07 (Excalation by 4% for 2016-17)
	Total for Biological Sciences Dept.					
	Total Cost of Electrical Works					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
I	Thermal Pumping Station					
A	Proposed Pumping system-Mechanical Equipment					
1.0	Supply, delivery at site, erection, testing and commissioning of brand new, best efficient, multistage,non-priming,vertical high pressure centrifugal pump inline design.stage chambers,impellers,and diffusers are made of chrome-nickel steel,confirming to IS: 9137 with latest amendments Pumps of 64cu.m/hr capacity at 90 MWC,2950 RPM with complete all accessories such as Base frame, Mating flanges, pressure gauge tapplings with necessary Bolts,gaskets & priming arrangement	2	Nos.			
	1. Shut off head: Min 110% & Max 130% of the specified head.2.The duty condition of the pump should be to the left of the best efficiency point and closer to best efficiency point. 3. Minimum guaranteed efficiency of horizontal split case pumps shall be 65% without negative tolerance. 5. The pump is required to work at an altitude of 500.0 m above MSL and at a maximum ambient temperature of 45 degree Centigrade.					
	Suction Housing: Cast Iron IS 210 FG 260, Impeller: SS ASTM A 743 CF8M, Stage Chambers: SS ASTM A 743 CF8M, Pressure Casing: SS ASTM A 743 CF8M, Shaft: Stainless Steel: BS 970 Gr. 410, Shaft Sleeve: Stainless Steel : BS:970 Gr 410 Hardness 350 BHN, Mechanical Seal: oil-lubricated with tungsten carbide or silicon-carbide faces,Pump Bearing:Tungsten Carbide,Fasteners, Anchors bolts, Foundation Bolts etc. both in wet and dry areas: Stainless Steel : 316, '- Base Plate: MS with epoxy coated.					
2.0	Supplying at site of work erection and commissioning any make approved by the department Vertical Flange mounted Solid Shaft Motor mounted TEFC, squirrel cage induction 2950 RPM motor for continuous duty conforming to IS 4691 and IS 325 for operation	2	Nos.			Price is inclusive in Pump price

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
	Specific requirements for motors: Operating condition: (i) Induction motor shall be TEFC type suitable for continuous operation and operating on 3 Ph, 50 Hz. 415 V supply.(ii) Cushion:20% more than maximum power required by the pump.(iii) The motor is required to work at an altitude of 500.0 m above MSL and at a maximum ambient temperature of 45 degree centigrade. Operating voltage and frequency: The motors shall be capable of giving rated output without reduction in the expected life span when operated continuously under either of the following cases of supply conditions. (i) Variation of supply voltage from the rated voltage $\pm 10\%$, (ii) Variation in supply frequency from the rated frequency $\pm 5\%$ (iii) Combined voltage and frequency variation $\pm 10\%$ absolute, Degree of protection and insulation: Protection IP: 55, insulation Class "F" and temperature rise limited to Class "B".					
3.0	Supplying & Fixing of 100mm dia. PN 16 of DI Resilient seated soft sealing sluice valve with body,bonnet of Ductile Iron of grade GGG50,Wedge fully rubber lined with EPDM & seals of NBR and the valves should be vacuum tight and 100% leak proof with face dimensions as per BS 5163-89/IS 14846- 2000/DIN 3202 F4/F5.The stem sealing should be with toroldol sealings rings (Minimum 2 "O" rings). All the valves should be with Electro static power coating both inside and outside with pocket less body passage. The rate is inclusive of cost of valve,TP set,bolts & nuts and rubber insertions,excluding earthwork.	2	Nos.			BWSSB SOR 2014-15 PG No.22 escalated by 4% for 2016-17 Sl.no.53 (2B),(a)
4.0	Providing,erecting electric actautors totally enclosed, weather proof and dust proof construction with IP-67, protection class suitable for installation in any position without lubrication,leakage or other operational difficulty with special grease filled gear box and handwheel for emergency manual operation which will automatically disengage on restoration of power to motor and 10 watt single phase space heater and continuous local mechanical position indicator and individually replaceable counter gear assembly and two torque and four limit switches with SS flap and operated with gear driven cams and of rating 250V, 5 Amp,AC/DC, torque switch dial and with TEFC Sq. cage induction motor working on 440V+/-10%, 3 Phase, 50Hz AC of intermittent duty rating S2, insulation class F, temp rise restricted to class B, with IP 67 protection, class suitable for DOL starting and with three thermostat and 30% over load margin, The torque rating of reduction gear box shall be atleast 1.5 times max. torque required for opening and closing (without Integral starter)	2	Nos.			MJP SOR 2012-13 Section VA-1 Escalation by 4% for 2016-17 Rates

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
5.0	Supplying & Fixing of 100 mm dia. PN 16 bar DI Double flanged swing check valves with Slanted seat or with lever weight with straight disc, with metallic corrosin proof and wear resistant seal faces with nickel overlay micro-finished with Body and disc in ductile iron of minimum grade GGG-40,shaft of Stainless steel and bearing of zinc free bronze and surface protection with epoxy liquid of GSK quality	2	Nos.			KUWSDB SOR 2015-16, PG.No. 85,Si.no.14, (3)
6.0	Supplying,Laying,jointing,testing and commissioning of GI pipes conforming to IS 1239:1990 with latest ammendments including fixing collars,elbows,tees,gland cocks and other fittings (Including cost of specials) with cuts and threads wherever necessary including conveying the materials to workspot including testing for water tightness with all lead & lift (contractor will make his own arrangements for procuring water for testing)					
i	100 mm dia GI pipe - Heavy Duty (Class C)	30	RM			KUWSDB SOR 2015-16, PG. No. 25, Si.no.1, (9)
ii	100 mm dia Elbow	4	Nos.			
iii	100 mm dia Tee	3	Nos.			
vi	100 mm dia Nipple	6	Nos.			
v	100 mm dia Socket	6	Nos.			
vi	100 mm dia Union	6	Nos.			
7.0	Providing,fabrication,supply & fixing at site of various diameter MS Flanges as per IS standards to fix sluice valves as per sketch.The rate is inclusive of all materials,labour, consumables, hire charges for tools & tackles,welding equipment etc. complete as per instructions of the Engineer in Charge.					
i	100 mm dia. x 10 mm thk	10	Nos.			BWSSB SOR 2014-15 PG No.34 escalated by 4% for 2016-17 SI.no.(3),(1)
8.0	Supply of 1440 Heavy Duty Exhaust Fan with bracket blades suitable to operate on 230V,50 Hz,AC supply complete Group "A" Dia = 15" sweep(450 mm)	2	Nos.			BWSSB SOR 2014-15 PG No.511 escalated by 4% for 2016-17 SI.no.22 (II),(b)
9.0	Fixing exhaust fan after making a suitable in the wall and finishing with cement mortar and colouring to match the existing wall or brackets and bolts and nuts and a 5 amps, ceiling rose with sufficient length of 23/0.0076" insulated twin core wire of approved make with wire mesh and wooden frame	2	Nos.			BWSSB SOR 2014-15 PG No.514 escalated by 4% for 2016-17 SI.no.11
10.0	Tool. Kit : Supply and delivery at site best make or Taparia make and other required make tool sets for operation and maintenance of the above pumpsets comprising of the following					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
i	Double end spanner set 6 to 32 Jhalani make or equivalent	2	Set			TWAD Board SOR 2016-17 Item no. 20 (21)
ii	200 mm Screw driver 825 Taparia make or equivalent	2	No.			TWAD Board SOR 2016-17 Item no. 20 (4)
iii	300 mm Screw driver 829 Taparia make or equivalent	2	No.			TWAD Board SOR 2016-17 Item no. 20 (5)
iv	200 mm Cutting plier Taparia make or equivalent	2	No.			TWAD Board SOR 2016-17 Item no. 20 (7)
v	800 gm Ball Pen Hammer with handle - Taparia make or equivalent	2	No.			TWAD Board SOR 2016-17 Item no. 20 (8)
vi	Pipe wrench 14 " Jhalani make or equivalent	2	No.			TWAD Board SOR 2016-17 Item no. 20 (24)
vii	Pipe wrench 24 " Jhalani make or equivalent	2	No.			TWAD Board SOR 2016-17 Item no. 20 (23)
viii	Lever type Grease gun	2	No.			TWAD Board SOR 2016-17 Item no. 20 (13)
ix	Rings spanner set 6 to 32 Jhalani make or equivalent	2	Set			TWAD Board SOR 2016-17 Item no. 20 (22)
x	12" Bearing Puller	2	No.			TWAD Board SOR 2016-17 Item no. 20 (12)
xi	Tool box fabricated from MS sheet of 18 SWG of size 50 cm x30 cm x 30 cm with locking arrangement	2	No.			MJP SOR 2012-13 Section 14-TL Escalation by 4% for 2016-17 Rates
B	Modification/Dismantling works of existing Thermal Pumping System					
1.0	For Replacement of existing Horizontal Split Case pumpsets of 20 HP, Valves and piping needs to be dismantled and returning the same to stores with all lead & lift	2	Nos.			
2.0	Removing and cleaning the DI/MS including jointing materials and washing (this includes DI/MS specials except valves and tail pieces)					
i	100 mm dia.	30	RM			KUWSDB 2015-16 Page No. 89,item no.17(2)
3.0	Removing the CI valves and tailpiece from the pipeline cleaning,washing,painting,and returning the same to stores with all lead & lift					
i	100 mm dia.	4	Nos.			KUWSDB 2015-16 Page No. 89,item no.15(2)
	Total cost of Mechanical equipments for Thermal Pumping Station					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
II	Main Pump House Near Bio Chemistry Building					
A	Proposed Pumping system-Mechanical Equipment					
1.0	Supply, delivery at site, erection, testing and commissioning of brand new, best efficient, single stage(Double Suction) , horizontal split case pumps confirming to IS: 1520, IS: 5120 and IS: 9137 with latest amendments Pumps of 52 cu.m/hr capacity at 26 MWC,1450 RPM with complete all accessories such as Base frame,flexible Coupling, Mating flanges, GI tubing for drain & vent,pressure gauge tappings with necessary Bolts,gaskets & priming arrangement	3	Nos.			
	1. Shut off head: Min 110% & Max 130% of the specified head.2.The duty condition of the pump should be to the left of the best efficiency point and closer to best efficiency point. 3. Minimum guaranteed efficiency of horizontal split case pumps shall be 65% without negative tolerance. 5. The pump is required to work at an altitude of 500.0 m above MSL and at a maximum ambient temperature of 45 degree Centigrade.					
	Casing: Cast Iron IS 210 FG 260 Impeller: Bronze: IS 318 Gr. LTB2 / Stainless Steel : ASTM A743 CF8M Shaft: Stainless Steel: BS 970 Gr. 410 Casing Rings:Bronze: IS 318 Gr. LTB2 Impeller Ring:Bronze: IS 318 Gr. LTB2, Shaft Sleeve:Stainless Steel : Stainless Steel : BS 970 Gr. 410 Annealed (Minimum hardness = 350 BHN) Gland:Bronze :IS 318 Gr. LTB2 Note: There shall be difference of 50 BHN hardness between Casing and Impeller rings. Packing: Non-asbestos, '- Fasteners, Anchors bolts, Foundation Bolts etc. both in wet and dry areas: Stainless Steel : 316, '- Base Plate: MS with epoxy coated. Driving end bearing: Grease lubricated roller/ ball/ journal bearing. & Non driving end bearing: Grease lubricated deep groove ball bearing as well as journal bearing or deep groove ball bearing only.					
2.0	Supplying at site of work erection and commissioning any make approved by the department Horizontal foot mounted Solid Shaft Motor mounted TEFC, squirrel cage induction 1450 RPM motor for continuous duty conforming to IS 4691 and IS 325 for operation	3	Nos.			Price is inclusive in Pump price

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
	Specific requirements for motors: Operating condition: (i) Induction motor shall be TEFC type suitable for continuous operation and operating on 3 Ph, 50 Hz. 415 V supply.(ii) Cushion:20% more than maximum power required by the pump.(iii) The motor is required to work at an altitude of 500.0 m above MSL and at a maximum ambient temperature of 45 degree centigrade. Operating voltage and frequency: The motors shall be capable of giving rated output without reduction in the expected life span when operated continuously under either of the following cases of supply conditions. (i) Variation of supply voltage from the rated voltage $\pm 10\%$, (ii) Variation in supply frequency from the rated frequency $\pm 5\%$ (iii) Combined voltage and frequency variation $\pm 10\%$ absolute, Degree of protection and insulation: Protection IP: 55, insulation Class "F" and temperature rise limited to Class "B".					
B	Modification/Dismantling works of existing Main Pump House Near Bio Chemistry Building					
i	For Replacement of existing Horizontal Split Case pumpsets of 20 HP needs to be dismantled and returning the same to stores with all lead & lift	2	Nos.			
	Total cost of Mechanical equipments for Main Pump House Near Bio Chemistry Building					
III	Library pump house					
a	Removing and Refixing the pump after repairing of existing Horizontal Mounting, horizontal Split casing or radically split multistage of volute casing & Suction back pull out type centrifugal pump with following Spares,etc. including aligning of pump with reference to motor & running the pump on load					
	Note:1.Rates are inclusive after absorbing all released material.					
	2.Warantee Period for one year from the date of commissioning.					
	above 15 HP and upto 20 HP					
i	Labour Charges for removing the pump with all tools & materials etc.complete	1	No.			BWSSB SOR 2014-15 P.No.560 Excalation by 4% for 2016-17
ii	Labour Charges for refixing,aligning with reference to pump & commissioning with all tools & materials etc.complete	1	No.			BWSSB SOR 2014-15 P.No.561 Excalation by 4% for 2016-17
iii	Labor charges for removing & refixing of Bearing using hydraulic puller	1	No.			BWSSB SOR 2014-15 P.No.560 Excalation by 4% for 2016-17
iv	Supply of New Ball Bearing (make SKF/FAG/NBC or equivalent with ISI/ISO Specification) after removing the old Bearing.	1	No.			BWSSB SOR 2014-15 P.No.560 Excalation by 4% for 2016-17

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
v	Replacement of mechanical water seal with all material.etc,	1	No.			BWSSB SOR 2014-15 P.No.560 Excalation by 4% for 2016-17
b	Removing and Refixing the 415V 50Hz 3Ph suitable capacity suitable speed horizontal foot mounted screen protected drip proof continous rated, squerriel cage induction motor with class f insulation,class H super enamelled copper wire with as per standards including transportation charges etc., complete					
	Note:1.Rates are inclusive after absorbing all released material.					
	2.Warantee Period for one year from the date of commissioining.					
	above 15 HP and upto 20 HP					
i	Labour charges for removing the motor	1	No.			BWSSB SOR 2014-15 P.No.568 Excalation by 4% for 2016-17
ii	Labour charges for refixing,aligning (dynamic balancing) with reference to pump & comissioning with all tools & materials,etc.complete	1	No.			BWSSB SOR 2014-15 P.No.569 Excalation by 4% for 2016-17
iii	Labor charges for removing & refixing of Bearings (Ball/Roller) using hydraulic puller	1	No.			BWSSB SOR 2014-15 P.No.569 Excalation by 4% for 2016-17
iv	Supply of New Ball Bearing (make SKF/FAG/NBC or equivalent with ISI/ISO Specification) after removing the old Bearing.	1	No.			BWSSB SOR 2014-15 P.No.569 Excalation by 4% for 2016-17
	Total cost of Mechanical equipments for Library pump house					
IV	Old Housing Colony Pump House					
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 15 HP, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.	2	Nos.			
2.0	Modification/Dismantling works of existing Pump of Old Housing Colony Pump House					
i	For Replacement of existing Horizontal Monobloc pumpsets of 15 HP needs to be dismantled and returning the same to stores with all lead & lift	2	Nos.			
	Total cost of Mechanical equipments for Old Housing Colony Pump House					
V	New 'E' (NE Type) Pump House					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
1.0	Providing, erecting and giving test of Open well submersible pumpset conforming to IS 14220 and motor conforming to IS 9283, with water proof winding. Pump shall be suitable for various delivery head and discharge with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, Motor suitable for working on 3.0 HP, 415 V \pm 10%,3 Ph, 50Hz A.C. Supply, with cable guard, thrust carbon/fiber bearing to withstand entire hydraulic thrust.The pump set shall be suitable for direct coupling, with suitable suction strainer. Pump should have suitable discharge out let as per manufacturer's design. 6 m submersible copper conductor cable in single / double run and 2 pairs of suitable size erection clamp 10 mm thick shall beprovided with each pump.	1	No.			
2.0	Modification/Dismantling works of existing pumpset of New 'E' (NE Type) Pump House					
i	For Replacement of existing pumpsets of 3.0 HP needs to be dismantled and returning the same to stores with all lead & lift	1	No.			
	Total cost of Mechanical equipments for New 'E' (NE Type) Pump House					
VI	New 'E' Type Pump House (10th Block)					
1.0	Providing, erecting and giving test of Open well submersible pumpset conforming to IS 14220 and motor conforming to IS 9283, with water proof winding. Pump shall be suitable for various delivery head and discharge with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, Motor suitable for working on 10.0 HP, 415 V \pm 10%,3 Ph, 50 Hz A.C. Supply, with cable guard, thrust carbon/fiber bearing to withstand entire hydraulic thrust.The pump set shall be suitable for direct coupling, with suitable suction strainer. Pump should have suitable discharge out let as per manufacturer's design.6 m submersible copper conductor cable in single /double run and 2 pairs of suitable size erection clamp 10 mm thick shall beprovided with each pump.	1	No.			
2.0	Modification/Dismantling works of existing pumpset of New 'E' Type Pump House (10th Block)					
i	For Replacement of existing pumpsets of 10.0 HP needs to be dismantled and returning the same to stores with all lead & lift	1	No.			
	Total cost of Mechanical equipments for New 'E' Type Pump House (10th Block)					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
VII	ICE pump house					
A	Proposed Pumping system-Mechanical Equipment					
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 12.5 HP, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.	2	No.			
2.0	Providing and fixing in position brass gate valve with CI wheel (screwed end) 65 mm dia. nominal bore including cost of all materials,labour and HOM of equipments with all leads complete as per specifications.	2	Nos.			PWD SOR 2016-17 P.No.92,Si.no. 13.38 Bangalore circle
3.0	Providing and fixing in position 65 mm dia. nominal bore gun metal non-return valve Horizontal type of approved make including cost of all materials,labour and HOM of equipments with all leads complete as per specifications.	2	Nos.			PWD SOR 2016-17 P.No.92,Si.no. 13.56 Bangalore circle
4.0	Supplying,Laying,jointing,testing and commissioning of GI pipes conforming to IS 1239:1990 with latest ammendments including fixing collars,elbows,tees,gland cocks and other fittings (Including cost of specials) with cuts and threads wherever necessary including conveying the materials to workspot including testing for water tightness with all lead & lift (contractor will make his own arrangements for procuring water for testing).					
i	80 mm dia GI pipe - Heavy Duty (Class C)	20	RM			KUWSDB SOR 2015-16, PG. No. 25, Si.no.1, (8)
ii	80 mm dia Elbow	4	Nos.			
iii	80 mm dia Tee	2	Nos.			
iv	80 mm dia Nipple	4	Nos.			
v	80 mm dia Socket	4	Nos.			
vi	80 mm dia Union	4	Nos.			

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
vii	65 mm dia GI pipe - Heavy Duty (Class C)	30	RM			KUWSDB SOR 2015-16, PG. No. 25, Si.no.1, (7)
viii	65 mm dia Elbow	6	Nos.			
ix	65 mm dia Tee	4	Nos.			
x	65 mm dia Nipple	4	Nos.			
xi	65 mm dia Socket	10	Nos.			
xii	65 mm dia Union	4	Nos.			
5.0	Supply of 1440 Heavy Duty Exhaust Fan with bracket blades suitable to operate on 230V,50 Hz,AC supply complete Group "A" Dia = 15" sweep(450 mm)	2	Nos.			BWSSB SOR 2014-15 PG No.511 escalated by 4% for 2016-17 SI.no.22 (II),(b)
6.0	Fixing exhaust fan after making a suitable in the wall and finishing with cement mortar and colouring to match the existing wall or brackets and bolts and nuts and a 5 amps, ceiling rose with sufficient length of 23/0.0076" insulated twin core wire of approved make with wire mesh and wooden frame	2	Nos.			BWSSB SOR 2014-15 PG No.514 escalated by 4% for 2016-17 SI.no.11
B	Modification/Dismantling works of existing pumpset of ICE pump house					
1.0	For Replacement of existing pumpsets of 12.5 HP needs to be dismantled and returning the same to stores with all lead & lift	2	No.			
2.0	Removing and cleaning the DI/MS including jointing materials and washing (this includes DI/MS specials except valves and tail pieces)					
i	65 mm dia.	30	RM			KUWSDB 2015-16 Page No. 89,item no.17(1)
3.0	Removing the CI valves and tailpiece from the pipeline cleaning,washing,painting,and returning the same to stores with all lead & lift					
i	65 mm dia.	4	Nos.			KUWSDB 2015-16 Page No. 89,item no.15(1)
	Total cost of Mechanical equipments for ICE pump house					
VIII	Bhaskar Apartments (Sump cum Pump House)					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 3.0 HP, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.	1	Nos.			
	Total cost of Mechanical equipments for Bhaskar Apartments (Sump cum Pump House)					
IX	HMT Quarters					
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 3.0 HP, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.	1	Nos.			
2.0	Modification/Dismantling works of existing Pump at HMT Quarters					
i	For Replacement of existing monoblock pumpsets of 3 HP,needs to be dismantled and returning the same to stores with all lead & lift	1	Nos.			
	Total cost of Mechanical equipments for HMT Quarters					
X	Bharani Hostel (Sump cum Pump House)					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 3.0 HP, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.	3	Nos.			
2.0	Modification/Dismantling works of existing Pump at Bharani Hostel (Sump cum Pump House)					
i	For Replacement of existing monoblock pumpsets of 3 HP,needs to be dismantled and returning the same to stores with all lead & lift	3	Nos.			
	Total cost of Mechanical equipments for Bharani Hostel (Sump cum Pump House)					
XI	Yeshwantpura Quarters (Sump cum Pump House)					
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on 5.0 HP, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.	2	Nos.			
2.0	Modification/Dismantling works of existing Pump at Yeshwantpura Quarters(Sump cum Pump House)					
i	For Replacement of existing monoblock pumpsets of 5 HP,Valves and piping needs to be dismantled and returning the same to stores with all lead & lift	1	Nos.			
	Total cost of Mechanical equipments for Yeshwantpura Quarters (Sump cum Pump House)					

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
XII	Spare Pumpsets for Stores					
1.0	Providing, erecting and giving test of Centrifugal Monoblock Pump set conforming to IS 9079 operating at 2900 RPM with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, priming funnel, cock, suitable flanges at suction and delivery side. Pump shall have common shaft for pump and motor. Motor shall be suitable for working on, 415 V \pm 10%, 3 Ph, 50Hz A.C. Supply. Motor shall be TEFC type. Pump set shall be suitable for working at various discharge and head requirements. Pump shall be erected on Provided C.C. foundation block with suitable foundation bolts grouted in C.C foundation block.					
i	3.0 HP	2	No.			
ii	5.0 HP	1	No.			
iii	10.0 HP	1	No.			
iv	12.5 HP	1	No.			
v	15.0 HP	1	No.			
2.0	Providing, erecting and giving test of Open well submersible pumpset conforming to IS 14220 and motor conforming to IS 9283, with water proof winding. Pump shall be suitable for various delivery head and discharge with pump casing: Cast Iron IS 210 FG Gr.260, Impeller:Bronze IS 318 LTB2, Shaft:SS 410 , Pump Seal: Mechanical Seal, Motor suitable for working on 415 V \pm 10%,3 Ph, 50 Hz A.C. Supply, with cable guard, thrust carbon/fiber bearing to withstand entire hydraulic thrust.The pump set shall be suitable for direct coupling, with suitable suction strainer. Pump should have suitable discharge out let as per manufacturer's design. 6 m submersible copper conductor cable in single / double run and 2 pairs of suitable size erection clamp 10 mm thick shall beprovided with each pump.					
i	3.0 HP	2	No.			
ii	5.0 HP	1	No.			
iii	8.0 HP	1	No.			
iv	10.0 HP	1	No.			

BoQ & Cost Estimate for Pumping Stations - Mechanical Works						
Item No.	Description	Qty	Unit	Unit Cost	Total Amount	References
				(Rs. INR)	(Rs. INR)	
	Total cost of Spare Pumpsets for Stores					
	Grand Total Cost of Mechanical Rehabilitation Works of water supply system					

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
1	Field Instrumentation					
A	Thermal Pumping Station					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 16 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 4 m)	3	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
4	Supply, delivery at site and fixing of Pressure Switch with necessary instrumentation cabling,glands and conduit with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary (1.6 - 16 Bar)	1	Nos.			
5	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 100 mm dia. (flow Range 50-100 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Thermal Pumping Station					
B	Main Pump House - Near Biochemistry Department					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 10 Bar)	5	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 4.5 m)	1	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 100 mm dia. (flow Range 40-80 m3/hr)	2	Nos.			
	Total Cost for Field Instrumentation Equipments in Main Pump House - Near Biochemistry Department					
C	Library Pump House					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	1	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 4 m)	1	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 100 mm dia. (flow Range 50-120 m3/hr)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
	Total Cost for Field Instrumentation Equipments in Library Pump House					
D	Old Housing Colony Pump House					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	2	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	2	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 80 mm dia. (flow Range 40 to 80 m3/hr)	2	Nos.			
	Total Cost for Field Instrumentation Equipments in Old Housing Colony Pump House					
E	New A Type Pump House					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 6 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 4m)	2	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 150mm dia. (flow Range 50 - 100 m3/hr)	1	Nos.			
5	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 100 mm dia. (flow Range 40 - 100 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in New A Type Pump House					
F	New Housing Colony Pump House					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	1	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 7 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 100 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in New Housing Colony Pump House					
G	ND Quarters Pump House					

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 6 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	3	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	3	Nos.			
	Total Cost for Field Instrumentation Equipments in ND Quarters Pump House					
H	NE Quarters Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 5 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	3	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	3	Nos.			
	Total Cost for Field Instrumentation Equipments in NE Quarters Pump House					
I	New E (10 th Block) Quarters Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 5 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 5 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in New E (10 th Block) Quarters Pump House					
J	E Block Hostel Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 4 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in E Block Hostel Pump House					
K	New Girls Hostel Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 5 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	2	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 80 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in New Girls Hostel Pump House					
L	New Boys Hostel Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 5 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	2	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 80 mm dia. (flow Range 30 - 80 m3/hr)	3	Nos.			
	Total Cost for Field Instrumentation Equipments in New Boys Hostel Pump House					
M	C Mess OHT					
1	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in C Mess OHT					
N	R Bock Pump House					

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 5 m)	1	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	4	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 80 mm dia. (flow Range 20 - 80 m3/hr)	2	Nos.			
	Total Cost for Field Instrumentation Equipments in R Block Pump House					
O	Tunga Apartments Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 4 m)	1	Nos.			
2	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 40 mm dia. (flow Range 15 - 40 m3/hr)	2	Nos.			
	Total Cost for Field Instrumentation Equipments in Tunga Apartments Pump House					
P	A Mess Pump House					

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 4 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	2	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 80 mm dia. (flow Range 20 - 65 m3/hr)	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 40 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in A Mess Pump House					
Q	B Mess Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 10 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	2	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 80 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 40 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in B Mess Pump House					
R	ICE Pump House					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 6 m)	1	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 100 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in ICE Pump House					
S	Primary School/ K Block Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Primary School / K Block Pump House					
T	PD Block Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in PD Block Pump House					
U	Yeshwantpur Quarters Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	2	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Yeshwantpur Quarters Pump House					
V	Bhaskara Apartments Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Bhaskara Apartments Pump House					
W	Aryabhatta Apartments Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Aryabhata Apartments Pump House					
X	KV School - Central School Pump House					
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 30 - 80 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in KV School - Central School Pump House					
Y	HMT Quarters Pump House					

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
1	Pressure Gauge: Supply, delivery at site and fixing of glycerine filled stainless steel pressure gauge of 100 mm Dia. suitable for the pump sets with nipple, snubber for vibration resistance and necessary length of SS tubing suitable for mounting on the delivery of pump , including 15 NB isolating valve for maintenance etc., complete with all lead and lifts etc, as applicable and necessary. (0 - 6 Bar)	2	Nos.			
2	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			
3	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 40/50 mm dia. (flow Range 15 - 40 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in HMT Quarters Pump House					
Z	Ashwini Hostel Pump House					
1	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
2	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Ashwini Hostel Pump House					
AA	Kirthika Hostel Pump House					

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in Kirthika Hostel Pump House					
AB	Bharani and Rohini Hostel Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 30 - 80 m3/hr)	2	Nos.			
	Total Cost for Field Instrumentation Equipments in Bharani and Rohini Hostel Pump House					
AC	New Staff Quarters Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 40 m3/hr)	1	Nos.			
	Total Cost for Field Instrumentation Equipments in New Staff Quarters Pump House					
AD	New Biological Science, Nano technology & Physical Science Building Pump House					
1	Supply, delivery at site and fixing of Ultrasonic type Level Indicating Transmitter with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up , as applicable and necessary. (0 - 3.5 m)	3	Nos.			
2	Supply, delivery at site and fixing of magnetic type Level Switch for the Overhead Tank, High Level & Low Level sensing - (2 point contact)with necessary instrumentation cabling,glands with suitable stub and flange and bolting arrangement for hook-up, as applicable and necessary. (0 - 3 m)	3	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. 50 mm dia. (flow Range 15 - 50 m3/hr)	3	Nos.			
	Total Cost for Field Instrumentation Equipments in New Biological Science Building Pump House					
AE	BWSSB Inlet lines					
1	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. D Gate 150 mm dia.	1	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. D Gate 150 mm dia.	1	Nos.			
3	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. R Block 25 mm dia.	1	Nos.			
4	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. R Block 200 mm dia.	1	Nos.			
5	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. Yeshwantpur 50 mm dia.	1	Nos.			
6	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. Yeshwantpur 50mm dia.	1	Nos.			
7	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. Main Gate 300 mm dia.	1	Nos.			
8	Supply, delivery at site and fixing of Electromagnetic Flow Indicating Transmitter (full bore type) with flange Ends, rates shall be inclusive of mating flanges with necessary fasteners and gaskets, as applicable and necessary. Maramma Circle 100 mm dia.	1	Nos.			
5	Total Cost for Field Instrumentation Equipments in BWSSB Inlets					
2	Automation System					
A	PLC processor with 24 V DC DI 20 points; Ry DO 12 points; RS-232C port; 24 V DC power supply,1 port RS-232C (Port 1) + 1 port RS-485 (Port 2), Enclosure to house above mentioned System along with required accessories for Pumping Station.	31	Nos.			

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
B	SCADA operator station ,PLC programming software,SCADA server software with Historian Software,A3 Laser Printer B/W,Furniture for Console and printer					
C	GSM/GPRS Modules at each Pumping station and Centralized SCADA room (including spares).	32	Nos.			
D	PLC programming software	1	Nos.			
E	SCADA server software with Historian Software	1	Nos.			
F	SCADA operator station	1	Nos.			
G	A3 Laser Printer B/W	1	Nos.			
H	Furniture for Consoles and printer	1	Nos.			
	Total Cost for Automation System					
3	Instrumentation and Control Cables					
A	Plain annealed multistranded tinned copper conductors; solid polyethylene insulation with each pair screened with aluminium-mylar tape including drain wire, with collective aluminium mylar tape screen including drain wire, solid polyethylene bedded steel wire armour with an outer sheath of flame retardant PVC. (2 Pair x 1.5 sq.mm)	3000	RM			
B	Plain annealed multistranded tinned copper conductors, solid polyethylene insulation collective aluminium mylar tape screen including drain wire, solid polyethylene bedded steel wire armour with an outer sheath of flame retardant PVC. (4 Core x 2.5 sq.mm)	2000	RM			
C	Plain annealed multistranded tinned copper conductors, solid polyethylene insulation collective aluminium mylar tape screen including drain wire, solid polyethylene bedded steel wire armour with an outer sheath of flame retardant PVC. (12 Core x 2.5 sq.mm)	1000	RM			
	Total Cost for Instrumentation and Control Cables					
4	Items for required for Fixing of Instruments					
A	Removing the GI pipes, cleaning, washing and using at spot or conveying from workspot to office/store with all lead including removal of all items such as collars, elbows,tees, bends,gland cocks,cuts,and threads etc.,					
1	15 mm to 25 mm dia.	10	RM			KUWSDB SOR 2015-16 PG. No. 29 ,Si.no.2

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	32 mm to 80 mm dia.	50	RM			KUWSDB SOR 2015-16 PG. No. 29 ,Si.no.2
3	100 mm dia.	40	RM			KUWSDB SOR 2015-16 PG. No. 29 ,Si.no.2
B	Removing and cleaning the DI pipes including jointing materials and washing (this includes the removal of DI special except valves and tail pieces)					
1	100 mm dia.	10	RM			KUWSDB SOR 2015-16 PG. No. 89,Si.no.17
2	150 mm dia.	10	RM			KUWSDB SOR 2015-16 PG. No. 89,Si.no.17
3	200 mm dia.	10	RM			KUWSDB SOR 2015-16 PG. No. 89,Si.no.17
4	300 mm dia.	10	RM			KUWSDB SOR 2015-16 PG. No. 89,Si.no.17
C	Supply, installation, welding of MS Collar 1/2" NPT on drilling hole on MS/GI pipes for Pressure Gauges and Pressure Switches in the pump house	30	Nos.			Market Price
D	Making Bores in DI/CI/MS/GI pipes to fix MS Collar 1/2" NPT (20 mm dia.)	30	Job.			KUWSDB SOR 2015-16 PG. No. 89,Si.no.16
E	Earth work excavation for pipe line trenches(except building works) including barricading depositing on bank with all lead including danger lighting and using sight rails and bonding rods including shoring, strutting, bailing out water at every 100 meters wherever necessary as directed in the following starta.					
	In all soils mixed with boulders of 30cm size upto and exclusive of disintegrated rock					
1	0 to 2 Mts. Depth	120	cum			BWSSB SOR 2014-15 Escalated by 4% for 2016-17

BOQ & Cost Estimate for Pumping Stations - Instrumentation,Control and Automation Works						
Sr.No	Items Description	Quantity	Unit	Unit Cost	Total Amount	References
				(Rs.)	(Rs.)	
2	In disintegrated rock, soft rock, soft shale and medium hard rock comprising of lime stone, sand stone, hard shale, schiest, fissured rock without restoring to blasting.					
i	a) 0 to 2 Mts. Depth	60	cum			BWSSB SOR 2014-15 Escalated by 4% for 2016-17
F	Refilling pipeline trenches with excavated earth from trench excavation and foundation including watering, consolidation in layers of 15cm thick including disposing off the surplus earth with all lead and all lifts - Under Normal Conditions	120	cum			BWSSB SOR 2014-15 Escalated by 4% for 2016-17
G	Refilling pipeline trenches with excavated earth from trench excavation and foundation including watering, consolidation in layers of 15cm thick including disposing off the surplus earth with all lead and all lifts - Under Water Conditions	60	cum			BWSSB SOR 2014-15 Escalated by 4% for 2016-17
	Replacing of corroded GI pipes (If found),during installation of Flowmeters (EMF) (Provisional Item)					
H	Supplying,Laying,jointing,testing and commissioning of GI pipes conforming to IS 1239:1990 with latest ammendments including fixing collars,elbows,tees,gland cocks and other fittings (Including cost of specials) with cuts and threads wherever necessary including conveying the materials to workspot including testing for water tightness with all lead & lift (contractor will make his own arrangements for procuring water for testing).					
i	100 mm dia GI pipe - Heavy Duty (Class C)	25	RM			KUWSDB SOR 2015-16, PG. No. 25, Si.no.1
ii	80 mm dia GI pipe - Heavy Duty (Class C)	30	RM			
iii	65 mm dia GI pipe - Heavy Duty (Class C)	25	RM			
iv	50 mm dia GI pipe - Heavy Duty (Class C)	50	RM			
v	40 mm dia GI pipe - Heavy Duty (Class C)	20	RM			
	Total cost Items for required for Fixing of Instruments					
	Grand Total Cost of ICA Works of water supply system					

Civil Cost Estimate for Repair works, Pipe Supports and Pedestals

Sl. No.	Description of work	Units	Quantity	Rate (Rs.)	Amount (Rs.)	Reference Bangalore PWD SOR 2016-17
1	Dismantling of existing structures like culverts, bridges, retaining walls and other structure comprising of masonry, cement concrete, wood work, steel work, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts and complete as per specifications. Lime/ Cement concrete by Manual means	Cum	34.26			SI no 18.18, Pg 137
2	Providing and laying in position plain Cement Concrete of nominal mix 1:2:4 with cement @ 240 kgs with 20mm and downsize graded granite metal coarse aggregates @ 0.878cum and fine aggregates @ 0.53cum machine mixed, concrete laid in layers not exceeding 15 cm thick, well compacted in foundation, plinth and cills, including cost of all materials, labour, HOM of machinery, finishing, curing, complete as per specifications.	Cum	35.67			SI no 4.6, Pg 12
3	Providing and removing centering, shuttering, strutting, propping etc and removal of form work for foundation, footings, bases of columns for mass concrete including cost of all materials, labour complete as per specifications	Sqm	113.20			SI no 4.28, Pg 15
4	Repairs to plasters in patches of 2.5 sqm and less in walls, ceilings and other structures 10 to 20mm thick in cement mortar 1:3 including cutting the patches in proper shape and replastering the surface including disposal of rubbish with a lead of 50m including curing cost of materials, labour, complete as per specification.	Sqm	100.00			SI no 16.38, Pg 131

Civil Cost Estimate for Repair works, Pipe Supports and Pedestals

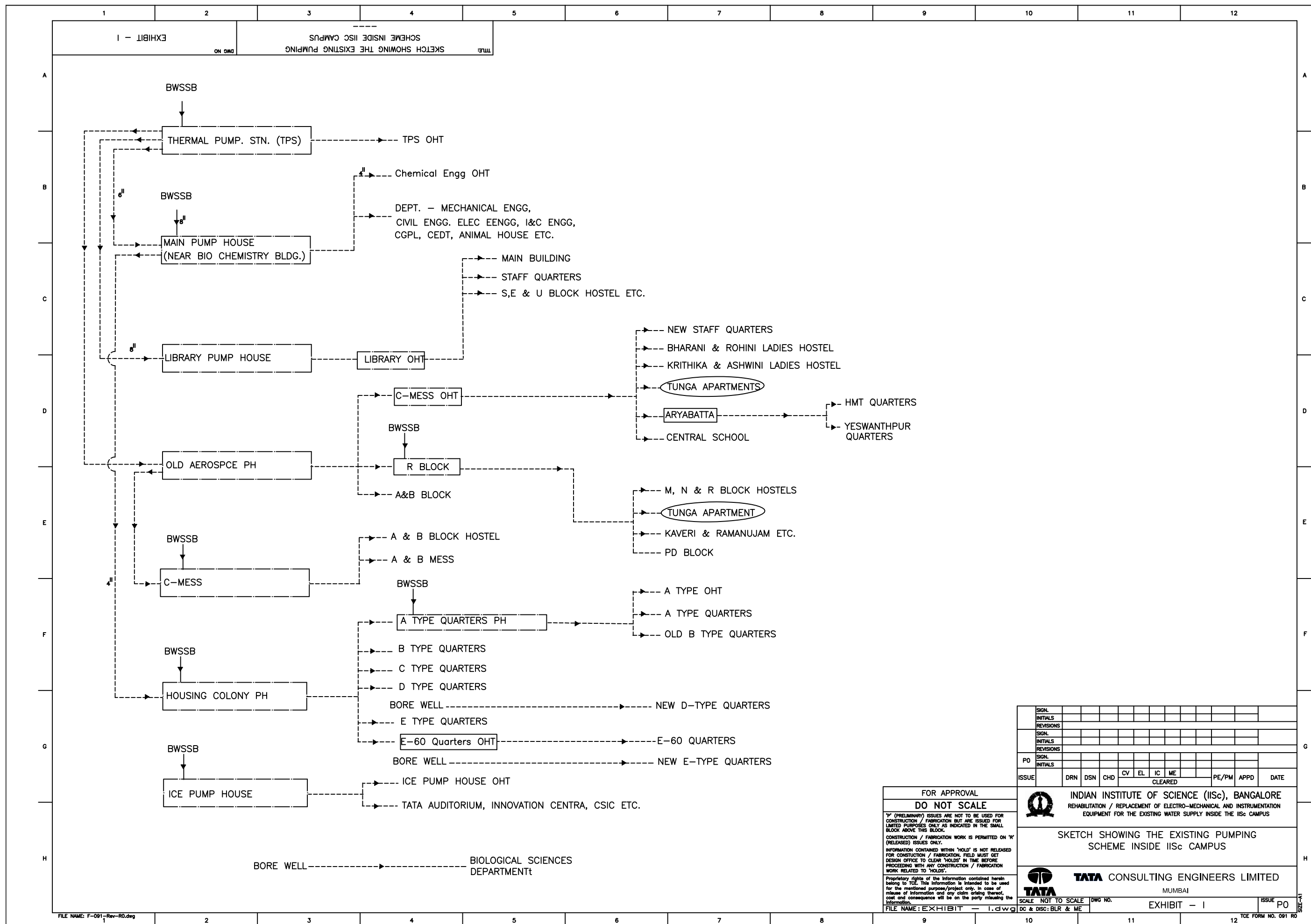
Sl. No.	Description of work	Units	Quantity	Rate (Rs.)	Amount (Rs.)	Reference Bangalore PWD SOR 2016-17
5	Provisional cost for Miselleneous civil works	LS				
	Total Cost in Rs.					

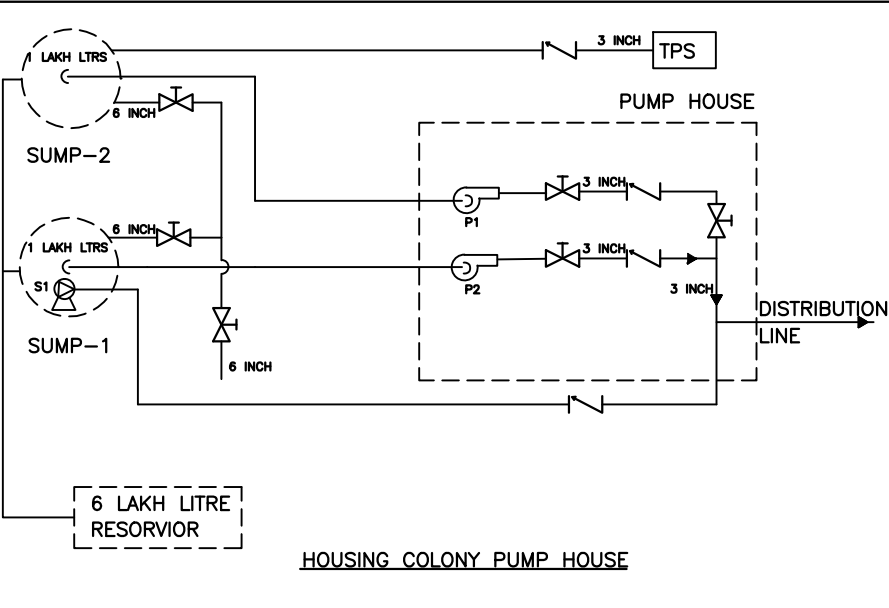
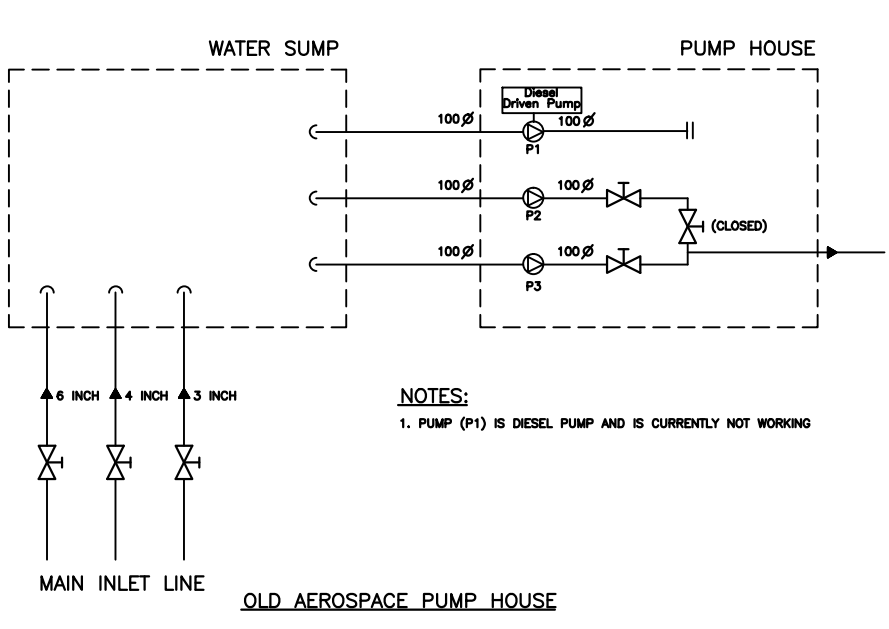
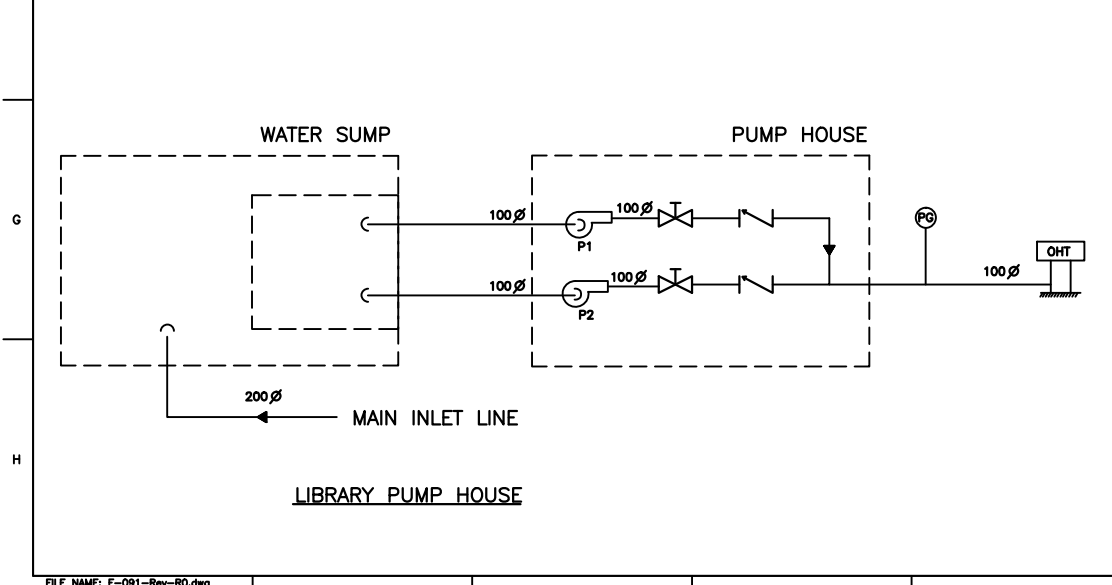
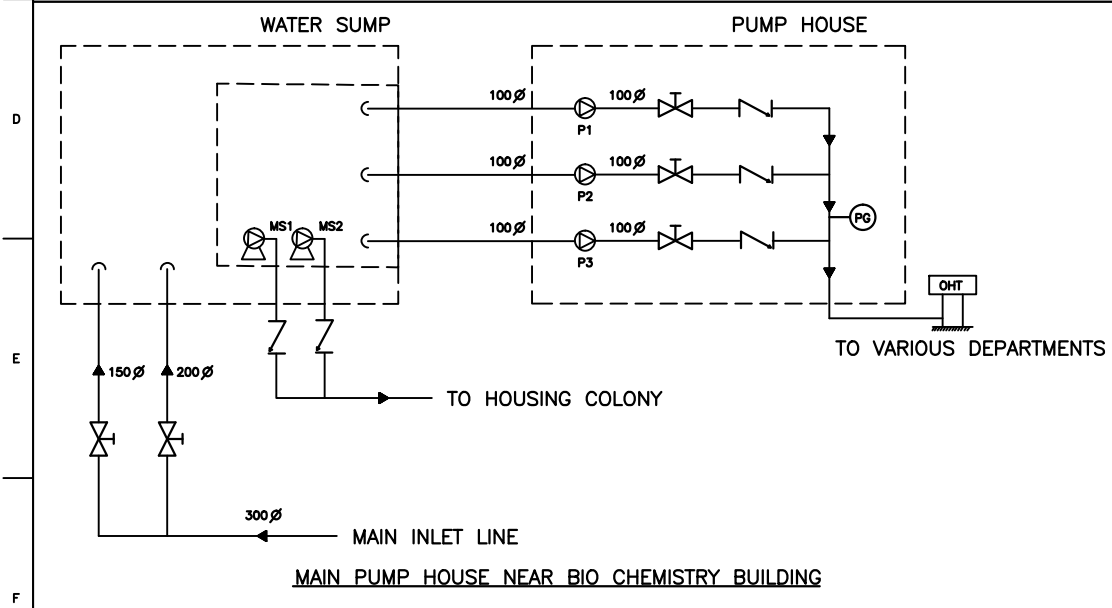
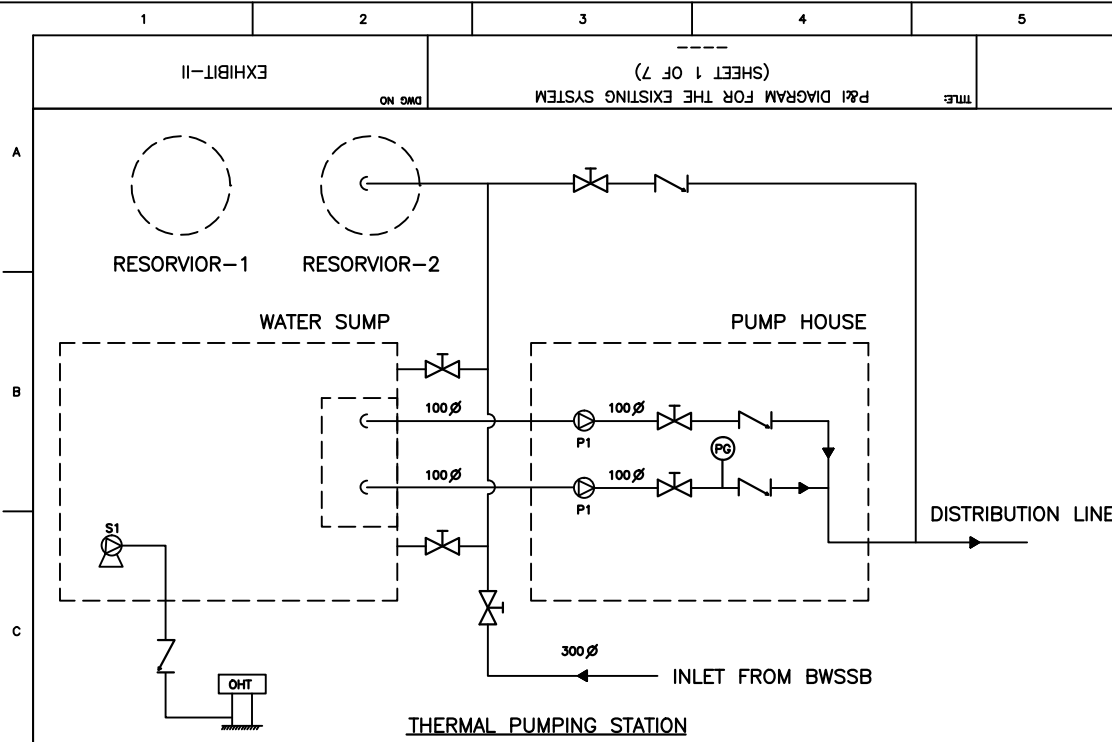
COST ESTIMATION FOR FLOW METER CHAMBERS

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COST ESTIMATION FOR FLOW METER CHAMBERS										
Sl. No.	Description	Unit	Nos	L	B	D	Quantity	Rate in INR	Amount in INR	Rate Reference
	KSRB 4-6.4 Providing and removing centering, shuttering, strutting, propping etc and removal of form work for vertical surfaces such as walls at any thickness, including attached pilasters, buttresses, plinth and string courses cost of all materials, labour complete as per specifications with all lead and lift.									
	Flow meter Valve chamber (200-300mm dia pipe)	sqm	5	11.52			57.60			PWD SOR (Bangalore circle) 2016-17, page 15-4.31
	Flowmeter Valve chamber (80-150mm dia pipe)	sqm	20	8.96			179.20			
7	KSRB 12-6.3 Providing Cast Iron Foot rests and fixing in manhole with M10 cement concrete block of 20x20x10cm using 20mm and down size metal of size including cost of materials, labour charges, curing complete as per specification.									
	Flow meter Valve chamber (200-300mm dia pipe)	Nos	5				25.0			PWD SOR (Bangalore circle) 2016-17, page 73-11.46
	Flowmeter Valve chamber (80-150mm dia pipe)	Nos	20				100.0			
8	Providing, supplying and fixing rectangular cast iron manhole covers of size 750x750mm and 600 x 600mm of grade HD-2.5 conforming to IS : 1726 to Inlet channels and underground chambers at locations shown in drawing including C.I. Frame etc. complete.									PWD SOR 2016-17 pg VIII, item no-211 + material cost for transportation and labour charges
		Kgs	1	0.6	0.6	0.01	28.3			
		Kgs	2	0.75	0.75	0.01	88.3			
Total Cost in Rupees										





LEGEND:

	HORIZONTAL SPLIT CASING PUMP
	SUBMERSIBLE PUMP
	HORIZONTAL END SUCTION TOP DISCHARGE PUMP
	BALL VALVE
	GATE VALVE
	NON RETURN VALVE
	BUTTERFLY VALVE
	OVER HEAD TANK

NOTES:
1. PUMP (P1) IS DIESEL PUMP AND IS CURRENTLY NOT WORKING

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INDIAN INSTITUTE OF SCIENCE (IISc), BANGALORE
REHABILITATION / REPLACEMENT OF ELECTRO-MECHANICAL AND INSTRUMENTATION EQUIPMENT FOR THE EXISTING WATER SUPPLY INSIDE THE IISc CAMPUS

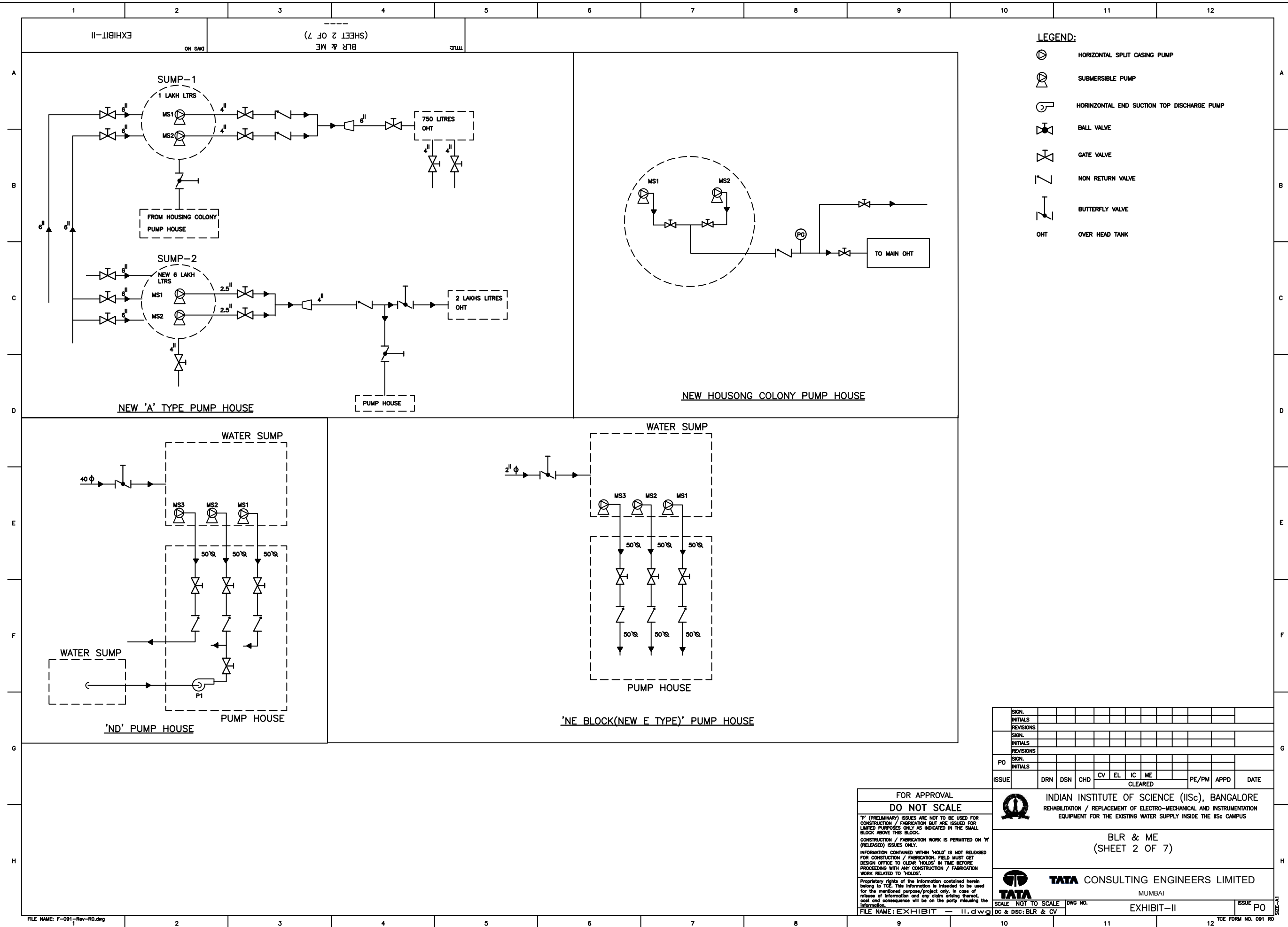
P&I DIAGRAM FOR THE EXISTING SYSTEM
(SHEET 1 OF 7)

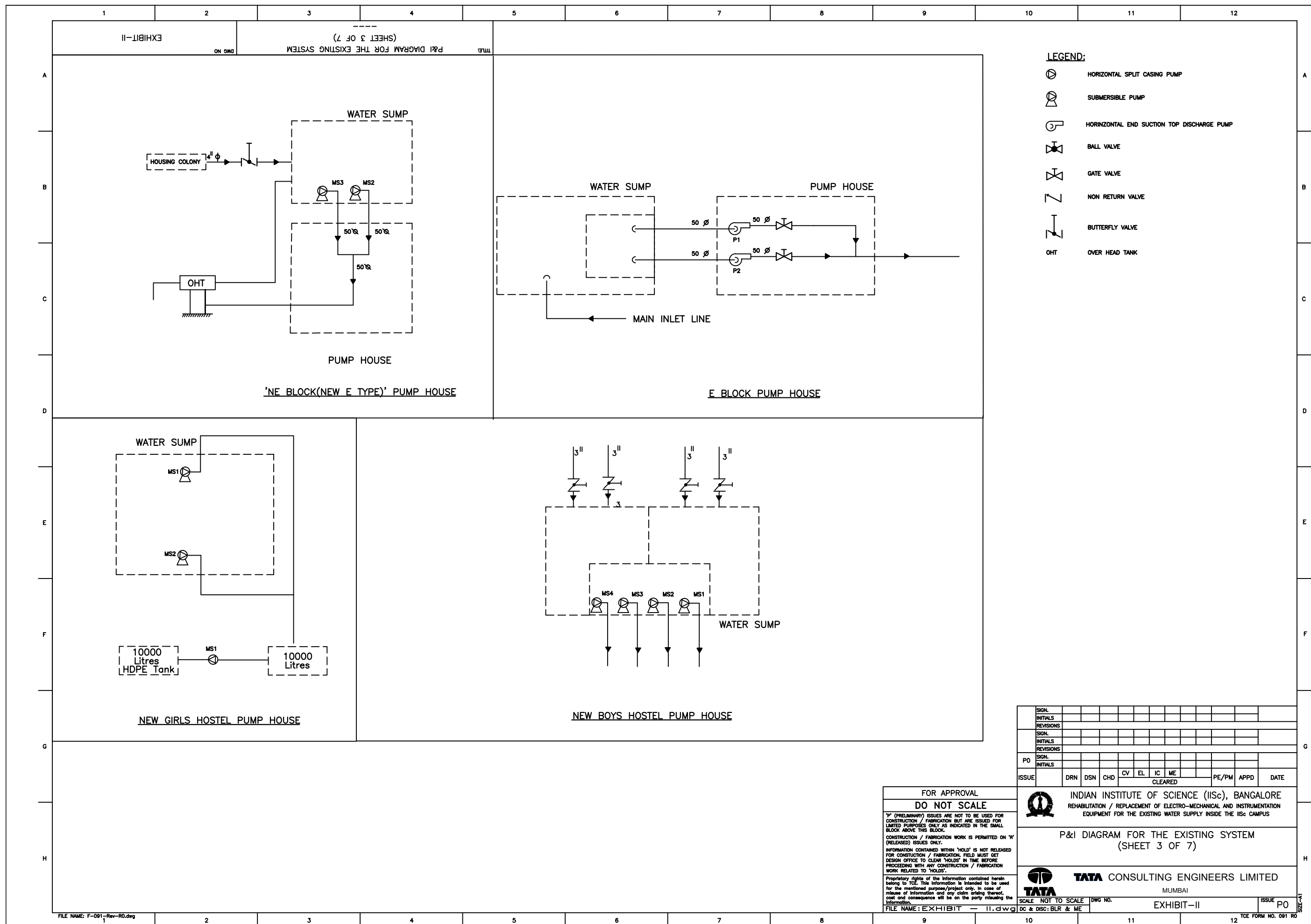
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

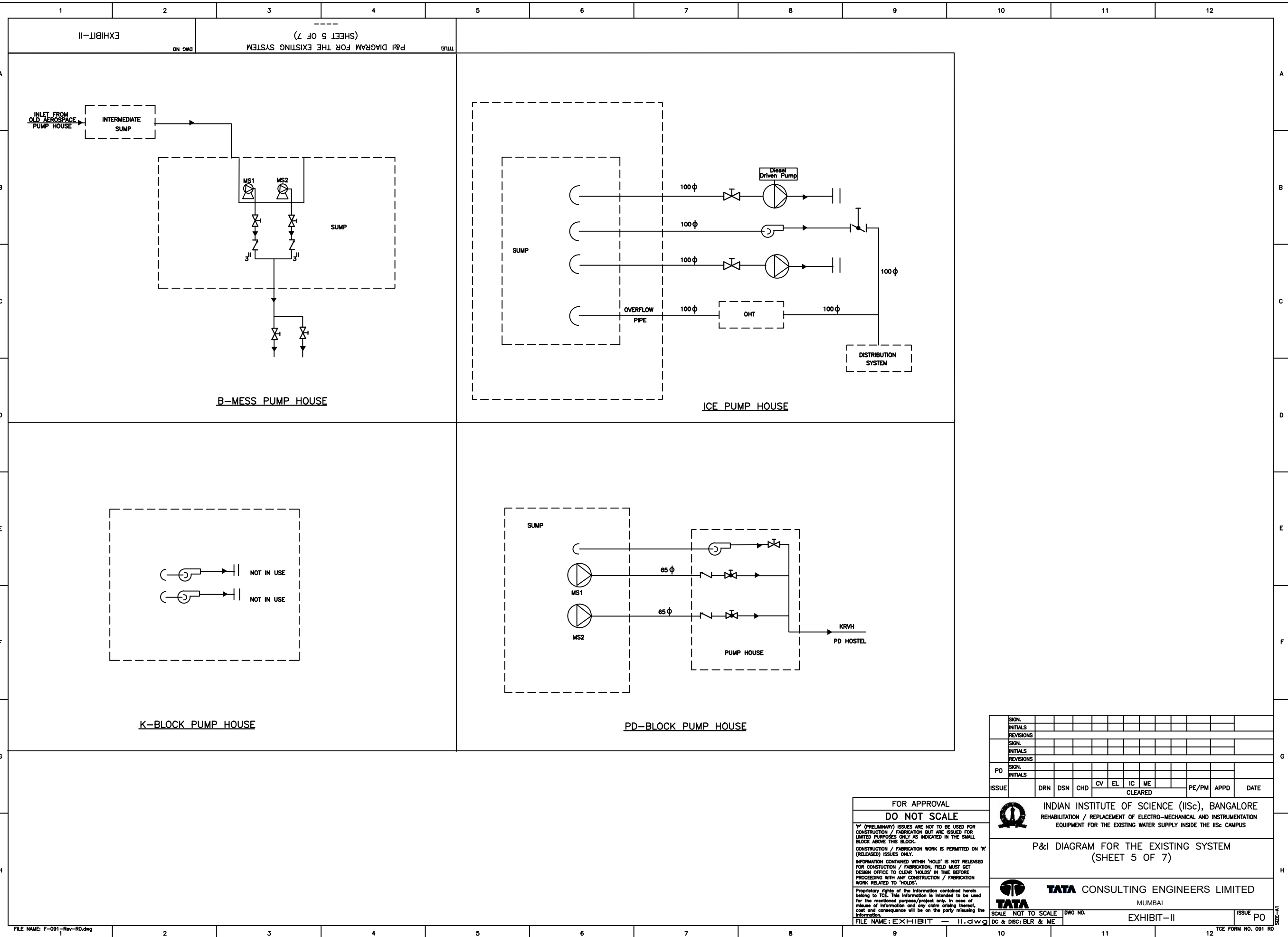
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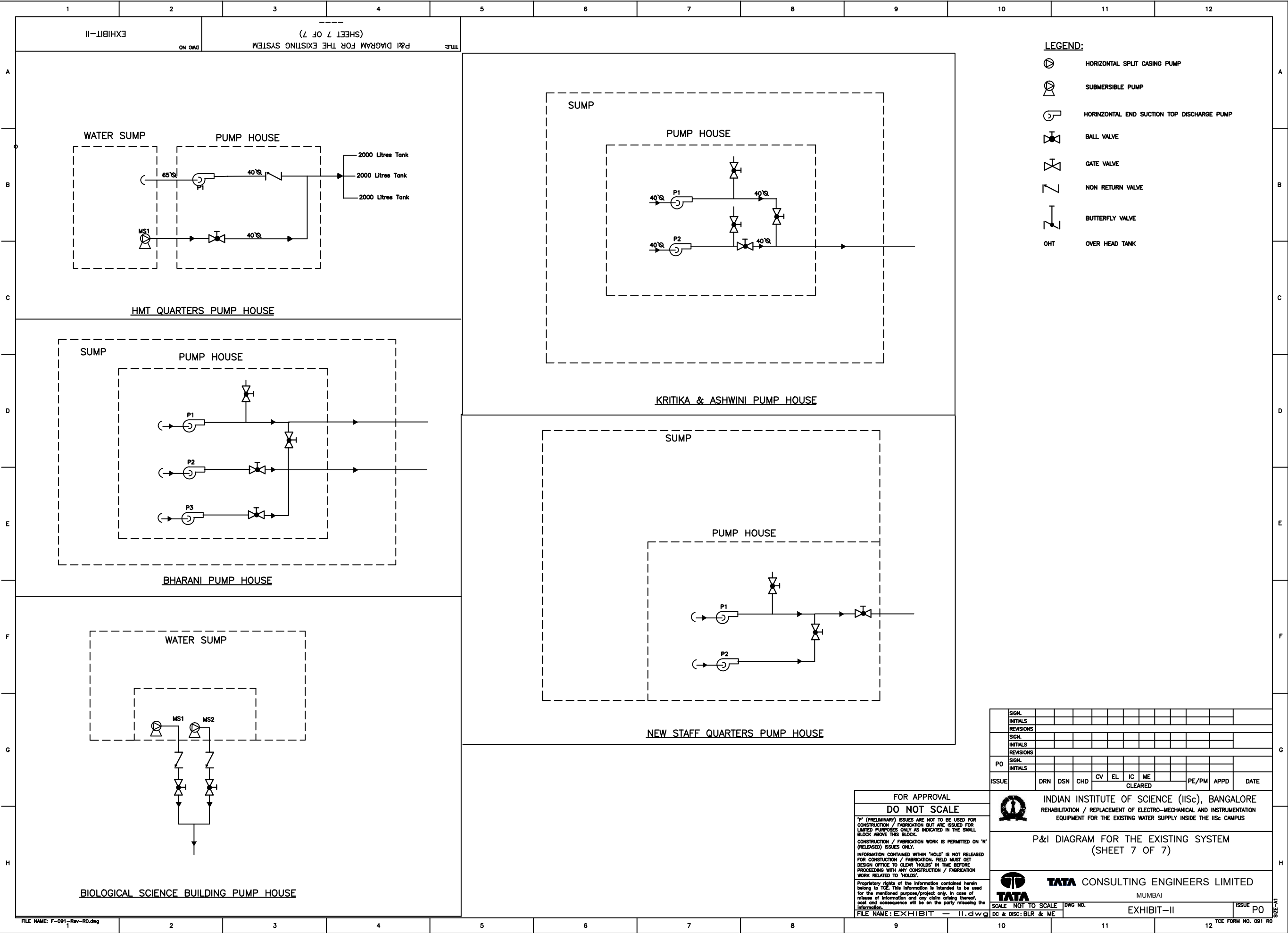
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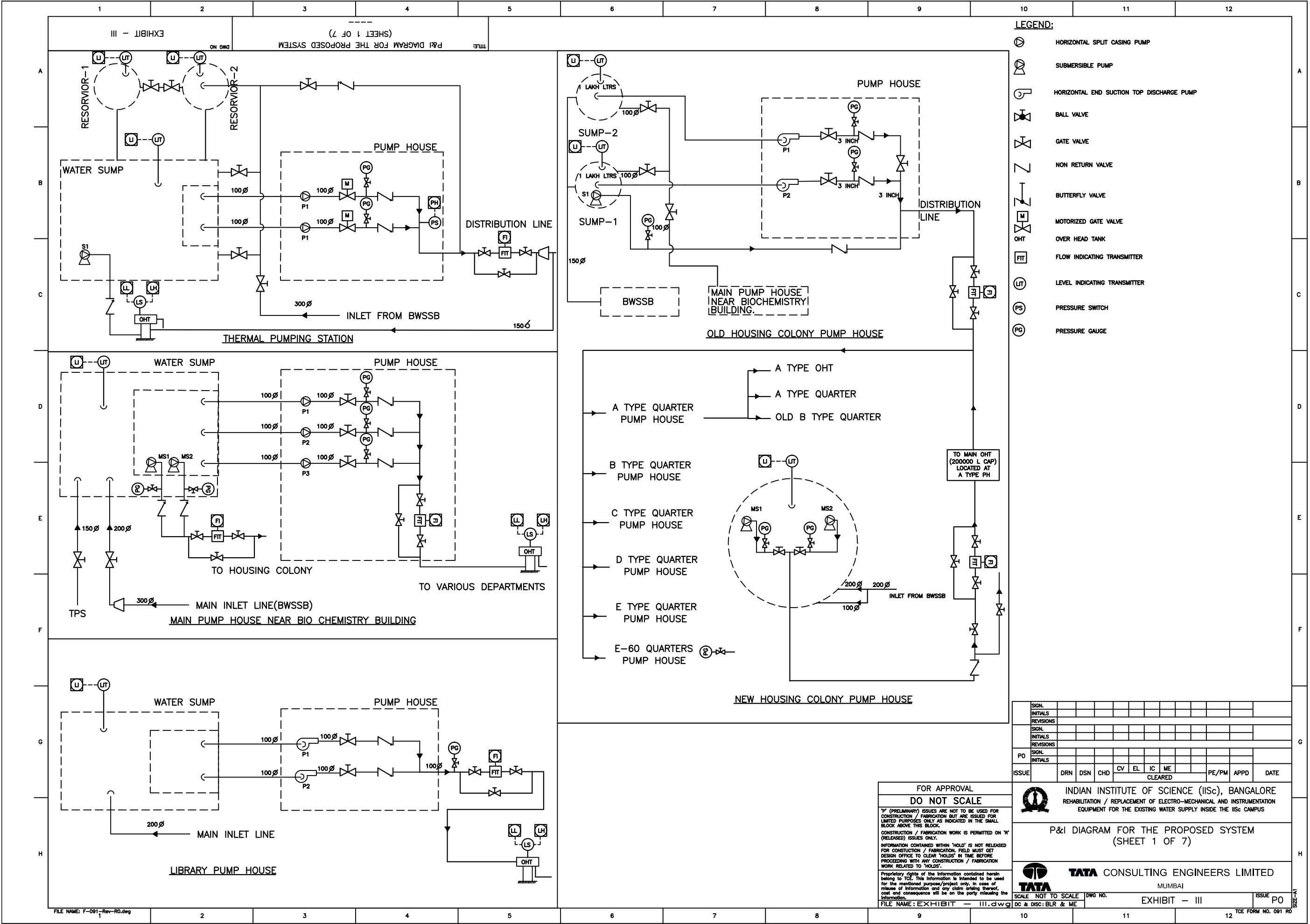
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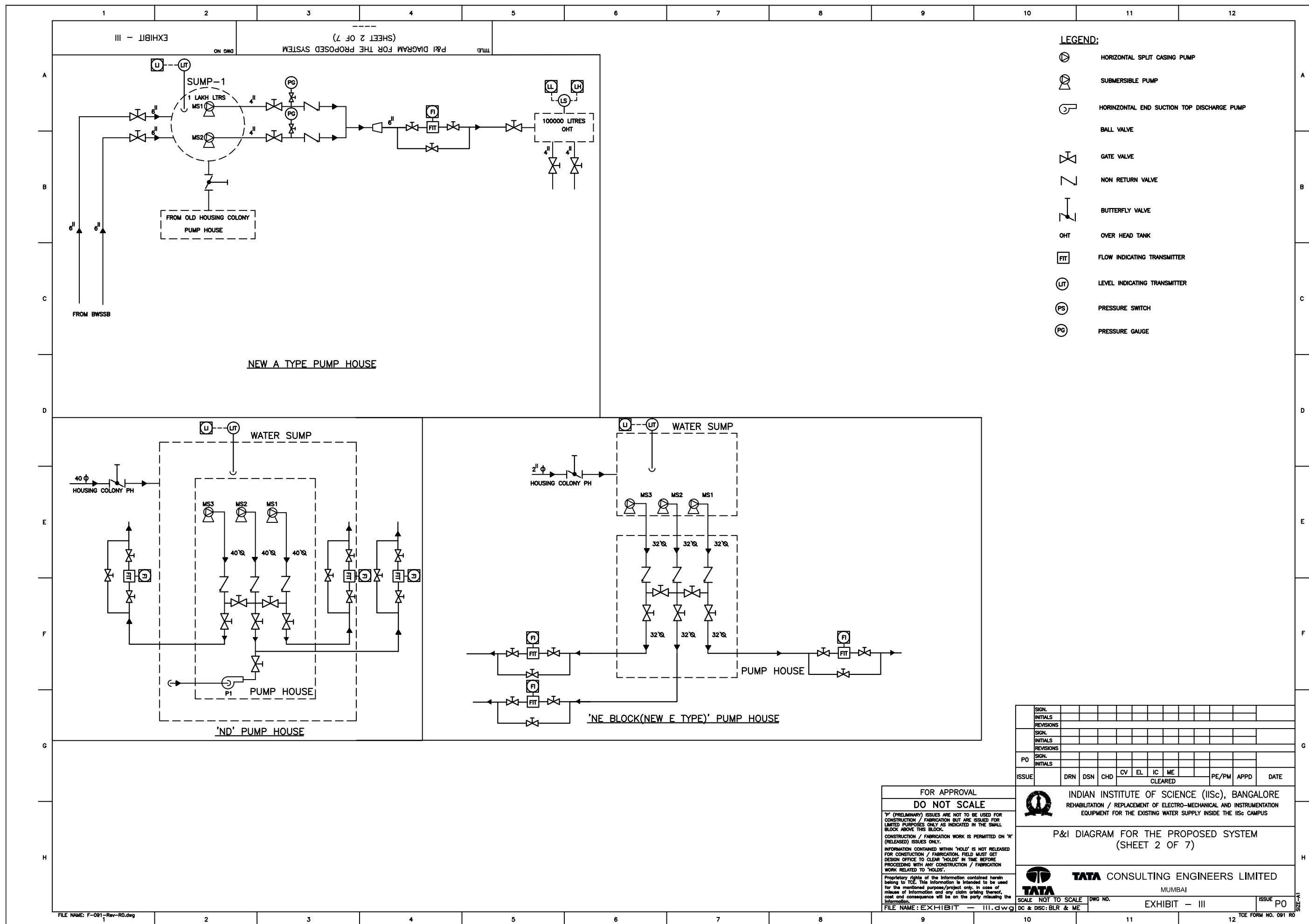


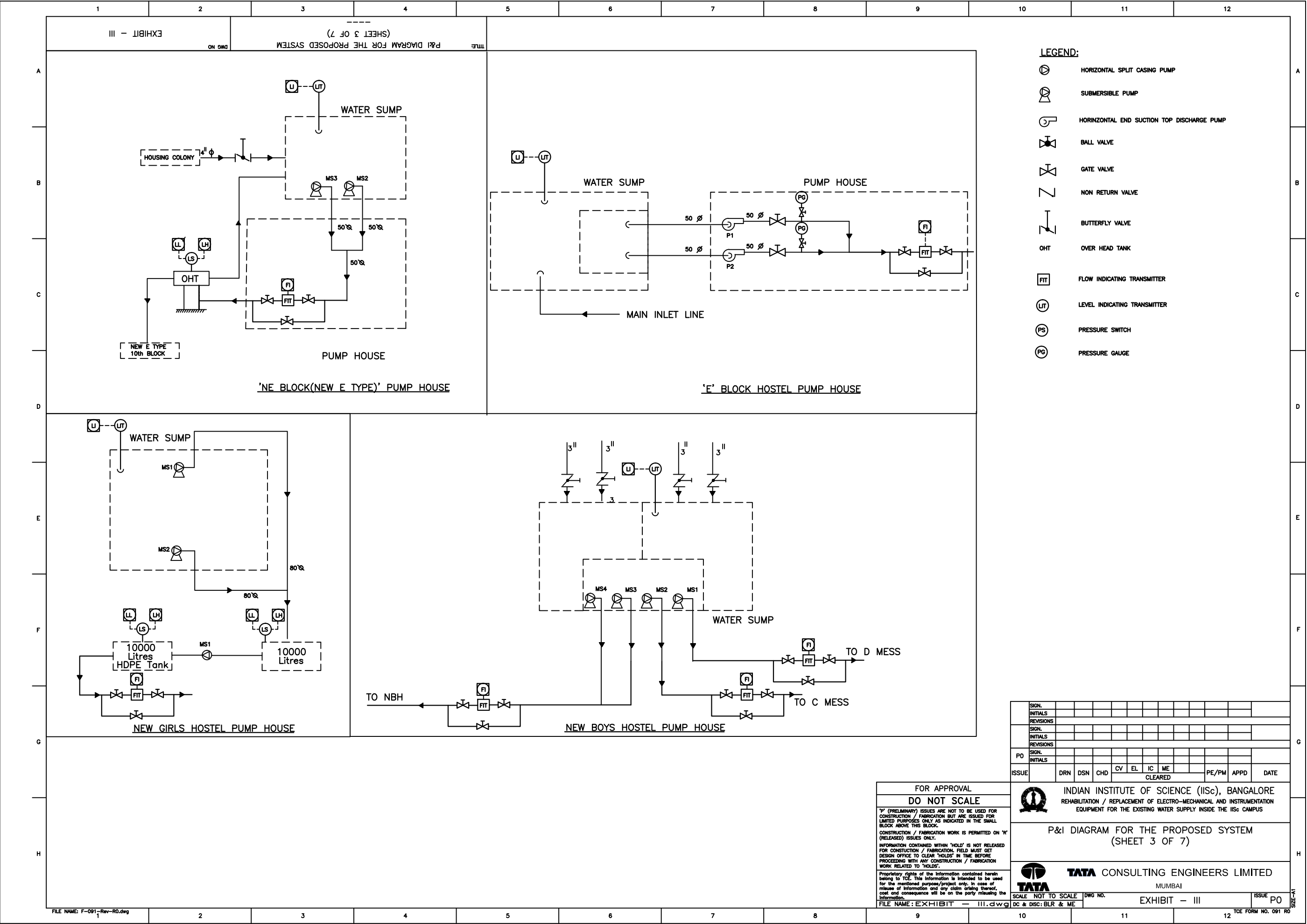


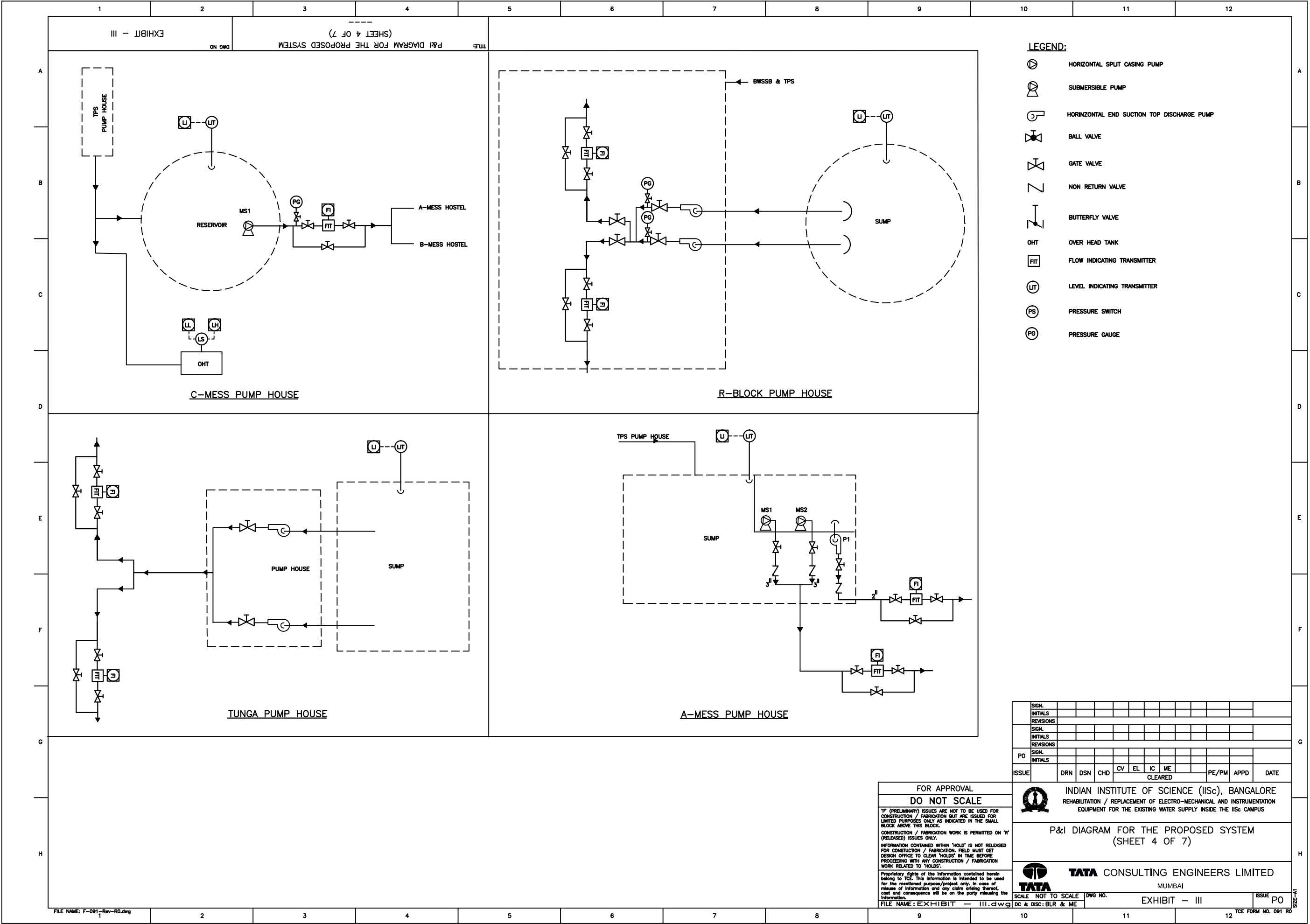


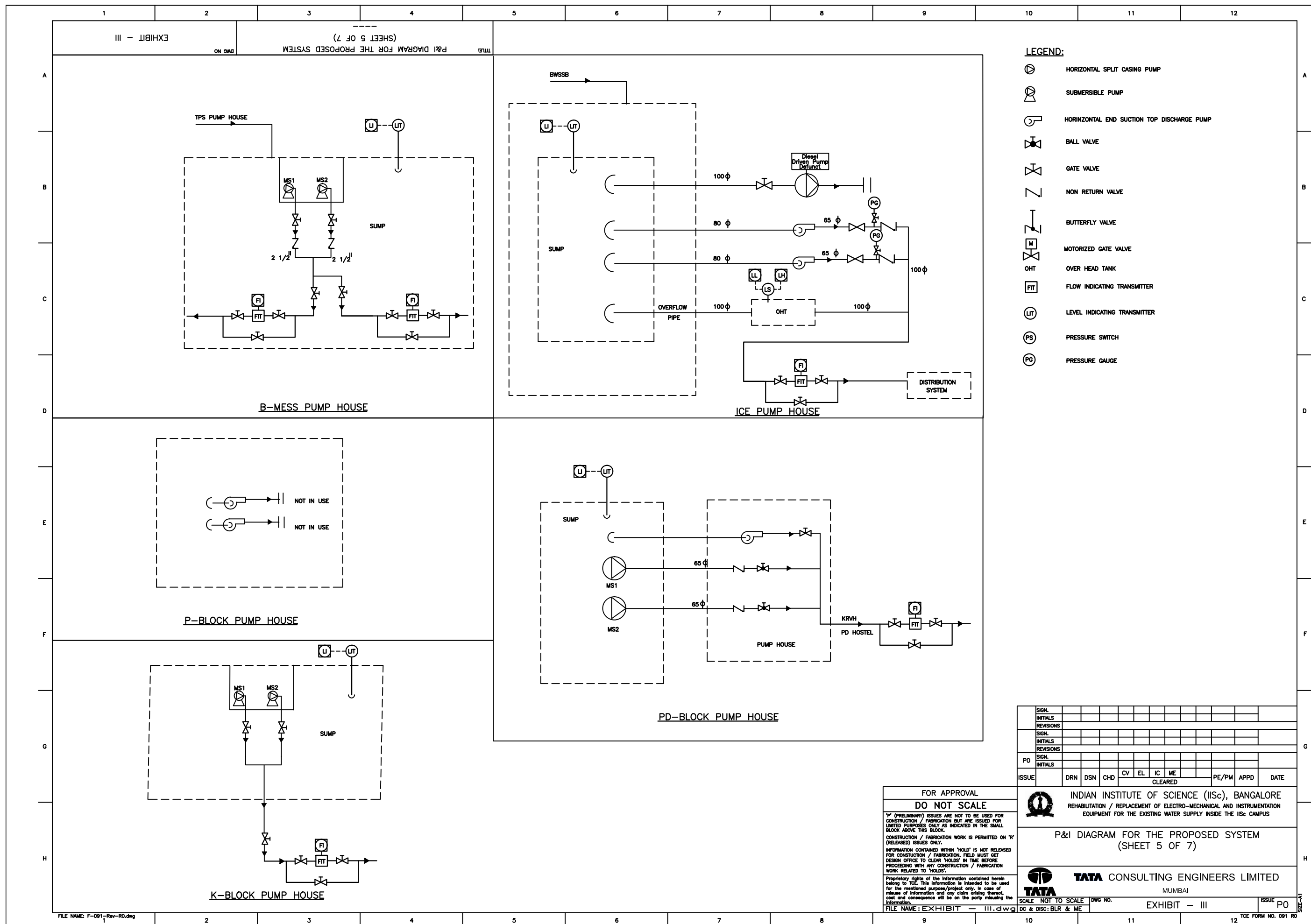


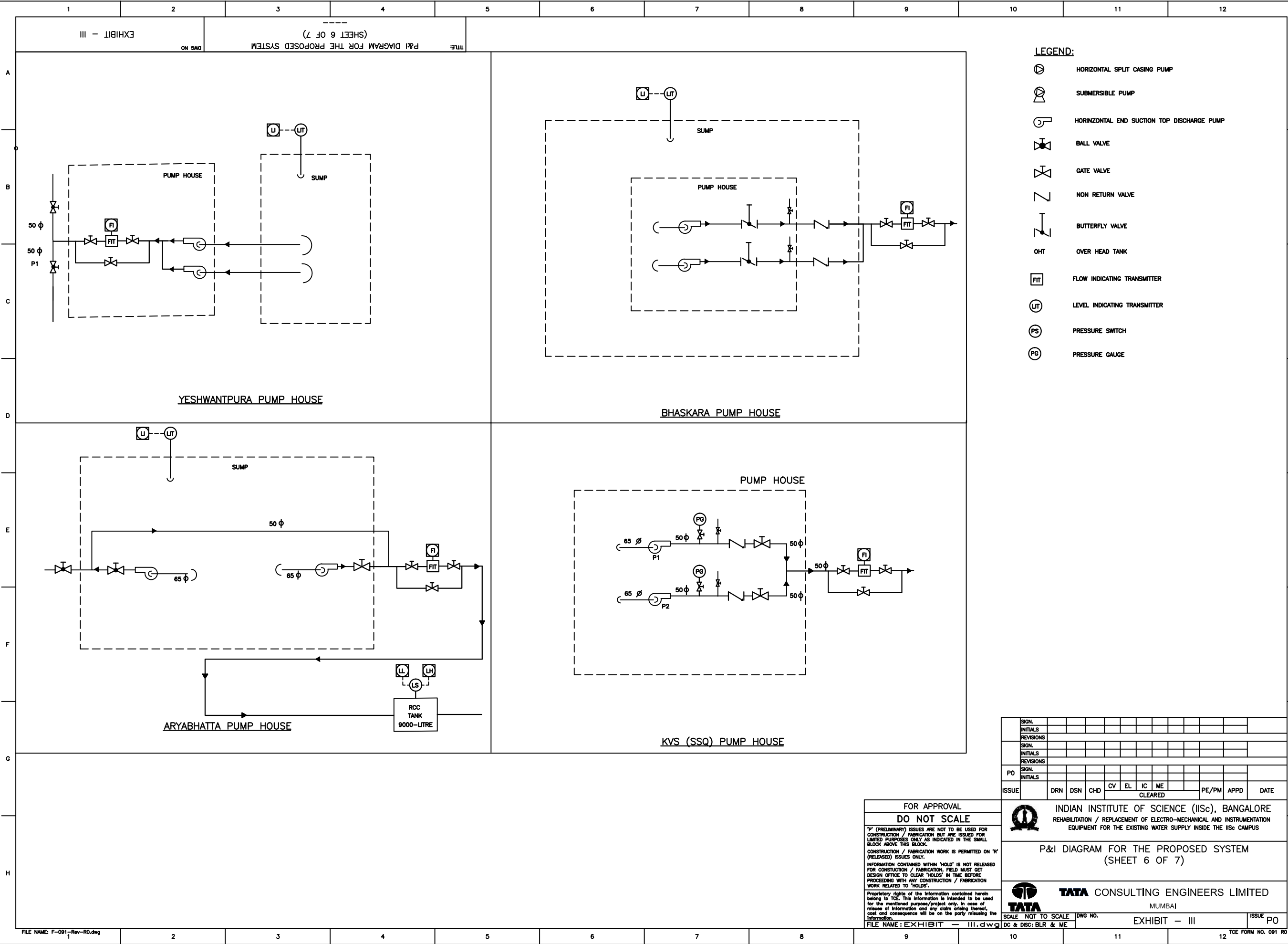


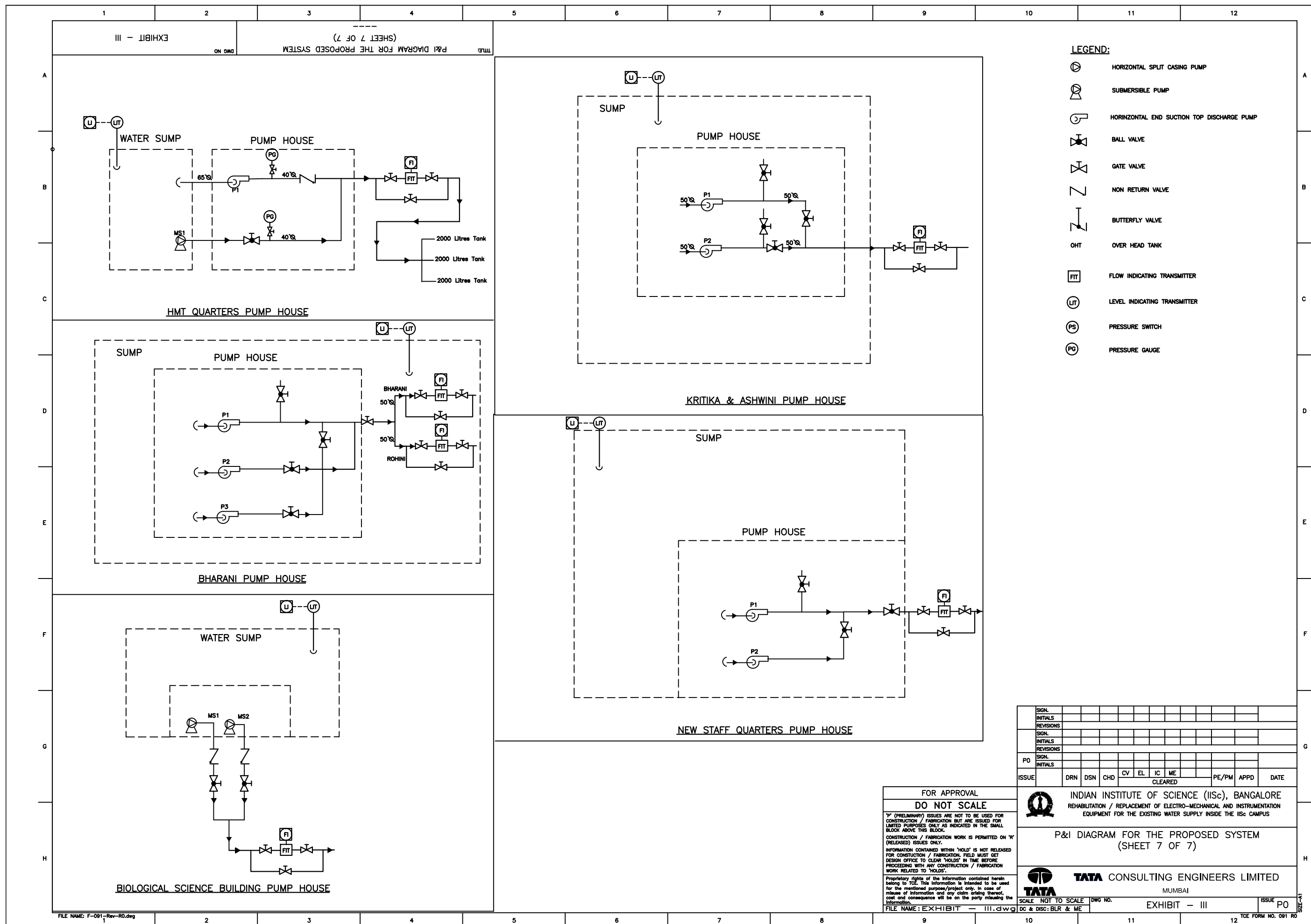


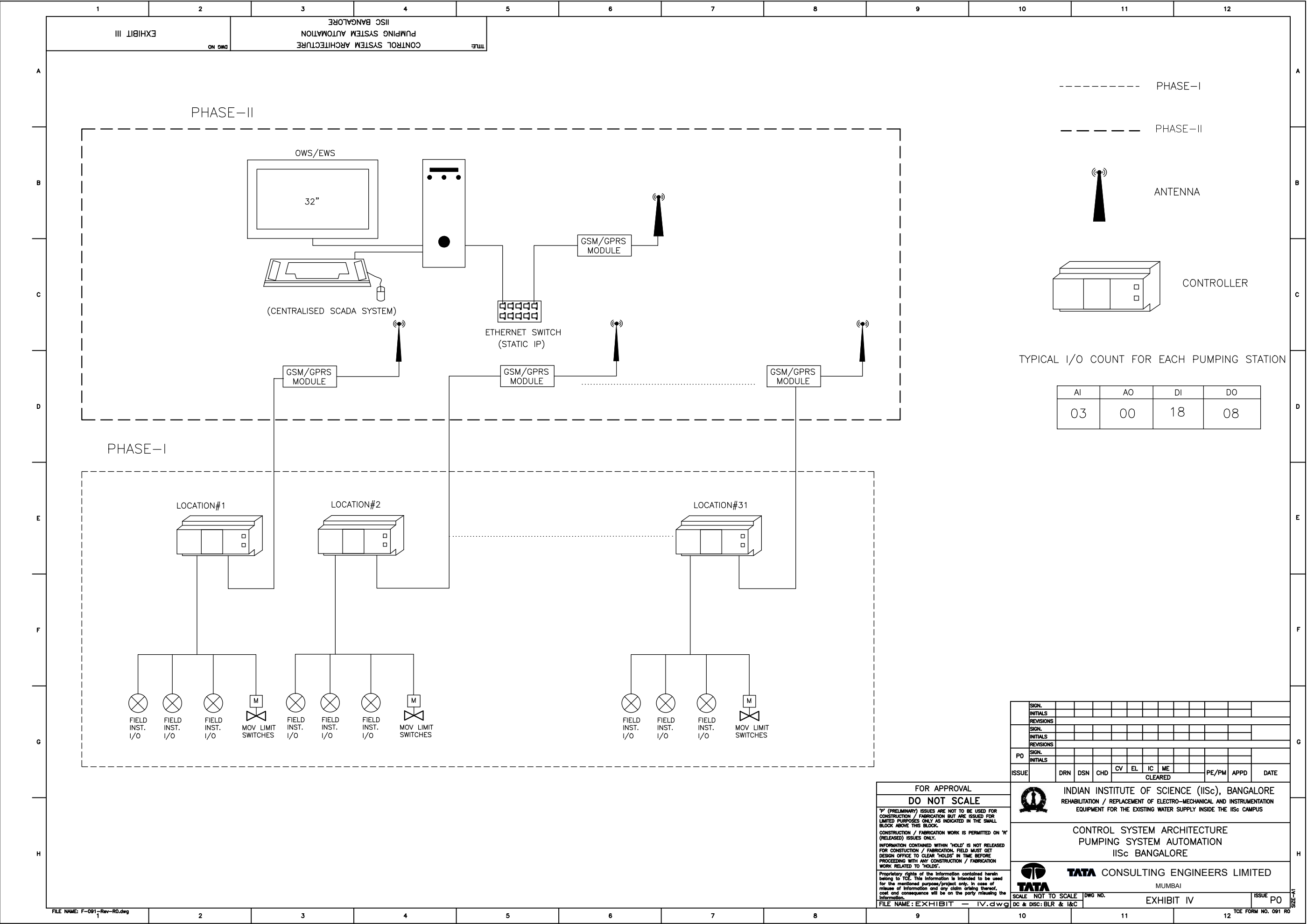















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