“Design, Engineering, Supply, Installation, Testing and Commissioning (DESITC) of an 800 KLD Effluent Treatment Plant (ETP) at Jagraon, Punjab. The proposed scheme is based on the optimal utilization and integration of the existing 350 KLD ETP unit with new treatment facilities to achieve a total treatment capacity of 800 KLD.”

IDMC
LIMITED

IDMC LIMITED
ANAND -388121

SECTION – 0

INVITATION FOR BID

Plot no. 124-128, G.I.D.C. Estate, Vithal Udyognagar,
Anand – 388 121, Tel: 02692-220521
Website: http://www.idmc.com

INVITATION FOR BIDS (IFB) NATIONAL COMPETITIVE B IDDING(NCB)

Tender/Event Ref. No: IDMC/ Sourcing & VD/ 2026-27/ Enquiry/ 381 Dated 17.10.2026

The IDMC Ltd having its Head Office at Anand, Gujarat invites rate bids from eligible bidders through "online E- Tender" from reputed eligible bidders for "**Design, Engineering, Supply, Installation, Testing and Commissioning (DESITC) of an 800 KLD Effluent Treatment Plant (ETP) at Jagraon, Punjab. The proposed scheme is based on the optimal utilization and integration of the existing 350 KLD ETP unit with new treatment facilities to achieve a total treatment capacity of 800 KLD**" as per details given below:

Estimated cost	**Rs. 8,50,00,000 (Inclusive of GST)** (Rupees Eight Crore Fifty Lakh Only).
Completion period	08 Months (from the date of notification of award of Contract/Purchase Order).
Earnest Money Deposit (EMD)	**₹ 8,50,000/- (Eight Lakh Fifty Thousand only)**
Mode of Tender	eProcurement at NCDFI eMarket portal, considering online open tender of IDMC with single stage two bid envelope system (Part I- Techno-commercial Bid and Part II- Price Bid) through www.idmc.com (click procurement) OR https://www.ncdfiemarket.com/index.php/idmc/ and can be downloaded and used as tender document for uploading the offer. The intending bidders are required to submit their offer electronically through NCDFI eMarket portal. No physical tender/email is acceptable.

Issued by Head (Purchase),
tender committee, IDMC LTD, Anand.

INVITATION FOR BID

Tender/Event Ref. No.: IDMC/ Sourcing & VD/ 2026-27/ Enquiry/ 381 Dated 17.10.2026

1.0 DESCRIPTION OF WORKS: The IDMC Limited, having its Head Office at Anand, Gujarat invites item rate bids from eligible bidders, for the construction & completion of the following works:

"Design, Engineering, Supply, Installation, Testing and Commissioning (DESITC) of an 800 KLD Effluent Treatment Plant (ETP) at Jagraon, Punjab. The proposed scheme is based on the optimal utilization and integration of the existing 350 KLD ETP unit with new treatment facilities to achieve a total treatment capacity of 800 KLD".

ADDITIONAL INFORMATION: Interested eligible bidders may obtain further information from and download the bidding documents from NCDFI portal www.idmc.com (click procurement) OR https://www.ncdfiemarket.com/index.php/idmc/

2.0 REQUEST FOR BIDDING DOCUMENT:

(a) The bid documents will be available in the website www.idmc.com (click procurement) OR https://www.ncdfiemarket.com/index.php/idmc/ can be downloaded and used as tender documents for uploading the offer.

(b) It is hereby brought to the notice of all bidders that if any change/additions/ deletions/alterations are found to be made by them in the tender and the same is subsequently noticed at any stage, even after award of the contract, the bidders are liable for all consequences thereof and IDMC LTD shall be free to take suitable actionas deemed necessary.

3.0 Minimum Eligibility Criteria: This invitation for bid is restricted to the invited bidders only and written communication sent through E-Mail by purchaser/ NCDFI e-Market. ~~For the purpose of bidding, the bidder shall meet the following minimum qualifying criteria:~~

~~a) The Bidder, in the same name and style, should be in business atleast for **five years** at the time of bid opening. In case of change of name of bidder by merger / acquisition / change in status, the bidder may be eligible based on the documentary evidence.~~

b) The Bidder should have valid registration under various Acts that may be applicable for the contract proposed. This shall include but not limited to Income Tax, Companies Act, GST, the Building & other construction workers' welfare cess act, Employee State Insurance, Contract Labour, Provident fund etc.

c) The Bidder's financial turnover in the same name and style during each of the **last three financial year (22-23; 23-24; 24-25)** ending 31st March should **not be less than 80% of the estimated contract value.**

d) The bidder should have positive net worth in **last two financial years.**

e) The bidder should have **cash profit** in any two financial years out of the last five financial years.

f) The Bidder in the same name & style shall have successfully executed /completed contracts of **Similar nature of work**** during the last five years ending last day of the month previous to the month in which bid is opened, either of the following: -

I. One contract/work of similar nature costing not less than 80% of estimated value of the contract.

OR

II. Two contracts/works of similar nature each cost not less than 50% of the estimated value of the contract.

Notes:

a) ****Similar nature of work means Effluent Treatment Plant works of industrial buildings in Dairy/ Food or Beverage/ Pharma/ Chemical/ Electronics/Frozen Semen station etc.**

.

b) The contract means the work done against one work order on a single location.

c) Cost of contracts/works shall be considered for evaluation as per the clause 4(f) above excluding the cost/recovery of materials supplied by the purchaser.

Bidder shall submit the following details to support their claim for meeting the minimum eligibility requirement –

1. Name / Names of project to be considered for meeting minimum eligibility criteria
2. Nature of each project / work completed.
3. Value of work of each project / work completed.
4. Location of execution of each project/work completed.

The copy of purchase order/work order, completion certificate and abstract sheet of final bill/invoice showing the cumulative value of work done should be submitted in order to support aforesaid details. In case, the final bill/invoice does not contain cumulative value of work done, copy of all the bills/invoices submitted prior to the final bill should be attached.

Note:

For evaluation and comparison of bids, the purchaser may, at its discretion, ask the bidder for clarification on the bid. The shortfall information / documents shall be sought only in case of historical documents which pre-exist at the time of tender opening and which have not under gone change since then.

So far as the submission of the documents is connected with regard to qualification criteria, after submission of the tender, only related shortfall documents shall be asked for the considered. For example, if the bidder has submitted a supply order without its completion / performance certificate, the certificate can be asked for and considered. However, no new supply order shall be asked for and considered so as to qualify the bidder.

1. In addition to the above, the following information/documents should also be submitted along with the bid by the bidders for evaluation/determination of their eligibility:
    a. Copy of Income Tax Returns and audited balance sheet for **three** previous years in original or certified true copies, along with Permanent Account Number (PAN) for income tax purpose.

    b. Copy of TDS certificate issued by the clients to substantiate the claim for the value of works executed in the private sector.
    c. Copy of Form 26 AS for the last 3 financial Years

2. Even though the bidder meets the specified criteria, it may be disqualified if it has:
    a. Made untrue or false declaration in the forms, statements and attachments submitted in proof of their qualification and / or
    b. Records of poor performance such as abandoning the work, not properly completing the contract, inordinate delays in completion or financial failure etc.

As a part of **Technical Bid** (part-I) the bidder shall also submit the following documents & credentials.

1. The deployment of manpower and organization chart at proposed site.

2. Technical capability of the firm includes the equipment owned by them. They should deploy one fully automated concrete batching plant with printing facility and accessories, Poclain machine, Excavator with Hydraulic Chisel/ Breaker arrangement & Backhoe loader, good quality new shuttering materials as per project requirements and fully furnished QC laboratory for regular testing of materials at project site as per QAP.

3. QAP plan with method statement & schedule in MS Project.

5.0 BID DETAILS: Detailed terms and conditions as well as the technical specifications for all the items of work indicated in the invitation for bid are contained in one bidding document.

(a)	Tender/Event Ref. No.:	IDMC/ Sourcing & VD/ 2026-27/ Enquiry/ 381 Dated 17.10.2026
(b)	Transaction Fee Payment of transaction fee by NEFT/ RTGS in favour of IDMC Limited (refer clause No.-4 of Annexure-A)	: Not Applicable
(c)	Incidental charges (in land) in case documents are to be sent by courier/post	: Not Applicable
(d)	Event Start Date	:17.11.2026
(e)	Event Close Date & time	: 02.12.2026, 17.00 Hours
(f)	Last Date and time for bid submission	: 02.12.2026, 17.00 Hours

(g)	Place of opening of bids	: ONLINE on web portal
(h)	Address for communication	: Head (Purchase), IDMC Ltd, V.U Nagar, Anand 124-128 GIDC Estate Vithal Udyognagar- 388121 Dist.- Anand (Gujarat) Tel: 02692-220521 Email: tenders@idmc.com
(i)	Estimated Cost of works	Rs 8,50,00,000/- (Including GST) (Eight Crore Fifty Lakh only)
(j)	Time of completion	: 08 (**Eight**) Months for overall completion (from the date of notification of award of Contract/ LOI/Purchase Order)
(k)	Amount of Bid Security	: ₹ 8,50,000/- (Eight lakh Fifty Thousand only)
(l)	Date and time for receipt of EMD. The EMD in original to be submitted to communication address as stated above inclause (i)	: On or before 01.12.2026, 17.00 Hours

6.0 PURCHASE OF BIDDING DOCUMENT IN PERSON: Not Applicable. Only Downloading.

7.0 PURCHASE OF BIDDING DOCUMENT BY COURIER/POST: Not Applicable. Only Downloading.

8.0 EARNEST MONEY DEPOSIT (EMD): All bids must be accompanied by a Earnest Money Deposit (EMD) in the acceptable form as specified in the bidding document and must be delivered to the address of communication as stated above in **clause 5.0 (i)** on or before the last date and time of receipt of bids as given in **clause 5.0 (l)** above.

9.0 PRE-BID MEETING: (Not applicable for this work)

10.0 OPENING OF BIDS: All the bidders should submit their online bids in Part I – Technical Bid and Part II – Price Bid. The technical bid (Part I) shall contain all the details EXCEPT FOR THE PRICE. Only technical bids (of those bidders who's Original EMD, in acceptableform, have reached the office of IDMC LTD as mentioned above in clause no. 5-Bid Details (m) of this Section) shall be opened online on the date and time specified above. The date and time of opening of Price Bid (Part II) shall be communicated later to responsive /technically qualified bidders.

11.0 BID VALIDITY: The Bid shall remain valid for a period **of 120 (One Hundred and twenty) days** from the date of bid opening.

12.0 BID SECURITY VALIDITY: The bid security accompanying the bid shall be valid till **31.03.2027**

13.0 TENDER DRAWINGS: Drawing(s) are attached with this bidding document and the same shall be available for reference at the office of The IDMC Ltd, at the address of communication on all working days.

14.0 RIGHTS RESERVED BY IDMC LTD: The IDMC Ltd, at its sole discretion & without assigning any reason, thereof reserves the right to accept and / or reject any or all the bids.

Issued by Head (Purchase),
tender committee, IDMC LTD, Anand.

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SECTION - I , INSTRUCTIONS TO BIDDERS / VENDORS

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SECTION - I - INSTRUCTIONS TO BIDDERS

A. GENERAL

1.0 General Information:

1.1 (a) Description : **Design, Engineering, Supply, Installation, Testing and Commissioning (DESITC) of an 800 KLD Effluent Treatment Plant (ETP) at Jagraon, Punjab. The proposed scheme is based on the optimal utilization and integration of the existing 350 KLD ETP unit with new treatment facilities to achieve a total treatment capacity of 800 KLD**.

(b) Owner : Mother Dairy Fruit & Vegetable Pvt Ltd.

1.2 Location and Area:

(a) **Project site** : Mother Dairy, Jagraon, Punjab.

(b) **Nearest Railway Station** : Jagraon Railway Station (station code: JGN).

(c) Nearest Airport : Shaheed Bhagat Singh International

(d) **Nearest Major Town** : Jagraon.

(e) Nearest Road : NH- 05

1.3 Period of Completion:

The Period of completion shall be **08 Months for overall completion** from the date of issuance of work order (PO / LOI), **which shall include the non-working periods during monsoon and festivals.**

2.0 Source of Funds:

The Service Recipient has arranged the funds and provided to the purchaser.

3.0 Eligibility and Qualification Requirements:

3.1 This invitation for bid is open to all bidders from all eligible sources.

3.2 All goods and services to be supplied under this Contract shall have their origin in eligible source and all expenditures made under the Contract will be limited to such goods and services.

3.3 For the purpose of this clause, "Origin" means the place where the goods are mined, grown or produced or from which the services are supplied. Goods are produced when, through manufacturing or processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics orin purpose of utility from its components.

3.4 The origin of goods and services is distinct from the nationality of the bidder.

3.5 To be eligible for the award of Contract, bidders shall provide evidence satisfactory to the IDMC Ltd, of their eligibility under **sub-clause 3.1** above, and adequacy of resources to carry out the Contract effectively. To this end, allbids submitted shall include the following information:

(A) Copies of original documents or certified true copies, defining the constitution or legal status, place of registration and principal place of business of the company or firm orpartnership.

(B) Power of Attorney or a true copy there of duly attested in case an authorized representative has signed the bid.

(C) Details of the experience and past performance of the bidder on works of similar nature **within the past five years,** and details of current work in hand and other Contractual commitments shall be submitted as per formats given in **Schedule IV and Schedule VIII of Section VII respectively of this bidding document.**

(D) Major items of constructional plant proposed for use in carrying out the Contract in the format prescribed in **Schedule I** and the qualifications and experience of key personnel proposed for the administration and the execution of the Contract, both on and off site, in the format prescribed in **Schedule II of Section VII of this bidding document.**

(F) Proposals for sub-contracting elements of the works amounting to more than **10%** of the bid price for each element and shall be as listed in **Schedule III of Section VII of this bidding document.**

(G) Reports on the financial standing of the bidder such as profit and loss statements, balance sheets and auditor's reports for **the past three years,**

an estimate of the financial projection for the **next two years** as prescribed in the **Schedule VII of Section VII of this bidding documents**, and an authority from the bidder to seek reference from the bidder's bankers; and

(H) Statement of arbitration/disputes in which the bidder is involved as prescribed in the **Schedule VI of Section VII of this bidding document.**

Note: As a part of **Technical Bid** (part-1) the bidder shall also submit the following documents & credentials.

1. **The deployment of manpower and organization chart at proposed site.**

2. **Technical capability of the firm includes the equipment owned by them. They should deploy one no. fully automated concrete batching plant with printing facility and accessories, Poclain, Excavator with Hydraulic chisel breaker arrangement & Back hoe, good quality new shuttering materials as per project requirements and fully furnished QC laboratory for regular testing of materials at projectsite as per QAP.**

3. **QAP plan with method statement & schedule in MS Project.**

3.6 For the purposes of this particular Contract bidders shall meet the following qualifying criteria as minimum: Not Applicable

~~a) The Bidder, in the same name and style, should be in business at least for **five years** at time of bid opening. Incase of change of name of bidder by merger / acquisition / change in status, the bidder may be eligible based on the documentary evidence.~~

~~**b)** The Bidder should have valid registration under various Acts that may be applicable for the contract proposed. This shall include but not limited to Income Tax, Companies Act, GST, the building & other construction workers' welfare cess act , Employee State Insurance, Contract Labour, Provident fund etc.~~

~~**c)** The Bidder's financial turnover in the same name and style during each of the **last three financial year (22-23; 23-24; 24-25)** ending 31st March should **not be less than 80% of the estimated contract value.**~~

~~**d)** The bidder should have positive net worth in last two financial years.~~

~~**e)** The bidder should have cash profit in any two financial years out of the last five financial years~~

~~**f)** The Bidder in the same name & style shall have successfully executed /completed contracts of similar nature**. Similar nature of work means Effluent Treatment Plant works of industrial buildings in Dairy/ Food or Beverage/ Pharma/ Chemical/ Electronics/Frozen Semen station etc. during thelast five years** ending last day of the month previous to the month in which bid is opened, either of the following: -~~

~~**I.** One contract/work of similar nature costing not lessthan 80% of the estimated value of the contract.~~

~~OR~~

~~**II.** Two contracts/works of similar nature each costing not less than 50% of estimated value of the contract.~~

~~Notes:~~

~~**** Similar nature of work means Effluent Treatment Plant works of industrial buildings in Dairy/ Food or Beverage/ Pharma/ Chemical/ Electronics/Frozen Semen station etc.**~~

~~a) The contract means the work done against one work order on a single location.~~

~~b) Cost of contracts/works shall be considered for evaluation as per the clause 3.6 (f) above excluding the cost/recovery of materials supplied by the purchaser.~~

Bidder shall submit the following details to support their claim for meeting the minimum eligibility requirement -

1. Name / Names of project to be considered for meeting minimum eligibility criteria
2. Nature of each project / work completed.
3. Value of work of each project / work completed.
4. Location of execution of each project/work completed. The copy of purchase order/work order, completion certificate and abstract sheet of final bill/invoice showing the cumulative value of work done should be submitted in order to support aforesaid details. In case, the final bill/invoice, does not contain cumulative value of work done, copy of all the bills/invoices submitted prior to the final bill should be attached.

g) In addition to the above, the following information/documents should also be submitted along with the bid by the bidders for evaluation/determinationof their eligibility:

I. Copy of Income Tax Returns and audited balance sheet for **three**

previous years in original or certified true copies, along with Permanent Account Number (PAN) for income tax purpose.

II. Copy of TDS certificate issued by the clients to substantiate the claim for the value of works executed inthe private sector.

III. Copy of Form 26 AS for the last 3 financial Years

h) Even though the bidder meets the specified criteria, it may be disqualified if it has:

I. Made untrue or false declaration in the forms, statements and attachments submitted in proof of their qualification and / or

II. Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion or financial failure etc.

4.0 Cost of Bidding:

The bidder shall bear all costs associated with the preparation and submission of his bid and the IDMC Ltd, hereinafter referred to as IDMC LTD will in no case be responsible or liable for these costs, regardless of the conduct or outcome of the bidding process.

5.0 Project Site Visit:

5.1 The bidder is advised to visit and examine the site of works and its surroundings and obtain for himself on his own responsibility all information that may be necessary for preparing the bid and entering into a Contract. The costs of visiting the site shall be at bidder's own expenses.

5.2 The bidder and any of his personnel or agent(s) will be granted permission by the IDMC LTD to enter upon the premises and landsfor the purpose of such inspection but only upon the express condition that the bidder, his personnel and agent(s) from and against all liabilities in respect thereof and will be responsible for personal injury (whether fatal or otherwise), loss of or damage to property and any other loss or damage, costs and expenses however caused, which but for the exercise of such permission would not have arisen.

5.3 Each of the civil contracts, if executed at site under the circumstances of an operating plant which cannot be closed down for any reason, the site works of every nature has to be planned and executed with the knowledge of operational and processing routines at existing plant, as the plant will continue uninterrupted throughout the year. The execution of contract will be done with clear under-standing that their all staff and workers will have to strictly abide by the security rules and procedures that is followed by plant authorities during the concurrency of the contract.

B. BIDDING DOCUMENTS

6.0 Contents of Bidding Documents:

6.1 The set of Bidding documents issued for the purpose of bidding includes the number of copies as stated below, together with any addenda there to issued in accordance with **clause-8** & any minutes of the pre-bid meeting issued in accordance with **clause-16.**

Number copies	Volume	Section	Descriptionof
1	I	0	Invitation for Bid
1	I	I	Instructions to bidders
1	I	II	General Conditions of Contract
1	I	III	Special Conditions of Contract
1	I	IV	Technical Specifications
1	I	V	Form of Bid
1	I	VI	Schedule of Materials to be issued by owner/IDMC LTD
1	I	VII	Schedule of Supplementary Information
1	I	VIII	Form of Agreement
1	I	IX	Acceptable Forms of Bank Guarantees
1	II	X	Schedule of Quantities
1	II	XI	Sketches – General Site Layout

6.2 The Bidder is expected to examine carefully all instructions, conditions, forms, terms, specifications and drawings in the bidding documents. Failure to comply with the requirements of bid submission will be at the bidder's own risk. Pursuant to **clause-25**, bids which are not substantially responsive to the requirements of the bidding documents will be rejected.

7.0 Clarification of Bidding Documents:

A prospective bidder requiring any clarification of the bidding documents may notify the IDMC LTD in writing at the address of communication indicated in

the Invitation for bid. The IDMC LTD will respond in writing to any request for the clarification which is required earlier than **10 days** prior to the dead line for the submission of the bids.

8.0 Amendment of Bidding Documents:

8.1 At any time prior to the deadline for the submission of bids, the IDMC LTD may for any reason whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding document by the issuance of amendment.

8.2 The amendment will be notified separately as Corrigendum for the respective bidding document on the IDMC LTD's website/NCDFI eMarket Portal.

8.3 In order to afford prospective bidders reasonable time in which to take an amendment into account in preparing their bids, the IDMC LTD may, at its discretion, extend the deadline for the submission of bids in accordance with **clause-19.**

C. PREPARATION OF BIDS

9.0 Language of Bid:

The bid prepared by the bidder and all correspondence & documents relating to the bid exchanged by the bidder and the IDMC LTD shall be written in the **English language**. Supporting documents and the printed literature furnished by the bidder with the bid may be in another language provided if required an English translation of the same is provided. For the purpose of the interpretation of the bid, the **English language** shall prevail.

10.0 Documents Comprising the Bid:

The bid to be prepared by the bidder shall comprise thefollowing:

(a) The form of bid along with Appendixes (**Refer Section V**)thereto duly filled;

(b) The bid Security;

(c) The Schedule of Quantities duly filled (**Refer Section X**);

(d) The Schedule of supplementary information (**Refer SectionVII**), the information on eligibility and qualifications;

(e) The complete bidding document duly signed has to be uploaded alongwith bid as stated above.

(e) Alternative offers where invited, and any other materials required to be completed and submitted in accordance with the Instruction to Bidders

(**Section I**) embodied in these bidding documents.

The forms, Schedule of quantities and Schedule provided in this bidding document shall be used without exception (subject to the extension of the Schedules in the same format and to theprovisions of **sub-clause 14.2** regarding the alternative form of Bid Security)

Additional special instructions:

Before uploading, of their bid, the bidder should check the IDMC LTD's website or NCDFI eMarket portal for any Corrigendum/additional information on the bidding document, if any. However, non- information in changes/amendments put on website as Corrigendum to the prospective bidders shall not bind the IDMC LTD to extend the deadline for the submission of the bids and non-compliance to such Corrigendum by the bidder shall result to non-responsiveness of the bid leading to rejection.

11.0 Bid Prices:

11.1 Unless stated otherwise in the bidding documents, the Contract shall be for the whole works as described in the Invitation for bid based on the schedule of unit rates and prices submitted by the bidder.

11.2 The bidder shall fill in rates and prices for all items of workdescribed in the schedule of quantities. **Items against which no rate is entered by the bidder shall not be paid for by the IDMC LTD when executed and shall be deemed to have coveredby the other rates in the schedule of quantities.**

11.3 All applicable Taxes (GST), levies, cess (including labour cess, seigniorage, royalty etc., as applicable to this contract) and duties shall be payable by the bidder under the Contract or forany other cause, and shall be included in the rates and the prices and total bid price submitted by the bidder and the evaluation and the comparisons of bids by the IDMC LTD shall bemade accordingly.

11.4 Fixed Prices:

The rates and prices quoted by the bidder shall be fixed for the entire duration of the Contract and shall not be subjected to adjustment on any account except as defined in clause no. 11.5 below. A bid submitted with any price adjustment condition except as defined in clause no. 11.5 below shall be treated as non-responsive & rejected, pursuant to **clause 25 of this section.** Any variation in the taxation shall be subjected to the adjustment as per the detailed specified under clause 72 of section II of the bidding document.

11.5 Price Variation – Not Applicable for this contract

12.0 Currency of Bid & Payment:

The unit rates and prices shall be quoted by the bidder entirely in Indian currency and all payment shall be made in Indian currency only.

13.0 Bid Validity:

13.1 Bids submitted shall remain valid for acceptance for a period of **120 days** from the date of bid opening.

13.2 In exceptional circumstances, prior to expiry of the original bid validity period, the IDMC LTD may request the bidder for a specified extension in the period of validity. The request and the response thereto shall be made in writing. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request shall not be permitted to modify his bid, but shallbe required to extend the validity of his bid security correspondingly. The provisions of **clause 14** shall continue to apply during the extended period of bid validity.

14.0 Bid Security:

14.1 The bidder shall furnish, as part of the bid, a bid security foreach package separately of the amount as specified in **clause 5 (l)** in the **Invitation for bid, Section 0).**

14.2 The Earnest Money Deposit (EMD) shall be denominated in Indian Rupees only, and shall be in one of the following forms.

a) **A Bank Guarantee issued by a Scheduled Commercial Banks in India, in the form Provided in Bidding Document and valid till 31st Jan, 2027.**

Or

b) **A Demand Draft/ Bankers Cheque issued by a Scheduled Commercial Bank in India, drawn in favour of IDMC Limited, payable at Anand.**

Or

c) **Through Online Banking Transaction i.e. NEFT/RTGS**

Bidders can pay/remit the EMD through NEFT/RTGS to IDMC LTD Account (details mentioned below) and upload the transaction details of NCDFI eMarket Portal along with technical bid. Bidder must inform the transaction details through email **(**tenders@idmc.com**)** as per enclosed format **on or before 24:00 hrs. on the last date of receipt of bid.**

Details of IDMC LTD's Bank Account for online banking transaction i.e. NEFT/RTGS is as under:

1. Beneficiary Name		**IDMC Limited**
2. Beneficiary Bank & Branch		**INDIAN BANK ANAND BRANCH**
3. Account Number to be credited		**CA - 494481837**
4. RTGS/IFSC Code		**IDIB000A021 (PLEASE READ 'ZERO' AFTER B)**

Format for e-mail confirmation about the transaction made thruNEFT/RTGS for EMD:

Name of the Bidder	**IFB Reference**	**EMD Amount**	**Bank Details UTR No. & date**

Bidders shall be required to submit/upload the successfultransaction details along with technical bid.

The bid shall not be considered if the valid EMD is notavailable at the time of opening of Technical Bid.

14.3 Any bid not accompanied by an acceptable Earnest Money Deposit (EMD) pursuant to **clause 14.1 and 14.2** hereof shallbe rejected by IDMC LTD as non-responsive.

14.4 The Earnest Money Deposit (EMD) of the unsuccessful bidders shall be refunded as promptly as possible, but not later than **30 days** after the expiry of the period of bid validity as prescribedin these documents.

14.5 Earnest Money Deposit (EMD) of the successful bidder(s) shall be refunded when the bidder has signed the Agreement and furnished the required performance security.

14.6 No interest shall be paid by the IDMC LTD on the Earnest MoneyDeposit (EMD) furnished by the bidder.

14.7 The Earnest Money Deposit (EMD) may be forfeited
(a) If a bidder withdraws his bid during the period of bidvalidity; or

(b) In the case of a successful bidder, if he fails within the timelimit to:
   (i) Sign the agreement, or
   (ii) Furnish the required performance security

15.0 Variation in Bidding Conditions:

15.1 The bidder shall submit offer which comply fully with the requirements of the bidding documents, including the basic technical design as indicated in the drawings and specifications. Conditional bids are liable to be considered as non-responsive in accordance with **clause-25.**

16.0 Pre-Bid Meeting: Not Applicable for this tender

17.0 Format and Signing of Bids:

17.1 The bidder shall prepare and upload the original copy of the documents comprising the bidding documents downloaded by him.

17.2 All pages of the bidding documents including corrigendum (if any) and drawings shall be signed by person(s) duly authorized, to bind the bidder to the Contract. Proof of authorization shall be in the form of a written power of attorney which shall accompany the bid. All pages of the bid documents, where entries and amendments had been made, shall additionally be initialled by the person(s) signing the bids.

17.3 The complete bid shall be without alterations, interlineations or measures except those in accordance with instructions issued by the IDMC LTD, or as necessary to correct errors made by the bidderin which case such corrections shall be initialled by the person(s) signing the bid. No over writing shall be permitted.

17.4 Only one bid may be uploaded by each bidder. No bidder shallbe allowed to participate in the bid in the name of another for the same Contract in any relation whatsoever.

17.5 The bidder shall quote the rate of each item both in figures and words.

D. SUBMISSION OF BIDS

18.0 The Technical Bid (Part I) and The Commercial Bid (Part II) has to be uploaded on-line at NCDFI eMarket portal.

19.0 Deadline for Submission of Bids:

19.1 Bids must be uploaded on or before the date and time of submission as stated in the bid**.**

19.2 The IDMC LTD may, at its discretion, extend the deadline for the submission of bids by issuing an amendment in accordance with **clause 8** hereof, in which case all rights and obligations of IDMC LTD and the bidders previously subject to the original deadline shall thereafter be subject to the new deadline as extended.

20.0 Late Bids: Not Acceptable.

21.0 Modification and Withdrawal of Bids

21.1 The bidder may modify or withdraw his bid before last date & time of bid submission.

21.2 Withdrawal of the bid during the interval between the deadline for the submission of bids & the expiry of the period of bid validity shall result in the forfeiture of the Earnest Money Deposit (EMD) pursuant to **clause 14.**

E. BID OPENING AND EVALUATION

22.0 Bid Opening

The IDMC LTD will open the Technical bids as per company norms.

Commercial bids will be opened electronically of only those bidders whose Technical Bid is found to be acceptable by IDMC LTD.

The IDMC LTD will examine the bids to determine whether they are complete, whether the requisite Earnest Money Deposit (EMD) have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

23.0 Process to be Confidential:

23.1 After the public opening of bids, information relating to the examination clarification, evaluation and comparison of bids and recommendations concerning the award of Contract shall not be disclosed to bidders or other persons not officially concerned with such process until the award of the Contract tothe successful bidder has been announced.

23.2 Any effort by a bidder to influence the IDMC LTD in the process of examination, clarification, evaluation and comparison of bids and in the decision concerning the award of Contract may resultin the rejection of the bidder's

bid.

24.0 Clarification of Bids:

24.1 To assist in the examination, evaluation and comparison of bids, the IDMC LTD may ask the bidders individually for clarification of their bids, including break down of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the IDMC LTD during the evaluation of the bids in accordance with **clause 26.**

25.0 Determination of Responsiveness

25.1 Prior to the detailed evaluation of the bids the IDMC LTD will determine whether each bid is substantially responsive to the requirements of the bidding documents.

25.2 For the purpose of this clause, a substantially responsive bid is one which conforms to all terms, conditions and specifications of the bidding documents without material deviation or reservation. A material deviation or reservation is one which affects in any substantial way the scope, quality or the performance of the works or which limits in any substantial way, inconsistent with the bidding documents, the IDMC LTD's right or the bidder's obligations under the Contract, and the rectification of which deviation or reservation would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

25.3 If a bid is not substantially responsive to the requirements of the bidding documents, it will be rejected by IDMC LTD and may not be subsequently made responsive by the bidder having corrected or withdrawn the non-conforming deviation or reservation.

26.0 Correction of Errors: Not Applicable for this tender

27.0 Conversion to Single Currency:

27.1 All bid prices shall be submitted in Indian currency only.

28.0 Evaluation and comparison of the Bids:

28.1 The IDMC LTD evaluate and compare only bids determined to be substantially responsive to the requirements of the bidding documents in accordance with **clause 25.**

28.2 In evaluating bids, the IDMC LTD will determine for each bid the evaluated price by adjusting the bid price making any correction for errors pursuant to **clause 26.0**

28.3 The IDMC LTD reserves the right to accept or reject any variation, deviation or alternative offers. Variations, deviations and alternative offers and other factors which are in excess of the requirement of the bidding documents or otherwise result in the accrual of unsolicited benefits to the IDMC LTD shall not be takenin to account in bid evaluation.

28.4 Price variation provisions of the Contract shall be taken in to account in bid evaluation pursuant to **clause 11.5**

28.5 For better price discovery, IDMC at the sole discretion to decide for reverse auction among technically responsive bidders for finalization of price.

28.6 Additional Performance Security:

If the bid of the successful bidder is having ALR (Abnormally Low Rates i.e. the rates less than 40% of estimated rates) for prices of individual items or total bid price offered in relation to the IDMC LTD's item rates estimate or total price estimate of the real cost of the work to be performed under the Contract, the IDMC LTD may require that the amount of the performance security deposit set forth in the **clause 33.0** be increased at the expense of the successful bidder to a level sufficient to protect the IDMC LTD against financial loss in the event of subsequent performance of the successful bidder under the Contract.

28.7 Upon the furnishing by the successful bidder of a performance security in accordance with the **clause 33** the IDMC LTD may notify the non-responsive bidders that their bids have been unsuccessful.

29.0 Award Criteria

The Purchaser will award the contract to the successful bidder whose bid has been determined to be substantially responsive and has been determined as the lowest evaluated bid provided further the bidder is determined to be qualified to perform the contract satisfactorily as per clause 28.

Subject to Para 29.1, the Purchaser will award one single contract or more than one contract to the successful bidder at the Purchaser's discretion.

30.0 IDMC LTD's Right to accept any bid and to reject any or all bids.

The IDMC Limited reserves the right to accept or reject any offer /bid and to annul the bidding process and reject all offers/ bids, at any time prior to the award of the Contract, without thereby incurring any liability to the affected bidder(s) or any obligation to inform the affected bidder(s) of the grounds for the IDMC Limited's action.

31.0 Notification of Award

31.1 Prior to the expiry of the period of offer /bid validity prescribed in the enquiry / bid documents, the IDMC Limited will notify the finalized bidder / vendor here in after referred to as the "Agency / Contractor", in writing on acceptance of their offer /bid and issue a Letter of Intent / Award, followed by Detailed Purchase order mentioning all the required terms and conditions and (hereinafter and in the Conditions of the Contract referred to as the "Contract price")

31.2 Upon the furnishing by the successful bidder of a performance security in accordance with the **clause 33** the IDMC LTD may notify the unsuccessful bidders that their bids have been unsuccessful.

32.0 Signing of Agreement:

32.1 At the same time that the IDMC LTD notifies the successful bidder that his bid has been accepted, the IDMC LTD will send the bidder the Form of Agreement provided in the bidding documents **(Section VIII),** incorporating all agreements between the parties.

32.2 Within **15 days** of the receipt of the Form of Agreement the successful bidder shall sign the Form and return it to IDMC LTD.

33.0 Performance Security:

33.1 Within **30 days** of the receipt of the notification of award from the IDMC LTD, the successful bidder shall furnish to the IDMC LTD a performance security for an amount of **5% (five percent)** of the Contract cost pursuant to **clause 10.0 of General Conditionsof Contract (Section II).**

Failure of the successful bidder to comply with the requirements of the **clause 32 or 33** shall constitute sufficient grounds for the annulment of the award and forfeiture of theEarnest Money Deposit (EMD).

34.0 License and Permit for Goods/Services:

Unless stated otherwise, no license or permit shall be provided by

Purchaser/Owner/Service Recipient for the Goods/Services being provided by contractor against this bid.

SECTION – II

GENERAL CONDITIONS OF CONTRACT

SECTION II GENERAL CONDITIONS OF CONTRACT

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GENERAL CONDITIONS OF CONTRACT

DEFINITIONS AND INTERPRETATIONS

1.0 DEFINATION AND INTERPRETATION: In the Contract, as hereinafter defined, the following words and expressions shall have the meanings hereby assigned to them, except where the context otherwise requires

1.1 OWNER/PROJECT AUTHORITY/ SERVICE RECIPIENT - shall mean the client on whose behalf the enquiry is issued by the IDMC Limited and shall include its successors and assignees, as well as its authorized representatives.

1.2 PURE AGENT/ CONSULTANT shall mean the IDMC Limited or the consultants appointed by the IDMC Limited or the Owner for the Project.

1.3 IDMC LTD shall mean the IDMC LIMITED

1.4 ENGINEER shall mean the Engineer or any other authorized representative of the IDMC LTD.

1.5 Architect shall mean the architect appointed by the IDMC LTD/Owner.

1.6 Structural Consultants shall mean the Structural Consultants appointed by the IDMC LTD/Owner.

1.7 Bidder shall be the firm/party/individual who submits the bid against the Invitation for Bid.

1.8 Contractor shall mean the successful bidder whose Bid has been accepted by the Owner / IDMC LTD and on whom a work order has been placed and shall include his heirs, legal representatives and assignees.

1.9 Sub-Contractor shall mean the person/firm/ party named by the Contractor whom a part of the Contract has been sublet with the consent of owner /IDMC LTD and shall include his heirs, successors, legal representatives, and assignees.

1.10 Contract price/rate shall mean the prices/rates of the accepted Bid.

1.11 Contract shall mean the work order along-with articles of agreement, the conditions, the appendix, the schedule of quantities, and/or specifications attached herewith.

1.12 "Notice in writing" shall mean a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to

have been received) by courier/registered/ordinary post to the last known address or the registered office of the addressee and shall be deemed to have been received when in the ordinary course of post it would have been delivered.

1.13 "**Engineer –In-charge**" means the site engineer designated as such or other Engineer appointed from time to time by purchaser.

1.14 **Site** shall mean the actual place of the proposed project or any other place where work is to be executed under the Contract. It shall also include any other land allotted by the IDMC LTD for the Contractor's use.

1.15 **Month** shall mean from the beginning of a given date of a calendar month to the end of the preceding date of the next calendar month.

1.16 **Week** shall mean seven consecutive days.

1.17 **Day** shall mean a day from midnight to midnight.

1.18 **Building** shall mean the proposed building (s), roads, fencing, sanitary and water supply, underground/overhead water tank etc. under the Contract.

1.19 **Bid Security** shall mean the sum paid along with the bid as a token to bind the Contract.

1.20 **Award** shall mean the written acceptance of Bid by the IDMC LTD/owner given to the successful bidder.

1.21 **Performance Security** shall mean the amount pledged with the IDMC LTD while signing the agreement for faithful and satisfactory performanceof the Contract.

1.22 **Constructional Plant** shall mean all appliances or things of whatsoever nature required in or about the execution and maintenance of the Works but does not include the materials or other things required /intended to form or forming part of the Works.

1.23 **Specifications** shall mean the specification referred to in the bid and any modification thereof or addition thereto as may from time to time be furnished or approved in writing by the IDMC LTD/Engineer.

1.24 **Drawings** shall mean drawings referred to in the specifications and any modification of such drawings approved in writing by the Engineer and such other drawings as may from time to time be furnished or approved in writing by the IDMC LTD/Engineer / consultant.

1.25 Temporary Works shall mean temporary works of every kind required in or about the execution or maintenance of works.

1.26 Permanent Works shall mean the permanent works to be executed and maintained in accordance with the Contract.

1.27 Works shall include both temporary works and permanent works.

1.28 Approved/Approval shall mean approval in writing, including subsequent written confirmation of previous verbal or written approval.

1.29 I.S.S. shall mean Indian Standard Specifications

1.30 Government shall mean the Government of India or any other State Government.

1.31 Tender shall mean the Bid.

1.32 Headings and Marginal notes:
All headings of and notes to the clauses of these Conditions of Contract or of and to the Specifications or any other bid document are solely for the purpose of giving concise indication and not a summary of the contents thereof, and they shall never be deemed to be the part of or be used in the interpretation or construction thereof or of the Contract.

1.33 Singular and Plural.
In this Contract document unless otherwise stated specifically the singular shall include the plural and vice-versa wherever the context so requires.

1.34 Cost
The cost shall be deemed to include overhead costs whether on or off the site.

1.35 Purchaser
The organization who is purchasing the goods/services.

ENGINEER & ENGINEER'S REPRESENTATIVE

2.0 Duties and Powers of the Engineer and the Engineer's Representative:

2.1 The field management shall be the responsibility of the Engineer. The Engineer shall carry out such duties as taking decisions and issuing

certificates and orders as specified in the Contract. The Engineer is empowered to take decisions on the following matters:

(a) Approval of subletting of any part of the works pursuant to **clause 4.0** hereof;

(b) Certification of additional sums under **sub-clause 53(2)** hereof;

(c) Determination of an extension of time pursuant to **clause 44.0** hereof;

(d) Issuance of a variation order pursuant to **clause 52.0** hereof;

(e) Fixing rates or prices for the additional works executed under the Contract pursuant to **clause 52.0** hereof.

2.2 The Engineer's Representative shall be responsible to the Engineer and his duties are to watch and supervise the works and to test and examine any materials to be used or workmanship employed with the works. The Contractor shall get the materials or the workmanship tested, as instructed by the Engineer's Representative, at his own cost. He shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract nor, except as expressly provided hereunder or elsewhere in the Contract, to order any work involving delay or any extra payment by the Service Recipient/ IDMC LTD, nor to make any variation of or in the works.

2.3 The IDMC LTD may from time to time in writing delegate to the Engineer's Representative any of the powers and authorities vested in the Engineer. Any written instruction or approval given by the Engineer's Representative to the Contractor within the terms of such delegations, but not otherwise, shall bind the Contractor as though it had been given by the Engineer provided always as follows:

(a) Failure of the Engineer's Representative to disapprove any work or materials shall not prejudice the power of the Engineer thereafter to disapprove such work or materials and to order the pulling down, removal or breaking up thereof.

(b) If the Contractor shall be dissatisfied by reason of any decision of the Engineer's Representative he shall be entitled to refer the matter to the Engineer, who shall there upon confirm, reverse or vary such decision.

3.0 Inspection of Works:

3.1 The IDMC LTD and his representatives shall have full power and authority to inspect the works at any time wherever the work is in progress either on the site or at the Contractor's premises/ workshop wherever situated, premises/ workshop of any person, firm or corporation where the work in connection with the Contract may be in hand or wherefrom materials are being produced or are to be supplied, and the Contractor shall afford or procure for the Engineer every facility and assistance to carry out such inspection. The Contractor shall at all times during usual working hours and at all other times at which reasonable notice of the intention of the Engineer or the Engineer's Representative to visit the works shall have been given to the Contractor, either himself be present to receive the orders and instructions, or have a responsible agent /representative duly accredited in writing present for the purpose. Orders given to the Contractor's agent/ representative shall be considered to have the same force as if they had been given to the Contractor himself. The Contractor shall give not less than **three days** notice in writing to the Engineer's Representative before covering up or otherwise placing beyond the reach of inspection and measurement any work in order that the same may be inspected and measured. In the event of breach of the above the same shall be uncovered at the Contractor's expenses for carrying out such measurement or inspection.

3.2 No materials shall be removed from the site before obtaining the approval in writing of the Engineer. The Contractor is to provide at all times during the progress of the work and the maintenance period proper means of access with ladders, gangways, etc. and the necessary attendance to move and adopt as directed for inspection or measurement of the works by the Engineer's Representative.

3.3 The Contractor shall make available to the Engineer's Representative free of cost all necessary instruments and assistance in checking of setting out of works and checking of any works made by the Contractor for the purpose of setting out and taking measurements of works.

3.4 Nothing in this clause shall in any way relieve the contractor from any warranty or other obligations under the contract.

4.0 Sub-letting of Work:

4.1 The Contractor shall not sub-let the whole of the works. Except where otherwise provided by the Contract, the Contractor shall not sub-let any part of the works without prior written consent of the Engineer, which shall not be unreasonably withheld, and such consent, 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 negligence of any sub-contractor, his agents, servants or workmen as fully as if they were the acts, defaults or negligence of the Contractor, his agents, servants or workmen, provided always that the provision of labour on a piece work basis shall not be deemed to be a sub-letting under this clause.

CONTRACT DOCUMENT

5.0 Language and Law of Contract:

5.1 i) All written material and correspondence shall be in **English.**
ii) The law to which the Contract is to be subjected and according to which the Contract is construed, shall be the law being in force in India and/or the state where the Contract shall be performed.

5.2 Documents Mutually Explanatory:

Except if and to the extent otherwise provided by the Contract, the provisions of the General Conditions and Special Conditions of the Contract shall prevail over those of any other documents forming part of the Contract. Several documents forming the Contract are to be taken as mutually explanatory. Should there be any discrepancy, inconsistency, error or omission in the Contracts or any of them the matter may be referred to Engineer who shall give his decisions and issue to the Contractor instructions, directing in what manner the work is to be carried out. The decision of the Engineer shall be final and cofectnclusive, and the Contractor shall carry out the work in accordance with this decision.

5.3 Works shown upon the drawing but not mentioned in the specifications or described in the specifications without being shown on the drawings shall nevertheless be held to be included in the same manner as if they had been specifically shown upon the drawings and described in the specifications.

6.0 Drawings: their Purpose and the Custody:

6.1 The Contract drawings read together with the Contract specifications are intended to show and explain the manner of executing the work and to indicate the type and the class of materials to be used.

6.2 In case any feature of the work is not set forth in the drawings and specifications, the Contractor shall forthwith apply to the Engineer for further instructions, drawings or specifications.

6.3 The drawings shall remain in the sole custody of the Engineer, but two copies shall be issued to the Contractor free of charge. One copy of the drawings, furnished to the Contractor as aforesaid, shall be kept by the Contractor on the site and the same shall at all reasonable times be available for inspection and use by the Engineer or the Engineer's Representative and by any other person authorized by the Engineer in writing. At the completion of the Contract the Contractor shall return to the Engineer all drawings issued under the Contract. The drawings and specifications issued are sole property of the Purchaser/ Consultants and these can not be reproduced/ copied or used for any other works without a written consent of the Purchaser/ Consultant.

6.4 The Contractor shall give written notice to the Engineer whenever planning or progress of the works is likely to be delayed unless any further drawing or instruction is issued by the IDMC LTD/ Engineer within a reasonable time. The notice shall include the detail of the drawing or instruction required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

6.5 The contractor shall submit the following information, in triplicate, to the Engineer for approval within the time stipulated against each item below:

a) A general layout plan of construction plant and equipment for the execution of work within **fourteen days** from the date of notice to proceed with the work; and

b) drawings or prints showing the location of major plants and other facilities which he proposes to put up at the site, including any changes in the general layout, at least **fourteen days** prior to the commencement of the respective work.

7.0 Further Drawings and Instructions:

7.1 The Engineer may also authorize his representatives to perform his duties and functions. The Contractor shall carry out and be bound by the same. The Engineer shall have full powers and authority to supply to the Contractor from time to time, during the progress of the works, such further drawings and instructions as shall be necessary for the proper execution of the project.

GENERAL OBLIGATIONS

8.0 Contractor's General Responsibilities:

8.1 The Contractor shall, subject to the provisions of the Contract, and with due care and diligence, execute and maintain the Works and

provide all labour, including the supervision thereof, materials, Construction Plant and all other things, whether of a temporary or permanent nature, required in and for such execution and maintenance, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

8.2 The Contractor shall take full responsibility for the adequate stability and safety of all site operations and methods of construction, provided that the Contractor shall not be responsible, except as may be expressly provided in the Contract, for the design or specification of the Permanent Works, or for the design or specification of any Temporary Works prepared by the Engineer.

9.0 Contract Agreement:

9.1 The Contractor shall be called upon so to do enter into and execute a Contract Agreement, in the form provided at **Section VIII (Form of Agreement)** with such modification as may be necessary.

10.0 Performance Security:

10.1 Within **30 days** of the receipt of the notification of the Award of the Contract from the IDMC LTD the successful bidder shall furnish to the IDMC LTD a performance security for an amount **of 5% (five percent)** of the total Contract cost.

10.2 The proceeds of the performance e security shall be payable to the IDMC LTD as compensation for any loss resulting from the Contractor's failure to complete his obligation under the Contract.

10.3 The performance security shall be **denominated** in Indian Rupees and shall be in any of the following forms:

a) A Demand draft drawn in favour of the IDMC Limited, payable at the place mentioned in the address of communication stated in the Invitation for Bid **(Section O).**

b) A Bank Guarantee issued by a Schedule commercial banks in India. The acceptable form shall be strictly as provided in **Section IX (Acceptable Forms OF Bank Guarantees)** of the Bidding documents.

10.4 The bank guarantee (B.G.) shall be valid for the entire period of Contract including the Period of Maintenance (defects liability period) **plus 3 months claim period**. The B.G. can be initially accepted for a period as per Banking norms, on written undertaking of contractor/ bidder that the BG shall be extended before its expiry & shall be kept

valid till Period of Maintenance (defects liability period) **plus 3 months claim period**. The validity of the bank guarantee shall be suitably extended in the event of extension of time of the Contract pursuant **to clause no. 44** herein.

10.5 The performance security shall be released by the IDMC LTD not later than **60 days** following the date of delivery of the Maintenance certificate by the Engineer.

10.6 In the event of increase in the Contract cost, in actual execution, proportionate additional performance security shall be provided by the Contractor or recovered from the subsequent payments due to the contractor.

10.7 In the event of decrease in the Contract cost the performance security shall be proportionately adjusted on the completion of the work.

10.8 No interest shall be paid by IDMC LTD for the amount deposited as Performance security with the IDMC LTD.

11.0 Inspection of Site:

11.1 The Contractor shall be deemed to have inspected and examined the site and its surroundings and information available in connection therewith and to have satisfied himself, before submitting his Tender, as to the form and nature thereof, including the sub-surface conditions, the hydrological and climatic conditions, the extent and nature of work and materials necessary for the completion of the Works, the means of access to the Site and accommodation he may require and, in general, shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Tender.

12.0 Sufficiency of Tender:

12.1 The Contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his Tender for the Works and of the rates and prices stated in the priced Schedule of Quantities and the Schedule of Rates and Prices, if any, which Tender rates and prices shall, except insofar, as it is otherwise provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper execution and maintenance of the Works.

13.0 Work to be to the Satisfaction of Engineer:

13.1 The Contractor shall execute and maintain the Works in strict accordance with the Contract to the satisfaction of the Engineer and shall comply with and adhere strictly to the Engineer's instructions and directions on any matter whether mentioned in the Contract or not, touching or concerning the Works. The Contractor shall take instructions and directions only from the Engineer.

14.0 Programme to be furnished:

14.1 The Contractor shall, after the acceptance of his Tender, submit to the Engineer for his approval a program showing the order of procedure in which he proposes to carry out the Works. The Contractor shall whenever be required by the Engineer, also provide in writing for his information a general description of the arrangements and methods which the Contractor proposes to adopt for the execution of Works.

14.2 If at any time it should appear to the Engineer that the actual progress of the Works does not conform to the approved program referred to in **sub-clause (1)** of this Clause, the Contractor shall produce, at the request of the Engineer, a revised programme showing the modifications to the approved programme necessary to ensure completion of the Works within the time for completion as defined in **Clause 43** hereof.

14.3 The submission to and approval by the Engineer of such programme or the furnishing of such particulars shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

14.4 The programme shall be reviewed and revised if required at three monthly intervals and shall include a chart of the principal quantities of work forecast for execution monthly and a schedule of payments expected to be made to the Contractor by the IDMC LTD.

15.0 Contractor's Superintendence:

15.1 The Contractor shall give or provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor, or a competent and authorized agent or representative approved of in writing by the Engineer, which approval may at any time be withdrawn, is to be constantly on the Works and shall give his whole time to the superintendence of the same. If such approval shall be withdrawn by the Engineer, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving written notice of such withdrawal, remove the agent from the Works and shall not thereafter

employ him on the Works in any capacity and shall replace him by another agent approved by the Engineer. Such authorized agent or representative shall receive, on behalf of the Contractor, directions and instructions from the Engineer.

16.0 Contractor's Employees:

16.1 The Contractor shall provide and employ on the Site in connection with the execution and maintenance of the Works:

a) Only such technical assistants as are skilled and experienced in their respective fields and sub-agents, foremen and leading hands as are competent to give proper supervision to the work they are required to supervise, and

b) Such skilled, semi-skilled and unskilled labour as is necessary for the proper and timely execution and maintenance of the Works.

16.2 It shall be the liability of the Contractor to remove forthwith from the works any personnel engaged by the Contractor, in or about the execution or maintenance of the works, who, misconduct himself or is incompetent or negligent in the proper performance of his duties or whose engagement is otherwise considered to be undesirable and such person shall not be again engaged upon the work. Any person so removed, by the Contractor, from the works shall be replaced, by the Contractor, as soon as possible by a competent substitute.

17.0 Setting-out:

17.1 The Contractor shall be responsible for the true and proper setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing and for the correctness, subject as above mentioned of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith. If at any time, during the progress of the Works, any error shall appear or arise in the position, levels dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer shall, at his own cost, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied in writing by the Engineer in which case the expense of rectifying the same shall be borne by the IDMC LTD. The checking of any setting-out orof any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the correctness thereof and the Contractor shall carefully protect and preserve all bench- marks, sight-rails, pegs and other things used in setting- out the Works.

18.0 Boreholes and Exploratory Excavation:

18.1 If, at any time during the execution of the Works, the Engineer shall require the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be ordered in writing and shall be deemed to be an addition ordered under the provision of **Clause 52** hereof, unless a provisional sum in respect of such anticipated works shall have been included in Schedule of Quantities.

19.0 Watching and Lighting:

19.1 The Contractor shall in connection with the Works provide and maintain at his own cost all lights, guards, fencing and watching when and where necessary or required by the Engineer, for the protection of the Works, or for the safety and convenience of the public or others.

20.0 Care of Works:

20.1 From the commencement of the Works until the date stated in the Certificate of Completion for the whole of the Works pursuant to **Clause 49** hereof the Contractor shall take full responsibility for the care thereof. Provided that if the Engineer shall issue a Certificate of Completion in respect of any part of the Permanent Works the Contractor shall cease to be liable for the care of that part of the Permanent Works from the date stated in the Certificate of Completion in respect of that part and the responsibility for the care of that part shall pass to the Owner/ IDMC LTD. Provided further that the Contractor shall take the full responsibility for the care of any outstanding work which he shall have undertaken to finish during the Period of maintenance until such outstanding work is completed. In case any damage, loss or injury shall happen to the Works, or to any part thereof, from any cause whatsoever, save and except the excepted risks as defined in **clause 20.3,** while the Contractor shall be responsible for the care thereof the Contractor shall, at his own cost, repair and make good the same, so that at completion the Permanent Works shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer's instructions. In the event of any such damage, loss or injury happening from any of the excepted risks, the Contractor shall, if and to the extent required by the Engineer and subject always to the provision of **Clause 66** hereof, repair and make good the same as aforesaid at the cost of the IDMC LTD. The Contractor shall also be liable for any damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of completing any outstanding work or complying with his obligations under **Clause 50 or 51** hereof.

20.2 The Contractor shall not demolish, remove or alter the structures, trees or other facilities on the site without the prior approval of the Engineer.

20.3 Excepted Risks:

The "excepted risks" are war, hostilities (whether war be declared or not), invasion, act of foreign enemies, rebellion, revolution insurrection or military or usurped power, civil war, or unless solely restricted to employees of the Contractor or of his sub-contractors and arising from the conduct of the Works, riot, commotion or disorder, or a cause solely due to the Engineer's design of the Works, or ionizing radiation or contamination by radio-activity from any nuclear fuel or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive, nuclear assembly or nuclear component thereof, pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds, or any such operation of the forces of nature as an experienced Contractor could not foresee, or reasonably make provisions for or insure against all of which are herein collectively referred to as "the excepted risks".

21.0 Insurance of Works, etc.:

21.1 Without limiting his obligations and responsibilities, the Contractor shall **prior to** the commencement of the Works **(as per appendix-I, Section-V)** insure in the joint names of the Service Recipient and the Contractor by naming Service Recipient as the beneficiary against all losses or damages from whatever cause arising, other than the excepted risks, for which he is responsible under the terms of the Contract and in such manner that the Service Recipient and the Contractor are covered for the period stipulated for loss or damage arising from a cause, occurring prior to the commencement of the Period of maintenance. The realized claim amount by Service Recipient shall be reimbursed to the contractor after making good of the damages by the contractor. **Copy of the insurance policies shall be submitted prior to commencement of the work.**

a) The Works for the time being executed to the estimated current Contract cost thereof **plus 10 percent** thereon to allow for any additional costs and professional fees resulting from the loss or damage.

b) The Constructional Plant and other things brought on to the Site by the Contractor to the replacement value of such Constructional Plant and other things.

c) It shall be the responsibility of the Contractor to notify the insurer of any change in nature and extent of the Works and to ensure the adequacy of the insurance cover at all times in accordance with the provisions of this Clause.

Such insurance shall be effected with an insurer and the Contractor shall, produce to the Engineer/IDMC LTD the policy or policies of insurance and the receipts for payments of the current premiums.

22.0 Damage to Persons and Property:

22.1 The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the IDMC LTD against all losses and claims in respect of injuries or damage to any person or material or physical damage to any property whatsoever which may arise out of or in consequence of the execution and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect of or in relation thereto except any compensation or damages for or with respect to:-

a) The permanent use or occupation of land by the Works or any part thereof.

b) The right of the IDMC LTD to execute the Works or any part thereof on, over, under, in or through any land.

c) Injuries or damage to persons or property which are the unavoidable result of the execution or maintenance of the Works in accordance with the Contract.

d) Injuries or damage to persons or property resulting from any act or neglect of the Engineer or other Contractors, not being employed by the Contractor, or for or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or where the injury or damage was contributed to by the Contractor, his servants or agents such part of compensation as may be just and equitable having regard to the extent of the responsibility of the Engineer or other Contractors for the damage or injury.

22.2 The contractor shall indemnify the IDMC LTD/Purchaser/Owner against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the provision to **sub-clause (1)** of this Clause.

23.0 Third Party Insurance:

23.1 Before commencing the execution of the Works the Contractor, but without limiting his obligations and responsibilities under **Clause 22** hereof, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property, including that of the owner/ IDMC LTD, or to any person, including any employee of the owner/ IDMC LTD, or by arising out of the execution of Works or in the carrying out of the Contract, otherwise than due to the matters, referred to in the provision to **Clause 22.1** hereof.

23.2 Such insurance shall be effected with an insurer. The Contractor shall, produce to the Engineer/ IDMC LTD the policy or policies of insurance and the receipts for payment of the current premiums.

23.3 The terms shall include a provision whereby, in the event of any claim in respect of which the Contractor would be entitled to receive indemnity under the policy being brought or made against the IDMC LTD, the insurer will indemnify the IDMC LTD against such claims and any costs, charges and expenses in respect thereof.

23.4 Such insurance shall be for 10 % of the value of works with number of occurrence unlimited.

24.0 Accident or Injury to Workmen:

24.1 The IDMC LTD shall not be liable for or in respect of any damages or compensation payable at law in respect or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any sub- Contractor. The Contractor shall indemnify and keep indemnified the IDMC LTD against all such damages and compensation, save and except as aforesaid, and against all claims, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto. Where any case is instituted against the IDMC LTD, the Contractor shall implead himself as a party asif the case has been instituted against the Contractor.

24.2 The Contractor shall insure against such liability with an insurer and shall continue such insurance during the whole of the time that any persons are employed by him on the Works and shall, produce to the Engineer/ IDMC LTD such policy of insurance and the receipts for the payment of the current premium. Provided always that, in respect of any persons employed by any sub-contractor, the Contractor's obligation to insure as aforesaid under this sub-clause shall be satisfied if the sub-contractor shall have insured against the liability in respect of such persons in such manner that the IDMC LTD is indemnified under the policy, but the Contractor shall require such sub-contractor

to produce to the Engineer/ IDMC LTD such policy of insurance and receipt for the payment of the current premium.

24.3 Employee State Insurance (ESI) Act:

The Contractor shall accept full and exclusive liabilities for the compliance with all obligations imposed by the ESI Act 1948, and the Contractor shall further defend, indemnify and hold the Owner/IDMC LTD harmless from any liabilities or penalties which may be imposed by the Central, State or local authorities by reason of any asserted violation by Contractor or sub-contractor of the ESI Act, 1948 and also from all claims, suits or proceedings that may be brought against the Owner/IDMC LTD arising under, growing up or by reason of the work provided for by this Contract whether brought by the employees of the Contractor, by the third parties, or by Central or State Govt. authorities or any political sub-division thereof. The Contractor shall fill in with the ESI the declaration form and all other forms which may be required in respect of the Contractor's or sub-contractor's employees and who are employed by for the works provided for or those covered by ESI from time to time under the agreement. The Contractor shall deduct and secure the agreement of the sub-contractor and deduct the employees contribution as per the first schedule of the ESI Act from wages and affix the employees' contribution cards at wages payment intervals. The Contractor shall remit and secure that agreement of the sub- contractor to remit, the employees contribution as required by the Act. The Contractor shall maintain all codes and records as required under Act in respect of the employees and payment and the Contractor shall secure the agreement of the sub-contractor to maintain such records. Any expense incurred for the contribution or maintaining records shall be to the Contractor's account.

The Owner/IDMC LTD shall retain such amount as may be necessary from the total Contract cost until the Contractor shall furnish satisfactory proof the whole contribution as required by the ESI Act have been paid.

25.0 Remedy on Contractor's Failure to Insure:

25.1 The contractor shall not start work at site without prior written consent/ permission accorded by the site engineer which shall not be accorded in absence of, inter-alia, the required insurance policies. However, if the contractor fails to effect and keep in force the required insurance policies and commences work without authorization, the Contractor shall be solely responsible for any damage or loss.

In addition to this, the failure of the contractor in meeting the above requirements would result in the following penalties:

a) A penalty @ 0.05% of the contract value shall be imposed (by way of deductions from his bills) on the contractor if the contractor fails to submit the required insurance policy and starts work without due authorization.

b) If the contractor fails to extend/renew any of the existing insurance policies before expiry, for every default in any of the insurance policy a penalty @ 0.05% of the contract value shall be imposed (by way of deductions from his bills) on the contractor. The maximum penalty for such defaults would be limited to 0.10%of the contract value.

26.0 Giving of Notices and Payment of Fees:

26.1 The Contractor shall give all notices and pay all fees required to be given or paid by any National or State Statute, Ordinance, or Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution of the Works and by the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works.

26.2 The Contractor shall conform in all respects with the provisions of any such Statute, Ordinance or Law as aforesaid and the regulations or bye-laws of any local or other duly constituted authority which may be applicable to the Works and with such rules and regulations of public bodies and companies as aforesaid and shall keep the IDMC LTD

indemnified against all penalties and liability of every kind for breach of any such Statute, Ordinance or Law, regulation or bye-law.

26.3 The IDMC LTD will repay or allow to the Contractor all such sums as the Engineer/IDMC LTD shall certify to have been properly payable and paidby the Contractor in respect of such fees.

27.0 Fossils, etc.:

27.1 All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the site of the Works shall as between the IDMC LTD andthe Contractor be deemed to be the absolute property of the IDMC LTD. The Contractor shall take precautions to prevent his workmen or any other persons from removing or damaging any such article or thingand shall immediately upon discovery thereof and, before removal, acquaint the Engineer of such discovery and carry out the Engineer's orders as to the disposal of the same.

28.0 Patent Rights and Royalties:

28.1 The Contractor shall save harmless and indemnify the IDMC LTD from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Constructional Plant, machine work, or material and for in connection with the Works or any of them and from and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto. Except where otherwise specified, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials required for the Works orany of them.

29.0 Interference with Traffic and Adjoining Properties:

29.1 All operations necessary for the execution of the Works shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with the convenience of the public, or the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the IDMC LTD or of any other person. The Contractor shall save harmless and indemnify the IDMC LTD in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters in so far as the Contractor is responsible therefore.

30.0 Extraordinary Traffic:

30.1 The Contractor shall use every reasonable means to prevent any of the highways or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his sub-contractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of plant and material from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such highways and bridges.

30.2 Should it be found necessary for the Contractor to move one or more loads of Constructional Plant, machinery or pre- constructed units or parts of units of work over a part of a highway or bridge, the moving whereof is likely to damage any highway or bridge unless special protection or strengthening is carried out, then the Contractor shall before moving the load on to such highway or bridge give notice to the concerned authority of the weight and other particulars of the load to be moved and his proposals for protecting or strengthening the said highway or bridge and obtain approval from that concerned authority at his own cost . He shall keep the Engineer informed of the action taken.

30.3 If during the execution of the Works or at any time thereafter the Contractor shall receive any claim arising out of the execution of the Works in respect of damage
or injury to highways or bridges he shall immediately report the same to the Engineer and thereafter shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the IDMC LTD in respect thereof and in respect of all claims, proceedings, damages, costs, charges and expenses in relation thereto.

30.4 Where the nature of the Works is such as to require the use by the Contractor of water-borne transport the foregoing provisions of this Clause shall be construed as though "highway" included a lock, dock, sea wall or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.

31.0 Opportunities for other Contractors:

31.1 The Contractor shall, in accordance with the requirements of the Engineer, afford all reasonable opportunities for carrying out their work to any other Contractors employed by the IDMC LTD/owner and their workmen and to the workmen of the IDMC LTD/owner and of any other duly constituted authorities who may be employed in the execution onor near the Site of any work not included in the Contract or of any Contract which the IDMC LTD may enter into in connection with or

ancillary to the Works. If, however, the Contractor shall, on the written request of the Engineer, make available to any such other Contractor, or to the IDMC LTD or any such authority, any roads or ways for the maintenance of which the Contractor is responsible, or permit the use by any such of the Contractor's scaffolding or other plant on the Site, or provide any other service of whatsoever nature for any such, theIDMC LTD shall pay to the Contractor in respect of such use or service such sum or sums as shall, in the opinion of the Engineer, be reasonable.

32.0 Contractor to Keep Site Clear:

32.1 During the progress of the Works the Contractor shall keep the site reasonably free from all unnecessary obstructions and shall store or dispose of any Constructional Plant and surplus materials and clear away and remove from the site any wreckage, rubbish or Temporary Works no longer required.,

33.0 Clearance of Site on Completion:

33.1 On the completion of the Works the Contractor, at his own cost, shall clear away and remove from the Site all Constructional Plant, surplus materials, rubbish and Temporary Works of every kind, and leave the whole of the Site and Works clean and in a workmanlike condition to the satisfaction of the Engineer. However for removal of surplus excavated earth & existing material, payment shall be made separately as per relevant tender item.

L A B O U R

34.0 Engagement of Labour:

34.1 The Contractor shall make his own arrangements for the engagements of all labour, local or otherwise, and, save insofar as the Contract otherwise provides, for the transport, housing feeding and payment thereof. The Contractor to the extent possible and reasonable to employ staff and labour with required qualifications and experience from source within India.

34.2 The Owner/IDMC LTD may at their own discretion and convenience make available at the site, land for Contractor's field office, godown, workshop and assembly yard required for the execution of the Contract. The Contractor shall at his own cost construct all these temporary buildings and provide suitable water supply and sanitary arrangement approved by the Engineer.

34.3 The personnel so engaged by the Contractor shall be the employees of the Contractor and there shall exist no probity of Contract between the personnel so engaged and the IDMC LTD/Owner.

34.4 On completion of the works undertaken by the Contractor, he shall remove all temporary buildings erected by him and have the site cleaned as directed by the Engineer. If the Contractor shall fail to comply with these requirements, the Engineer may at the expenses of the Contractor remove such surplus and rubbish materials and dispose off the same as he deems fit and get the site cleared as aforesaid; the Contractor shall forthwith pay the amount of all expenses so incurred and shall have no claim in respect of any such surplus material disposed off as aforesaid. The owner reserves the right to ask the Contractor any time during the tendency of the Contract to vacate the land by giving **7 days** notice without giving any reason.

34.5 Land for residential accommodation for staff and labour may be made available at the discretion of the IDMC LTD / Engineer.

34.6 The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer an adequate supply of drinking and other water for the use of the Contractor's staff and work people.

34.7 The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor, or drugs or permit any such importation, sale, gift, barter or disposal by his sub-contractors, agents or employees.

34.8 The Contractor shall not give, barter or otherwise dispose of to any person or person, any arms or ammunitions of any kind or permit the same as aforesaid.

34.9 The Contractor shall in all dealings with labour in his employment, have due regard to all recognized festivals, days of rest and religious or other customs.

34.10 In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

34.11 The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his

employees and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same. The Contractor shall be responsible to comply with the various labour laws such as **Contract Labour (R&A) Act, 1970, Payment of Wages Act, Minimum Wages Act, Provident Fund Act & Rules etc. in respect of the persons engaged by him.**

34.12 The Contractor shall be responsible for observance by his sub-contractors of the foregoing provisions.

35.0 Returns of Labour, etc.:

35.1 The Contractor shall submit to the IDMC LTD/Owner copies of the licence under the Contract Labour Act, if required and obtained by the Contractor and his Provident Fund Number. The Contractor shall, if required by the Engineer, also deliver to the Engineer a return in detail in such form and at such intervals as the Engineer may prescribe showing the supervisory staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Constructional Plant as the Engineer may require.

35.2 The Contractor shall not employ in connection with the works any person who has not **completed fifteen years of age.**

35.3 The Contractor shall in respect of labour employed by him comply with or cause to be complied with the provision of the various **labour laws and rules and regulations such as Contract Labour Act(R&A) Act, 1970, Payment of Wages Act, Minimum Wages Act, Provident Fund Act & Rules etc.** applicable to them in regard to all matters provided therein and shall indemnify the IDMC LTD in respect of all claims that may be made against the IDMC LTD for non-compliance thereof by the Contractor.

35.4 Notwithstanding anything contained herein, the Engineer may take such actions as may be necessary for compliance of the various labour laws and recover the costs thereof from the Contractor.

35.5 In the event of the Contractor committing a default or breach of any of the provisions of labour laws and rules and regulations as applicable, shall pay penalties as imposed by the statutory Authorities and shall indemnify and keep indemnified the IDMC LTD/Owner all such penalties and compensations.

MATERIALS AND WORKMANSHIP

36.0 Materials and Workmanship:

36.1 All materials and workmanship shall be of the respective kinds described in the Contract and in accordance with the Engineer's instructions and shall be subjected from time to time to such tests as the Engineer may direct at the place of manufacture or fabrication, or on the Site or at such other place or places as may be specified in the Contract, or at all or any of such places. The Contractor shall provide such assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used and shall supply samples of materials before incorporation in the Works for testing as may be selected and required by the Engineer.

36.2 All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Contract.

36.3 The cost of conducting any test ordered by the Engineer to ascertain the quality of the materials and the workmanship shall be borne by the Contractor.

37.0 Inspection of Operations:

37.1 The Engineer and any person authorized by him shall at all times have access to the Works and to all workshops and places where work is being prepared or from where materials, manufactured articles or machinery are being obtained for the Works and the Contractor shall afford every facility for and every assistance in or in obtaining the right to such access.

38.0 Examination of Work before covering up:

38.1 No work shall be covered up or put out of view without the approval of the Engineer and the Contractor shall afford full opportunity for the Engineer to examine and measure any work which is about to be covered up or put out of view and to examine foundations before permanent work is placed thereon. The Contractor shall give due notice to the Engineer whenever such work or foundations is or are ready or about to be ready for examination and the Engineer shall, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such foundations.

38.2 The Contractor shall uncover any part or parts of the Works or make openings in or through the same as the Engineer may from time to time direct and shall reinstate and make good such part or parts to the satisfaction of the Engineer. If any such part or parts have been put out of view after compliance with the requirement of **clause 38.1**

and are found to be executed in accordance with the Contract, the expenses of uncovering, making openings in or through, reinstating and making good the same shall be borne by the IDMC LTD, but in any other case all costs shall be borne by the Contractor.

39.0 Removal of Improper Work and Materials:

39.1 The Engineer shall during the progress of the Works have power to order in writing from time to time.

a) The removal from the Site, within such time or times as may be specified in the order, of any materials which, in the opinion of the Engineer, are not in accordance with the Contract.

b) The substitution of proper and suitable materials and

c) The removal and proper re-execution, notwithstanding any previous test thereof or interim payment therefore, of any work which in respect of materials or workmanship is not, in the opinion of the Engineer, in accordance with the Contract.

39.2 In case of default on the part of the Contractor in carrying out such order, the IDMC LTD shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the IDMC LTD or may be deducted by the IDMC LTD from any payment due or which may become due to the Contractor.

40.0 Suspension of Work:

40.1 The Contractor shall, on the written order of the Engineer, suspend the progress of the Works or any part thereof for such time or times and in such manner as the Engineer may consider necessary and shall during such suspension properly protect and secure the work, so far as is necessary in the opinion of the Engineer. The extra cost incurred by the Contractor in giving effect to the Engineer's instructions under this Clause shall be borne and paid by the IDMC LTD unless such suspension is:

a) Otherwise provided for in the Contract, or
b) Necessary by reasons of some default on the part of the Contractor, or
c) Necessary by reason of climatic conditions on the Site, or
d) Necessary for the proper execution of the Works or for the safety of the Works or any part thereof insofar as such necessity does not arise from any act or default by the Engineer or the IDMC LTD or fromany of the excepted risks defined in **Clause 20** hereof.

Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives written notice of his intention to claim to the Engineer within **fifteen days** of the Engineer's order. The Engineer shall settle and determine such extra payment and/or extension of time under **Clause 44** hereof to be made to the Contractor in respect of such claim as shall, in the opinion of the Engineer, be fair and reasonable.

40.2 If the progress of the Works or any part thereof is suspended on the written order of the Engineer and if permission to resume work is not given by the Engineer within a period of **ninety days** from the date of suspension then, unless such suspension is within paragraph (a), (b), (c) or (d) of sub-clause (1) of this Clause, the Contractor may serve a written notice on the Engineer requiring permission within **twenty-eight days** from the receipt thereof to proceed with the Works, or that part thereof in regard to which progress is suspended and, if such permission is not granted within the time, the Contractor by a further written notice so served may, but is bound to, elect or treat the suspension where it affects only part of the Works as an omission of such part under **Clause 52** hereof, or, where it affects the whole Works, as an abandonment of the Contract by the Service Recipient/ IDMC LTD.

COMMENCEMENT TIME AND DELAYS

41.0 Commencement of Works:

41.1 The Contractor shall commence the Works on Site within the period named in the **Appendix to the Tender (Form of Bid)** after the receipt by him of a written order to this effect from the Engineer and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer, or be wholly beyond the Contractor's control.

42.0 Possession of Site:

42.1 Save insofar as the Contract may prescribe, the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order in which such portions shall be made available to him and, subject to any requirement in the Contract as to the order in which the Works shall be executed, the IDMC LTD will, with the Engineer's written order to commence the Works, give to the Contractor

possession of so much of the Site as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in **Clause 14** hereof, if any, and otherwise in accordance with such reasonable proposals of the Contractor as he shall, by written notice to the Engineer, make and will, from time to time as the Work proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with the said programmes or proposals, as the case may be. If the Contractor suffers delay from the failure on the part of the IDMC LTD to give possession in accordance with the terms of this Clause, the Engineer shall grant an extension of time for the completion of the Works as, in his opinion shall be fair.

42.2 The Contractor shall bear all costs and charges for special or temporary way leaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional accommodation outside the Site required by him for the purposes of the Works.

43.0 Time for Completion:

43.1 Subject to any requirement in the Contract as to completion of any section of the Works before completion of the whole, the whole of the Works shall be completed, in accordance with the provisions of **Clause 49** hereof, within the time stated in the Contract or such extended time as may be allowed under **Clause 44** hereof.

43.2 Upon acceptance of the bid, the contractor shall submit to the Purchaser/IDMC LTD for his approval a comprehensive work programme in the form of **Bar chart** indicating the critical activities as well. After approval by the Purchaser/IDMC LTD, the contractor shall strictly adhere to the sequence of activities stated therein. The contractor shall review the actual progress of work in each month, in relation to the approved programme and shall inform the Purchaser/IDMC LTD. The submission to and approval by the Purchaser/IDMC LTD of the programme shall not relieve the contractor of any of his duty and responsibility under the contract.

43.3 Time is the essence of the contract to the responsive bidder.

44.0 Extension of Time of Completion:

44.1 Should the amount of extra or additional work of any kind or any cause of delay referred to in these Conditions, or exceptional adverse climatic conditions, or other special circumstances of any kind whatsoever which may occur, other than through a default of the Contractor, be such as fairly to entitle the Contractor to an extension of time for the completion of the Works, the Engineer shall determine

the amount of such extension and shall notify the IDMC LTD and the Contractor accordingly. Provided that the Engineer is not bound to take in account any extra or additional work or other special circumstances unless the Contractor has within thirty days after such work has been commenced, or such circumstances have arisen, or as soon thereafter as is practicable, submitted to the Engineer full and detailed particulars of any extension of time to which he may consider himself entitled in order that submission may be investigated at the time.

45.0 No Night Work:

45.1 Subject to any provision to the contrary contained in the Contract, none of the Permanent Works shall, save as hereinafter provided, be carried on during the night without the permission in writing of the Engineer except when the work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer. Provided always that the provisions of this Clause shall not be applicable in the case of any work which it is customary to carry out by rotary or double shifts.

46.0 Rate of Progress:

46.1 If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any section is at any time, in the opinion of the Engineer, too slow to ensure completion by the prescribed time or extended time for completion, the Engineer shall so notify the Contractor in writing and the Contractor shall thereupon take such steps as are necessary and the Engineer may approve to expedite progress so as to complete the Works or such section by the prescribed time or extended time. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Engineer under this Clause, the Contractor shall seek the Engineer's permission to do any work at night, such permission shall not be unreasonably refused.

47.0 Liquidated Damages for Delay:

47.1 If the Contractor shall fail to achieve completion of the Works within the time prescribed in the **Appendix to the Form of Bid,** then the Contractor shall pay to the IDMC LTD the sum at the rate **of 0.5% (zero point five percent)** of the amended up-to date total contract cost as liquidated damages for such default and not as a penalty for **each completed week** (week comprising of **7 days** including holidays and any incomplete week shall be ignored for the calculation of liquidated damages) which shall elapse between the time prescribed by **clause**

43 hereof and the date of certified completion of the particular Works. The IDMC LTD may without prejudice to any other method of recovery, deduct the amount of such damages from any payment in its hands, due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

47.2 The aggregate maximum of the liquidated damages payable to the IDMC LTD under this clause shall be subject to a maximum **of 10% (ten percent) of the total order / Contract cost** (i.e. value indicated in letter of acceptance or any subsequent amendment, accepted by the contractor).

47.3 If, before the completion of the whole of the Works any part or section of the Works has been certified by the Engineer as completed, pursuant to **Clause 49** hereof, and occupied by the Owner/IDMC LTD, the liquidated damages for delay shall, for any period of delay after such certificate be reduced in the proportion which the value of the part or section so certified bears to the value of the whole of the Works.

47.4 The criteria for deriving the liquidated damage shall be the actual value of works executed and the amended time of completion.

48.0 Bonus For Early Completion: NOT APPLICABLE FOR THIS CONTRACT.

49.0 Certification of Completion of Works:

49.1 When the whole of the Works have been virtually completed and have satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer accompanied by an undertaking to finish any outstanding work during the period of Maintenance. Such notice and undertaking shall be in writing and shall be deemed to be a request by the Contractor for the Engineer to issue a Certificate of Completion in respect of the Works. The Engineer shall, on receipt of such notice either issue to the Contractor, with a copy to the Service Recipient/IDMC LTD, a Certificate of Completion stating the date on which, in his opinion, the Works were virtually completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, requires to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting virtual completion that may appear after such

instructions and before completion of the works specified therein. The Contractor shall be entitled to receive such Certificate of Completion, or on the completion, to the satisfaction of the Engineer, of the works so specified and making good any defects so notified.

49.2 Similarly, in accordance with the procedure set out in **sub- clause (1)** of this Clause, the Contractor may request and the Engineer shall issue a Certificate of Completion in respect of :-

a) Any section of the Permanent Works in respect of which a separate time for completion is provided in the Contract and

b) Any substantial part of the Permanent Works which has been both completed to the satisfaction of the Engineer and occupied by the IDMC LTD/ Owner.

49.3 If any part of the Permanent Works shall have been virtually completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the Engineer may issue a Certificate of Completion in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete any outstanding work in that part of the Works during the Period of Maintenance.

49.4 Provided always that a Certificate of Completion given in respect of any section or part of the Permanent Works before completion of the whole shall not be deemed to certify completion of any ground or surfaces requiring reinstatement, unless such Certificate shall expressly so state.

MAINTENANCE AND DEFECTS (DEFECT LIABILITY)

50.0 Definition of Period of Maintenance:

50.1 In these conditions the expressions the expression "Period of Maintenance" shall mean the period of maintenance named in the appendix to the tender, calculated from the date of completion of the works, certified by the engineer in accordance with the **clause 49** hereof, or, in the event of more than one certificate having been issued by the engineer under the said clause, the period of maintenance the expression the " the works" shall be constructed accordingly.

50.2 To the intent that the works shall at or as soon as practicable after the expiry of the period of maintenance be delivered to the IDMC LTD in the condition required by the contract, fair wear and tear expected, tothe satisfactory of the engineer, the contractor shall finish the work, if

any, outstanding at the date of completion , as certified under the **clause 49** hereof, as soon as practicable after which date and shall execute all such work of repair, amendment, reconstruction, rectification and making good defects, imperfections, shrinkage or other faults as may be required of the Contractor in writing by the Engineer during the Period of Maintenance, or **within fifteen days** after its expiry as a result of an inspection made by or on behalf of the Engineer prior to its expiry.

50.3 All such work shall be carried out by the Contractor at his own expense if the necessity thereof shall, in the opinion of the Engineer, be due to the use of materials or workmanship not in accordance with the Contract, or to neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract.

50.4 If the Contractor shall fail to do any such work as aforesaid required by the Engineer, the Service Recipient/ IDMC LTD shall be entitled to employ and pay other persons to carry out the same and if such work is work which in the opinion of the Engineer, the Contractor was liable to do at his own expense under the Contract, then all expenses consequent thereon or incidental thereto shall be recoverable from the Contractor by the Service Recipient/ IDMC LTD or may be deducted by the Service Recipient/ IDMC LTD from any payment due or which may become due to the Contractor.

50.5 The defect liability period shall be 12 months from the date of completion of work as per clause – 49.

51.0 Contractor to Search:

51.1 The Contractor shall, if required by the Engineer in writing, search under the direction of the Engineer for the cause of any defect, imperfection or fault appearing during the progress of the Works or in the Period of Maintenance. Unless such defect, imperfection or fault shall be one for which the Contractor is liable under the Contract, the cost of the work carried out by the Contractor in searching as aforesaid shall be borne by the Service Recipient/ IDMC LTD. If such defect, imperfection or fault shall be one for which the Contractor is liable as aforesaid, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case repair, rectify and make good such defect, imperfection or fault at his own expense in accordance with the provisions of **Clause 50** hereof.

ALTERATIONS, ADDITIONS AND OMISSIONS

52.0 Variations:

52.1 The Engineer shall make any variations of the form, quality or quantity of the Works or any part thereof that may, in his opinion, be necessary and 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 any of the following :-

a) Increase or decrease the quantity of any work included in the Contract,

b) Omit any such work,

c) Change the character or quality or kind of any such work,

d) Change the levels, lines, position and dimensions of any part of the Works, and

e) Execute additional work of any kind necessary for the completion of the Works,

f) Change any specified sequence, method or timing of construction of any part of the works,

No such variation shall in any way vitiate or invalidate the Contract, but the value, if any, of all such variations shall be taken into account in ascertaining the amount of the Contract Price.

52.2 No such variations shall be made by the Contractor without an order in writing of the Engineer. 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 not the result of an order given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Schedule of Quantities. Provided also that if for any reason the Engineer shall consider it desirable to give any such order verbally, the Contractor shall comply with such order and any confirmation in writing of such verbal order given by the Engineer, whether before or after the carrying out of the order, shall be deemed to be an order in writing within the meaning of this clause. Provided further that if the Contractor shall within seven days confirm in writing to the Engineer and such confirmation shall not be contradicted in writing within fourteen days by the Engineer, it shall be deemed to be an order in writing by the Engineer.

53.0 Valuation of Variations:

53.1 All extra or additional work done or work omitted by order of the Engineer shall be valued at the rates and prices set out in the

Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the extra or additional work, then suitable rates or prices shall be agreed upon between the Engineer and the Contractor. For settling the rates of the extra items, the contractor's cost for overheads and profits shall be taken as **15% (fifteen percent)** of the materials, labour cost etc.. In the event of disagreement the Engineer shall fix such rates or prices as shall, in his opinion, be reasonable and proper.

53.2 Provided that if the nature or amount of any omission or addition relative to the nature or amount of the whole of the Works or to any part thereof shall be such that, in the opinion of the Engineer, the rate or price contained in the Contract for any item of the Works is, by reason of such omission or addition, rendered inapplicable, then a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In case of disagreement the Engineer shall work out and fix the rate or the price.

53.3 In case of any class of work for which there is not such specification supplied by the Owner/Service Recipient/IDMC LTD as is mentioned in the tender documents such work shall be carried out in accordance with Indian Standard Specifications and if the I.S.S. do not cover the same the work should be carried out as per the standard Engineering practice subject to the approval of the Engineer.

Provided also that no increase or decrease under **clause 53.1** or variation of rate or price under **clause 53.2** of shall be made unless, as soon after the date of the order as is practicable and, in the case of extra or additional work, before the commencement of the work or as soon thereafter as is practicable, notice shall have been given in writing:-

a) By the Contractor to the Engineer of his intention to claim extra payment or a varied rate or price or

b) By the Engineer to the Contractor of his intention to vary a rate or price.

53.4 If, on certified completion of the whole of the works, it shall be found that a reduction or increase greater than **25 (Twenty-five) per cent** of the sum named in the Letter of Acceptance, results from:-

a) The aggregate effect of all Variation Orders, and

b) All adjustments upon measurement of the estimated quantities set out in the Schedule of Quantities,

But not from any other cause, the amount of the Contract Price shall be adjusted by such sum as may be agreed between the Contractor and the Engineer or, failing agreement, fixed by the Engineer having regard to all material and relevant factors, including the Contractor's site and general overhead costs of the Contract.

53.5 The Contractor shall send to the Engineer once in every month an account giving particulars, as full and detailed as possible, of all claims for any additional payment to which the Contractor may consider himself entitled and of all extra or additional work ordered by the Engineer which he has executed during the preceding month.

No final or interim claim for payment for any such work or expense will be considered which has not been included in such particulars. Provided always that the Engineer shall be entitled to authorize payment to be made for any such work or expense, notwithstanding the Contractor's failure to comply with this condition, if the Contractor has, at the earliest practicable opportunity, notified the Engineer in writing that he intends to make a claim for such work.

PLANT, TEMPORARY WORKS AND MATERIALS

54.0 Plant, etc., Exclusive Use for the Works:

54.1 All Constructional Plant, Temporary Works and materials provided by the Contractor shall, when brought on to the of the Works and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the site to another, without the consent, in writing, of the Engineer, which shall not be unreasonably withheld.

54.2 Upon completion of the Works the Contractor shall remove from the Site all the said Constructional Plant and Temporary Works remaining thereon and any unused materials provided by the Contractor.

54.3 The Service Recipient/ IDMC LTD shall not at any time be liable for the loss of or damage to any of the said Constructional Plant, Temporary Works or materials save as mentioned in **Clauses 20 and 66** hereof.

55.0 Approval of Materials, etc., not Implied:

55.1 The operation of **Clause 54** hereof shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to

therein nor shall it prevent the rejection of any such materials at any time by the Engineer.

MEASUREMENT

56.0 Quantities:

56.1 The quantities set out in the Schedule of Quantities **for Civil & IE** are the estimated quantities of the work, but they are not to be taken as the actual and exact quantities of the Works to be executed by the Contractor in fulfilment of his obligations under the Contract.

57.0 Works to be measured:

57.1 The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value in terms of the Contract of work done in accordance with the Contract. He shall, when he requires any part or parts of the Works to be measured, give notice to the Contractor's authorized agent or representative, who shall forthwith attend or send a qualified agent to assist the Engineer in making such measurement, and shall furnish all particulars required by either of them. Should the Contractor not attend, or neglect or omit to send such agent, then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of the work. For the purpose of measuring such permanent work as is to be measured by records and drawings, the Engineer shall prepare records and drawings month by month of such work and the Contractor, as and when called upon to do so in writing, shall, within fourteen days, attend to examine and agree such records and drawings with the Engineer and shall sign the same when so agreed. If the Contractor does not so attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree the same or does not sign the same as agreed, they shall nevertheless be taken to be correct, unless the Contractor shall, within fourteen days of such examination, lodge with the Engineer, for decision by the Engineer, notice in writing of the respects in which such records and drawings are claimed by him to be incorrect.

58.0 Method of Measurement:

58.1 The Works shall be measured net, as prescribed in the specification of works, notwithstanding any general or local custom, except where otherwise specifically described or prescribed in the Contract. Wherever not specifically mentioned in the Contract, the mode of measurement as prescribed in the relevant IS codes shall be applicable and binding to the Contract. A list of **ISS code of practices**, which shall be referred to in that event, is attached as **annex to the Section**

IV of Technical Specifications. Only the latest editions of all the codes of practices including all latest official amendments and revisions shall be applicable.

58.2 For measurement of items of work in foundation and plinth & in super structure the criteria shall be the plinth level of the individual buildings covered under this Contract.

NOMINATED SUB-CONTRACTORS

59.0 Definitions of "Nominated Sub-Contractors":

59.1 All specialists, merchants, tradesmen and others executing any work or supplying any goods, materials or services, who may have been or be nominated or selected or approved by the Service Recipient/ IDMC LTD or the Engineer, and all persons to whom by virtue of the provisions of the Contract the Contractor is required to sub-let any work shall, in the execution of such work or the supply of such goods, materials or services, be deemed to be sub-Contractors employed by the Contractor and are referred to in this Contract as "nominated Sub-Contractors".

59.2 The Contractor shall not be required by the Service Recipient/ IDMC LTD or the Engineer or be deemed to be under any obligation to employ any nominated Sub-Contractor against whom the Contractor may raise reasonable objection, or who shall decline to enter into a sub-contractwith the Contractor containing provisions :-

a) That in respect of the work, goods, materials or services the subject of the sub-contract, the nominated Sub- Contractor will undertake towards the Contractor the like obligations and liabilities as are imposed on the Contractor towards the Service Recipient/ IDMC LTD by the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoeverarising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities, and

b) That the nominated Sub-Contractor will save harmless and indemnify the Contractor from and against any negligence by the nominated Sub-Contractor, his agents, workmen and servants and from and against any misuse by him or them of any Constructional Plant or Temporary Works provided by the Contractor for the purposes of the Contractor and from all claims as aforesaid.

59.3 If in any connection with any Provisional Sum the services to be provided include any matter of design or specification of any part of

the permanent works or of any equipment or plant to be incorporated therein, such requirement shall be expressly stated in the Contract and shall be included in any nominated Sub-Contract. The nominated Sub-Contract shall specify that the nominated Sub-Contractor providing such services will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection with any failure to perform such obligations or to fulfil such liabilities.

59.4 For all work executed or goods, materials, or services supplied by any nominated Sub-Contractor, there shall be included in the Contract Price:-

a) The actual price paid or due to be paid by the Contractor, on the direction of the Engineer, and in accordance with the Sub-Contract;

b) The sum, if any, entered in the Schedule of Quantities for labour supplied by the Contractor in connection therewith, or if ordered by the Engineer as may be determined in accordance with **Clause 53** hereof;

c) In respect of all other charges and profit, a sum being a percentage rate of the actual price paid or due to be paid calculated, where provision for such is made in a special item provided in the Schedule of Quantities for such purpose.

59.5 Before issuing, under **Clause 60** hereof, any certificate, which includes any payment in respect of work done or goods, materials or services supplied by any nominated Sub- Contractor, the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments, less retention, included in previous certificates in respect of the work or goods, materials or services of such nominated Sub-Contractor have been paid or discharged by the Contractor, in default whereof unless the Contractor shall

a) Inform the Engineer in writing that he has reasonable cause for withholding or refusing to make such payments and

b) Produce to the Engineer reasonable proof that he has so informed such nominated sub-contractor in writing,

the Service Recipient/ IDMC LTD shall be entitled to pay to such nominated sub- contractor direct, upon the certificate of the Engineer, all payments, less retention, provided for in the sub-contract, which the Contractor has failed to make to such nominated sub-contractor and to deduct by way of set-off the amount so paid by the Service

Recipient/ IDMC LTD from any sums due or which may become due from the Service Recipient/ IDMC LTD to the Contractor. Provided always that, where the Engineer has certified and the Service Recipient/ IDMC LTD has paid direct as aforesaid, the Engineer shall in issuing any further certificate in favour of the Contractor deduct from the amount thereof the amount so paid, direct as aforesaid, but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

59.6 In the event of a nominated sub-contractor, as hereinbefore defined, having undertaken towards the Contractor in respect of the work executed, or the goods, materials or services supplied by such nominated sub-contractor, any continuing obligation extending for a period exceeding that of the Period of Maintenance under the Contract, the Contractor shall at any time, after the expiry if the Period of Maintenance, assign to the Service Recipient/ IDMC LTD, at its request and cost, the benefit of such obligation for the unexpired duration thereof.

CERTIFICATE AND PAYMENT

60.0 Interim Payment Certificate:

60.1(a) The Contractor shall submit a bill or shall submit measurement of works executed for the preparation of the bill on computer of Service Recipient/ IDMC LTD for interim payment in 3 copies to the Engineer on a specified date in each month in a form approved by the Engineer. The bill for interim payment shall include the following items, as applicable, which shall be taken in to account in the sequence listed:-

i) The estimated Contract cost of the Permanent Works executed since the submission of the last bill, obtained by applying the base unit rates and prices in the Schedule of Quantities measured by the Engineer pursuant to **clause 57.** Additional part payment of an item in respect of initial part certification shall be admissible in the interim payment bill.

ii) The estimated Contract cost of the Permanent Works as obtained above executed up to the previous bill;

iii) The cumulative estimated Contract cost at base unit rates and prices of the Permanent Works up to the bill in question obtained by adding (i) and (ii) ;

iv) The cumulative amounts approved in respect of extra items executed up to the bill in question, obtained by applying the rates approved.

v) An amount reflecting any changes in cost pursuant to **clause 71 (Refer Clause 11.5 of Vol I Section I of this bidding document)** hereof;

vi) Any amount to be withheld under the retention provisions of **clause 60.3;**

vii) Any credit or debit for the period in question in respect of materials on site intended for, but not yet incorporated in , the Permanent Works in the amount and under the conditions set forth in **clause 60.2;**

viii) Any amount to be deducted on account of the mobilization advance under the provisions set forth in **clause 60.5.**

ix) Any other sum to which the Contractor may be entitled under the Contract.

x) Deductions of Income tax shall be made on the gross amount of each bill as per the provision of the Income tax Act.

xi) Any amount to be deducted on account of water charges and power supply, if any, pursuant to **clause 5.4 & 6.2 of Section III, Special Conditions of Contract.**

xii) Any amount to be deducted on account of materials issued to the Contractor pursuant to **clause 7.1 of section III, Special Conditions of Contract.**

60.1(b)

Within a reasonable period or any other agreed period of the receipt of the said bill with all required supporting documents for interim payment, it shall be approved or amended such that, in the Engineer's opinion, the certificate reflects the amount due to the Contractor in accordance with the Contract. In cases where there is difference of opinion as to the value of any item, the Engineer's view shall prevail. IDMC shall verify the RA bills/Invoices and process the payment of each certified bill/Invoices amount as per Special conditions of the contract (SSC clause No. – 9.0)

60.2 Secured Advance for Material: (Not Applicable)

~~The Contractor shall be entitled to such sum as the Engineer may consider proper in respect of materials intended for but not yet incorporated in the Permanent Works provided that:~~

~~The materials are in accordance with the specification for the Permanent Works;~~

~~**a)** Such materials have been delivered to the site, and are properly stored and protected against loss or damage or deterioration to the satisfaction of the Engineer;~~

~~**b)** The Contractor's records of the requirements, orders, receipts and the use of materials are kept in a form approved by the Engineer and such records shall be available for inspection by the Engineer;~~

~~**c)** The Contractor shall submit with his running bill, the estimated value of the materials on site together with such documents as may be required by the Engineer for the purpose of the valuation of materials and providing evidence of ownership and payment therefore ;~~

~~**d)** The ownership of such materials shall be deemed to vest in the Service Recipient; and~~

~~**e)** Secured advance, against an undertaking in the prescribed format can be paid up to 90% of value of the material applicable only for cement, Reinforcement steel & Structural steel brought and physically available at site. The value of such secured advance shall be worked out on the basis of basic rate available in purchase order or invoice rate of building material. The lower valueof the two shall be payable as secured advance against material available at site. In case basic rate of building material is not indicated/ available in the purchase order, the value of such secured advance shall be worked out on the basis of invoice rate of building material. **The advance on material shall be recovered as soon as material is used & billed by vendor/bidder.**~~

~~**f)** The contractor shall have to sign & give the undertaking given below for obtaining secured advance for material on site:~~

~~"Certified that the above material I/We have actually brought at the site and I/We have not previously received any advance on the same material. These materials are of imperishable nature and are actually required for use or work in connection with items for which rates for finished work have been agreed upon and agreement has been signed and executed. The above materials on which secured~~

advance is applied are our own property and free from encumbrances of any kind and I/We will indemnify the Board against all claims to any material in respect of which an advance has been made as aforesaid.

I/We shall made at my/our own cost all necessary and adequate arrangements for proper watch, safe custody and protection against all risks of the said materials and that until used in construction as per contract.

The said material shall remain at the site of the said work in the contractor's custody and on his own responsibility and shall at all times be open to inspection by the Board or any Officer authorized by them. In the event of the materials or any part thereof being stolen, destroyed or damaged or becoming deteriorated. I/We will forthwith replace same with other materials of like quality or repair and made good, the same as required by the Board.

It is hereby agreed and declared that notwithstanding anything in the contract agreement and without prejudice to the power contained therein if and whenever the convenient for payment and repayment herein before contained shall become enforceable and the money owing shall not be paid in accordance with the Board may at any time thereafter adopt all or any of the following courses as they may deem best:

a) Seize and utilize the said materials or any part thereof in the completion of the said works on behalf of the Contractor in accordance with the provisions in that behalf contained in the said agreement debiting the Contractors with the actual cost of effecting such completion and the amount due in respect of advances under these presents and crediting the Contractor with the value of work done as if he had carried it out in accordance with the said agreement and the rates thereby provided. If the balance is against the Contractor he is to pay same to the Board on demand.

b) Remove and sell by public auction the seized materials or any part thereof and out of the money arising from the sale retain all the sums aforesaid repayable or payable to the Board under these present and pay over the Surplus (if any) to the Contractor.

c) Deduct all or any part of the money owing out of the security deposit or any sum due to the Contractor under the said agreement.

Signature of the Contractor"

60.3 Retention Money:

a) A retention amounting to **5.0%** of the amount included in any monthly interim payment certificate pursuant to **clause 60.1** due to the Contractor on account of the Permanent Works executed by him shall be made by the Engineer in the first and following certificates until such time as the cumulative total of such deductions shall amount **to 5%** of the total actual value of Work to be done;

b) If the Contractor so requests, the Purchaser/Service Recipient/ IDMC LTD may pay the cumulative amount of retention money to the Contractor upon lodgment with the Service Recipient/ IDMC LTD of a Bank guarantee issued by a Nationalized Indian Bank or a foreign bank having branches in India**.** The acceptable form of Bank guarantee shall be strictly as given in **Section IX** of the bidding document.

c) Retention money in full shall be released to the Contractor upon successful completion of works along with full and final settlement of the contract. Provided always that, if at such time there shall remain to be executed by the Contractor any works ordered during such period pursuant to **clause 50 and 51 hereof**, the Purchaser/Service Recipient/ IDMC LTD shall be entitled to withhold payment until the completion of such works of so much of the balance of the retention money as shall, in the opinion of the Engineer, represent the cost of the works so remaining to be executed; and

d) No interest shall be paid by the Purchaser/Service Recipient/ IDMC LTD to the Contractor for the amount withheld as Retention Money.

e) The bank guarantee (B.G.) shall be valid for the entire period of Contract **plus 3 months claim period**. The B.G. can be initially accepted for a period as per Banking norms, on written undertaking of contractor/ bidder that the BG shall be extended before its expiry & shall be kept valid scheduled completion period stipulated in the contract **plus 3 months claim period**. The validity of the bank guarantee shall be suitably extended in the event of extension of time of the Contract pursuant **to clause no. 44** herein **plus 3 months claim period**.

60.4 The Engineer may by any Interim Payment Certificate make any corrections or modifications in any previous bills (other than one purporting to be a Final payment certificate) which shall have been

issued by him and shall have power to modify or withhold any Interim Payment Certificate if the works or any part thereof are not being carried out to his satisfaction.

60.5 Mobilization Advance Loan:

a) The Service Recipient/ IDMC LTD, if requested for, will make an advance loan to the Contractor for the costs of mobilization in respect of the works in a lump sum amount equivalent to **20%** of the Order/Contract price excluding the costs of the materials to be supplied by the Owner/Service Recipient/ IDMC LTD, always provided that the value of the Contract is more than **₹ 10 lakh**. Payment of the loan will be due under separate certification by the Engineer after;

i) Execution of the **Form of Agreement** by the parties thereto,

ii) Provision by the Contractor of the Performance Security in accordance with **clause 10** hereof, and

iii) Provision by the Contractor of a bank guarantee equivalent to 110% of advance amount, valid till the delivery period of contract issued by a Nationalized Indian Bank or a foreign bank having branches in India. The acceptable form of Bank guarantee shall be strictly as given in **Section IX** of the bidding document. The bank guarantee shall remain effective until the advance loan has been completely repaid by the Contractor out of current earnings under the Contract and certified accordingly by the Engineer.

b) The acceptable form of bank guarantee shall be as given in **Section IX** of bid document. The mobilization advance loan shall be free of interest.

c) Recovery towards mobilization advance paid shall be made proportionately **starting from the first interim RA Bill in a manner so as to recover the entire mobilization advance by the time 80% work is completed. In case the scope/value of work is reduced the % rate of recovery shall be enhanced suitably.**

d) The bank guarantee (B.G.) shall be valid for the entire period of Contract **plus 3 months claim period**. The B.G. can be initially accepted for a period as per Banking norms, on written undertaking of contractor/ bidder that the BG shall be extended before its expiry & shall be kept valid scheduled completion period stipulated in the contract **plus 3 months claim period**.

~~The validity of the bank guarantee shall be suitably extended in the event of extension of time of the Contract pursuant to clause no. 44 herein plus 3 months claim period.~~

60.6 All interim payments shall be treated as advance payments. On completion of the entire work, the Contractor shall submit his final bill. After verifying the final bill, the Service Recipient/ IDMC LTD will issue to the Contractor a statement (hereinafter called as the Final Account statement). The Contractor shall return the Final Account Statement duly signed as an acknowledgement of full and final value of work performed under the Contract and full & final settlement of the payment. On receipt of this statement back from the Contractor, the final payment shall be released.

61.0 Approval only by Maintenance Certificate:

61.1 No certificate other than the Maintenance Certificate referred to in **Clause 62** hereof shall be deemed to constitute approval of the Works.

62.0 Maintenance Certificate:

62.1 The Contract shall not be considered as completed until a Maintenance Certificate shall have been signed by the Engineer and delivered to the Service Recipient/ IDMC LTD stating that the Works have been completed and maintained to his satisfaction. The Maintenance Certificate shall be given by the Engineer after the expiry of the Period of Maintenance, or, if different periods of maintenance shall become applicable to different sections or parts of the Works, the expiry of thelatest such period, or as soon thereafter as any works ordered during such period, pursuant to **Clause 50 and 51 hereof,** shall have been completed to the satisfaction of the Engineer and full effect shall be given to this Clause, not withstanding any previous entry on the Works or the taking possession, working or using thereof or any part thereof by the Service Recipient/ IDMC LTD/Purchaser.

62.2 The Service Recipient/ IDMC LTD shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contractor the execution of the works, unless the Contractor shall have made a claim in writing in respect thereof before the issuance of the Maintenance Certificate under this Clause.

62.3 Notwithstanding the issue of the Maintenance Certificate the Contractor and, subject to **clause 62.2,** the Service Recipient/ IDMC LTD shall remain liable for the fulfilment of any obligation incurred under

the provisions of the Contract prior to the issue of the Maintenance Certificate which remains unperformed at the time such Certificate is issued and, for the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties hereto.

REMEDIES AND POWERS

63.0 Default of Contractor:

63.1 If the Contractor shall become bankrupt, or have a receiving order made against him, or shall present his petition in execution levied on his goods, or if the Engineer shall certify in writing to the Service Recipient/ IDMC LTD that in his opinion the Contractor: -

a) Has abandoned the Contract, or
b) Without reasonable excuse has failed to commence the works or has suspended the progress of the works for **28 days** after receiving from the Engineer written notice to proceed, or
c) Has failed to remove materials from the site or pull down and replace work for **30 days** after receiving from the Engineer written notice that the said materials or work had been condemned and rejected by the Engineer under these conditions, or
d) Despite previous warnings by the Engineer, in writing, is not executing the works in accordance with the Contract, or is persistently neglecting to carry out his obligations under the Contract, or
e) Has, to the detriment of good workmanship, or in defiance of the Engineer's instructions to the contrary, sub-let any part of the Contract.

Then the Service Recipient/ IDMC LTD may, after giving **15 day's** notice in writing to the Contractor, enter upon the site and the works and expel the Contractor there from and without thereby voiding the Contract, or releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and powers conferred on the Service Recipient/ IDMC LTD or the Engineer by the Contract, and may himself complete the works or may employ any other Contractor to complete the works. The Service Recipient/ IDMC LTD or such other Contractor may use for such completion so much of the constructional plant, temporary works and materials, which have deemed to be reserved exclusively for the execution of the works, under the provisions of the Contract, as he or they may think proper, and the Service Recipient/ IDMC LTD may at any time, sell any of the said Constructional Plant, temporary works and unused materials including invocation of bank guarantees and apply the proceeds of sale in or towards the satisfaction of any sum(s) due or which may become due to him from the Contractor under the Contract .

63.2 The Engineer shall, as soon as may be practicable after any such entry and expulsion by the Service Recipient/IDMC LTD, fix and determine **ex parte**, or by or after reference to the parties, or after such investigationor enquiries as he may think fit to make or institute, and shall certify what amount, if any, had at the time of such entry and expulsion been reasonably earned by orwould reasonably accrue to theContractor in respect of work than actually done by him under the Contract and the value of any of the said unused or partially used materials, any Constructional Plant and any temporary works.

63.3 If the Service Recipient/ IDMC LTD shall enter and expel the Contractor under this clause, it shall not be liable to pay to the Contractor any money on account of the Contract until the expiry of Period of Maintenance and thereafter until the costs of execution and maintenance, damages for delay in completion, if any, and all other expenses incurred by the Service Recipient/ IDMC LTD have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum(s), if any, as the Engineer may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount shall exceed the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Service Recipient/ IDMC LTD the amount of such excess and it shall be deemed a debt due by the Contractor to the Service Recipient/IDMC LTD and shall be recoverable accordingly.

63.4 In such event, the Service Recipient/ IDMC LTD shall charge **15%** overhead to cover the departmental charges and the same shall be recovered form the Contractor.

63.5 No credit shall be allowed to the Contractor in case the amount spent by the Service Recipient/ IDMC LTD for a particular item which shall beless than the amount payable as per the tender amount.

63.6 Risk cost purchase will be applicable if contractor failed to execute work as per owner's schedule and Project Authority/ IDMC Limited is forced to meet work completion through other agency/contractor/sub-contractor, immaterial whether if the liquidated damages is applied with or without expulsion/closure of contract. This will also include the supervision charges of 15% on and above risk purchase cost plus applicable GST.

64.0 Urgent Repairs:

64.1 If, by reason of any accident, or failure, or other event occurring to in or in connection with the works, or any part thereof, either during the execution of the works, or during the Period of Maintenance, any remedial or other work or repair shall, in the opinion of the Engineer,

be urgently necessary for the safety of the works and the Contractor is unable or unwilling at once to do such work or repair, the Service Recipient/ IDMC LTD may employ and pay other persons to carry out such work or repair as the Engineer may consider necessary. If the work or repair so done by the Service Recipient/ IDMC LTD is work which, in the opinion of the Engineer, the Contractor was liable to do at his own expense under the Contract, all expenses properly incurred by the Service Recipient/ IDMC LTD in so doing shall be recoverable from the Contractor by the Service Recipient/ IDMC LTD, or may become due from the Contractor. Provided always that the Engineer, as the case may be, shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

SPECIAL RISKS

65.0 No Liability for War etc.:

65.1 Notwithstanding anything in the Contract contained:-

The Contractor shall be under no liability whatsoever whether by way of indemnity or otherwise for or in respect of destruction of or damage to the works, save to work condemned under the provisions **of Clause 39** hereof prior to the occurrence of any special risk hereinafter mentioned, or to property whether of the Service Recipient/ IDMC LTD orof third parties, or for or in respect of injury or loss of life which is the consequence of any special risk as hereinafter defined. The Service Recipient/ IDMC LTD shall indemnify and save harmless the Contractor against and from the same and against and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising there out or in connection therewith.

65.2 If the works or any material on the site, or any other property of the Contractor used or intended to be used for the purposes of the works, shall sustain destruction or damage by reason of any of the said special risks the Contractor shall be entitled to payment for:-

a) Any permanent work and for any materials so destroyed or damaged, and, as so far as may be required by the Engineer, or as may be necessary for the completion of the works, on the basis of costs plus such profit as the Engineer may certify to be reasonable

b) Replacing or making good any such destruction or damage of the works:

c) Replacing or making good such materials or other property of the Contractor used or intended to be used for the purposes of works.

65.3 Destruction, damage, injury or loss of life caused by the explosion or impact whenever and wherever occurring of any mine, bomb, shell, grenade or other projectile, missile, munitions or explosive of war, shall be deemed to be a consequence of the said special risks.

65.4 The Service Recipient/IDMC LTD shall repay to the Contractor any increased cost of or incidental to the execution of the work, other than such as may be attributable to the cost of reconstruction work condemned under the provisions of **Clause 39** hereof, prior to the occurrence of any special risk, which is however, attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however to the provisions in this clause hereinafter contained in regard to outbreak of war, but Contractor shall as soon as any such increase of cost shall come to his knowledge forthwith notify the Engineer thereof in writing.

65.5 The Special Risks are unprecedented flood, earthquake or other convulsion of nature, war, hostilities (whether war be declared or not) invasion, act of foreign enemies, the nuclear and the pressure wave risk described in **clause 20** hereof, or in so far as it relates to the country in which the works are being or are to be executed or maintained, rebellion, revolution, insurrection, military or usurped power, civil work, or unless solely restricted to the employees of the Contractor or of his Sub-Contractors and arising from the conduct of the works, riot, commotion or disorder.

65.6 If, during the currency of the Contract, there shall be an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the works, the Contractor shall, until and unless the Contract is terminated under the provision of this Clause, continue to use his best endeavors to complete the execution of the works. Provided always that the Service Recipient/ IDMC LTD shall be entitled at any time aftersuch outbreak of war to terminate the Contract by giving written notice to the Contractor and, upon such notice being given, this Contract shall, except as to the rights of the parties under this clause and to the operation of **clause 65.8** hereof, terminate, but without prejudice to the right of either party in respect of any antecedent breach thereof.

65.7 If the Contract shall be terminated under the provisions of the last preceding sub-clause the Contractor shall, with all reasonable despatch, remove from the site all constructional plant and shall give similar facilities to his sub-Contractors to do so.

65.8 If the Contract shall be terminated as aforesaid, the Contractor shall be paid by the Service Recipient/ IDMC LTD, as in so far as much amount

or items shall not have already been covered by payments on account made to the Contractor, for all works executed prior to the date of termination at the rates and prices provided in the Contract and in addition:-

a) The amounts payable in respect of any preliminary terms, so far as the works or service comprised therein has been carried out or performed, and a proper proportion as certified by the Engineer of any such items, the work or service comprise in which has been partially carried out or performed.

b) The cost of materials or goods reasonably ordered for the works which shall have been delivered to the Contractor, or of which the Contractor is legally liable to accept delivery, such materials or goods becoming the property of the Service Recipient/ IDMC LTD upon such payments being made by him.

c) A sum to be certified by the Engineer, being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the works insofar as such expenditure shall not have been covered by the payments in thissub-clause before mentioned.

d) Any additional sum payable under the provision of the **clauses 65.1, 65.2, and 65.4.**

e) The reasonable cost of removal of construction plant under **clause 65.7** and, if required by the Contractor, return thereof to the Contractor's main plant yard in his country of registration or to any other destination, at no greater cost.

f) The reasonable cost of repatriation of all the Contractor's staff and workmen employed in or in connection with the works at the time of such termination.

Provided always that against any payments due from the Service Recipient/ IDMC LTD under this sub-clause, the Service Recipient/ IDMC LTD shall be entitled to be credited with any outstanding balances due from the Contractor for advances in respect of constructional plant and materials and any other sums which at the date of termination were recoverable by the Service Recipient/ IDMC LTD from the Contractor under the terms of the Contract.

66.0 Payment in the Event of Frustration:

66.1 If a war or other circumstances outside the control of both parties, arises after the Contract is made so that either party is prevented from

fulfilling his Contractual obligation, or under the law governing the Contract, the parties are released from further performance, then the sum payable by the Service Recipient/ IDMC LTD to the Contractor in respect of the work executed shall be the same as that which would have been payable under **clause 65** hereof if the Contract had been terminated under the provisions of **clause 65** hereof.

67.0 Settlement of Disputes:

67.1 If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or considers any drawings, record or ruling of the Engineer on any matter in connection with or arising out of the Contract or the carrying out of the work to be unacceptable, he shall promptly ask the Engineer in writing, for written instructions of decision. There upon the Engineer shall give his written instructions or decision within a period of **thirty days** of such request.

67.2 Upon the receipt of the written instructions or decisions the Contractor shall promptly proceed without delay to comply with such instructions or decisions.

67.3 If the Engineer fails to give his instructions or decisions in writing within a period of **thirty days** after being requested, or if the Contractor is dissatisfied with the instructions and decisions appeal to the Service Recipient/ IDMC LTD which shall afford an opportunity to the Contractor to be heard and to offer an evidence in support of his appeal. The Service Recipient/ IDMC LTD shall give a decision within a period of **thirty days** after the Contractor has given the said evidence in support of his appeal.

67.4 If the Contractor is dissatisfied with this decision, the Contractor within a period of **thirty days** from the receipt of the decision shall indicate his intention to refer the dispute to Arbitration, failing which the said decision shall be final and conclusive.

68.0 Arbitration:

In the event of any dispute in the interpretation of the terms and conditions of this order/ agreement or difference of opinion between the parties or any point in the order / contract arising out of or in connection with the agreement/ accepted order/ contract or with regard to performance of any obligation hereunder by either party, the parties hereto shall use their best efforts to settle such disputes or difference of opinion amicably by mutual negotiations. In case no agreement is reached, either party may forthwith give to the order, a notice in writing of the existence of such question, dispute or difference of opinion and the same shall be referred to the adjudication of **sole**

arbitrator to be appointed by "IDMC LTD" whose decision in the matter shall be final and binding on the parties. The arbitration proceedings shall be governed under the provisions of the **Indian Arbitration and Conciliation Act of 1996** and the rules thereunder or any statutory notification thereof for the time being in force. In the order/ contract, the venue of such arbitration shall be **Anand (Gujarat)** and courts at Anand alone shall have jurisdiction regarding any matter arising out of order/ contract.

69.0 Notices:

69.1 All certificates, notices or written orders to be given by the Service Recipient/ IDMC LTD or by the Engineer to the Contractor under the terms of the Contract shall be served by sending by post to or delivering the same to the Contractor's principal place of business, or such other address as the Contractor shall nominate for this purpose.

69.2 All notices to be given to the Service Recipient/ IDMC LTD or to the Engineer under the terms of the Contract shall be served by sending by post or delivering the same to the respective addresses nominated for that purpose.

69.3 Either party may change a nominated address to another address in the country where the works are being executed by prior written notice to the other party and the Engineer may do so by prior written notice to both parties.

70.0 Default of Service Recipient/ IDMC LTD:

70.1 In the event of the Service Recipient/ IDMC LTD:-

a) Failing to pay to the Contractor the amount due under any certificate of the Engineer within **60 days** after the same shall have become due under the terms of the Contract, subject to any deduction that the Service Recipient/ IDMC LTD is entitled to make under the Contract, or

b) Interfering with or obstructing or refusing any required approval to the issue of any such certificate, or

c) Giving to the Contractor a formal notice that for any unforeseen reasons, it is impossible for Service Recipient/ IDMC LTD to meet its Contractual obligations.

The Contractor shall be entitled to terminate his employment under the Contract after giving thirty days prior written notice to the Service Recipient/ IDMC LTD, with a copy to the Engineer.

70.2 Upon the expiry of the **fourteen days** notice referred to in **clause 70.1**, the Contractor shall, notwithstanding the provisions of **clause 54.1** hereof, with all reasonable dispatch, remove from the site all constructional plant brought by him thereon.

70.3 In the event of such termination the Service Recipient/ IDMC LTD shall be under the obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of **clause 65** hereof, but, in addition to the payments specified in **clause 65.8** hereof, the Service Recipient/ IDMC LTD shall pay to the Contractor the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such termination, as are deemed reasonable & fair.

71.0 Changes in Cost and Legislation: (Refer Clause 11.5 of Vol I Section I of this bidding document)

72.0 Taxation:

72.1 The prices quoted by the Contractor shall include all applicable Taxes (GST), levies, cess and duties that may be levied according to the laws and regulations on the constructional plant, material and supplies acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the contract shall relieve the Contractor from his responsibility to pay any tax that may be levied on profits made by him in respect of the Contract. Any variation after receipt of bids on account of change in rates of applicable Taxes, levies, cess and duties shall be considered for payment provided the price break up is submitted by the party in their bid. If, any altogether new Tax, levy, cess and duty is imposed on such contract after the bid opening date, the same shall be considered for payment / reimbursement upon documentary evidence.

GST Notification No. 20/2017 (Central Tax – Rate) dated 22 August, 2019 is not applicable for this Job.

Applicable GST for this job is @ 18%. However, the actual GST shall be paid as per the prevailing rate at the time of billing.

72.2 The Contractor's staff, personnel and labour will be liable to pay personnel income taxes in respect of such of their salaries and wages as are chargeable under the laws and regulations for the time being in force, and the Contractor thereof as may be imposed on him by such laws and regulations.

73.0 Bribery and Collusion:

73.1 The Service Recipient/IDMC LTD shall be entitled to terminate the Contract and recover from the Contractor the amount of any loss resulting from such termination if the Contractor shall have offered or given to any person any gift or consideration of any kind as an inducement or reward for doing, or for bearing to do any action in relation to obtaining, or in the execution of Contract or any other Contract with the Service Recipient/ IDMC LTD, or if any of the like acts shall have been done by any person employed by the Contractor or acting on his behalf (whether with or without the knowledge of the Contractor), or if the Contractor shall have come in to any agreement with another Contractor(s) whereby an agreed quotation or estimate shall be offered as a bid to the Service Recipient/ IDMC LTD by one or more Contractors.

73.2 In the event of such termination, the Contractor shall:

a) Proceed as provided in sub **clause 65.7** hereof, and

b) Be paid by the Service Recipient/IDMC LTD as provided in sub **clause.**
65.8 hereof, provided that any loss referred herein shall first be deducted.

74.0 Termination of Contract for Service Recipient / IDMC LTD's Convenience:

74.1 The Service Recipient/IDMC LTD shall be entitled to terminate this Contract at any time for its own convenience after giving **60 days** prior notice to the Contractor, with a copy to the Engineer.

74.2 In the event of such termination the Contractor:

a) Shall proceed as provided in **sub clause 65.7** hereof, and

b) Shall be paid by the Service Recipient/ IDMC LTD as provided in sub **clause 65.8** hereof.

SECTION – III

SPECIAL CONDITIONS OF CONTRACT

SECTION III

SPECIAL CONDITIONS OF CONTRACT

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Section III

SPECIAL CONDITIONS OF CONTRACT

1.0 General:

The following Special conditions of Contract shall supplement the General conditions of Contract, given in **Section II.** Wherever there is a conflict the provision herein shall prevail over those in the General conditions of Contract.

2.0 Taxes:

2.1 The prices quoted by the Contractor shall include all applicable Taxes (GST), levies, cess and duties that may be levied according to the laws and regulations on the constructional plant, material and supplies acquired for the purpose of the Contract and on the services performed under the Contract. Nothing in the contract shall relieve the Contractor from his responsibility to pay any tax that may be levied on profits made by him in respect of the Contract. Any variation after receipt of bids on account of change in rates of applicable Taxes, levies, cess and duties shall be considered for payment provided the price break up is submitted by the party in their bid. If, any altogether new Tax, levy, cess and duty is imposed on such contract after the bid opening date, the same shall be considered for payment / reimbursement upon documentary evidence.

3.0 Time of Completion: 08 Months from the date of LOI/Purchase order and applicable as per GCC

3.1 The Contractor shall execute the Contract up to **10% increase** in the value of the works within the specified completion period of the Contract and no extension of time shall be granted. In case the increase in the value **exceeds 10%** of the Contract amount, proportionate extension of time shall be granted, for the entire amount of increase over the original Contract value.

4.0 Engineer's Office Accommodation & Project's Name Board:
Board:(Not applicable for this contract)

4.1 The Contractor shall at his own cost provide a temporary furnished office accommodation in the form of either three nos. of containers (Portable Office Cabins) each **20 sqm** (with Air Conditioner) or approx. **60 Sq.m building area at the approved locations and as per approved plan** along with **AC** (Air Conditioner) and modern toilet facility with electrical and water connection.

Further, 4 Nos. office tables, 1 Conference table, 3 Nos. Cupboards, 12 Nos. Chairs, Colour television of 55 inch and A3 multifunctional colour printer, etc. (this includes the replacement of cartridge on time-to-time basis) shall also be provided by Contractor for IDMC LTD site officers. Contractor shall provide free electricity during the duration of contract and shall be liable for regular maintenance of the facilities. The structure shall be removed after the completion of work, by the Contractor, at his own cost. However, this requirement shall be applicable only if the estimated contract amount is more than **Rs. 100 lakhs.**

4.2 The contractor at his own cost shall also provide near the entrance of the project site, a suitable name board fabricated from MS sheet with support structure, duly painted and lettering, indicating the name of project, owner, turnkey consultant, architect, civil contractor and mechanical contractor etc., as per drawing and details approved by purchaser's site engineer. However, this requirement shall be applicable only if the estimated contract amount is more than **Rs. 100 lakhs.**

5.0 Water for Construction and Other Use:

5.1 Unless otherwise specified the Contractor shall make his own arrangement for water for the work and nothing extra shall be paid for the same.

5.2 The water used by the Contractor shall be fit for drinking as well as construction purposes to the satisfaction of the Site Engineer/Project Authority.

5.3 The Contractor may be allowed to construct temporary tube well /wells in the Project site for getting water after he has got written consent of the Owner/Project Authority/Engineer. The Contractor shall be required to provide necessary arrangements to avoid any accident or damage to the buildings, roads, and service lines adjacent to the tube wells/wells sunk. The Contractor shall dismantle the tube well/well on completion of work and restore the ground to its original condition at his own cost.

5.4 In case the Owner/Project Authority/purchaser supplies water, it shall be on the following conditions:

1. Water charges shall be recovered from each RA bill @ **0.5%** of net amount of work done of such bill.

2. The water shall be provided at one point in the site at the discretion of the Engineer. The Contractor shall make its own arrangement for water connection and distribution pipe lines in the construction area.

3. The Owner/Project Authority shall not guarantee the maintenance of uninterrupted water supply. It will be the responsibility of the Contractor to make alternative arrangements for water supply at his own cost in the event of any break down so that the progress of work is not affected for want of water. No claim or damage or refund of water charges shall be entertained on account of such break down.

6.0 Power (Electricity) Supply:

6.1 Unless otherwise specified the Contractor shall have to make his own arrangements for the power supply at his cost. All the electrical works shall be done as per **INDIAN ELECTRICITY RULES**. The temporary lines shall be removed by the Contractor at his cost after the completion of the work or if there is any hindrance , to the other works due to the alignment of these lines, during the Contract period.

6.2 In case the ELECTRIC power supply is provided by the Purchaser/Owner/project Authority, it shall be on the following conditions:-

1. Electricity charges shall be recovered from each RA bill @ **0.5%** of net amount of work done of such bill.

2. The supply shall be made at one point in the site at the direction of the Engineer. The Contractor shall make his own arrangement to receive, carry and distribute the power wherever it is required within the site as per **INDIAN ELECTRICITY RULES.**

3. The Purchaser/owner / project authority shall not guarantee the maintenance of uninterrupted electricity supply and voltage fluctuations etc. It will be the responsibility of the contractor to make alternative arrangements for electricity supply at his own cost in the event of any breakdown so that the progress of work is not affected for want of electricity. No claim or damage or refund of electricity charges shall be entertained on account of the above.

4. The temporary supply lines shall be removed and the site shall becleared by the Contractor after the completion of the work at his own cost.

7.0 Materials to be issued by the Purchaser/Owner/Project Authority:
(Not applicable for this contract)

7.1 If the specification of the work provides for the use of any material of special description to be supplied from the Purchaser/Owner/Project Authority's stores or is required that the Contractor shall use certain stores to be provided by the Engineer, such materials and stores, and price to be charged therefore, as hereinafter mentioned being as practicable for the convenience of the Contractor , but not so as in any way to control the meaning or the effect of the Contract, the Contractor shall bound to purchase and shall be supplied with such materials and stores as are from time to time required to be used by him for the purpose of the Contract only. The sum due from the Contractor for the value of materials supplied by the Project Authority/Owner **plus 5%** of its value towards wastage shall be recovered from the interim bill on the basis of the actual consumption of the materials in the works covered and for which the interim bill has been prepared. After the completion of the works, the Contractor shall account for full quantity of the material supplied to him as per relevant clauses herein.

7.2 The value of the materials as may be issued to the Contractor by Purchaser/Owner/Project Authority shall be debited to the Contractor's account at the rate shown in the Schedule of material given **in Section VI (Schedule of material to be issued by owner/IDMC LTD)**of this bidding document and if they are not entered in the schedule, they will be debited at cost price, which for the purpose of the Contract shall include the cost of carriage and all other expenses whatsoever such as normal storage, supervision charges which shall have been incurred in obtaining the same at the Owner/Project Authority's stores. All materials so supplied to the Contractor shall remain the absolute property of the Purchaser/Owner/ Project Authority and shall not be removed on any account from the site of work unless specifically approved by the Engineer and shall be at all times open for inspection to the Engineer. Any such serviceable material remaining unused at the time of the completion or termination of the Contract shall be returned to the Purchaser/Owner/ Project Authority stores at a place as directed by the Engineer in perfectly good condition.

7.3 Conditions for Issue of Materials:

i) Materials specified as to be issued by the Purchaser/Owner/Project Authority will be supplied to the Contractor by the Engineer from his stores as given in the **`Schedule of material to be supplied by the Owner/ IDMC LTD in Section VI** of this bidding document. It shall be the responsibility of the Contractor to take delivery of the materials and arrange for its loading, transport and unloading at the site of works at his own cost. The material shall be issued during the working hours and as per the rules of the Purchaser/Owner/ Project Authority as framed from time to time.

ii) The Contractor shall bear all incidental charges for the storage and safe custody of the materials at site after they have been issued tohim.

iii) Materials as specified to be issued by the Purchaser/Owner/Project Authority shall be issued in standard sizes and quantities obtained from the manufacturers.

iv) The Contractor shall construct suitable godown wherever required at the site of works for storing the issued materials safely against damage by rain, dampness, fire, theft etc. He shall also employ necessary watch and ward establishment for the purpose.

v) It shall be the duty of the Contractor to inspect material supplied to him at the time of taking delivery and satisfy himself that they are in good condition. After the materials have been delivered by the Purchaser/Owner/Project Authority, it shall be the responsibility of the Contractor to keep these in good condition and if the materialsare lost or damaged, at any time the value thereof shall be recovered from the Contractor pursuant to **clause 7.4** hereof and **clause 5.0 of Section VI.**

vi) The Purchaser/Owner/Project Authority shall not be liable for delay in supply or non-supply of any material which they have undertaken to supply, where such failure or delay is due to natural calamities,act of enemies, transport and procurement difficulties and any circumstances beyond the control of the Purchaser/Owner/Project Authority. In no case, the Contractor shall be entitled to claim any compensation or loss by him on this account.

vii) It shall be the responsibility of the Contractor to arrange in time all materials required for the works other than those supplied by the Purchaser/Owner/ Project Authority. If, however, in the opinion of the Engineer the execution of the works is likely to be delayed due to the Contractor's inability to make arrangements for supply of such materials which normally he has to arrange for the Engineer shall have the right at his own discretion to issue such material if available with the Purchaser/Owner/ Project Authority or procure such materials from the market or elsewhere and the Contractor will be bound to take such materials at the rates decided by the Engineer.

This, however, shall not absolve the Contractor from the responsibility of making arrangement for the supply of such materials in part or full, should such situation occur nor shall this constitute a reason for delay in the work.

vii) Unless specifically approved by the Engineer, none of the materials supplied to the Contractor shall be utilized by the Contractor for manufacturing the item which can be obtained as supplied from standard manufacturer in finished form.

ix) The Contractor shall, if desired by the Engineer, be required to execute an indemnity bond in the prescribed form, for safe custody and accounting all materials issued by the Purchaser/ Owner/Project Authority.

x) The Contractor shall furnish to the Engineer sufficiently in advance the statement showing his requirement of the quantities of the materials to be supplied by the Purchaser/Owner/Project Authority and the time when the same will be required by him for the works, so as to enable the Engineer to make necessary arrangement for procurement and supply of the material.

xi) A day account of the materials issued by the owner shall be maintained by the Contractor indicating the daily receipt, consumption and balance in hand. This account shall be maintained in a manner prescribed by the Engineer along with all connected paper viz. requisition, issues etc. and shall be always available for in the Contractor's office at site.

xii) The Contractor should see that only the required quantity of the materials is issued. The Contractor shall not be entitled to cartage and incidental charges for returning the surplus materials, if any , to the store wherefrom they were issued or to the place as directed by the Engineer.

xiii) Materials/equipment supplied by the purchaser/Owner / Project Authority shall not be utilized for any other purpose other than issued for.

xiv) Completion of the works and the receipt of unutilized materials issued to the Contractor by the Owner/Project Authority/Purchaser pursuant to **clause 7.3** herein. The Contractor shall submit the reconciliation statement of materials received, utilized in the works and wastage thereon. The wastage of materials so determined shall be accounted for pursuant to **clause 5.0** of **Section VI,** and the value thereof shall be recovered from the Contractor.

7.4 Notwithstanding anything contained to the contrary in any or all clauses of this Contract where any materials for the execution of the Contract are procured with the assistance of the Owner/ Project Authority/ Purchaser either by issue from Owner' stock or purchase made under orders, or permits or licenses issued by the Govt., the Contractor shall hold the said materials as trustee for the owner and use such materials economically and solely for the purpose of the Contract and not dispose them off without the permission of the Owner/ Project Authority/ Purchaser and return, if required by the Engineer, all surplus or unserviceable materials that may be left with him after the completion of the Contract or at its termination for any reason whatsoever on his being paid or credited such price as Engineer shall determine having due regard to the condition of the materials. The price allowed to the Contractor, however, shall not exceed the amount charged to him excluding the storage charges, if any, shall be decided by the Engineer. In the event of the breach of the aforesaid condition, the Contractor shall, in terms of the licenses or permits and /or for criminal breach of trust, be liable to compensate the Owner/ Project Authority/ Purchaser at double the item rate or at double the prevailing market rate if the material was issued free of charge or any higher rate in the event of those materials at that time having higher rate or not being available in the market, than any other rate t be determined by the Engineer.

8.0 Price Basis/Incoterms – FOR IDMC Site, Jagraon, Punjab

8.1 The Transit insurance to be taken by the supplier shall be in an amount equal to 110% of the FOR-destination value of the goods from "warehouse to warehouse "on all risks basis including ITCA, ICCA, SRCC and war risk valid for a period not less than three months after the date of arrival of goods at destination.

8.2 For Installation and commissioning job, storage- cum – installation all risk insurance policy for an amount equal to contract value inclusive of 10% escalation valid for period not less than three months after installation, including three months for testing and commissioning shall be obtained by the supplier as per governing rules and regulations of Indian government.

8.3 Third party insurance – Before commissioning the installation work the supplier without limitinghis obligations and responsibilities, shall insure against his liability for any material or physical damage, loss or injury which may occur to any property including that of the Owner/IDMC, or to any person including any employee of the Owner/IDMC. Such Insurance shall be for an amount not less than 10% of the contract value.

8.4 Transportation of the Goods up to the site including its insurance till delivery at the site shall be the responsibility of the Bidder and the cost thereof shall be included in the bid price.

9.0 : **Payment terms:**

9.1 Payment terms for Supply of Goods

A) 20% as advance of contract value against submission of equivalent security in the form of Bank guarantee from a Schedule commercial banks of India with banker confirmation (SFMS) and shall valid till receipt of all equipment as per contract to IDMC Site (Itola, Gujarat) in acceptable condition.

B) 60% of contract value shall be payable in 30 days from the date of safe receipt of all equipment at site in acceptable condition.

C) 10% of contract value shall be payable against successful erection and Installation of all equipment and duly certified by IDMC engineer/consultant.

D) 10% of the contract value on successful commissioning and final acceptance of the plant and fulfilment of all contractual obligation and accepted by the IDMC engineer/consultant and against submission of equivalent amount of performance bank guarantee valid till defect liability/warranty period (12 months) from the date of handing over and acceptance of the plant.

9.2 Payment terms for Installation, testing and commissioning

A) 90% of the contract value for installation and commissioning shall be paid on prorate basis on actual completion of installation/erection and billed for and after due inspection and approval by the purchaser (against detailed break up cost to be furnished by the Supplier in advance and accepted by the Purchaser).

B) 10% of the contract value on successful commissioning and final acceptance of the plant and fulfilment of all contractual obligation and accepted by the IDMC engineer/consultant and against submission of equivalent amount of performance bank guarantee valid till defect liability/warranty period (12 months) from the date of handing over and acceptance of the plant.

9.3 Payment terms for Spares, CTO approval & Operation & Maintenance

A) 30 days after receipt of Invoice and duly certified by IDMC engineer/consultant

10.0 Warranty:

The Supplier warrants that the Goods and equipment, supplied, installed, and commissioned under the Contract are new, unused, of the most recent or current models and incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Supplier further warrants that the Goods supplied under this Contract shall have no defect arising from design, materials
or workmanship (except insofar as the design or material is required by the Purchaser's Specifications) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in the conditions obtaining in the country of final destination. The Supplier also guarantees that the Goods supplied shall perform satisfactorily as per the signed/rated/-installed capacity as provided for in the Contract.

The warranty period is 12 months after the date of successful commissioning acceptance, and completion certificate duly signed by both parties or handover of the machine The automation systems, instruments, and controls will be guaranteed against system malfunction for a period of 12 months from the date of commissioning. Bidder to inform the terms and conditions for extended warranty for 1 year + 2 year after completion of warranty period

The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty.

Upon receipt of such notice, the Supplier shall promptly respond and resolve the issue maximum within 7 days from the date of notice by way of repair or replace the defective Goods or parts thereof, without costs to the Purchaser. If the Supplier, having been notified, fails to remedy the defect(s) within a reasonable period mentioned above, the Purchaser may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

11.0 Storage Materials and Equipment:

11.0 The contractor shall make suitable arrangement at project site for storage of all the construction material and construction equipment being supplied by him. Suitable watch and ward arrangement shall be made by the contractor. This arrangement has to be done by the contractor at his own cost.

11.1 The Pre-painted sheet roofing shall be stacked strictly as per manufacturers' guideline and stored in a covered shed.

11.2 The fabrication yard for MS sections shall have a levelled pucca floor, and should be maintained dust free at all times. The structural sections shall be stacked & stored orderly so as to avoid initial warping of the sections.

12.0 Rate of Progress - Contractor's Schedule:

The schedule prepared by the Contractor shall be based on the normal day of eight hours of working plus a break of one hour. All Sundays and local holidays should be considered as the day of rest. The schedule shall thus be prepared considering above working conditions. The contractor shall plan the resources adequately to meet the schedule date of completion.

13.0 Mode (Drawings/specifications) of Execution:

The bid drawings/tender drawings displayed/presented for inspection are liable to changes and the work shall be executed as per construction/execution drawings & details released for execution in accordance with technical specifications & schedule of quantities.- The items not covered under technical specifications, if any, shall be executed as per latest applicable BIS code of practice.

14.0 Quality Control Engineer & QA-QC Lab:

14.1 The Contractor shall at his own cost deploy a dedicated and full time qualified quality control engineer (Mechanical) at site throughout the entire duration of the contract. The engineer shall be a B.Tech (Mechanical) with minimum 5 years of experience OR a Diploma (Mechanical) with minimum 7 years of experience specifically in the field of quality assurance and control of similar type of civil works. The quality engineer should be conversant with relevant IS codes, material testing procedures, record keeping/documentation, in-situ testing, quality conformance of bought out materials & quality of workmanship in various construction activities at project site. The CV & experience certificates ofthe quality engineer are to be submitted along with the bid document.

Non deployment, delay in deployment and /or withdrawal of quality engineer from project site without prior written permission of IDMC LTD Engineer in charge shall invite permanent deduction of Rs. 80,000/- (Rupees Eighty thousand) per month from the running bills. Thereafter, IDMC LTD will be selecting the quality control engineer to be appointed by the contractor on their rolls for the entire duration of their contract with IDMC LTD. Nothing extra shall be paid by IDMC LTD on this account.

Above conditions at clause no. 14.1 is generally applicable for civil works contract value of Rs. 5.0 Crore and above.

14.2 The Contractor shall at his own cost construct and maintain for the total duration of the contract an onsite quality control laboratory of size not less than 4m x 3m with white board of size 4feetx3feet, proper working platform, foundations for testing machines and hard levelled floor at the approved location within the project site and as per approved plan by engineer in charge. The laboratory is to be equipped with all required equipment/machines
/instruments, power points etc. required for carrying out testing of various construction materials, in-situ tests etc. to implement the quality assurance plan & quality control processes as directed by Engineer-in-charge.

15. Instructions for billing:

15.1 Minimum Billing Requirement:

At any point during the currency of the contract, the minimum bill submitted by the contractor shall be ₹ 5.00 Cr.

15.2 Billing Plan: The contractor shall submit a detailed billing plan prior to the commencement of work. The billing plan must outline the contractor's expected monthly billing amounts and ensure that the work is completed as per the agreed commitment/timeline. The billing plan shall be calculated by dividing the total purchase order value by the original delivery period (in months).

15.3 Adherence to Billing Plan: The contractor is obligated to adhere strictly to the billing plan submitted. Any deviation from the agreed plan, resulting in non-compliance with the minimum billing amount, shall be treated as a breach of contract.

15.4 Non-Compliance and Consequences: In case the contractor fails to meet the minimum billing requirement as specified above, the Engineer-In-Charge reserves the right to reject the contractor's bill without any further explanation or correspondence. Additionally, the contractor may be subject to penalties or other actions deemed appropriate as per the terms of the contract.

15.5 Enforcement: The Engineer-In-Charge has the authority to monitor the contractor's billing progress and ensure compliance with the billing plan and minimum billing requirements throughout the contract duration.

16. Instruction for Local Liaisoning and statutory compliance

16.1 Local Liasoning: The contractor shall be required to ensure that all works and activities undertaken under this contract comply with local regulations, norms, and any specific instructions related to local governance. The contractor must maintain regular communication with the local authorities, if applicable, and ensure that all required permits and approvals are obtained in a timely manner for the smooth execution of the work.

16.2 Statutory Compliance: The contractor shall comply with all applicable laws, statutes, rules, regulations, and orders issued by government authorities, including but not limited to labor laws, environmental regulations, tax laws, safety standards, and any other legal requirements that may be relevant to the performance of the contract. The cost for same shall be included in the quoted rate by the contractor. The contractor is responsible for ensuring that all statutory obligations, including but not limited to:

Registration with local labor authorities

- Registration with BOCW and applicable fees/Cess to be considered. Any invoices/JMS submitted for payment must accompany the details of payment made toward labour Cess.
- Payment of applicable taxes, duties, and levies
- Compliance with health and safety standards
- Environmental compliance requirements
- Any other statutory or regulatory compliance specific to the nature of the work being undertaken are strictly adhered to throughout the duration of the contract.
- Timely compliance related to GST submission to be ensured before submission of bills.

16.3 Indemnification for Non-Compliance:

The contractor shall indemnify and hold harmless the employer from any loss, damage, or penalty that may arise due to the contractor's failure to comply with local regulations or statutory requirements during the execution of the contract.

16.4 Documentation and Reporting:

The contractor shall maintain records of all statutory filings, permits, and compliance reports and shall make these available for inspection by the employer or relevant authorities upon request. The contractor shall provide periodic updates on the status of statutory compliance as may be required by the employer.

16.5 Failure to Comply:

In case of non-compliance with any local regulations or statutory requirements, the employer reserves the right to take corrective action, including but not limited to withholding payment, imposing penalties, or terminating the contract, as deemed appropriate.

SECTION – IV

TECHNICAL SPECIFICATIONS

SECTION IV
TECHNICAL SPECIFICATIONS
TRADE INDEX

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TECHNICAL SPECIFICATION

SECTION 11.0 WATER SUPPLY

11.01 Providing & Laying under ground GI pipe line for 80 mm dia.

The pipes shall be galvanized mild steel welded pipes and screwed and socketed tubes conforming to the requirements of IS: 1239-1982, for medium grade. They shall be of the diameter (nominal bore {NB}) specified in the description of the item. The sockets shall be designated for the respective nominal bores of the pipes for which they are intended. The pipes and sockets shall be cleanly finished well galvanized in and out and free from cracks surface flaws, laminations, and other defects. All screwed threads shall be clean and well cut. The ends shall be cut cleanly and square with the axis of the tube.

All screwed tubes and sockets shall have pipe threads conforming to the requirements of IS: 554 screwed tubes shall have taper threads while the sockets shall have parallel threads.

The fittings shall be of malleable cast iron or mild steel tubes complying with all the appropriate requirements as specified for pipes. The fittings shall be designated by the respective nominal bores of the pipes for which they are intended. The fittings shall have screw threads at the ends conforming to the requirements of IS: 554 Female threads on fittings shall be parallel and male threads (except on running nipples and collars of unions) shall be taper.

The pipes and fittings shall be inspected at site before use to ascertain that they conform to the specification. The defective pipes shall be rejected. Where the pipes have to be cut or re-threaded, the ends shall be carefully filed out so that no obstruction to bore is offered. The end of the pipes shall then be threaded conforming to the requirements of IS: 554 with pipe dies and taps carefully in such a manner as will not result in slackness of joints when the two pipes are screwed together. The taps and dies shall be used only for straightening screw threads which have become bent or damaged and shall not be used for turning of the threads so as to make them slack, as the latter procedure may not result in a water tight joint. The screw threads of pipes and fitting shall be protected from damage until they are fitted.

The pipes shall be cleaned of all foreign matter before being laid in jointing the pipes, the inside of the socket and the screwed end of the pipes shall be oiled and rubbed over with white lead and a few turns of spun yarn wrapped round the screwed end of the pipes. The end shall then be screwed in the socket, tee etc. with the pipe wrench. Care should be taken that all pipes and fittings are properly jointed so as to make the joints completely water tight and pipes are kept at all times free from dust and dirt during fixing. Burr from the joint shall be removed after screwing. After laying, the open ends of the pipes shall be temporarily plugged to prevent access of water, soil or any other foreign matter. Any threads exposed after jointing shall be painted or in the case of under ground piping thickly coated with approved anticorrosive paint to prevent corrosion.

If the galvanized iron pipes and fittings are laid in trenches, the widths and depths of the trenches for different diameters of the pipes shall be as in the table given below:-

Table:

Diameter of pipe	Width of trench	Depth of trench
15 mm to 50mm	30 cm	60 cm
65 mm to 100mm	45 cm	75 cm

At joints the trench width shall be widened where necessary. The work of excavation and refilling shall be done true to line and gradient in accordance with general specifications for each work in trenches. After successful pressure testing, the pipe line to be painted a coat of APCOMIN ROZC primer PQ 1741, 25 micron DFT followed by two coats of Bituminous paint of approved make OR pipes shall be wrapped with thermo-fusible composite film 4 mm thick made out of fibre glass mat base with polymeric coatings (like PYKOTE) of approved make, as per the procedure recommended by the manufacturer **as specified in schedule of quantities.** The pipes shall be laid on a layer of 7.5 cm sand and filled up to 15 cm above the pipes. The remaining portion of the trench shall then be filled with excavated earth. The surplus earth shall be disposed off as directed. When excavation is done in rock the bottom shall be cut deep enough to permit the pipes to be laid on a cushion of sand 7.5 cm minimum. In case of bigger diameter pipes where the pressure is very high thrust

blocks of cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 graded stone aggregate of 20 mm nominal size) shall be constructed on all bends to transmit the hydraulic thrust without impairing the ground sand spreading it over a sufficient area.

TEST:

After laying and jointing, the pipes and fittings shall be inspected under working conditions of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost.

The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 kg/sq.cm. (60 MWC). The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw off takes and stop cocks shall then be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped the test pressure should maintain without loss for at least half an hour. The pipes and fittings shall be tested in sections as the work of laying proceeds, keeping the joints exposed for inspection during the testing. High thrust blocks of CC 1:2:4, if provided shall be paid under relevant concrete item.

Mode of Measurement: GI pipes with fittings completely fixed in position shall be measured and paid for the finished centre line lengths and the measurement shall be in Running Meter.

11.02 Providing & laying under ground GI pipe line for 50mm dia underground

The general specification is same as per Item spec. no. 11.01.

Mode of Measurement: Same as per Item spec. no.11.01

11.03 Providing & Laying GI pipe 40 mm dia under ground

The general specification is same as per Item spec. no. 11.01.

Mode of Measurement: Same as per Item spec. no.11.01

11.04 Providing & laying 25mm dia GI pipe under ground

The general specification is same as per Item spec. no. 11.01.

Mode of Measurement: Same as per Item spec. no.11.01

11.05 Providing & Laying GI pipe 20mm dia under ground

The general specification is same as per Item spec. no. 11.01.

Mode of Measurement: Same as per Item spec. no.11.01

11.06 Providing & Laying GI pipe 15 mm dia under ground

The general specification is same as per Item spec. no. 11.01.

Mode of Measurement: Same as per Item spec. no.11.01

11.07 Providing & Laying open GI pipe line 80 mm dia

For open line work the galvanised iron pipes and fittings shall run on the surface of the walls or ceiling (not in chase) unless otherwise specified. The fixing shall be done by means of standard pattern holder bat clamps, keeping the pipes about 1.5 cm clear of the walls ceiling. pipes may be fixed in the ducts or recesses etc. provided there is sufficient space to work on the pipes with the usual tools.

All pipes and fittings shall be fixed truly vertical and horizontal unless unavoidable the pipes shall be fixed to walls with standard pattern holders bat clamps made out of MS flat carrier fixed with bolts in the RCC or brick masonry and "C" clamp fixed to secure the pipe with GI bolts / screws / washers of required shape and size so as to fit tightly on the pipes when tightened with screwed bolts. The clams shall be painted with two coats of enamel paint over a coat of anti-corrosive primer. The clamps shall be fixed at short length and near the fittings as directed by the Engineer. The pipe line shall be tested as specified in item 11.01.

The rate shall include providing and laying the pipe line with all necessary specials in open, properly fixing it with clamps and testing the line all complete including necessary scaffolding.

Mode of Measurement: GI pipes with fittings completely fixed in position shall be measured and paid for the finished centre line lengths and the measurement shall be in Running Meter.

11.08 Providing & Laying open GI pipe line 50mm dia

The general specification is same as per Item spec. no. 11.07

Mode of Measurement: Same as per Item spec. no.11.07

11.09 Providing & Laying open GI pipe line 40 mm dia

The general specification is same as per Item spec. no. 11.07

Mode of Measurement: Same as per Item spec. no.11.07

11.10 Providing & Laying open GI pipe line 25mm dia

The general specification is same as per Item spec. no. 11.07

Mode of Measurement: Same as per Item spec. no.11.07

11.11 Providing & Laying open GI pipe line 20mm dia

The general specification is same as per Item spec. no. 11.07

Mode of Measurement: Same as per Item spec. no.11.07

11.12 Providing & Laying open GI pipe line 15 mm dia

The general specification is same as per Item spec. no. 11.07

Mode of Measurement: Same as per Item spec. no.11.07

11.13 Providing & Laying concealed in structure GI pipe line 80 mm dia

For internal work the pipes shall be concealed in the brick masonry / RCC. Chasses or zarries shall be cut in the walls and the pipes shall be laid. The pipes laid in the zarries (recess /grooves) shall be secured in position by approved arrangement like duly painted MS holding hook The pipes shall not ordinarily be buried in solid floors. Where unavoidable pipes may be buried for short distances provided adequate protection is given against damage, but the joints in pipes shall not be buried. Where directed by the Engineer MS sleeve of appropriate diameter GI pipe shall be fixed at a place where a pipe is passing through a wall or floor for inception of the pipe and to allow freedom for expansion movements and contraction and other. All the embedded pipe lines in walls or floors to be painted with anti-corrosive bituminastic paint of approved quality. The pipe should not come in contact with lime mortar or lime concrete as the pipe shall be laid in layer of sand filling done under concrete floors or as directed by the Engineer. **The floor and wall shall be finished same as the surrounding surface after the completion of the work.** The line shall be tested as specified in the item 11.01. The rate shall include making zarries in the wall, cutting floor, making holes, painting the pipe line with anticorrosive bituminastic paint all complete.

Mode of Measurement: GI pipes with fittings laid properly shall be measured along the centre line lengths and the measurement shall be in Running Meter.

11.14 Providing & Laying concealed in structure GI pipe line 50mm dia

The general specification is same as per Item spec. no. 11.13

Mode of Measurement: Same as per Item spec. no.11.13

11.15 Providing & Laying concealed in structure GI pipe line 40 mm dia

The general specification is same as per Item spec. no. 11.13

Mode of Measurement: Same as per Item spec. no.11.13

11.16 [AX ITEM NO. 100006748]
Providing & Laying concealed in structure GI pipe line 25mm dia

The general specification is same as per Item spec. no. 11.13

Mode of Measurement: Same as per Item spec. no.11.13

11.17 Providing & Laying concealed in structure GI pipe line 20mm dia

The general specification same as per Item spec. no. 11.13
Mode of Measurement: Same as per Item spec. no.11.13

11.18 Providing & Laying concealed in structure GI pipe line 15 mm dia

The general specification is same as per Item spec. no. 11.13

Mode of Measurement: Same as per Item spec. no.11.13

11.19(a) CPVC pipes work

For internal work and external work only where specified CPVC pipes tubes conforming to Specific Gravity ASTM D 792 at 23oC should be 1.55 as specified. With Tensile Strength as per ASTM D 638 at 23oC should be 55N/mm2.

All special fittings and accessories like internally or externally threaded brass adaptors, ball valves, globe valves, unions, diaphragm valves, butterfly valves, etc. shall be made of CPVC by licensee.

The CPVC solvent cement used for installing CPVC piping systems shall conform to ASTM F493. Pipes from 15 mm up to 50 mm pipes and fittings, single step medium bodied CPVC solvent cement should be used. For CPVC pipes and fittings upwards of 50 mm, a primer shall be used followed by heavy bodied solvent cement conforming to ASTM F493. PVC solvent cement should not be used.

Concealed Plumbing:

All internal concealed plumbing for water supply shall be done with CPVC pipes. The pipes & fittings shall conform to CTS (Copper Tube Size) SDR-11 as per ASTM D2846 OR SDR-13.5. All pipes and fittings from 15 mm up to 50 mm shall come under this category. Medium body CPVC solvent cement conforming to ASTM F493 should be used for joining pipes to fittings.

External Plumbing:

The CPVC pipes above 50 mm for external water supply lines shall conform to ASTM F441 CPVC Schedule 40 & 80 pipe and will be the CPVC brand. The fittings above 50 mm size shall conform to ASTM F438 for Schedule 40 CPVC fittings and ASTM F 439 for Schedule 80 CPVC fittings. All threaded CPVC fittings shall conform to ASTM F437 (threaded CPVC fittings schedule). Heavy bodied CPVC solvent cement shall be used along with a primer. IPS brand primer and heavy bodied CPVC solvent cement only should be used conforming to ASTM F493. All external CPVC pipes shall be coated with water based acrylic paint emulsion for enhanced UV protection.

Installation procedure:

All parameters pertaining to the installation of CPVC plumbing system such as cutting, joining, support spacing, expansion loops, insulation, type of support, special connections, etc. shall be as per the manufacturer's specifications.

All pipes shall be fixed in accordance with layout and alignment shown on the drawings. Care shall be taken to avoid air pockets.

Trenches:

All water supply pipes below ground shall be laid in trenches with a minimum cover of 60 cms. The width and depth of the trenches shall be as follows:-

Dia. of pipe	Width of trench	Depth of trench
15 mm to 50 mm	30 cms	75 cms
65 mm to 100 mm	45 cms	100 cms

Pipe Insulation for Hot Water Pipes:

Hot Water Pipes fixed in wall chase shall be insulated by using 9mm thick rubberised insulation sleeve of material shall be closed cell Elastomeric Nitrile Rubber or closed cell cross linked polyethylene foam.

Thermal conductivity of elastomeric nitrile rubber shall not exceed 0.038 W/m OK or 0.0313 K.Cal/M.hr OC at an average temperature of 30°C. Density of the material shall not be less than 0.06 gm/cm3.

Testing:

After laying and jointing, the pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost. Use of any compound or stop leak compound will not be permitted.

The pipes and fittings after they are laid shall be tested to hydraulic pressure of 1.5 times the working pressure or 7.5 Kg/Sq.cm whichever is more. The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw of taps and stop cocks shall then be closed and specified hydraulic pressure shall be applied gradually.

Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped, the test pressure should be maintained without loss for at least two hours. The pipes and fittings shall be tested in sections as the work of laying proceeds, having the joints exposed for inspection during the testing.

Measurements: - The Specification same as Item No. 11.01.

11.19(b) UPVC pipes Work

Providing and fixing open UPVC threaded pipes (schedule 80 / 40 as specified in BOQ) of approved make, complete, including making airtight joints, with necessary specials, couplers, elbow, equal tees, tail piece, adapter (both male and female), reducer (single stage, double stage and triple stage), end cap, fabricated bend, etc., in proper line and level including necessary support like clamps, brackets to wall, ceiling and floor, approved quality, and lubricant or jointing material, including testing, cutting, making good the wall, ceiling and floor etc,

Materials:

The threaded pipe (schedule 80 / 40 as specified in BOQ) of specified diameter

with working pressure shall conform to ASTM-D-1785. The specials and fittings required shall be of best quality and UV stabilized so as to facilitate open fixation, conforming to IS: 4985 or ASTM D-2467 schedule 80 and relevant specifications of plumbing materials.

Workmanship:

1. The UPVC pipes of specified diameter shall be fixed as directed. Due to thermal expansion of UPVC pipes due allowances about of 10 mm of thermal gap shall be made particularly in case of over the ground pipe lines for any change in length of pipe line which may occur during installation or when pipe line is in serve stress developing from thermal expansion.
2. Generally, in horizontal runs, UPVC pipes shall be supported at an interval of not more than ten times the outside diameter of the pipe. In vertical lines, UPVC pipes shall be supported at an interval of 1 m. to a maximum of 2 m. Closer support spacing shall be provided, if approved by the manufacture.
3. The guide line indicated by the manufacture regarding handling, transporting, storage, laying and jointing of pipes shall be kept in view during execution. Provision for expansion joints, air vents and proper anchorage shall be made. UPVC pipes shall be fixed on wall with wooden plugs and suitable clamps.

Jointing the pipes

1. The pipes and sockets shall be accurately cut. Care shall be taken to cut the pipe square. The shortened pipe end shall be chamfered to an angle of 15° with a medium file. The ends of the pipes and fittings should be absolutely free from dirt and dust. The outside surface of the pipes and the inside of the fittings shall then be roughened with emery paper and then solvent cement shall be applied to the matching surface i.e. , to the spigot end and the sealing ring and then push the spigot end in to the socket containing the sealing ring until pushed home fully and joined. Mark the position of the socket edge on the pipe and then withdraw the pipe from the socket for the necessary thermal gap. Since solvent cement is aggressive to UPVC, care must be taken to avoid applying excessive cement to the inside of pipe sockets as any surplus cement cannot be wiped off after jointing. Very old, hard, dense solvent cement shall not be used. Empty solvent cement tins, brushes, rags of paper impregnated with cement should not be buried in the trenches. They should be gathered, not left scattered about, as they can prove to be a hazard to animals, which may chew them.
2. Threaded UPVC pipe-fittings shall not be over tightened, as the threads may get damaged. The pipes shall never be threaded but suitable threaded fittings shall be used.

3. If any manufacturer recommends its own methods of jointing, the same shall be adopted after necessary approval from the Engineer-in-charge.

Laying the pipes in trench:
The pipes shall be laid over uniform relatively soft fine-grained soil, found to be free from presence of hard objects such as large flints, rocky projections, large tree roots, etc., While laying the pipes underground, care shall be taken so that the trench shall be as narrow as possible as required for working and its bottom shall be free of stones, sharp objects etc.
The pipes laid underground shall not be less than 1 meter from the ground level. The pipe shall be positioned in the trenches so as to avoid any induced stresses due to deflection. Any deviation required shall be obtained by using proper type of rubber ring joints.

Mode of Measurements and payment: - The Specifications same as Item No. 11.01.

11.20 Full way lever operated forged brass ball valve

The ball valve shall be of Brass or Gunmetal as specified conforming to IS: 1703.The ball valve shall be as given below:

High Pressure:

High pressure is indicated by the abbreviation 'HP' for use on mains having pressure. These shall remain closed at a test pressure of 10.5 Kg/Sq.cm.

	Nominal Size of Ball Valve					
Dia. of spherical float (mm)						
High Pressure	127	152	203	229	254	305
Low Pressure	114	127	178	203	203	254
Minimum weight of ball valve including back nut, body and piston (gms)	283	446	823	1149	1589	1852

The ball valves shall be of following nominal sizes 15mm, 20mm, 25mm, 32mm, 40mm, 50mm and 80 mm. The nominal size shall correspond with the nominal bore of the inlet shanks.

Mode of Measurement: All valves shall be measured by numbers.

11.21 Providing and fixing Sluice valve for 40mm dia pipe line

The general specification is same as per Item spec. no. 11.19

Mode of Measurement: Same as per Item spec. no.11.19

11.22 Providing and fixing Sluice valve for 25mm dia pipe line

The general specification is same as per Item spec. no. 11.19

Mode of Measurement: Same as per Item spec. no.11.19

11.23 Providing and fixing Sluice valve for 20mm dia pipe line

The general specification is same as per Item spec. no. 11.19

Mode of Measurement: Same as per Item spec. no.11.19

11.24 Providing and fixing Sluice valve for 15 mm dia pipe line

The general specification is same as per Item spec. no. 11.19

Mode of Measurement: Same as per Item spec. no.11.19

11.25 Providing and fixing of Gunmetal Wheel valve of approved quality for 80 mm dia pipe line

Providing and fixing 80 mm diameter Wheel valve of approved make confirming to relevant IS etc complete as directed by Engineer.

Mode of Measurement: This shall be measured in Number.

11.26 Providing and fixing of Wheel valve of approved quality for 50mm dia pipe line

The general specification is same as per Item spec. no. 11.25

Mode of Measurement: Same as per Item spec. no.11.25

11.27 Providing and fixing of Wheel valve of approved quality for 40mm dia pipe line

The general specification is same as per Item spec. no. 11.25

Mode of Measurement: Same as per Item spec. no.11.25

11.28 Providing and fixing of Wheel valve of approved quality for 25mm dia pipe line

The general specification is same as per Item spec. no. 11.25

Mode of Measurement: Same as per Item spec. no.11.25

11.29 Providing and fixing of Wheel valve of approved quality for 20mm dia pipe line

The general specification is same as per Item spec. no. 11.25

Mode of Measurement: Same as per Item spec. no.11.25

11.30 Providing and fixing of Wheel valve of approved quality for 15mm dia pipe line

The general specification is same as per Item spec. no. 11.25

Mode of Measurement: Same as per Item spec. no.11.25

11.31 Providing & Fixing Bib cock for 15mm dia pipe line

A bibcock (foam flow) is a draw off tap with horizontal inlet and free outlet .It shall of brass chromium plated (CP) the finish obtained electrolytically by applying layer of chromium so as to improve the appearance, enhance surface hardness, heavy duty of specified size

and approved make & type and shall be of the screw down type. The closing device should work by means of a disc carrying a renewable non-metallic washer, which shuts against water pressure on a seating at right angles to the axis of the threaded spindle, which operates it. The handle shall be catch type securely fixed to the spindle. The cocks shall open in anti-clockwise direction. The bib cocks shall be chromium plated, the chromium plating shall be of grade B type conforming to IS: 1068 in finish and appearance, the plated articles shall be free from plating defects such as blister, pits, and roughness and shall not be stained or discoloured. A suitable matching CP brass flange is included in this item. A sample of each kind of fittings shall be got approved from the Engineer and all supplies made according to the approved sample.

Mode of Measurement: This shall be measured in Number.

11.32 Providing & fixing long body bib cock

The general specification is same as per Item spec. no. 11.31. but for providing and fixing the bib cock with long body which is generally provided for the kitchen sink or similar utilities.

Mode of Measurement: This shall be measured in Number.

11.33 Providing & Fixing stop cock for 15mm dia. pipeline

A stopcock (stop tap) is a valve with a suitable means of connections for insertion in a pipe line for controlling or stopping the flow. It shall be heavy duty made of Brass chromium plated of an approved make, specified size and shall be of the screw down type. The closing device should work by means of a disc carrying a renewable non- metallic washer, which shuts against water pressure on a seating at right angles to the axis of the threaded spindle which operates it. The handle shall be catch type securely fixed to the spindle. Valve shall be of the loose letter seated pattern. The cocks shall open in anti-clockwise direction. The chromium plating shall be of grade B type conforming to IS: 1068, in finish and appearance, the plated articles shall be free from plating defects such as blister, pits, roughness and shall not be stained or discoloured. A sample of each kind of fittings

shall be got approved from the Engineer and all supplies made according to the approved sample.

Mode of Measurement: This shall be measured in Number.

11.33(a) C.P. brass pillar cock

Materials:

15mm dia CP brass screw down shall conform to IS: 781, as per relevant specification of plumbing materials. The bib-tap shall be of 1st quality.

Workmanship:

The screw down bib-tap of 15mm dia as specified above shall be fixed as directed. The threaded portion shall be smeared with white or red lead and provided with a few turns of fine spun yarn round the screwed end of the pipe or the joint shall be done with a Teflon tape. The bib-tap shall be then screwed and fixed water tight.

Mode of Measurements and Payment:

The rate shall be for a unit of one number and include cost of all labour, materials, tools and plant, etc., required for satisfactory completion of this item.

11.34 Providing & Fixing stop cock for 20mm dia pipe line

The general specification is same as per Item spec. no. 11.33.

Mode of Measurement: This shall be measured in Number.

11.35 Providing & Fixing Angle valve

The brass fittings shall be of heavy quality, CP. and approved manufacture and pattern with screwed or flanged ends as specified. The fittings shall in all respects comply with the requirements of IS: 781. The standard size of brass fittings shall be designated by the normal bore of the pipe to which the fittings are attached. A sample of each kind of fittings shall be got approved from the Engineer and all

supplies made according to the approved samples. All cast fitting shall be sound and free from lumps pot holes and pittings, both internal and external surfaces shall be clean, smooth and free from sand etc. burring, plugging stopping or patching of the casting shall not be permitted. The bodies, spindles and other parts shall be truly machined or that when assembled the points shall be axial, parallel and cylindrical with surfaces smoothly finished. The area of the water way of the fittings shall not be less than the areas of the nominal bore. The fittings shall be fully examined and cleared of all foreign matter before being fixed. The fittings shall be fitted in the pipe line in a workman like manner. The joints between fittings and pipes shall be made leak proof. The joints and fittings shall be leak proof when tested to a pressure of 6 kg/sq.cm and the defective fittings and joints shall be replaced or redone. The rate shall include providing and fixing of angle valve with the flange (disc) all complete.

Mode of Measurement

This shall be measured in Number.

11.36 Providing & Fixing shower rose

CP Brass heavy duty overhead shower of approved make and model confirming to approved sample with CP brass 190 mm matching arm with wall flange . The Shower shall be pressure adjusted shower with revolving joint or single flow shower as specified in the item specification etc complete as directed by the Engineer

Mode of Measurement: This shall be measured in Number.

11.37 Providing & fixing 25mm dia GI hydrant for gardening

The work shall be carried out as per the drawing and as directed. It shall be provided with a wheel valve and a vertical piece of GI pipe to keep the hydrant above dressed ground level or at a height as directed by the Engineer. The scope of work includes excavation, making connection with main GI pipeline, GI specials as required, connecting pipe, spout of appropriate GI pipe etc complete as directed by the Engineer.

In case a brick chamber is necessary same shall be of size 450x450 mm and depth 230 to 500 mm to suit the site conditions. The bottom of the chamber shall be finished with PCC 1:4:8 100 mm thick and the walls shall be finished with 12 mm thick plaster in CM 1:4. with a MS cover for the chamber however the chamber shall be measured under relevant tender items and shall be paid for. Nothing extra shall be paid over and above item rates for the construction of chamber if required to be provided. The rate shall be for providing the hydrant and connecting it to the main line with required specials, providing and fixing wheel valve and GI pipe piece, as specified above.

Mode of Measurement: This shall be measured in Number.

11.38 Providing & fixing 6mm thick asbestos or other equivalent non asbestos string for 25mm dia line

This shall be wound closely and uniformly wound over the GI pipe line to open/ concealed in structure. Sample of asbestos string shall be got approved from the Engineer before use.

Mode of Measurement: This shall be measured in Running Meter of the pipe treated as above.

11.39 Providing & fixing 6mm thick asbestos or other equivalent non asbestos string for 15mm dia line

The general specification is same per as Item spec. no.11.38

Mode of Measurement: Same as per Item spec. no. 11.38

11.40 Providing & Fixing Towel rail

This shall be heavy duty brass chromium plated or as specified, of approved make. The length shall be 610 mm and the rod shall be of 20mm dia cover cup / disc. It shall be fixed with brass screws on each end, firmly securing the towel rail firmly, as directed by the Engineer. Sample of the towel rail needs to be got approved by the Engineer.

Mode of Measurement: This shall be measured in Number.

11.41 Providing & Fixing CI manhole cover of 40 kg

This shall be of approved make and conforming to relevant IS specification. The cover shall be provided over CI frame. The frame shall be properly grouted in the brickwork / RCC cover slab of the chambers.

Mode of Measurement: Manhole cover with frame (as one unit) shall be measured in Number.

11.42 Providing & Fixing Ball cock for 40mm dia pipe

This shall be of approved class and make. This may be of brass or PVC as specified in the item with arm and the ball to be fixed in the incoming water supply line. The cock shall withstand the pressure and shall be fixed directly on the water line as directed by the Engineer.

Mode of Measurement: This shall be measured in Number.

11.43 Providing & fixing ball cock for 25mm dia pipe

The general specification is same as per Item spec. no.11.42

Mode of Measurement: Same as per Item spec. no. 11.42

11.44 Providing & Fixing Ball cock for 15mm dia pipe

The general specification is same as per Item spec. no.11.42

Mode of Measurement: Same as per Item spec. no. 11.42

11.45 Providing & Fixing CP brass water spout 15mm dia

This shall be provided and fixed at places as directed by the Engineer. The part of brickwork around the spout shall be finished to match the external finish. No patch shall be seen. The spout shall be of approved quality and make.

Mode of Measurement: This shall be measured in Number.

11.46 Providing & Fixing GI 'B' class water spouts of 80mm dia

The spout shall be 200 to 450 mm in length as directed by the Engineer. One end of the pipe shall be cut diagonally and tack welded at the bottom to facilitate the flow of water. It shall be fixed at places as directed by the Engineer. The brickwork after the placement of the spout shall be finished properly to match the external finish. The spout shall be painted with paint of approved shade and make. The rate shall be quoted for providing and fixing water spout in RCC or brick work as specified above.

Mode of Measurement: This shall be measured in Number.

11.47 P&F GI water spout of 50mm dia

The general specification is same as per Item spec. no.11.46

Mode of Measurement: Same as per Item spec. no. 11.46

11.48 P&F GI water spout of 40mm dia

The general specification is same as per Item spec. no.11.46

Mode of Measurement: Same as per Item spec. no. 11.46

11.49 P&F GI water spout of 25mm dia

The general specification is same as per Item spec. no.11.46

Mode of Measurement: Same as per Item spec. no. 11.46

11.50 Fixing of Geyser

The Geyser shall be shifted from the Site stores to the required place. Supply and fixing the geyser with necessary anchor bolts with nuts, washer, CP brass angle valves, CP brass copper pipes and installation of the standard accessories supplied by the geyser supplier etc complete as directed by the Engineer. The rate shall be quoted for fixing Geyser including angle valve and chromium plated copper pipe as specified above

Mode of Measurement: This shall be measured in Number

11.51 Fixing of Water coolers

The Water cooler shall be shifted from the Site stores to the required place. Then necessary coach/anchor bolts with nuts, CP brass pipes and CP brass angle valves for inlet and GI outlet pipe of 25mm dia up to drain point shall be provided and fixed. The rate shall be quoted for fixing of Water cooler and other accessories supplied by the manufacturer as specified above.

Mode of Measurement: This shall be measured in Number

11.52 Fixing HDPE/ PVC water tank- 2000 Ltr. capacity

To take delivery of the tank / shifting from the site stores to the place of installation as directed by the Engineer. All accessories supplied by shall be fitted to the tank and the tank shall be properly installed over the Pedestals / base constructed for installation as directed by the Engineer. (Construction of the pedestals / base shall be carried out and same shall be measured and paid under relevant tender item. Nothing extra shall be paid for the construction of pedestals / base. The rate shall be quoted for fixing water tank as specified above.

Mode of Measurement: This shall be measured in Number.

11.53 Fixing HDPE/PVC Water Tank- 1000 Ltr. capacity

The general specification is same as per Item spec. no. 11.52.

Mode of Measurement: This shall be measured in Number.

11.54 Fixing HDPE/PVC Water Tank- 500 Ltr. capacity

The general specification is same as per Item spec. no. 11.52.

Mode of Measurement: This shall be measured in Number

11.55 Providing and fixing Valves of various diameters complete

General - Brass or gunmetal valves shall be heavy quality, of approved manufacturer & pattern and with screwed or flanged ends as specified. The valves shall in all respects comply with IS.778-1984 & IS.781-1984. The standard size of brass or gunmetal valves shall be designated by the nominal bore of the pipe outlet to which they are to be connected. A sample of each kind of valve shall be got approved from the Project Manager & all supplies made according to the approved samples.

All cast valves shall be round & free from blow holes. Both internal & external surfaces shall be clean, smooth & free from sand etc. Burning, plugging, stopping or patching of the casting shall not be permissible. The bonnet, spindles & other parts shall be truly machined so that when assembled the parts shall be axial, parallel & cylindrical with surface smoothly finished. The area of the water way of the valve shall not be less than the area of nominal bore.

The valve shall be thoroughly examined & cleaned of all foreign matter before being fixed. The valves shall be fixed in the line in a workmanlike manner. The joints between fittings & pipes shall be made leak proof When Tested as described in paragraph 5.12 & the defective fittings & joints shall be replaced or redone.

Mode of Measurement

It shall be measured in numbers

11.56 Providing and fixing insulation to small pipes embedded in walls, with 9 mm thick Nitrile rubber tube , on cPVC pipe lines for hot water supply, etc. complete, as directed of

1) 150 mm. n.b.
2) 100 mm. n.b.
3) 80 mm. n.b.
4) 65 mm. n.b.
5) 50 mm. n.b.
6) 40 mm. n.b.
7) 32 mm. n.b.
8) 25 mm. n.b.
9) 20 mm. n.b.
10) 15 mm. n.b.

Materials:

The insulation shall be provided as under 9 mm. thick Nitrile rubber tube.

The insulation shall be fire inhibiting 9 mm. thick Nitrile rubber tube, Highly – flexible closed - cell insulation material high vapour diffusion resistance and Low thermal conductivity value of not more than 0.035 w/(m . k), FM Approved. It shall be fire inhibited (TF quality) and solvent resistant and shall be of close cellular structure and hence of negligible vapour permeability.

Workmanship:

Application:

The pipe surface shall be thoroughly cleaned with a wire brush to remove all rust and other foreign matter.

The cleaned surface shall be applied with a coat of industrial bitumen 85/40 or 85/25. The insulation slab shall then be stuck over this with staggered joints. The joints shall be sealed with a vapour barrier of Bitumen. The insulation shall be held in position with 1 mm. G.I. wire at 600 mm. C/C. A coat of bitumen shall then be applied over the insulated surface.

Finish: The insulated surface shall be cladded all around with 24 gauge aluminium sheet.

Mode of Measurement

It shall be measured in installed running meter; The Cost shall including installation of Insulation.

11.57 Providing and fixing, testing & commissioning of health faucet with regulator

The general specification as specified in the item description in the schedule of quantity.

Mode of Measurement: This shall be measured in Number.

11.58 Providing & Fixing C.P. brass exposed type flush valve for Urinal Pressmatic

It shall be Flush Valve of CP Brass construction of approved make as specified complete with elbow set with provision of setting and operating lever. Chromium plating shall be confirming to relevant specification. .

Mode of Measurement: This shall be measured in Number.

11.59 Providing and Fixing, testing & commissioning of Concealed type flush valve."

The general specification as specified in the item description in the schedule of quantity.

Mode of Measurement: This shall be measured in Number.

11.60 Providing and fixing Recessed type Stainless Steel soap dish

The general specification as specified in the item description in the schedule of quantity.

Mode of Measurement: This shall be measured in Number**.**

11.61 Providing and fixing ABS plastic body liquid soap dispenser

Providing and fixing liquid soap holder with soap bottle of approved make such as fixed with CP brass screws etc. complete as directed.

Mode of Measurement: This shall be measured in Number.

11.62 Providing & fixing stainless steel toilet paper holder

The general specification as specified in the item description in the schedule of quantity.

Mode of Measurement: This shall be measured in Number**.**

11.63 Providing & Fixing HDPE pipe

Providing & Fixing HDPE pipe of diameter as specified in SOQ 4 kg pressure 4984 PE 80 with welding, all fitting such as bend, tee, reducer etc complete.

Mode of Measurement: This shall be measured in running meter**.**

FOR THE SPECIFICATIONS AND MODE OF MEASUREMENT OF ALL OTHER ITEMS, PLEASE REFER THE SCHEDULE OF QUANTITY SINCE THEY ARE SELF EXPLAINATORY.

SECTION – IV-A

TECHNICAL SPECIFICATIONS (ELECTRICAL WORKS)

TECHNICAL SPECIFICATION (SECTION – IV)
(INTERNAL ELECTRIFICATION)

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TECHNICAL SPECIFICATIONS FOR INTERNAL ELECTRIFICATION WORKS

The following specifications will apply under all circumstances to the equipment to be supplied and installed against this contract and it is to be ensured that the contractor shall obtain for himself at his own expense and on his own responsibility all the information which may be necessary for the purpose of submitting the tender and for entering into a contract keeping in view the specifications of installation and inspection of site etc.

1.0 STANDARDS AND CODES

The following Indian Standard Specifications and code of practices amended as on date will apply to the equipment, materials and installation for this contract:

a)	Steel boxes for enclosure of electrical accessories	IS 5133 – 1969 Part I
b)	Fittings for rigid steel conduits	IS 2667 – 1964
c)	Rigid PVC conduits for electrical wiring	IS 9537 Part III
d)	Accessories for rigid PVC conduits for electrical wiring	IS: 2667-1964 & IS: 3857-1966
e)	Switch socket outlets	IS 4615 - 1968
f)	Three pin plug and socket outlets	IS 1293 - 1967
g)	Switches for domestic and similar purpose	IS 3854 - 1966
h)	PVC wires	IS 694 – 1990
i)	PVC Insulated Heavy Duty Cables	IS 1554 - 1976
j)	Conductor for Insulated Electric Cables	IS 8130 - 1984
k)	PVC Insulated & PVC Sheathed solid Al conductor cables – 1100 volts.	IS 4288 - 1988
l)	Low Voltage Switchgears & Control Gears	IS 13947 – 1993
m)	Switchgear bus bars	IS 375 - 1963
n)	Enclosures for low voltage switchgear	IS 2147 - 1962

o)	Molded Case Circuit Breakers	IS 13947 - 1993
p)	Miniature Air Circuit Breakers for AC Circuits	IS 13947 – 1993
q)	Code of Practice for Installations & Maintenance of power cables	IS 1255 – 1983
r)	Code of Practice for Electrical wiring installation	IS 732 - 1989
s)	Code of Practice for Selection, Installation & Maintenance of Switchgear & Control gear	IS 10118 – 1982
t)	Code of practice for Earthing	IS 3043 – 1987
u)	Code of Practice for Lightening protection	IS 2309 – 1989
v)	Code of Practice for personal hazard & fire safety of buildings	IS 1644 – 1960
w)	Code of Practice for Electrical Installation Fire Safety of Building	IS 1646 – 1982

Indian Electricity Rule 1956 & Indian Electricity Act 1910 amended as on date and NATIONAL BUILDING CODE OF INDIA

2.0 CONCEALED / SURFACE CONDUIT WORKS

2.1 Rigid PVC Conduits specification & size

2.1.1 Rigid PVC Conduits: These shall be rigid PVC conduit of perfectly circular tubing having minimum wall thickness of medium gauge 1.8 mm approved by F.I.A. & I.S.I. and shall conform to IS 9537 Part III. No PVC conduit of less than 25 mm dia shall be used for electrical wiring.

i) Up to 38 mm diameter - min. 1.8 mm wall thickness

ii) Above 40 mm diameter - min. 2.2 mm wall thickness

2.1.2 PVC Conduit fittings: Connections between PVC conduit shall be with rigid PVC conduit accessories only. PVC conduit accessories / fittings such as couplers, unions, bends, tees, junction boxes, reducers, chase nipples, split couplings, plugs etc. shall be specifically designed and manufactured for their particular

application. All conduit accessories shall be PVC grip type and shall conform to IS: 2667-1964 and IS: 3857-1966. As far as possible, the conduit system shall be so laid out that it will alleviate the use of tees, and sharp bends. No elbows shall be used and only PVC regular bends, slip in type shall be used for bonding/turning.

In long distance straight runs of conduits, inspection boxes at reasonable intervals shall be provided. The conduit pipes including all bends, unions, couplers, tees, junction boxes etc. forming part of the conduit system shall be adequately supported. Bending of conduit with large radius while laying at site to minimize use of readymade bends shall be adopted as far as possible. For diversion purpose pipes shall be bent."

2.1.3 Conduit Cross Section / Size : The conduit shall be of ample section area to facilitate the drawing of PVC wires/cables. In no case shall the total cross section of wires/cables measured overall, be more than half the inside area of the conduits. Refer Table provided at **Clause No. 13, Page IV-48** for maximum no. of wires that can be pulled in various sizes of conduits.

MINIMUM CONDUIT DIA (0.D.) FOR ELECTRICAL WIRING - 25 MM

2.1 (A) Hot DIP Galvanized Steel Conduits specification & size

2.1.1. (A) Steel Conduits: These shall be hot dip galvanized steel of wall thickness 16 SWG (1.6 mm thick) up to 32 mm and 14 SWG (2 mm thick) for sizes above 32 mm. These shall be heavy duty, electric resistance welded, electric thread type, having perfectly circular tubing and capable of being cleaned and tight fitting joints.

2.1.2 (A) Steel Conduit Connection: Connections between steel conduits shall be with screwed couplers ensuring screwed metal to metal contact. Length of the threads in all cases of joints shall be between **13 to 19 mm**. Connections between screwed conduits & sheet metal boxes shall be by means GI hexagon check nuts fixed inside the box. Joints in conduit and termination shall be free of burrs to avoid damage to insulation of conductors while pulling through the conduits.

2.1.3 (A) Conduit Bends: Conduit bends shall of **16 SWG**. As far as possible the conduit system shall be so laid out that it will alleviate the use of tees, elbows and sharp bends. Bending of conduit with large radius while laying at site to minimize use of readymade bends shall be adopted as far as possible. No length of conduit shall have more than the equivalent of two-quarter bends from inlet to outlet.

2.1.4 (A) Conduit Cross Section / Size: The conduit shall be of ample section area to facilitate the drawing of PVC wires/cables. In no case shall the total cross section of wires/cables measured overall, be more than half the inside area of the conduits. Refer Table provided at **Clause No. 13, Page IV-48** for maximum no. of wires that can be pulled in various sizes of conduits.

MINIMUM CONDUIT DIA (0.D.) FOR ELECTRICAL WIRING - 25 MM

2.1 (B) Metallic Conduits specification & size

2.1.1. (B) Steel Conduits: These shall be Mild steel of wall thickness 16 SWG (1.6 mm thick) up to 32 mm and 14 SWG (2 mm thick) for sizes above 32 mm, heavy duty, electric resistance welded, electric thread type, having perfectly circular tubing and capable of being cleaned and tight fitting joints. The conduit shall be protected from rust by two coats of primer and one coat of black enamel paint applied inside and outside in its manufactured form.

2.1.2 (B) Steel Conduit Connection: Connections between steel conduits shall be with screwed couplers ensuring screwed metal to metal contact. Length of the threads in all cases of joints shall be between **13 to 19 mm**. Connections between screwed conduits & sheet metal boxes shall be by means MS hexagon check nuts fixed inside the box. Joints in conduit and termination shall be free of burrs to avoid damage to insulation of conductors while pulling through the conduits.

2.1.3 (B) Conduit Bends: Conduit bends shall of **16 SWG**. As far as possible the conduit system shall be so laid out that it will alleviate the use of tees, elbows and sharp bends. Bending of conduit with large radius while laying at site to minimize use of readymade bends shall be adopted as far as possible. No length of conduit

shall have more than the equivalent of two-quarter bends from inlet to outlet.

2.1.4 (B) Conduit Cross Section / Size: The conduit shall be of ample section area to facilitate the drawing of PVC wires/cables. In no case shall the total cross section of wires/cables measured overall, be more than half the inside area of the conduits. Refer Table provided at **Clause No. 13, Page IV-48** for maximum no. of wires that can be pulled in various sizes of conduits.

MINIMUM CONDUIT DIA (0.D.) FOR ELECTRICAL WIRING - 25 MM

2.2 Laying of Conduits

2.2.1 Conduits shall be laid before casting in the upper portion of a slab/in PCC if below flooring or otherwise, as may be instructed in accordance with approved drawings, so as to conceal the entire run of conduits and ceiling outlet boxes with a concrete cover of **minimum 12 mm.** Conduits shall be so laid that they are interconnected. This is required to facilitate pulling of wires from different routes in case of any of the portion of conduit/junction box/outlet box is blocked during slab casting. Vertical drops shall be cut in masonry work by the contractor to sufficient depth to allow full thickness of plaster over conduits. The width of the chases will be made to accommodate the required number of conduits. The chases will be filled with cement, coarse sand mortar **(1:4)** and properly cured by watering by the contractor. This filling of chases shall be done by electrical contractor prior to building contractor doing finishing plaster on walls.

2.2.2 When the conduit is to be embedded in a concrete member it shall be adequately tied by steel wires to the reinforcement to prevent displacement during casting/vibrating of concrete. Tying wire shall be supplied by the contractor. Conduit in chases or laid in the slab shall be supported at maximum of 1 m centre.

2.2.3 Cutting of chases in any R.C.C. member/finished floor/ already finished wall surface is not allowed unless prior approval of Site Engineer is taken in site instruction book. If a chase is cut in an already finished surface, the contractor shall fill the chases and finish it to match the existing finish including painting at his cost to Site Engineer's satisfaction.

2.2.4 Contractor shall not cut any steel reinforcement bars or steel structure to fix the conduits. Puncturing of wooden/ steel shuttering for R.C.C. slab/beams/column etc. for conduit work is also not allowed, unless Site Engineer permits in site instruction book under special conditions.

2.2.5 Run of conduit pipe through expansion joints in R.C.C. members should be avoided as far as possible and if unavoidable, flexible conduit pipe should be used with ceiling outlet box on both sides of expansion joint.

2.2.6 Surface Conduiting : Conduit on surface of walls/R.C.C. members shall be avoided as far as possible and if unavoidable prior approval of Site Engineer on sample saddles, clamps, screws and a **minimum 5 M conduit** laid on surface shall be taken, to achieve best possible workmanship. Distance between 2 consecutive clamps for fixing conduit on surface shall not exceed 600 mm. No wooden gutties for fixing saddles/clamps shall be used. Roll plug/steel fastener with hard setting/sealing compound shall be used. Conduits & boxes fixed on surface shall be painted with finishing paint of approved colour & finish.

WHERE EVER FALSE CEILING IS BEING PROVIDED, CONCEALED CONDUITS IN RCC SLAB SHALL NOT BE PROVIDED BUT SURFACE CONDUITING WITH MS SUPPORTS / CLAMPS ETC. SHALL BE DONE OVER FLASE CEILING. SIMILARLY FOR INSULATED CEILING & WALLS, ONLY SURFACE CONDUITING TO BE PROVIDED.

2.2.7 Conduiting on Stone wall: In case of stone masonry, necessary conduits with MS boxes should be placed as the masonry is in progress, since after completing masonry; it is very difficult to cut chases in walls. Special location of cement concrete shaft is also recommended to conceal conduit in stone masonry and the same shall be provided by the IDMC.

2.2.8 Conduits below floor: In ground floor conduiting below the flooring should be avoided. Wherever it is unavoidable GI `A' class pipe or heavy gauge PVC pipe shall be used with prior approval of Site Engineer.

2.2.9 **Steel draw wires :** All conduits shall be provided with steel draw wires (fish wires) of at least **16 SWG** wherever required.

2.3 Ceiling/Wall outlet boxes for lights/fans

2.3.1 Outlet boxes shall be **of minimum 16 SWG** steel sheets or of casting with removeable cover sheet for all the light points & the fan points and so installed as to maintain continuity throughout. These shall be protected at the time of laying by filling with jute/earth/cotton etc. so that no cement mortar finds its way inside during concreting or plastering etc. **Typical sketches SK – 18 A & B** for such outlet boxes are attached. While installing lighting fixture and ceiling fans, removeable covers to be removed and **3 mm** thick matching colour hylem sheet covers to be used.

2.3.2 For fixing lighting fixtures/brackets, outlet boxes complete with check nut for holding conduits shall be used. For fixing lighting fixture suitable for 14 /18 /20 Watts fluorescent tubes/ incandescent lamps/discharge lamps on RCC slabs/walls, only **one** outlet box is required. For fixing lighting fixture suitable for 28/ 36 / 40 / 54 Watts fluorescent lamps in RCC slabs/walls, **two** numbers outlet boxes should be provided at a distance of **300 mm** away from the centre in the longitudinal direction of the fixture, so that the use of gutties / rawl plugs etc. may be avoided, as well as wiring from outlet box to the light fitting is completely concealed. However, if for fixing of lighting fixture suitable for 28/36/40/54 W fluorescent lamp in RCC slab walls, **2 nos.** anchor fasteners are being used, only one outlet box may be provided. If the light fitting is to be installed in RCC beam, and due to heavy reinforcement at the bottom of beam it is not possible to provide outlet boxes, simple conduit should be provided. These details have been shown in the **attached sketch no. SK-16** and these should always be followed.

2.3.3 For fixing ceiling fans, circular outlet boxes, made of **minimum 14 SWG** Sheet Steel, **125 mm** diameter, complete with **12 mm dia** Mild Steel rod **525 mm** long, with loop in the box & hylem sheet cover **150 mm dia** at bottom shall be used/ **for Readymade PVC Ceiling fan outlet box** See attached **sketch no. SK - 17** for the details of this special outlet box and fan fixing detail. However, if anchor fasteners with D-hook specially designed for fixing ceiling fans are used, simple outlet box without mild steel rod shall be used .

2.4 Draw Out Junction Boxes Heavy gauge PVC / Steel draw out boxes fabricated from **minimum 16 SWG** sheet steel of ample dimensions shall be

provided at convenient points on walls/ceilings to facilitate pulling of long runs of cables/wires. These shall be completely concealed with **3 mm** thick hylem sheet covers, flush with plasterwork. These draw out boxes should be five sided. The location of these boxes is to be decided prior to fixing, as per site requirement and following shall be treated as general guidelines for deciding the location of these:

a) These shall be provided at a place where these are not in direct view. Recommended place is **400 / 450 mm** below ceiling, if conduits are running vertically.

b) Junction boxes in the offset of bottom of R.C.C. beamed vertical wall shall not be provided.

c) If junction boxes are coming side by side for two or more conduits, one common MS box of proper size can be used to act as junction box.

d) Junction box in ceiling to be avoided as far as possible & if junction box is to be provided in ceiling, its position should be so located that it is in line with other light/fan points.

e) Junction boxes shall never be used for splitting one conduit into two or more. Junction box for such functions is avoidable and for this, number of conduits to be connected to one switchboard shall be calculated correctly as per drawing before laying conduits in ceiling.

f) Locating junction boxes on outer surface of exterior walls of building shall be avoided as these are in direct view and are also exposed to weather.

g) Junction boxes shall never be closed permanently by plaster. Removable covering of Aluminium / Sheet Steel shall be provided for conduit boxes acting as junction boxes and for MS junction boxes removable hylem (white colour) plate shall be provided. This cover shall be painted with wall colour.

h) Junction boxes in important areas shall be avoided and can be located in toilets/corridors/service shafts & stores etc.

2.5 A Switch Boxes (for Piano type switches)

Steel boxes of required sizes fabricated from **16 SWG steel sheets,** shall be provided to house speed regulators of fans, switches for lights, fans, plug sockets etc. as per requirement of drawings. These should be so designed that accessories on hylem sheet could

be mounted with tapped holes and brass machine screws, leaving ample space at the back and on the sides for accommodating wires and check nuts at conduit entries. These shall be attached to conduits by means of check nuts on all walls of the boxes through which the conduits are entering. These shall be completely concealed leaving edges flush with finished wall surfaces. **3 mm** thick hylem cover should be fixed to these switch boxes by means of brass chrome plated machine screws. Utmost care shall be taken by contractor to ensure that all switch boxes are in line and level. Inside each switchbox, one bolt shall be welded to receive earthing wire.

TYPICAL SKETCHES FOR THESE SWITCHBOXES ARE SHOWN IN THE ATTACHED SKETCH NO. SK-19. UNLESS OTHERWISE SPECIFIED IN EXECUTION DRAWINGS, THE HEIGHT OF SWITCH BOXES, OUTLET BOXES FOR LIGHTS IN WALLS, POWER PLUGS ETC. FROM FINISH FLOOR LEVEL SHALL BE AS SHOWN IN SKETCH NO. 20 (ATTACHED).

2.5 B Switch Boxes (for Modular type switches)

Same as above but only Zinc chromate passivated MS boxes suitable to house modular type switches, fan regulators & sockets of required ratings. These shall be so designed that accessories are mounted on a grid plate with tapped holes for brass machine screws. The grid plates & MS boxes shall be fitted with a brass earth terminal. Moulded front covers made from high impact resistant, flame retardant and ultra violet stabilized engineering plastics shall be fixed by means of counter sunk chromium plated brass machine screws.

NOTE-

CONVENTIONAL PIANO TYPE OR MODULAR SWITCHES AND CORRESPONDING SWITCH BOXES SHALL BE USED AT LOCATIONS AND AS PER THE DETAIL SPECIFIED IN SCHEDULE OF QUANTITIES/ DRAWINGS/ INSTRUCTION OF SITE ENGINEER.

2.6 Cleaning and Protection of Conduit System

The entire conduit system including outlet boxes, junction boxes and switchboxes shall be thoroughly cleaned after completion of erection and tested for non-blockage by air/sound or steel wire (minimum 16 gauge) prior to finishing of building and before drawing in of cables/wires.

To safe guard conduit system against filling up with the plaster/cement slurry/water etc. all the outlet and switch boxes will have to be provided with temporary jute/cotton filling, covers and plugs etc. within tendered cost which shall be replaced later on by hylem sheet cover after wiring as required.

2.7 Painting of MS Outlet & switch boxes

All outlet & switch boxes etc. should have their original finish & paint in good finish prior to erection & if due to long storage in open, painting has been peeled off/damaged/worn-out; fresh coat of paint should be applied.

2.8 Raceways

These shall be used for drawing wiring for system like UPS, telephone, data processing etc. specially under floors or above false ceiling, due to use of modular furniture. Heavy-duty removable cover raceways of sizes as per schedule of quantities/ drawings fabricated from 14 SWG sheet of approved design and make shall be provided. The raceways shall be embedded in floors, with covers flush with finished floor level or shall be fixed on surface over false ceiling, as indicated in drawings and as required. Covers of raceways shall be screwed on neoprene gasketed top with counter sunk brass chrome plated screws. Sheet steel raceways shall be galvanised. Fixing of raceways in floors shall be done in close co–ordination with Mechanical works & utmost care shall be taken to prevent mortar from seepage into the raceways. These raceways be provided when floors are being laid. If these have to be provided after laying of floors, cost of cutting chases in floor and making them good, as required shall be without any extra cost. All telephone & data raceways shall be at least 300 mm away from those of electrical unless otherwise stated

/ shown in drawings. Common raceways with steel partition can be used (with approval) for power and telephone data purpose.

3.0 WIRING AND SWITCHES**:**

3.1 Specification of wires, sizes and laying / termination.

All wires shall have been manufactured in accordance with the latest IS Specification (IS 694-1990 Part II). All wires shall be PVC insulated, unsheathed, single core, FRLS (Fire Resistance Low Smoke), copper conductor (stranded), of 1100 volt grade. Cross section of the conductor shall be as per the specification mentioned in schedule of quantities.

MINIMUM CROSS SECTION OF COPPER STRANDED CONDUCTOR FOR ELECTRICAL WIRING - 1.5 MM SQUARE.

For single phase wiring, colour of live conductor's insulation shall be Red/Yellow/Blue (only one of these colour for one building) and Black for neutral. Earthing is to be done by green PVC insulated copper conductor. For three phase wiring, colour of live conductor's insulation shall be Red/Yellow/Blue, as per relevant phase and black for neutral. However, if due to unavoidable circumstances, these colour codes cannot be used by contractor, prior approval of the Site Engineer shall be taken and correct colour PVC tape should be put in distribution board/ outlet boxes/switch boxes etc. wherever these wires are to be inspected. Earth wire shall always be of Copper conductor PVC insulated & colour of insulation shall be Green. Whenever wires are being terminated in a Distribution Board / Switch Box / Plug Points / Outlet Box etc., a minimum of 200-mm long extra wire should be provided in the form of a loop for future maintenance/use. Conductor having nominal cross sectional area exceeding 4 Sq.

mm. Shall always be provided with crimping socket unless switchgear is having facility to receive direct naked wires.

NO JOINTS IN WIRES SHALL BE MADE INSIDE CONDUITS AND INSPECTION DRAWOUT BOXES.

3.2 A Switches And Sockets (Conventional piano key type)

All 6 and 16 Ampere switches shall be conventional piano key type 240 volts AC of best quality & standard. The switch's moving & fixed contacts shall be of silver nickel and silver graphite alloy & contact tips coated with silver switches controlling the light, fan or sockets shall be connected on to the phase wire of the circuit. 6 A socket shall be 3-pin type with safety shutter, suitable for 240 V AC, 16 A socket shall be universal type (6 pins) suitable for 240 V AC with safety shutter.

3.2 B SWITCHES AND SOCKETS (Modular type)

All 10 & 20 A switches shall be of the modular flush mounting type, 240 V AC of best quality & standard. The switch's moving & fixed contacts shall be of silver nickel & silver graphite alloy & contact tips coated with silver. Housing of switches shall be made from high impact resistant, flame retarding & ultra violet stabilized engineering plastic material. Fan regulators shall be fixed inside

the switch boxes on grid plates with tapered holes & brass

machine screws leaving ample space at the back & sides for accommodating wires. Switches & sockets shall be provided with moulded cover plates of approved colour, shape & size made from high impact resistant, flame retarding & ultra violet stabilized engineering Plastic material & secure the box with counter sunk / round head chromium plated brass screws, where two or more switches are installed together, they shall be provided with one common switch cover plate as described above with notches to accommodate all switches either in one, two or three rows. 10 /20 A socket outlets shall be of modular flush mounting type & shall be switch three pin type (for 10 A) and 6 pin type (for 20 A) and fitted with automatic linear safety shutters to ensure safety from putting fingers. Socket outlets shall be made from high impact, flame retarding & ultra violet stabilized engineering plastic material. Switch & sockets shall be located in the same plate.

3.3 Point wiring

3.3.1 For lights, fans, call bells & 10 A plug points in lighting switch boards

(a) Providing & fixing of conduit, conduit accessories, draw out boxes, outlet boxes and switch boxes etc. in concealed / surface system.

(b) Looping system shall be adopted from terminal to terminal throughout including supply and drawing of required numbers and sizes (minimum 1.5 sq. mm copper stranded conductor) of wires without stripping off the insulation in-between.

(c) All flush type switches and accessories will be used on **3 mm** thick hylem sheet in MS switch box or modular switches in special boxes as per technical specifications & requirement given in schedule of quantities.

(d) The point will commence from the switch box and would end up to outlet box and shall also include supply and fixing of 6 A switch for each light point or group of light points as the case may be for the items.

(CIRCUIT WIRING INCLUDING CONDUITING UP TO SWITCH BOARDS IS NOT INCLUDED IN SCOPE OF POINT WIRING)

(e) POINT WIRING AND CIRCUIT WIRING IN SAME CONDUIT IS NOT ALLOWED AND THESE SHOULD BE DRAWN IN INDEPENDENT CONDUITS. POINT WIRING ORIGINATING FROM TWO

DIFFERENT PHASES SHALL NOT BE RUN IN THE SAME CONDUIT.

(f) The ceiling fan point shall be complete with special outlet box as specified in **2.3.3.** including fixing and connection of regulator. Supply and fixing of 6A switch and electronic stepped fan regulator for each ceiling fan is included in scope of the contractor. Switch box for ceiling fan shall be suitable for electronic type regulators unless otherwise specified.

(g) For exhaust fans, ceiling rose near exhaust fan to be provided.

(h) In any switch box, not more than **six (6)** regulators for ceiling fans should be provided unless approved in writing by the Site Engineer.

(i) Joining of wires by taping inside the switch box to be avoided by utilizing neutral & phase pin of 6/10, 16/20, 6/16, 10/20, 25 A socket or of suitable capacity connector if there is no socket in switch box.

(j) Fan regulator in switch box should be earthed if it is chocked or resistance type. **Earthing of light fittings / call bells / fans not required.** 10 Amp. convenience plug point's 3rd pin to be earthed with 2.5 sq. mm. green PVC insulated copper wire.

(k) In one switch box, only one phase circuit shall be provided.

(l) **BUILDING FOR POINT WIRING (LIGHTS, FANS, CALL BELLS AND 10 A PLUG POINTS N LIGHTING SWITCH BOARDS) SHALL BE TWO TYPES :**

TYPE A - NON INDUSTRIAL BUILDING SUCH AS RESIDENTIAL QUARTERS, OFFICE BUILDINGS, HOSTLES, MARKETING SHOPS/MILK BOOTHS AND GUEST HOUSES ETC.

TYPE B - INDUSTRIAL BUILDINGS SUCH AS PRODUCTION BLOCK, SERVICE BLOCK, SUB-STATION, REF. BLOCK, BOILER HOUSE AND WORKSHOP ETC.

3.3.2 For 20/25 A Power Plug Points

(a) Providing & Fixing of conduit, conduit accessories, draw out boxes switch boxes etc. in concealed/surface system including supply and drawing of circuit wiring. Conduit and wiring up to power plug point shall be paid separately and is not including
in the scope of work for supplying & fixing power plug point.

(b) Providing and drawing of wires of sizes as specified in the item. In one circuit, there shall not be more than 2 nos. 20/25 A power plug points and circuit shall be **2 x 2.5/4.0 sq. mm** copper stranded conductor wires, as specified in schedule of quantities.

(c) One no. flush type plug socket outlet and switch shall be supplied and fixed for each power point on 3 mm thick hylem sheet cover. Plug socket shall be universal type (one common 20 A switch for 10/20 or 10/25 A sockets). 6-pin switch & socket to be piano type in conventional MS box or modular type in special MS box as required in schedule of quantities.

(d) The point would commence from the distribution board and will end up to the switch box. Looping of circuit would be done to second 20/25 A power point from first 20/25 A power point.

(e) Each circuit would have its own **2.5/4.0 sq. mm.** green PVC insulated copper wire from distribution board to switch box and would be connected to third pin of socket outlet.

(f) For some special 20/25 A power plug point, only one point on one circuit has to be provided as required in schedule of quantities/drawings.

Note : Conduit and wiring up to 20 / 25 A power plug point from DB shall be paid under circuit wiring on length basis and supplying fixing of MS box with switch & socket shall be paid on number basis for each point.

3.3.3 For 20 / 25 A Power Plug Point

(a) Providing and fixing of conduit, conduit accessories, draw out boxes & switch box etc. in concealed/surface system.

(b) Providing and drawing of wires of sizes as specified in the item. In one circuit, there shall be only one power point and circuit shall be **2 x 4.0 sq. mm** copper stranded conductor wire as specified in schedule of quantities, complete with 4.0 mm sq. green PVC insulated copper wire.

(c) One no. M.C.B. 20 / 25 A, single phase shall be fixed for each power point on 3-mm thick hylem sheet cover, in such a way that only knob is outside MS switch box. It should also have one no. 20/25 A three-pin metallic type socket outlet complete with metallic plug top if specified in schedule of quantities.

However, for modular socket & MCB grid & switch plate with special MS box shall be provided.

(d) The point would commence from the distribution board and will end up to the switch box.

Note : Conduit and wiring up to 20/25 A power plug point from DB shall be paid under circuit wiring on length basis and supplying fixing of MS box with switch & socket shall be paid on number basis for each point.

3.4 Group Wiring (for industrial lighting)

(a) Specification for this would be applicable if either 1 or more lights of total 200 Watts or more lighting load is controlled by one M.C.B.

(b) Lights would be controlled by M.C.B. of rating and wire size, as specified in schedule of quantities. However, it shall not be less than **10 A and 2.5 sq.mm** copper conductor respectively. Light points controlled by one M.C.B. would be in parallel.

(c) M.C.B. for these lights would be installed in a suitable modular MS box with modular grid & switch plate. Total electric load to be controlled from this "Group Lighting Board" would not exceed **3000 W or 6 groups of lights**.

(d) `Group Lights' point would commence from group lighting switch board in surface / concealed conduit system, necessary wiring and up to the last light of the group.

(e) Group light points having fluorescent lamps light fittings with total wattage up to **500 W or less** should be covered under the **item 81.36 to 81.38.** For discharge lamp type light fittings if total wattage is more than **150 but less than 750 watts** it should be covered under the **item no. 81.32 to 81.35** of library of schedule of quantities. However, if wattage of each point is above **500 W,** each fitting may be controlled by independent MCB under **item no. 81.33** of library of schedule of quantities.

3.5 Circuit / Sub Mains Wiring

3.5.1 Circuit wiring with PVC insulated wires

Specification for this item covers, PVC insulated wires from distribution boards to light switchboard or to Group lighting switchboard, or to 10/20/25 A isolated power plug points, in

surface/concealed conduit system. This shall also cover wiring

between two light switchboards or between two group lighting switchboards or between Two 10 /20 /25 / 30 A power plug points. This shall be carried out as follows:

(a) Supply and fixing of conduit, conduit accessories, draw out boxes, etc. in concealed/surface system as per specification given in **2.0.**

(b) Providing and drawing of wires of sizes as specified in items details specified in schedule of quantities. For each circuit, independent conduit of size as specified in schedule of quantities to be provided i.e., pulling of more than one circuit in one conduit is not allowed. However, this condition can be relaxed by Site Engineer as per site conditions. In such cases one circuit shall be paid as per the relevant circuit wiring item and wires for other circuits shall be paid in items of pulling wires in existing conduits. Specification of wires shall be as per details given at **3.1**.

(c) Each circuit shall have a parallel independent running earthing of green PVC insulated copper stranded conductor wire of sizes as specified in schedule of quantities. For single-phase (2 wires) circuit one earthing wire and for 3 phase (4 wires) circuit, 2 earthing wire shall be drawn.

(d) For the purpose of determining the load per circuit, the following electric rating of points shall be assumed:

Light points (4' Fluorescent lamp)	80 Watts
Light points (incandescent lamp)	60 Watts
Light points (Compact Flu. lamp)	20 Watts
Light points (Discharge lamps)	As per the load of the fitting
Call bell point	20 Watts
Convenience plug point 10 A	100 Watts
Fan points	60 Watts
Exhaust fan points	300 Watts or as specified.
Convenience plug point 20/25 A	1000 Watts

Type and size of circuit shall be specified in the drawings. However, if this is not specified the same may be worked out based on following guidelines:

1. For non-industrial buildings such as office building, worker's amenity, staff quarters etc. the load per lighting circuit (light points, fan points & 10 A socket outlet) shall not exceed **1000 W or a total of 10 lights, fan or socket points which ever is less** and hence circuit of **2.5 sq. mm** copper conductor wire may be used.
2. For industrial buildings load per lighting circuit can be more than 1000 W. Size of copper conductor wire for circuit may be

   For load up to 1500 W : 2.5 sq.mm circuit
   For load above 1500 & up to 2000 W : 4.0 sq.mm circuit
   For load above 2000 & up to 3000 W : 6.0 sq.mm circuit
   For load more than 3000 W : 10 sq. mm circuit

   For Industrial Building depending upon the load 3 phase circuits of 4.0 & 6.0 sq.mm can also be used.
3. For 20/25 A power plug points circuit wiring of min. size 2.5 sq. mm copper conductor to be used. Maximum two 20 A power plugs points can be provided in one power circuit.

3.5.2 Sub-Main Wiring with PVC insulated wires

Specification for this item covers, PVC insulated wires/cables from main switch board to distribution board or from one distribution board to other distribution board in surface/concealed conduit system. This shall be carried out as specified in **3.5.1.**

3.5.3 Sub-Main Wiring with PVC insulated, PVC sheathed armoured cables.

Same as **3.5.1** above except that PVC insulated, PVC outer & inner sheath, armoured, Al. conductor cables shall be used instead of PVC insulated wire/cable. These cables shall be supplied &laid as specified in **4.0** of tender' technical specification.

4.0 POWER CABLE WORK

4.1 Specification of Cables

Heavy duty, PVC insulated, PVC outer and inner sheath, steel armoured, Al. conductor cables suitable for 1100 Volts AC, as per IS 1554 (Part-I-1976) of sizes as specified in schedule of quantities. The conductor of cable of size 16 sq. mm. & above shall be stranded whereas cables of size up to 10 sq. mm. shall be of single strand. While deciding the sizes of cable (if not specified in

drawings) for current rating following conditions may be considered

a)	Maximum conductor C Temperature	70 deg.
b)	Ambient Air Temperature	45 deg. C.
c)	Ground Temperature	30 deg. C
d)	Depth of Laying	750 mm.
e)	Load	Maximum connected load
f)	Grouping of cable	Yes
g)	Voltage drop	Not to exceed 5% from one end to another end

4.2 General Precautions for handling of cables

4.2.1 Before laying cables, these shall be tested for physical damage, continuity, absence of cross phasing, insulation resistance to earth and between conductors. Insulation resistance tests shall be carried out with **500/1000-Volt** Insulation Tester**.**

4.2.2 The cables shall be supplied to site wound on wooden drum as far as possible. For smaller length and sizes, cable in properly coiled form can be accepted. The cables shall be laid by mounting the drum of the cable on drum carriage (specially for cable of sizes above 50 sq. mm.). Where the carriage is not available, the drum shall be mounted on a properly supported axle, and the cable laid out from the top of the drum. In no case the cable will be rolled on, as it produces kinks which may damage the conductor.

4.2.3 Sharp bending and kinking of cables shall be avoided. The bending radius for PVC insulated and sheath armoured cable shall not be **less than 12 D where `D' is overall dia of the cable.**

4.2.4 While drawing cables through GI pipes and conduits & RCC pipe, ensure that size of pipe is such that, after drawing cables, **40% area is free.** After drawing cable, the end of GI pipes/conduits shall be sealed with cotton/bituminous compound. After drawing cables through RCC pipes, the ends shall be sealed with lean mortar of brickbat.

4.2.5 Electric power cables and telephone wires/cables shall not be laid in same trench, G.I./conduit/R.C.C. pipe. Minimum distance of

400 mm between power and telephone wire/cable shall be maintained.

4.2.6 Armoured cables shall never be concealed in walls / floor/ roads without GI pipes, conduit or R.C.C. pipes.

4.3 Laying of Cables (Underground System)

4.3.1 Cables shall be so laid in ground that these will not interfere with other underground structures. All water pipes, sewage lines or other structure which become exposed by excavation shall be properly supported and protected from injury until the filling has been rammed solidly in places under and around them. Any telephone or other cables coming in the way are to be properly shielded, diverted as directed by the Site Engineer.

4.3.2 Cables shall be laid at a minimum depth of **750 mm** from existing ground level. Excavation will generally be in ordinary alluvial soil. The width of the trench shall be sufficient for laying of required number of cables.

4.3.3 Sand bedding **75 mm** thick shall be made below and above the cables. A layer of second class bricks (full size 230 x 100 x 75 mm) shall be laid over the cable, above sand bedding to cover cable completely. More than one cable can be laid in the same trench by providing sand between two cables. For details of laying of cables see **sketch no. SK-26 attached**. However, the relative location of cables in trench shall be maintained till termination. The surface of the ground after back filling the earth shall be made good so as to conform in all respects to the surrounded ground and to the entire satisfaction to Site Engineer.

4.3.4 Cable Joints: Joints in the cable throughout its length of laying shall be avoided as far as possible and if unavoidable, prior approval of site engineer shall be taken. If allowed proper straight through epoxy joint shall be made including preparing necessary bedding without any additional cost.

4.3.5 Cable Loops : A minimum loop of **3 M** shall be provided on both ends of the cable at entry of buildings, or after every **150 M** of un-jointed length of cable, and on both ends of straight through cable joint. This additional length shall be used for fresh termination in future. Cable for this loop shall be paid for supply and laying.

THE LOOP SHALL BE KEPT IN "S" FORM AND LOOPS OF DIFFERENT CABLES SHOULD NOT OVERLAP.

4.3.6 Route Markers

For all underground cables, route markers should be used:

(i) Separate cable route marker should be used for L.T., H.T. and Telephone cables.

(ii) Standard specification of cable markers is as follow:

Galvanised cast iron plate with marking (LT/HT/Telephone cable) dia 100 mm with 600 mm long GI 'B' class 20 mm pipe or 35 x 35 x 6 mm MS angle (Galvanized) riveted/bolted with this plate.

(iii) Route markers should be grouted in ground with **1:2:4 cement concrete pedestal size: 230 x 230 x 300 mm.**

(iv) Cable markers should be installed at an interval not exceeding **50 M** along the straight routes of cables at a distance of **0.5 M** away from centre of cable with the arrow marked on the cable markers plate indicating the location of cable. Cable markers should also be used to identify change in direction of cable route and for location of every joint in underground cable. The typical sketch of a cable marker is shown in **Sketch no. SK- 27 attached.**

4.3.7 R.C.C. hume pipe for crossing road in cable laying shall be provided by purchaser/Client. Similarly masonry/concrete trench inside building if required shall be provided by IDMC. However,

`A' class GI pipes for laying cables in walls/floors/concrete block etc. near cable ends/if required shall be provided by contractor without any extra cost. Sealing of GI pipes/conduits, R.C.C. hume pipe, trenches etc. also shall be done by electrical contractor without any extra cost.

4.4 Laying of cables (in air)

4.4.1 If major length **(more than 75 %)** of cable is in air above ground & balance underground, full length would be considered laid in air whereas if major portion **(more than 75%)** is in the ground and part length is in air, full length would be considered in underground system.

4.4.2 Cables in air shall be laid in **GI `A' class pipes or on cable trays,** as specified in schedule of quantities. Clamping of cables directly on wall surface shall not be allowed. Suitable aluminium clamps with aluminium cast saddles to be provided if GI pipes is laid on wall surface. For fixing cables on cable trays, Aluminium strip

clamp of **minimum 2-mm thickness** shall be used. Providing and fixing of MS supports for cable tray would be done by electrical contractor without any extra cost. However cable trays shall be paid extra.

4.4.3 **Clause no. 4.3.4, 4.3.5, 4.3.7** of underground cable system shall be applicable to cable in air system also.

4.4.4 Cable Trays:

These shall be perforated type, heavy duty, return flange or inward bend shape, manufactured from mild steel confirming to IS 226 and hot dip galvanized as per IS 2629 / BS 729. Width of cable Tray shall be as per the requirement. Height to be **minimum 50 mm & thickness of plate to be 1.5 mm up to 300 mm cable tray width. For cable Trays having width more than 300 mm, height to be 75 mm & Thickness of plate to be 2.0 mm.** Cable Trays to be supplied to site in standard length of **2.5 M.** Necessary accessories of cable trays such as coupler side plates for joining cable trays, bends, outside riser, inside riser etc. to be provided. MS supports for cable trays and fixing of these supports to RCC roofs with anchors fasteners are included in scope of supply and installation.

4.5 Termination & Jointing of Cables

4.5.1 On both ends of cables suitable size **brass chrome plated (CP)** heavy duty, **double compression type** cable glands shall be used before it enters terminal box/main L.T. panel/distribution board/sub-distribution board/joint box/cable box etc. Armour of cable shall be connected to earth point.

4.5.2 All the cores of PVC cables, of conductor size **exceeding 4 sq. mm.** shall be connected at the ends with the help of appropriate size and type of sockets/lugs. These sockets shall be of tinned copper or Aluminium alloy (socket material to be same as of cable conductor) and these shall be fitted on conductor **by crimping process** only with appropriate crimping tool. Following is the recommended procedure for crimped joint and the same shall be followed:

(i) Strip off the insulation of the cable and with every precaution, not to severe or damage any strand. All insulations to be removed from the stripped portion of the conductor and ends of the insulation should be clean and square.

(ii) The cable should be kept clean as far as possible before assembling it with the terminal/socket. For preventing the ingress of moisture and possibility of re-oxidation after crimping of the Aluminium conductors, the socket should be fitted with corrosion inhibiting compound. This compound should also be applied over the stripped portion of the conductor and the palm surface of socket.

(iii) Correct size and type of socket/ferrule/lug should be selected depending on size of conductor and type of connection to be made.

(iv) Make the crimped joint by suitable crimping tool.

(v) If after crimping the conductor in socket/lug, some portion of the conductor remains without insulation the same should be covered sufficiently with PVC tape.

5.0 TELEPHONE, COMPUTER DATA AND TELEVISION WIRING

5.1 Point Wiring for Telephone System

(a) The point wiring shall be carried out with telephones wires/cables, **2 pair,** un-armoured, PVC insulated and sheath,

0.51 mm dia annealed tinned copper conductor, conforming to ITD specification S/WS-113C armouring and outer sheath as per IS: 1554 (Part -I) in **25 mm** PVC conduit (one pair always remaining spare for one point). If more than one telephone point has to be provided at one point, multi-core, un-armoured telephone cable shall be used (pairs required are equal to 2 x no. of points) in suitable size conduit. If specifically mentioned in schedule of quantities, instead of ordinary PVC insulated telephone wire as specified above, UTP cable Cat – 5 to be supplied & laid.

The item includes providing and fixing/laying of conduit, switch boxes, socket for telephones connection and telephone wires/cables etc.

MINIMUM DIAMETER OF PVC CONDUIT FOR TELEPHONE WIRING – 25 MM

(b) The point shall commence from the main telephone tag box/sub tag box and would terminate at outlet box of point. Connection at both ends included in point wiring.

(c) Steel conduit, accessories, draw out boxes, switch boxes etc. shall be supplied & laid as per the details given at 2.0.

(d) Each telephone point shall have 1 no. flush type RJ11 telephone jack fixed on **3 mm** thick, hylem sheet in MS outlet box **(size 100 x 100 mm).** More than one telephone socket outlet (maximum 2 nos.) can be fixed on one outlet box, provided these points are at one place and multi-pair (more than 2 pair) telephone cable has been drawn to this point from tag box. However if specified in schedule of quantities, telephone cord grid plate mounted outlet unit (RJ – 11) with moulded cover plate in recessed galvanised MS box to be provided.

(e) Joint in telephone wiring (between main tag box/sub tag box and outlet box of point) shall not be allowed and the contractor should bear the wastage of wire if resulted due to this special requirement of telephone system. No looping in telephone system is allowed unless specifically shown in the drawing or instructed by site engineer in the drawing/instruction book.

(f) Telephone and computer data wiring can be drawn in the same conduit, provided after drawing wires, **50%** of conduit cross sectional area is free. However independent PVC insulated telephone & data wire of suitable size shall be used for telephone and computer data.

(g) To identify each pair of multi-pair telephone wire/cable, PVC indication numbers shall be put on both end of pair just before termination.

5.2 Point Wiring (Computer Data)

(a) The point wiring shall be carried out with data cable of **4 (FOUR) pairs** (or as specified in schedule of quantities) un-armoured, PVC insulated and sheath, **0.50 mm** dia annealed tinned copper conductor **(CAT 5E or CAT 6** as specified in schedule of quantities), in suitable size conduit.

The item includes providing and fixing/laying of conduit, switch boxes, socket for computer connection and data wires/cables etc

MINIMUM DIA OF PVC CONDUIT FOR COMPUTER DATA WIRING
- 25 MM.

(b) The point shall commence from the main junction box or sub junction box at floor of computer data system, and would

terminate at outlet box of point. Connection at both ends of cable shall be carried out by purchaser.

(c) General specification for concealed/surface conduit system of telephone system **(clause no. 5.1 (c), 5.1 (d) & 5.1 (g) shall be applicable for this system also.**

(d) Joint in computer data cable (between junction box and outlet box of point) shall not be allowed and the contractor should bear the wastage of cable if resulted due to this special requirement of computer data system.

5.3 Telephone Cable Work (Underground System)

(a) The cable shall be suitable for telephone system of suitable pairs (as specified in schedule of quantities), steel armoured, PVC insulated and sheath, 0.51 mm dia annealed tinned copper conductor, conforming to ITD specification S/WS-113C armouring and outer sheath as per IS:1554 (Part-I). All telephone cables for underground laying shall be **jelly filled type.**

(b) Specification for laying of telephone cable in underground system shall be same as for electrical system **(clause nos. 4.2, 4.3, 4.4 and 4.5** and the same shall be followed.

5.4 Telephone Tag Boxes

These shall be of KRONE type using insulation displacement technique in which there is no stripping or soldering of wire, of MS sheet **14 G** with connector suitable for telephone connection. It shall have hinged MS sheet cover. Tag box to be of sufficient size to not only accommodate required KRONES but also space for dressing of wires.

5.5 Television Point Wiring

(a) ONLY STEEL CONDUIT MINIMUM 25 MM DIA SHALL BE PROVIDED AND LAID FOR ALL TV WIRING. ALL SPECIFICATIONS FOR CONDUTING SHALL BE SAME AS MENTIONED AT 2.0.

(b) Co-axial TV cable of single strand tinned copper conductor of diameter 0.80 mm, complete with metallic shield. Cable having signal loss less than 6 db per 100 Mts. for band 1 UHF should be provided and laid.

(c) One number TV wall outlet in suitable MS box should be fixed at each receiving end.

(d) In each 25 mm dia conduit max. 2 nos. co-axial cables should be drawn. There should be the least possible number of bends in the conduit system.

(e) The samples of TV cable & wall outlet should be got approved before installing.

(f) Matter to be checked by contractor with purchaser, whether system of each TV point having its own TV antenna is there for the project or cable TV system having common antenna for project is to be followed. This shall be specially applicable if in the project residential quarters are also included. If central cable TV system is their, necessary amplifier, tap-off, and splitters etc. to be provided as per detail drawings and schedule of quantities.

6.0 EARTHING & LIGHTENING PROTECTION SYSTEM

6.1 Earth Pit

(a) Plate or pipe type earth electrode with earth pit shall be provided for this work unless otherwise advised by site engineer due to typical site conditions. Earthing electrode and pit shall be as per IS 3043-1987, the latest revision (code of practices for Earthing). For ready reference, sketches for pipes and plate type earth electrode earthing pit have been shown in the **attached sketch no. SK - 25.** All earth electrodes shall preferably be driven to a sufficient depth to reach permanent moist soil.

PRIOR APPROVAL OF SITE ENGINEER SHALL BE TAKEN FOR SELECTING TYPE OF EARTH ELECTRODE (PIPE OR PLATE).

(b) Earth pit centre shall be at a minimum distance of **3 M** from nearest building, unless otherwise advised. The minimum **3 M** distance shall be maintained between centres of 2 earth pits.

(c) Earth electrode for Neutral of transformer shall be of copper, whereas the same for all other application shall be of GI.

6.2 Earth Bus, Earthing Lead & Earth Wire/Strip

(a) All single phase & three phase distribution boards, LT Panels shall be provided with two earth point from 2 independent earthing systems.

(b) Bare round/flat sections of galvanised Iron or PVC insulated aluminium conductor wire of sizes as specified in schedule of quantities shall be used for taking out earthing from earth

electrodes, for making earthing bus or for connecting to LT panels/distribution board etc.

(c) Heavy duty, PVC insulated, PVC outer and inner sheath armoured copper conductor cable suitable for 1100 Volts as per IS-1554 (PART -1 : 1976) of sizes in specified in schedule of quantities shall be used from earth electrode to concealed distribution board shall be laid underground. Specification 4.2, 4.3, 4.4 & 4.5 of handling and laying of power cable shall be applicable for this cable also.

6.3 Lightening Protection System

For lightening protective system IS 2309-1989 "Code of practice for the protection of building & allied structures against lightning" shall be followed.

6.3.1 Lightening Arrestor/Vertical Air Termination

Vertical air terminations shall comprise of finals made of **25-mm** dia GI tube 1200 MM long with multiple spikes at the top. Vertical terminations when provided shall project at least **300 mm** above the salient point or network on which it is fixed. Roof conductors/down conductor/GI strip as specified in schedule of quantities shall be fixed to base plate of this lightning arrestor. Lightning arrestor shall be fixed on highest point of the tallest building of the project. Numbers and building on which it has to be installed shall be shown in the drawings/ finalised by site engineer.

6.3.2 Roof Conductors

These shall be used as per drawings (if required) to interconnect the various lightning arrestors of one building near the top, to extend zone of protection. These shall be of GI strip of size 25x3 mm or as specified in schedule of quantities and shall be fastened securely to the building surface by means of GI saddles, maximum 1 m apart with GI nails/screws.

6.3.3 Down Conductors

These shall be used for connecting the lighting arrestors/roof conductors to earth electrode of earth pit. Structures with a base area of up to 90 sq. m may if the height of the lightning arrestor gives sufficient protection, be equipped with one down conductor only. These shall be of GI strip size 25 x 6 mm or as specified in

schedule of quantities fastened securely to the building surface by means of GI saddles, maximum 1 m apart with GI nails/screws. Each down/conductor shall have its own independent earth pit.

6.3.4 General

The lightning protective system shall have as few joints as possible and they shall be mechanically and electrically effective. In general, joints for strips shall be tinned, soldered and at least double riveted. Bolted joints shall only be used on test points or on bonds to existing metals. Each down conductor shall be provided with a testing joint in a position convenient for testing but inaccessible for interference.

All other metal objects such as water tanks, iron staircase/railings, water or gas pipes on top of, inside or by the side of a building should be at least 2 m away from the lightning roof conductor/down conductor system. If this is not possible they should be provided with a separate down conductor and earth pit.

Structures with explosive or inflammable contents shall not have any spire, flagstaff or other salient point, which can impair the efficiency of air termination/lightning arrestor. No outdoor radio aerials or overhead line poles may be located within a distance of **15m** from the structure. Special instructions for earthing system:

a) EARTHING SYSTEM USED FOR LIGHTNING PROTECTION MUST BE INDEPENDENT OF THE EQUIPMENT/ DISTRIBUTION EARTHING SYSTEM.

b) EARTHING SYSTEM FOR TELEPHONE SYSTEM SHALL NOT BE MIXED WITH EQUIPMENT/DISTRIBUTION OR LIGHTNING EARTHING.

c) EARTHING SYSTEM FOR COMPUTER SYSTEM SHALL NOT BE MIXED WITH OTHER EARTHING SYSTEMS.

d) EARTHING SYSTEMS FOR UPS AND DG SETS SHALL NOT BE MIXED WITH OTHER EARTHING SYSTEMS.

7.0 SUPPLY & INSTALLATION OF LIGHTING FIXTURES/FANS

7.1 Technical specifications of lighting fixtures/fans

Lighting fixtures, fans and exhaust fans are generally not to be supplied by the contractor and hence the detail specifications of these are not being given here.

7.2 Installation of Lighting Fixtures

7.2.1 Scope of work under this item shall start from light point, with a 6 A bakelite connector, 2 core 1.5 Sq. mm PVC insulated copper stranded conductor wires from this connector to the connector inside the lighting fixture, connections, fixing of lighting fixture complete with all accessories, lamps on wall/roof/steel truss etc. testing the lighting fixture and commissioning. If wire length of light point is enough to reach connector of light fitting, connector in light point can be deleted.

7.2.2 If lighting fixtures are being supplied by Purchaser/Client, the contractor would take delivery of these from site store, test the same before installation and if found defective, the defect would be brought to the notice of site engineer. Repair of wiring/circuit of the fitting shall be carried out by contractor without any additional cost. However, if any component of the lighting fixture is defective/ damaged, the same would be located and brought to the notice of site engineer, who would arrange repair/procurement of the same. However, labour for replacement of the damaged/defective component of lighting fixture shall be done by contractor without any additional cost.

7.2.3 Contractor shall clarify from site engineer for type of installation (direct on ceiling/hanging) of lighting fixture, if not specifically mentioned on drawings. Length of the suspension rods shall also be decided in consultation with site engineer.

7.3 Installation of Ceiling Fans

7.3.1 Scope of work under this item shall start from fan point with a 6 A bakelite connector, 2 core 1.5 Sq. mm PVC insulated copper stranded conductor wires from this connector to the connector fan, connections, fixing of fan (complete with all accessories) to the fan hook of fan point, testing the fan with regulator and commissioning.

7.3.2 If ceiling fans are being supplied by Purchaser, the contractor would take delivery of these from site store, assemble the same, test before installation and if found defective, the defect would be brought to the notice of site engineer. If any component of fan is defective/damaged, the same shall be located and brought to the notice of site engineer, who would arrange repair/procurement of the same. However, labour for replacement of the

damaged/defective component of fan shall be done by contractor without any additional cost.

7.3.3 Extension/replacement of hanging rod of fans shall be carried out only if advised by site engineer on drawing/site instruction book. Only GI pipe (`B' class) shall be used for ceiling fan hanging. Screwed joint within the length of fan hanging rod is not allowed and shall never be adopted. Fan hanging rod should be preferably of one piece and if not possible, welded joint can be allowed. This hanging rod shall be painted with enamel paint as directed.

7.4 Installation of wall fans Specification same as **7.3** except that fan has to be fixed on wall with screws/bolts grouting instead of on fan hooks.

7.5 Installation of Exhaust fans

7.5.1 Scope of work under this item shall start from exhaust fan point, with a ceiling rose, 2 core 2.5 Sq. mm PVC insulated copper stranded conductor cable in flexible conduit from ceiling rose to connector of exhaust fan, connections, fixing of exhaust fan in existing opening, complete with accessories and louvers on walls with hold- fasts, testing the exhaust fans and commissioning.

7.5.2 Same as **7.3.2** (read exhaust fan instead of ceiling fans).

7.5.3 If instructed by Site Engineer, Electrical contractor shall make opening in wall for exhaust fan including repair and finishing of opening. Charges of this work shall be paid separately as per schedule of quantities.

7.6 Special Notes

7.6.1 Location of lighting fixtures/fans shall be shown on the working drawings and the same shall be followed. However, if due to site conditions the location can not be adhered to, the same shall be brought out to the notice of site engineer for advice.

7.6.2 Maintenance & custody of light fixture/fans after installation/ commissioning would be with contractor till that building/area is completed and handed over to IDMC Site Engineer in satisfactory working order.

8.0 STREET LIGHTING

8.1 Street Light Poles Specification

These shall be of hot dip galvanized polygonal/octagonal type with suitable arrangement at the top of the pole for

fixing the lighting fixture. The Material for Pole Shaft as per IS 5986 Grade - Fe 510 or Equivalent, Material for Base Plate - As per IS 2062 Grade -Fe 410, Metal protection - Hot Dip Galvanisation as per IS 4759 or equivalent, The minimum zinc coating required is 75 to 80 microns uniform thickness all around the surface of poles, brackets and foundation bolts. Poles will have one bracket arm/two brackets arm radially equidistant/three brackets arm radially equidistant as specified in schedule of quantities for fixing one/two/three lighting fixtures. Each pole would have in-built water tight box complete with a 4 way heavy duty 30 Amp. power connector, four way heavy duty 30 Amp neutral connector, 10 A SP MCB of 10 KA rupturing capacity and GI High tensile suitable size foundation bolts, Nuts washer etc. refer the attached drawing of street light poles. The earthing of each street light pole shall be carried out with PVC insulated black colour 10 Sq. mm (single core) Aluminium conductor cable, connected to perforated 38 mm NB GI `B' class pipe 2.5 M long, driven in earth (150 mm dia pit filled with charcoal & salt). The pipe should have removable plug at top.

DETAILS FOR HOT DIP GALVANIZED POLYGONAL / OCTAGONAL STREET LIGHT POLE SIZE 6.5 METER

H	Total Height	6.50 METER
T1	Sheet Thickness	3.5 MM
D	Door Opening	Standard
L	Foundation Bolts Length	600MM min.
D	Foundation Bolts Diameter	M20
N	No. Of Bolts	4
P	P.C.D. Of Bolts	250 MM
S	Size Of Base Plate	260 X 260 MM
T1	Thickness Of Base Plate	16 MM min.
BL	Length Of Breaket Arm	1.5 METER
TA/F	Top Across Flat (Out Side)	90 MM

BA/F	Bottom Across Flat (Out Side) MM RCC Foundation nominal reinforcement steel (Min size 450X450X1500MM)	160

8.2 Bracket for street light fittings on buildings - Specification

The brackets shall be made of **38 mm NB MS class `B' pipe,** approx. 1.8 M long, bent at the centre at an angle of 10 degree from horizontal, with necessary holding brackets, hold fasts etc. with special reducer at end to accommodate type of street light fitting to be fixed. Bracket shall have two coats of anti-corrosion Zinc chromate red-oxide primer before despatch to site and 2 coats of approved make and shade of enamel paint at site after installation. Each bracket to be provided with suitable MS flat clamps for fixing. Each bracket shall also be provided with one MS water tight switch box, complete with a **4 way** connector, **4 way** connector or neutral, **10 A SP MCB with 10 KA** rupturing capacity etc. similar to box being provided for street light poles. **See attached drawing of street light poles.**

8.3 Installation of poles

Installation of poles shall be done as per attached drawing of street light poles. The erection of street light poles includes excavation, refilling and RCC 1:2:4 foundation with nominal reinforcement steel (Min size 450X450X1500MM) as per attached Drawing , The foundation bolts shall be grouted in RCC Foundation. Special care shall be taken in erecting poles so that these are not strained or damaged during erection and are firmly stayed. The cement concrete shall be protected from premature drying by curing for at least seven days after pouring. All concrete surfaces from 150 MM below ground level to top shall be finished smooth with cement mortar 1:4. The pole shall be installed only after foundation are secured. Before placement of concrete for pole foundation in the pit, necessary GI class A pipes (not less than 38 mm dia. NB) shall be placed for facilitating drawing of cables and earthing wire. Separate pipes shall be provided for incoming

and each outgoing cable. Nothing extra shall be paid for these GI pipes which are there to facilitate pulling of armoured cables & earthing wire, as cost of these are included in laying of cables.

8.4 Installation of street light fixtures

This includes fixing of street light fitting complete with accessories and lamps at the end of the pole/bracket, connecting it with **3 X**
2.5 Sq.mm Copper stranded conductor, PVC insulated, flexible cable from water tight MS switch box, testing & commissioning. One core of cable shall be connected with earthing point of light fitting at one end & earthing point of MS switch box at the other end. If the pole has more than one light fitting, each fitting should have independent flexible cable from MS switch box to fitting. While fixing streetlight fitting on bracket (8.2 above), supplying and fixing of necessary MS conduit between MS switch box and fitting is also included in contractor's scope without any extra cost.

8.5 Installation of post top lantern

8.5.1 For entrance gate

This includes providing & **fixing 65 mm NB MS class `B' pipe of 0.5 M** long and **25 mm dia MS `B' class pipe** with bend at lower end for pulling wire in brick/RCC column, including MS water tight switch box (specification same as that of street light pole) and installation of post top lantern complete with all accessories and lamp, connecting it with **3x2.5 Sq. mm copper stranded conductor,** PVC insulated flexible cable, testing & commissioning. Painting of the exposed portion of the pipe with **two** coats of approved make & shade of enamel paint is also included. One conductor of flexible cable shall be used for earthing.

8.5.2 For open ground

This includes providing and fixing **65 mm dia MS class `B' pipe of total length 3.5 M** (including 750 mm in ground to be grouted with **300 x 300 x 1000 mm cement concrete 1:2:4)** and water tight switch box (specification same as that of street light poles) installation of post top lantern complete with all accessories and lamp connecting it with **3 x 2.5 sq.mm** copper stranded conductor, PVC insulated flexible cable, testing and

commissioning. Painting of exposed pipe length with **2** coats of approved make & shade of enamel paint is also included. One conductor of flexible cable shall be used for earthing.

The earthing of each street light pole shall be carried out with PVC insulated black colour **10 Sq.mm Aluminium conductor** (single core) cable, connected to perforated **38 mm NB GI `B' class pipe 2.5 M long,** driven in earth (150 mm dia pit filled with charcoal & salt). The pipe should have removable plug at top.

8.6 Flood Lighting on Tower

8.6.0 Supply & installation of High Mast, fabricated out of special steel plates conforming to BS-EN10-025 only one longitudinal seam weld per section along with Lantern Carriage, cast aluminium junction box, self-sustaining Winch arrangement for lowering and raising the Lantern Carriage Assembly, head frame, stainless wire ropes of AISI 316 grade, cables and lighting finial, earth pits along with Light Fittings complete. Tower to be complete with painting & details as per technical specification.

16 m motorized high mast pole suitable for 50 m/sec wind speed, with raising lowering system comprising head frame, luminaires carriage suitable to install 6 nos. luminaires in symmetrical arrangement, double drum, winch, 6 mm dia. SS wire rope, trailing cable, connector, integral power tool motor, manual handle, junction box, lightening finial, including complete wiring, supply of foundation bolts manufactured from special steel, along with nuts, washers, anchor plates, template. Supply of LED floodlight min. 6 nos. of up to 150 W each (Make/model-Bajaj- BJFL 150W LED I & equivalent model in Philips /Wipro make). Supply of LED type single dome aviation obstruction light outdoor stand mounted feeder pillar with 63 A TPN MCB incomer, single dial time switch, contactor for automatic switching of luminaires, power tool control with 2 no 9A Contactor, raise lower push buttons, incoming 16 sqmm & outgoing 16 & 2.5 sq mm terminals. Complete Testing & commissioning of high mast is included in bidder scope, the Mechanical foundation for high mast is also

included in bidder scope. (Design & Drawing to be got approved from IDMC)

8.6.1 Flood Light Tower Specification

Flood lighting tower shall be either of **steel tubular or MS angle** type with suitable arrangement at the top of the tower for fixing the lighting fixtures. Tower shall be fabricated out of MS medium class pipes ERW type or with MS angles/flats etc. **as specified in the attached drawing.** Each tower would have one MS water tight switch box fabricated out of **14 SWG** thick sheet steel complete with a heavy duty **30 A, 6 way power connector, 6 way heavy duty 30 A connector for neutral, 15 A SP MCB with 10 KA rupturing capacity** as shown in the **attached drawing of flood light tower**. The control gearbox of each light fitting, received with the fittings, shall be installed on the working platform at the top of tower. MS switch box at bottom of tower and control gear box of each light fitting on tower platform shall be connected by three- core, copper conductor of suitable size , FRLS , PVC insulated and sheathed un-armoured cable in conduit pipe through a common junction box installed at the tower platform as shown in the attached drawing of tower. Cost of this conduit, cable and junction box at tower platform is included in supply and installation cost of tower. The tower shall be painted with two coats of anti-corrosive zinc chromate red-oxide primer before despatch to site and two coats of Aluminium paint after installation. The earthing of tower shall be carried out with PVC insulated **10 Sq. mm** Aluminium conductor (single core) PVC insulated black wire, connected to perforated **38 mm GI `B' class pipe** as shown on **flood light pole drawing,** driven in earth near tower (150 mm dia pit filled with charcoal and salt).

8.6.2 Installation of flood light tower

Installation of flood light tower shall be done by the contractor on concrete pedestal, **which shall be made ready by IDMC as per the drawing.** However necessary GI pipes **(minimum 38 mm NB)** shall be provided by electrical contractor to put in the concrete pedestal to facilitate pulling of power cables & earthing wire. Nothing extra shall be paid for providing these GI pipes, as cost of the same is including in laying & connecting of cables/wires.

8.6.3 Installation of flood lights on tower

This includes fixing of street light fittings complete with accessories and lamps on the bracket of tower, connecting it with **3 x 4 Sq. mm** copper stranded conductor, FRLS , PVC insulated,& sheathed, un-armoured cable in a flexible GI conduit from water tight MS junction box installed on tower platform through control gear box of light fitting, testing and commissioning. One conductor of cable shall be connected with earthing point of light fitting at one end and earthing point of MS junction box at the other end. If the tower has more than one light fitting, each fitting should have **3 x 4 sq. mm** copper stranded conductor, independent cable from MS junction box to fitting.

8.7 Flood Lighting on building top

This includes supplying and installation of MS switch box (specification same as that of street light pole) approximately 1 M above ground, laying of **25 mm** conduit up to fitting on top of building, installation of flood light with grouting of clamps etc. if required, connecting with **3 x 2.5 Sq. mm** copper stranded conductor PVC insulated cable, testing and commissioning of flood lights.

8.8 General notes for Street & Flood Lighting

8.8.1 For supplying and laying of cable, **clause no 4.1, 4.2, 4.3, 4.4 & 4.5** of technical specification **(POWER CABLE WORK)** shall be applicable.

8.8.2 If Purchaser supplies street light fixtures, flood lights and post top lanterns, **clause no. 7.2.2** of technical specification shall be applicable.

8.8.3 For street light poles along roads, nearest finished road level shall be taken as ground level and for street light poles and flood light poles along compound wall/away from roads, existing ground/finished ground shall be taken as ground level.

8.8.4 Minimum Distance of **1.5 M** shall be maintained between centre of pole and centre of curb of road. For compound wall poles, distance between compound wall and poles shall be minimum **5 M.**

8.8.5 A minimum loop of **1.5 M** of cable shall be provided near each street light pole for all incoming and outgoing cables.

9.0 SWITCH BOARDS AND DISTRIBUTION BOARDS

9.1 Cubicle type electrical switch boards

9.1.1 General

It shall be of cubicle type (having individual cubical for each incoming and outgoing feeder), totally enclosed, dust and vermin proof, floor mounted, fabricated out of 14 G mild steel sheets of commercial quality. However doors & covers may be fabricated from 1.6 mm thick (16 G) CRCA sheets. A base channel of **75 x 75 mm** shall be provided at the bottom. A horizontal wire way cable compartments with screwed cover shall be provided at the top or bottom (as per site conditions, first preference being at top) to take inter connecting control wiring between vertical sections. Separate cable compartments of adequate size running for the complete height of the switchboard in the case of front access boards shall be provided for incoming and outgoing cables. Adequate & proper support shall be provided in cable compartments to support cables.

The height of switchboard to be so designed that no operating switch is at more than **1900 mm** and less than **300 mm** from finished floor level. Door closing shall be by quick open able thumb screws. Mechanical inter-locking to be there for doors of cubicles having incoming/outing feeder such that door can be opened only if feeder is OFF.

9.1.2 Painting

All the MS parts shall be given rigorous rust proofing process comprising degreasing, pickling, phosphatising etc. and anti rust primer coating, following by powder coating finish with two coats of shade 692 to IS 5 with outside & white on the inside paint thickness shall not be less than 50 microns approved shade. Half-litre paint shall be supplied along with panel for touch up wherever necessary.

9.1.3 Gaskets

All joints between different sections and the switchboard shall be provided with synthetic rubber gaskets so as to make the complete board completely dust proof as per **IP 54**.

9.1.4 Bus Bars

A completely enclosed ventilated dust & vermin proof bus bar compartment for the horizontal & vertical busbars. The rectangular busbar shall be made of high conductivity Aluminium alloy, PVC sleeved (heat shrinkable), air insulated, and of adequate

size (full load current for phase busbars and half rated current for neutral busbars), current density to be considered as 0.8 Amp/sq.mm for operation on 3 phase, 4 wire, 440 V, 50 Hz. AC supply system, as per IS 345-1963 with amendment till date. The busbars shall be supported and separated by strong epoxy based SMC/DMC blocks at close intervals to prevent busbar sag and to effectively withstand electro-magnetic stresses in the event of a short-circuit (25 MVA fault level on 415 volts for 1 sec). Minimum clearance to be maintained for enclosed indoor air insulated busbars working at system voltage up to 600 V shall be as follows:

Phase to neutral - 20 mm Phase to phase - 25 mm

Feeder boxes should be completely shrouded by sheet steel plates provided between the feeder boxes and the busbar chambers, in order to avoid falling down of any nuts/ bolts/parts into the busbar chambers while carrying out maintenance of the feeder components.

MINIMUM SIZE OF MAIN AL. BUSBAR OF CUBICAL TYPE MAIN SWITCH BOARD TO BE -- 40 X 6 SQ.MM.

9.1.5 Components of switch boards

The panel shall be provided with switches, fuses, MCB, MCCB, meters and instruments etc. of size, capacity as specified in schedule of quantities. Only approved make as selected by contractor in annexure III can be used for manufacture of switchboard.

Switches disconnector fuse switches:

The load break switches shall confirm to IES-947-3 and IS 13947-3 specification. They shall be suitable for continuous maximum rating having positive isolation with position indication of contact separation. They should have high short circuit making and withstanding capacities. Breaking capacity should correspond to AC 23A utilisation category. Switches handle shall be provided with door interlocking arrangement. Also 'defeat' arrangement shall be provided to open the door in switch 'Close' position for testing purpose. Live terminals of the switch shall be shrouded.

HRC cartridge fuse links

These shall be non deteriorating HRC cartridge link type with operation indicator which will be visible without removing fuses for the service. These shall be complete with moulded phenolic fuse

base and cover. The fuse base shall be so located in the modules to permit insertion of fuse pullers and removing of fuse links without any problem.

Miniature circuit breakers (MCB)

These shall be suitable for 230/415 V, 50 Hz. AC supply and current rating as specified in schedule of quantities. These shall be of short circuit current of 10 KA minimum at 0.5 pf on 230 V.AC, long mechanical and electrical operation life, with over load tripping through accurately calibrated thermal bimetal strips and short circuit tripping through magnetic coil. Complete MCB should be housed in heat resistant moulding. Over current tripping should result in switching off all poles automatically even if tripping only takes place in one pole. Miniature circuit breakers shall confirm IS 13947 - 1993.

Moulded case circuit breakers (MCCB)

The MCCB shall be as per to provisions of IS 13947 – 1993. The MCCB's shall be of triple / four pole construction arranged for simultaneous three /four pole manual closing or opening and automatic instantaneous tripping on short circuits. Closing mechanism shall be quick make, quick break and trip-free type. 'ON', 'OFF' and 'Trip' indications shall be provided on the front cover with door interlocking facility. All feeders having MCCB shall be provided with neutral link complete with isolating link, if not FOUR POLE type. The control voltage shall be 240 V AC.

MCCB's shall be provided with following interlocking devices for interlocking to door of switchboard.

- Handle interlock to prevent unnecessary manipulation of the breaker.
- Door interlock to prevent doors being opened when the breaker is on ON position.
- De-interlocking device to open the door even if the breaker is in ON position.

The MCCB's shall be rated for continuous maximum duty as specified. The rating of the MCCB's shall be as per the feeder details.

Rated breaking capacities shall be as under:

MCCB's up to 100 Amps 25 kA (minimum) at 415 volts

Above 100 A to 400 Amps 35 kA (minimum) at 415 volts

Above 400 A 50 KA (minimum) at 415 volts

Measuring instruments & Indication Lamps

Measuring instruments shall be of square pattern having approximate dimensions 96mm x 96mm, flush mounting type. Necessary auxiliary instruments like CTs, PTs etc. are also included in the scope of supply.

All AC meters shall be of moving iron type having class 1.0 accuracy for voltmeters and 1.5 for ammeters. Voltmeter shall be suitable for direct line connection. Voltmeters shall be connected through fuses only. Energy meters shall be suitable to measure unbalanced/balanced loads of 3-phase 3/4-wire system.

Ammeters provided for switch fuse units shall be with rotary selector switches and those for motors shall be without selector switches.

All voltmeters shall be provided with selector switches.

Ammeters for 40 Amps and above shall be CT operated. For each outgoing feeder, LED type indication Lamp shall be provided in its cubicle door. For incoming feeder, LED type indication lamp shall be provided for all three phases. If specifically asked in schedule of quantities, digital type Ammeters, Voltmeters & Energy meters shall be provided rather than analogue type specified above.

Current Transformers (CTs) & Potential Transformers (PTs)

CTs shall be cast resin insulated type. Primary and secondary terminals shall be marked indelibly. CTs shall preferably be mounted on stationery parts. CT rating and ratios shall be as per feeder ratings. These shall be capable of withstanding momentary short circuit and symmetrical short circuit current for 1 second. Neutral side of CTs shall be earthed. Protection CTs shall have low reactance, accuracy class "SP" and an accuracy limit factor greater than "10". Instrument CTs shall be of accuracy class "1.0" and accuracy limit factor less than "5.0". CT shall confirm to IS 2705 (part I, II & III) in all respects. PTs shall confirm to IS 3156 (part I, II & III) in all respects.

Earth leakage circuit breakers (ELCB/RCCB)

These current operated ELCB's shall be suitable for 2/4 poles 230/415 V, 50 Hz. AC supply, current and sensitivity rating to be as specified in schedule of quantities. (If not specified it may be taken as 30 MA). These shall be able to withstand short circuit current of 3 kA minimum at 230 V AC and have long operational life. This shall incorporate highly sensitive relay to trip the circuit in case of earth leakage. This shall have the facility to trip the circuit during interruption in the earth connection or loss of supply neutral. Over current tripping should result in switching off all poles automatically even if tripping takes place in one pole. Earth leakage circuit breakers shall conform to BS - 4293.

9.1.6 Connections

Connections to the busbars shall be made by drilling holes. However, no holes shall be left in the busbars. The bolts & nuts used for connections to busbars shall be of Aluminium alloy of tinned forged brass. For tapping of connections from busbars suitable size PVC insulated copper stranded conductor wire (minimum size for power wiring 4.0 sq. mm & for control wiring 1.5 sq. mm.) shall be used with suitable size and type of crimped lugs/cable sockets. For connection of feeder above 63 Amps, only Al. alloy busbar links with PVC tapes shall be used. Suitable size cable boxes shall be provided for incoming/ outgoing cable of sizes more than 95 sq.mm. For all outgoing cables, cable alleys of suitable sizes in sides and tops, as required for proper cable connections/laying inside the panel, shall be provided. Switchboard shall be suitable for Aluminium conductor PVC insulated incoming and outgoing cables. Removable gland plates shall be provided for cable entries.

9.1.7 Earthing

Two independent earthing points shall be provided outside the panel near bottom and these shall be inter-connected with GI earthing busbars of minimum size **40 x 6 mm.** All earthing points inside the distribution board shall be interconnected to these earthing points with suitable size copper conductor PVC insulated wire.

9.1.8 Name plates

Switch board/distribution board shall be provided with danger plate and name plates for all incoming and outgoing feeders. These

name plate shall be of PVC (black colour base & white letters

engraved) screwed to panel. PVC identification ferrule numbers shall be used for all internal wiring.

9.1.9 Approvals

The drawing showing general arrangements and detailed wiring diagram for the switch board shall be submitted to employer for approval, prior to manufacture and switch board shall be got inspected, prior to despatch to project site. The complete switchboard and its component shall conform to Indian Electricity Rules & relevant I.S.S. Approval if required from Electrical Inspector shall be obtained by contractor and changes if desired by Electrical Inspector shall be carried out.

9.1.10 Rubber Matting

A **15 mm** thick rubber matting, 1 meter wide shall be provided in front and along full length of the main switchboard. The rubber mat shall withstand **15 kV for 1 minute** & Leakage current shall not exceed **160 mA** .

9.1.11 Space Heaters

The main switchboard shall have thermostatically controlled space heaters with a controlling 16 A 230 V MCB & socket outlet to eliminate condensation.

9.2 Electrical Distribution Boards

9.2.1 General

These shall be wall mounted, surface/flush type, indoor type enclosure, hinged front cover, dust and vermin proof fabricated out of **16 G** mild steel sheet of commercial quality. All components such as switches, M.C.B. etc. to be so mounted inside the distribution boards, that only operating handles/knobs are visible outside the front hinged door. Detachable cable/conduit entry plates with required 25 mm dia knockouts shall be provided on top and bottom of D.B**.**

If distribution board is concealed and receiving incoming power from bottom of board by Armoured cable through GI pipes, height of DB shall be increased suitably, so that 2 mm thick gland plate can be fixed as shown in the **attached sketch no. 24.**

Alternatively, if specifically asked, **readymade DBs** (in standard size/ capacity) of reputed make, as approved by the purchaser, **with double metal door (16/18 G sheets)** complete with Tinned copper bus bars, neutral link, earth bus, DIN rail, detachable

gland plate and all interconnections may also be provided and installed.

9.2.2 Painting

Same as clause no. 9.1.2 of cubicle switch boards.

9.2.3 Gaskets

Same as clause no. 9.1.3 of cubicle switch boards.

9.2.4 Bus bars

Same as clause no. 9.1.4 of cubicle switchboard except that these shall be only of copper & minimum size of busbars shall be 19 x 6 mm, current density being 1.5 A per sq. mm.

9.2.5 Component of Distribution board

Same as clause no. 9.1.5 of cubicle switch board.

9.2.6 Connections

All interconnections shall be done either by solid copper PVC insulated or by suitable size (minimum 4.0sq.mm.) Copper stranded conductor PVC insulated wires with suitable size and type of crimped type plug. Arrangement shall be there for directly mounting of M.C.B. on busbars. The bolts and nuts used for connections to busbars shall be of Al. alloy or tinned forged brass.

Enough space shall be provided inside the distribution board to accommodate loop of surplus incoming and outgoing wires. For all line conductor PVC colour of wire would be Red, Yellow, Blue & that of neutral to be Black. For accommodating neutral wires of all incoming and outgoing circuits , suitable size connector or neutral bus shall be provided inside the distribution board.

9.2.7 Earthing

Two independent earthing points shall be provided inside the distribution board in case of 3 phase and one earthing point in case of single phase distribution system. An earthing bus of copper shall be provided inside the D.B.

9.2.8 Name plates

Same as clause no. 9.1.8 of cubicle switch boards.

9.2.9 Approval

Same as **clause no. 9.1.8.** of cubicle switch boards except that sample approval of only one typical distribution board may be taken from employer.

9.2.10 Components of distribution boards

Same as **clause no. 9.1.5** of cubicle switch boards.

10.0 COMPLETION TEST AND DRAWINGS

After supply and installation of complete project or a particular building/area, following tests shall be carried out by the contractor before switching on the power to installation and the results shall be recorded and submitted to the site engineer. If results are not satisfactory/as per the standard set herewith, the contractor shall identify the defects/short coming and shall rectify the same. Nothing extra shall be paid for carrying out these tests and contractor has to arrange all necessary instruments.

10.1 Insulation resistance to earth This to be measured with all fuse links in place, all switches on, all lamps and appliances in position by applying a voltage not less than twice the working voltage (subject to a limit of 500V). Insulation resistance of the whole or any part of the installation to earth must not be less than 50 Mega-ohms divided by the number of outlets (points and switch positions) except that it need not exceed 1 Megaohm for the whole installation.

10.2 Insulation resistance between conductors Test to be made between all the conductors connected to one pole or phase conductor of the supply and all the conductors connected to the middle wire or neutral or the other pole or phase conductors of the supply. For this test, all lamps shall be removed and all switches put on. The result of the test must be 50 Mega-ohms divided by the number of outlets (point and switch positions) but need not exceed one Megaohm for the whole installation.

10.3 Polarity of single pole switches Test shall be made to verify that all non-linked single pole switches are on phase conductor (Live) and not on the neutral or earthed conductor. This can be done by connecting test lamps between two terminals of switch and earth. If the lamp lights up when switch is ON & either terminal is touched the switch is correctly installed.

10.4 Resistance of metal conduits/sheaths (Earth continuity test) In case of cables encased in metal whether conduit of metallic sheathing, the total resistance of the conduit or sheathing from the earthing point any other position in the completed installation shall not exceed 2 ohms. This can be carried out by the circuit

shown in Annexure VII. One end of the lead is connected to the ECC at its connection with the electrode and the other to the farthest point of the ECC. First, current through the circuit is measured with the resistance of 2 ohms short-circuited by the link. Next, current is measured through the two ohms resistance by disconnecting the two leads from the ECC and joining them together. If current is more in the first case, the resistance of ECC is less than two ohms.

10.5 Completion Drawings and Documents

10.5.1 Completion drawings After completion of works & before issuance of virtual completion certificate the contractor shall submit completion drawings in the form of one complete set of originals on sepia cloth with two sets of blue prints & three sets of documents as listed below:

i) As built conduit layout for lights, sockets, outlets, fans, telephones and computer data circuits & sub-mains showing position of bends/inspection boxes/draw-out boxes/junction boxes / outlet boxes / switch boxes, conduit size, number & size of wires in each run, number & size of earth continuity conductor etc.

ii) As built layout of lights, sockets outlet, telephone points, computer data points, telephone tag boxes, computer data patch panels, switch boards, distribution boards etc.

iii) As built details of electric, telephone & computer cable runs, showing size, type & number of cables of mode of installation.

iv) As built detail earthing conductors, earth pits and lightning protection system etc.

v) As built General Arrangement and schematic diagrams of switchboards & distribution boards.

vi) A certificate shall be furnished by the contractor countersigned by the licensed electrical supervisor, under whose direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply/electrical inspector authority. The contractor shall be responsible for getting the electrical installation inspected & approved by the local & statutory authorities concerned.

11.0 MODE OF MEASUREMENT

11.1 WIRING (PART I) TRADE CODE 81

Item	Mode of Measurement
1.	Each light point shall be measured as one no.
2.	Two light points shall be measured as one no.
3.	Three light points shall be measured as one no.
4.	Four light points shall be measured as one no.
5.	Each light point shall be measured as one no.
6.	Two light points shall be measured as one no.
7.	Three light points shall be measured as one no.
8.	Four light points shall be measured as one no.
9.	One light with 2 switches shall be measured as 1 no.
10.	One light with 2 switches shall be measured as 1 no.
11.	One fan point shall be measured as one no.
12.	One fan point shall be measured as one no.
13.	One exhaust/bracket fan shall be measured as one no.
14.	One exhaust/bracket fan shall be measured as one no.
15.	One buzzer point shall be measured as one no.
16.	One buzzer point shall be measured as one no.
17.	One buzzer extension shall be measured as one no.
18.	One isolated 10 A power point shall be measured as one no.
19.	One 10 A power point in lighting SB shall be measured as 1 no.
20.	One isolated 10 A power point shall be measured as one no.
21.	One 10 A power point in lighting SB shall be measured as 1 no.
22.	One 20 A power point shall be measured as one no.
23.	One 25 A power point shall be measured as one no.
24.	One 30 A power point shall be measured as one no.
25.	One 20 A power point shall be measured as one no.
36.	One 25 A power point shall be measured as one no.
27.	One 30 A power point shall be measured as one no.
28.	One 10 A switch and socket shall be measured as one no.
29.	One 10 A socket shall be measured as one no.
30.	One 20 A ON/OFF switch and socket shall be measured as one no.

31. One aviation light point shall be measured as 1 no.
32. Each light point shall be measured as one no.
33. Two light points shall be measured as one no.
34. Three light points shall be measured as one no.
35. Four light points shall be measured as one no.
36. Each light point shall be measured as one no.
37. Two light points shall be measured as one no.
38. Three light points shall be measured as one no.
39. Four light points shall be measured as one no.
40. One fan point shall be measured as one no.
41. Blank
42. One fan point shall be measured as one no.
43. One exhaust/bracket fan shall be measured as one no.
44. One exhaust/bracket fan shall be measured as one no.
45. One buzzer point shall be measured as one no.
46. One light controlled by one MCB shall be measured as one no.
47. Group of 2 lights controlled by 1 MCB shall be measured as one no.
48. Group of 3 lights controlled by 1 MCB shall be measured as one no.
49. Group of 4 lights controlled by 1 MCB shall be measured as one no.
50. Group of 3 lights controlled by 1 MCB shall be measured as one no.
51. Group of 4 lights controlled by 1 MCB shall be measured as one no.
52. Group of 5 lights controlled by 1 MCB shall be measured as one no.

53 to 58 Length of single run of PVC insulated wire for circuit (Not total of 3 or 5 wires but one length) used, to be measured in meter. (This will be equal to conduit length as loose/loop wire inside distribution board/lighting switch box / 6, 16, 20 A power plug boxes, not to be measured but to be carried out). Measurement in meters to be restricted up to two points after decimal.

59 to 65 Length of single run of PVC insulated wire for sub-main used, to be measured in meter. (This will be equal to conduit length as loose/loop wire inside distribution board not to be measured but to be provided). Measurement in meters to be restricted up to two points after decimal.

66 to 68 Length of conduit including bends laid shall be measured in meters. Measurement to be restricted up to two points after decimal.

69 to 72 Length of GI pipe including bends shall be measured in meters. Measurement to be restricted up to two points after decimal.

73 to 75 Length of raceway to be measured in meters without junction box. Measurement to be restricted up to two points after decimal

76 to 78 Each raceway junction box to be measured as one no.

79 One 20 A power point with piano switch & socket placed separately shall be measured as one no.

80 One 20 A power point with modular switch and socket outlet installed separately shall be measured as one no.

81 to 85 Length of single run of wire shall be measured in meters. Extra wire at ends for switch loops etc. not to be measured. Measurement shall be restricted up to two points after decimal.

86 to 87 Length of GI pipe including bends shall be measured in meter. Measurement to be restricted to two points after decimal.

88 to 90 Length of cable tray including bends used to be measured in Meter. Measurement to be restricted up to two points after decimal.

11.2 INSTALLATION AND SUPPLY OF FIXTURES (PART-II) TRADE CODE 82

Item Mode of Measurement

1 to 9 Each lighting fixture shall be measured as one no.

10 to 12 Each fan shall be measured as one no.

13 Each exhaust fan shall be measured as one no.

14 Each buzzer/bell/musical bell shall be measured as one no.

15 Each aviation light (consisting of 2 bulbs) shall be measured as 1 no.

16 to 17 Each opening of exhaust fan shall be measured as one no.

18 to 19 Each clamp shall be measured as one no.

20 Each GI bolt shall be measured as one no.

11.3 STREET LIGHTING (PART-III) TRADE CODE 83

Item	Mode of Measurement
01	Each pole with one arm shall be measured as one no.
02	Each pole with two arms shall be measured as one no.
03	Each pole with three arms shall be measured as one no.
04	Each pole with one arm shall be measured as one no.
05	Each pole with two arms shall be measured as one no.
06	Each pole with three arms shall be measured as one no.
07	Each street light bracket shall be measured as one no.
08	Each flood light tower shall be measured as one no.
09	Each flood light tower shall be measured as one no.
10	Each pole for post top lantern shall be measured as one no.
11	-do-
12	Each light on street light pole arm shall be measured as one no.
13	Each light on street light bracket shall be measured as one no.
14	Each post top lantern shall be measured as one no.
15	-do-
16	Each floodlight shall be measured as one no.
17	-do-
18	Each control panel shall be measured as one no.
19	Each floodlight shall be measured as one no.

11.4 EARTHING AND LIGHTING PROTECTION (PART-IV)

TRADE CODE 84

Item	Mode of Measurement
1	Each plate type earthing pit shall be measured as one no.
2 to 8	Total length as laid of continuity conductor shall be measured in meter. Overlaps shall not be measured. Measurement shall be restricted to two points after decimal.
9	Each lighting arrestor shall be measured as one no.

10 Total length as laid of roof conductor shall be measured in meter. Overlaps shall not be measured. Measurement shall be restricted to 1st point after decimal.

11 Each earthing pit shall be measured as one no.

12 Length of PVC insulated cable to be measured in Metres. (Portion of cable to without outer insulation and armouring inside the distribution board/junction

13 box/cable joint/switch box also to be measured and paid. All loops inside the board/switch box/ground/trench also to be measured. No deduction in quantity or rate to be effected for more than one cable laid in same trench).No deduction in quantity or rate to be effected for cable laid in hume pipe/GI pipe/trench etc. provided by employer. Measurement to be restricted up to two points after decimal.

TELEPHONE AND COMPUTER DATA WIRING SYSTEM (PART-V) TRADE CODE 85

Item Mode of Measurement

1 to 2 Each telephone point shall be measured as one no.

3 to 4 Two telephone points in one box shall be measured as one no.

5 to 6 Each telephone point shall be measured as one no.

7 to 8 Two telephone points in one box shall be measured as one no.

9 to 10 Length of wire/cable laid shall be measured in Meters, loose wire provided in junction box/ tag box/ outlet box shall not be measured and paid. Measurement to be restricted up to two points after decimal.

11 One telephone outlet shall be measured as one no.

12 Two telephone outlet in one box shall be measured as one no.

13 to 14 One telephone outlet shall be measured as one no.

15 Length of CAT 5 UTP cable laid shall be measured in meter. Wire provided in junction box / tag box/outlet box shall not be measured and paid. Measurement to restricted to two points after decimal.

16 to 17 Each computer outlet shall be measured as one no.

18 to 20 Length of cable laid shall be measured in meter. length of cable & without outer insulation and armouring inside tag box / junction

	box/outlet box etc. shall also be measured and paid. Loop of cable provided shall also be measured. No deduction in quantity or rate shall be done for laying more than one cable in same trench. No deduction in measurement or rate shall be made for cable drawn through hume pipe/trench/GI pipe etc. provided by employer. Measurement to be restricted up to two points after decimal
21	Spare
22	Each extension of telephone point shall be measured as one no.
23	Spare
24 to 29	Length of cable laid shall be measured in meter. length of cable & without outer insulation and armouring inside tag box / junction box/outlet box etc. shall also be measured and paid. Loop of cable provided shall also be measured. No deduction in quantity or rate shall be done for laying more than one cable in same trench. No deduction in measurement or rate shall be made for cable drawn through hume pipe/trench/GI pipe etc. provided by employer. Measurement to be restricted up to two points after decimal
30 to 34	Each tag block shall be measured as one no.
35 to 38	Length of Telephone cable shall be measured in meters. All loops of cable in ground, tag box etc to be measured. Measurement to be restricted up to two points after decimal.
39	Length of TV cable shall be measured in meters. All loops of cable in air and boxes not be measured and paid. Measurement to be restricted up to two points after decimal.
40 to 41	Each TV outlet to be measured as one no.
42	Length of UTP cable shall be measured in meters. All loops of cable in air and boxes not to be measured and paid. Measurement to be restricted up to two points after decimal.
43	Length of TV cable shall be measured in meters. All loops of cable in air and boxes shall be measured and paid. Measurement to be restricted up to two points after decimal.
44 to 47	Length of Telephone cable laid shall be measured in meters. All loops of cable in ground/air, tag box etc to be measured. Measurement to

be restricted up to two points after decimal.

11.6 DISTRIBUTION SYSTEM (PART-VI)

TRADE CODE 86

Item Measurement

1 to 65 Each switchboard /distribution board complete with switchgear for incoming and outgoing feeder shall be measured as one set.

66 to 82 Total length of cable supplied to be measured in metre. Measurement to be restricted up to two points after decimal.

83 to 90 Length of PVC insulated and sheath cable to be measured in meters (Portion of cable without outer insulation and armouring inside the main panel/distribution board also to be measured and paid. All loops inside the board/in ground or trench also to be measured and paid). Measurement in meters to be restricted up to two points after decimal and in addition no reduction in rates or quantity to be effected for drawing cable through hume pipe/ trench/ GI pipe etc. provided by employer for not providing bricks and sand etc.

NOTE : FOR ITEM NO. 83 TO 90, ONE CABLE SHALL BE MEASURED UNDER ONE ITEM ONLY THOUGH IT MIGHT HAVE BEEN LAID UNDER TWO ITEMS (UNDER GROUND AS WELL AS IN AIR) FOR DIFFERENT PORTION OF IT'S LENGTH. ITEM AS PER WHICH MORE LENGTH HAS BEEN LAID SHALL BE APPLICABLE FOR COMPLETE LENGTH.

11.7 GENERAL

The following guidelines to be followed for recording part payment of various items, if rather than secured advance, Engineer Incharge agrees to recommend part rate for incomplete work.

11.7.1 Part I (Wiring)

(a) Point wiring, sockets wiring, group wiring, circuit wiring, sub-main wiring etc.

- Supply & laying of conduit in ceiling only (30% of the item rate)
- Supply & laying of conduit in ceiling/ walls and switch boxes i.e., point ready without wiring (30% of the item rate)
- Item ready with wiring & switches but without testing / commissioning (30% of the item rate)
- Testing & commissioning (10% of the item rate)

(b) Providing and fixing Cable Tray

- Supply of cable tray only (85% of the item rate)
- Laying of cable trays (10% of the item rate)
- Testing & commissioning (5% of the item rate)

(c) Wiring in existing conduit/pipes/modular furniture etc.

- Supply of wires (80% of item rate)
- Laying of wires (10% of item rate)
- Testing and commissioning (10% of item rate)

11.7.2 Part II (Installation of Fixtures)

- *After installation of fixture (90% of the item rate)*
- After testing & commissioning (10% of the item rate)

11.7.3 Part III (Street Lighting)

(a) Street light poles and Towers

- Supply of street light poles & flood light towers (80% of the item rate)

- Installation of street light poles & towers (15% of the item rate)
- Testing & commissioning of poles/ towers (5% of the item rate)

(b) Installation of fixtures

- Installation of fixtures (90% of the item rate)
- Commissioning of fixtures (10% of the item rate)

11.7.4 Part IV (Earthing & Lighting Protection)

- Supply of item only (85% of the item rate)
- Installation of item (10% of the item rate)
- Testing & commissioning of item (5% of the item rate)

11.7.5 Part V (Telephone & Computer Data Wiring System)

(a) Point Wiring & wiring

- Supply & laying of conduit in ceiling only (30% of the item rate)
- Supply & laying of conduit in ceiling/ walls and switch boxes i.e., point ready without wiring (30% of the item rate)
- Item ready with wiring and switches but without testing/commissioning (30% of the item rate)
- Testing & commissioning (10% of the item rate)

(b) Supply of Cable

- Supply of cables only (95% of the item rate)
- Testing & commissioning (5% of the item rate)

(c) Laying of cables

- laying of cables (90% of the item rate) testing and commissioning (10% of item rate)

(d) providing wires & laying of wires in existing conduits/ pipes/ modular furniture

- Supply of wires (80% of item rate)
- Laying of wires (10% of item rate)
- Testing and commissioning (10% of item rate)

11.7.6 Part VI (Distribution System)

(a) Supply and installation of panels / distribution boards

- Supply of Panel / DB (85% of the item rate)
- Installation of panel / DB (10% of the item rate)
- Testing & commissioning of panel / DB (5% of the item rate)

(b) Supply of cables

- Supply of cables (90% of item rate)
- Testing & commissioning (10% of item rate)

(c) Laying of cables

- Laying of cables (90% of item rate)

Testing and commissioning (10% of item rate)

TECHNICAL SPECIFICATION (SECTION – IV)

- Introduction

  The proposed automation system for the 800 KLD Effluent Treatment Plant (ETP) is designed to convert a traditionally semi-manual process into a fully automated, intelligent, and self-regulating facility. The automation package ensures that all process units operate seamlessly with minimal human intervention, significantly improving reliability, operational stability, energy efficiency, and plant safety.

  By integrating a wide network of smart sensors, pneumatic valves, VFD-driven pumps and agitators, analytical instruments, and a centralized PLC-SCADA control platform, the system offers end-to-end automation of treatment operations — from influent collection to treated water discharge and sludge handling.

- Field Instrumentation and Control Elements

  A comprehensive range of field instruments and automation hardware is included across all major process sections to ensure complete control and real-time monitoring. Key instruments and devices include:

  Level Sensors: Installed at collection tanks, hydrolysis tanks, sludge sump, treated water tanks, and dosing systems to continuously monitor liquid levels and trigger control actions (pump start/stop, valve actuation, bypass logic) as required.

  Flow Meters: Deployed at critical transfer points such as influent feed, CSTR feed, and dosing systems to ensure accurate flow measurement, proportional chemical dosing, and hydraulic balancing.

  pH Meters and DO Meters: Integrated for continuous water quality monitoring and automatic chemical dosing or aeration control based on real-time process conditions.

  Pressure Transmitters and Temperature Sensors: Provide safety interlocks, performance data, and feedback control signals for critical process lines and steam systems.

  Pneumatic Control Valves: Strategically located throughout the plant to enable automated flow diversion, unit isolation, process sequencing, and bypass operations without manual intervention.

  Auto Backwash Valves: Installed in filtration units (PSF/ACF) to enable fully automated cleaning cycles based on differential pressure or time-based logic.

- Automated Equipment Operation

  The automation system extends beyond sensors and valves to include active control of major electromechanical equipment across the plant:

  Pump Automation: All pumps installed in a 1 Working + 1 Standby configuration are programmed for automatic alternation after defined operational hours. This ensures balanced wear, increases equipment life, and provides continuous service during maintenance or breakdowns.

  VFD-Driven Equipment: Major pumps, agitators, blowers, and dosing pumps are fitted with Variable Frequency Drives (VFDs) to allow precise speed control, optimized energy consumption, and enhanced process flexibility.

  Agitators and Mixers: Automated start/stop sequences and speed regulation are provided for flash mixers, flocculators, hydrolysis tanks, and dosing preparation tanks, ensuring uniform mixing and consistent treatment efficiency.

  Sludge Recirculation and Transfer: Sludge handling pumps and recirculation lines are fully automated based on level feedback, process sequence, or operator-defined schedules, minimizing the risk of overflows or manual errors.

- Advanced Process Control and Logic

  The automation design incorporates a range of advanced control strategies and built-in operational intelligence:

  Automatic Bypass and Unit Isolation: Each major unit operation is equipped with automated bypass valves, allowing any section to be isolated for maintenance or emergency without disrupting plant operation.

  Interlock and Safety Logic: All equipment and instrumentation are integrated through safety interlocks to prevent dry-running, overpressure, overflow, or hazardous process conditions.

  Closed-Loop Chemical Dosing: Real-time signals from pH and flow sensors enable the dosing systems to adjust chemical feed rates automatically, maintaining optimal pH and treatment efficiency.

  Automated Sampling System: A dedicated auto- sampling network collects representative samples from critical process points and transfers them to the laboratory for monitoring and analysis, reducing manual intervention and improving quality control.

- **Centralized PLC-SCADA Control System**
  At the heart of the automation package is a **state-of-the-art PLC (Programmable Logic Controller) and SCADA (Supervisory Control and Data Acquisition) system.** All field devices, instruments, and equipment are interconnected through the PLC, which executes control logic, interlocks, and sequencing. The SCADA platform provides:
  Real-Time Monitoring: Continuous visualization of process parameters such as flow, level, pressure, pH, DO, temperature, and energy consumption.
  Alarm Management: Automatic alerts and alarms for abnormal conditions, enabling proactive troubleshooting and reducing downtime.
  Data Logging and Historization: Continuous recording of operational data for compliance reporting, performance optimization, and predictive maintenance.
  Remote Access and Control: Operators can monitor and control the plant remotely through the SCADA interface, improving responsiveness and reducing dependency on on-site manpower.
  A robust UPS-backed power supply ensures uninterrupted automation even during power fluctuations, while industrial-grade cabling and communication infrastructure guarantee reliable data transfer and system stability.

- **SCADA and PLC Automation consists of the following major areas;**
  Operation of Effluent Treatment Plant (inlet pH correction, all motorized/solenoid valves, FRU, chemical dosing in tanks, sludge recirculation pumps, aeration operation, secondary clarifier mechanism etc.
  All the parameters like Flow, pH, Temperature, Level, controls, effluent parameters at different stage, shall be monitored and control through PLC and SCADA system.

- **Automation Hardware –**
  The Control & Automation system shall be designed, supplied and commissioned to enable the operator to operate plant in efficient, reliable and safe manner, without exceeding the plant operational limits and ensuring the overall performance. System shall have following salient features:
  System shall be microprocessor-based control system (High End PLC) integrated with SCADA OS stations.
  High degree of system availability and reliability with necessary spares viz. 30% spare I/O cards, 40% spare memory for main PLC and 30% spares SCADA tags.
  Bidder shall provide redundant power supply for IM. The 24 VDC power supply system for the CPU as well as field I/O stations shall have dual/twin channel power output.

Open connectivity using OPC (Ole for Process Control) through open protocol for third party/system connectivity including MES.
Bidder to ensure tags availability & usability (if required) during MES integration, implementation and usage.

- **Following automation hardware has been considered for ETP:**
  Plant Server Quantity: 1 No. Type: Core i7 Processor RAM: Minimum 16 GB

  Plant Server be located in main control room and to be connected with network. The Server shall be high end type PC with RAID-5 (minim 1 TB each) having 3 partitions. The system shall automatically reconstruct data using parity information in case of any drive failure. The hard disc shall have data storage capacity of 360 days data. The Server PC with 32 Inch LED screen shall have DVD R/W drive with backup data recording facility.

- **Engineering cum Operator Station**
  Plant Server Quantity: 1 No. Type: Core i7 Processor RAM: Minimum 16 GB
  The ES/OS would be high-end PC with latest configuration, the hard drive shall have suitable data storage capacity, the station shall be fully capable of addressing any plant data, thus will function as a single window for operation, monitoring and control. Engineering Station shall also be provided with OS Runtime license. The station shall be provided with 32 Inch LED screen.

- **Operator Station**
  Plant Server Quantity: 1 No. Type: Core i7 Processor RAM: Minimum 16 GB
  The OS would be high-end PC with latest configuration, the hard drive shall have suitable data storage capacity, the station shall be fully capable of addressing any plant data, thus will function as a single window for operation, monitoring and control. Engineering Station shall also be provided with OS Runtime license. The station shall be provided with 32 Inch LED screen.

- **MIS Server PC**
  Quantity: 1 No Type : Intel Xeon Processor PC with 24" colour full HD LED with antiglare protection Hard Drive : Min 500 GB SSD and 1 TB HDD : Min 32 GB expandable up to RAM 128GB

- **Memory**

The server shall be a high-end type PC with RAID-3 hard disc having 3 partition & hot swappable facility. The hard disc shall have data storage capacity of at least 12 months data. The server PC shall have DVD_RW drive with back-up data recording facility. Server will store all the relevant information from the DCS/PLC and shall generate the MIS reports. MIS should be having open protocol.

Necessary RDBMS software either ORACLE or SQL Server and D2K or Visual Basic as front end will be considered for data storage and MIS reports generation. Data storage capacity shall for 400 days.

Printing of graphs/trends & report would be possible from this PC.

- **Printer**

  Quantity: 01 no - LaserJet B/W

- **Automation Software (application software)**

  Quantity: 1 Lot The Application software will preferably be based on technical specifications, equipment functioning, approved P&IDs and safety issues. Application develop shall be based on latest based firm wares, which result in fully scalable application, which shall support future Upgradation of base software and system software. Application software to be developed used standard OEM libraries. Original license version of the latest release of platform software shall be used and handed over to purchaser.

- **System software**

  Quantity: 1 Lot The system software will be based on open architecture/protocol and shall support minimum 64-bit processing platform. It shall be latest object-oriented software, which result in fully scalable system. Original license version of the latest release of software shall be used. The system shall use Fibre optics as backbone. For networking TCP/IP or ISO-OSI model will be in use. All the license should be latest version and should be procured in name of End-User.

- **MIS Software**

  Quantity: 1 Lot

  Web enabled MIS system. MIS Integration in SQL or Oracle based on RDBMS software (preferably SQL). Most of the data shall be automatically pickup from PLC/SCADA system of the plant (Real time data) with necessary interface. Necessary forms to develop on the networked PC's for entering the data. All the reports shall be developed after the discussion with the customer. Original Source codes shall be in the name of purchaser.

  The Tentative minimum list of MIS reports for entire plant (ETP, Bio Gas, UF/RO) is as per below. The MIS reports shall be as per functional requirements. Necessary forms to be developed in the networked PCs for manually entering the data which is not automatically.

- **Drawn in MIS.**

  Raw Effluent receiving data

  Chemical Consumption data

  CSTR Anaerobic reactor data (Inlet and Outlet parameters of CSTR)

  Aeration data

  Treated water report

  Biogas flow report

  Sludge Generation Report

  Equipment Run Hours Reports

  Maintenance reports

  Summary Reports

  Plant Performance reports

  All the reports shall be developed after the discussion with the customer. Sensors will be checked for open and short circuit conditions. Failure of sensor/transmitter shall be indicated by the control system through over/ under range facility & not lead to stoppage/ suspension of the corresponding control system. Necessary provisions shall be made available in the system to enable exchange of important operational data to the Dairy's MIS system in a compatible format. This will be finalized while deciding the report formats.

- **Automation Accessories, Communication Network Accessories, Signal/ Instrument Cables/ Wires & Related Items**

  Quantity: 1 Lot
  Ethernet cable / Fibre Optic cable (6 core) – 1 Lot
  Field run bus/ similar bus cable – 1 Lot
  Switches – Giga bit, manageable as per network design with UPS Power supply (Cisco or Equivalent)
  Converters – With fiber optic to Ethernet converter (Gigabit Switch)
  Interfacing Units for third party devices/instruments etc. – 1 Lot
  Remote I/OS complete with communication & power unit – 1 Lot
  Hardware based security device – 1 Lot
  Other hardware – as per requirement
  The hardware units shall be installed inside suitable wall/rack mounted water tight cabinets. All instrument/signal cables/wires shall be shielded/screened type. Details of accessories to be finalized during detail engineering as per tender & functional requirement.
  Necessary interfaces/exchange of data with Automation System of Main Plant section for monitoring, logging and control shall be part of scope of bidder. Required
  hardware/convertors/LIU Unit, etc. shall be part of scope of Bidder.

- **UPS Power Supply:**

  Quantity: 1 Lot
  The supplier shall supply redundant UPS of appropriate capacity (minimum 5 KVA) and submit the detailed calculation in the technical bid.
  For control system, 24 V DC power supply shall be used wherever applicable and will be derived from UPS. Any other voltage level required for the system shall be responsible of the supplier along with all required hardware.
  DC voltage system for main CPU & all I/O stations / panels shall be with dual channel & kept separate for different step down / standard power converter module system from 220 V AC to dual channel 12 / 24 V DC to meet the requirement. The UPS system shall be with all the required protection, voltage stabilizers, and standard batteries and with min. Backup of 60 minutes.
  Battery shall be with minimum five year's warranty

SECTION IV B
SCHEDULE OF REQUIREMENTS –
TECHNICAL SPECIFICATIONS

SECTION IV B

SCHEDULE OF REQUIREMENTS

CONTENTS

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SCOPE OF CONTRACT

Design, Engineering, Supply, Installation, Testing and Commissioning (DESITC) of an 800 KLD Effluent Treatment Plant (ETP) at Jagraon, Punjab. The proposed scheme is based on the optimal utilization and integration of the existing 350 KLD ETP unit with new treatment facilities to achieve a total treatment capacity of 800 KLD.

1.1 Details of Mechanical equipment's and their Datasheet.

All equipment shall be designed for an operating duration of **20 hours per day**.

1.1.1 Bar Screen – 1 No. (The existing unit will be used.)

S. No.	Description	Specification
1.	Civil tank size	**2.0 m x 1.0 m x 0.20 m LD + FB** as per site condition.
2.	Location	Screen Chamber
3.	Purpose	To remove floating solids - Screening in Wastewater
4.	Numbers	1 No.
5.	Type	Each flat shall be **min. 50 x 6 mm thick. The spacing shall be 10 mm between bars**. **Minimum Size of Bar Screen - 0.4 m (depth) x 1.0 m (width)**
6.	MOC of all parts including anchor fastener, inserts	SS-304
7.	Angle of inclination	As per process requirement
8.	Other item details	The screen shall be provided with a. **suitable SS-304 guide frame manual pulley type lifting arrangement** for screen cleaning & maintenance. b. **all necessary provisions for mounting the bar racks, Inlet/outlet Puddle pipes** in civil portion as per process flow requirement. c. **SS-304 racking arm** for manual operation for removal of screenings.

1.1.2 RAW EFFLUENT TRANSFER PUMPS

S. No.	Description	Specification
1.	Purpose	To transfer equalized and effluent sump to hydrolyzing Tanks 01 & 02
2.	Numbers	2 (1 W + 1 S)
3.	Flow m^3/hr	**Min. 60.0 m^3/hr./** As per process requirement subject to minimum indicated flow rate
4.	Discharge Head MWC	**Min. 15 m /As per process requirement**
5.	Type	Submersible Pumps
6.	Suction lift/ +ve head	As per site requirement
7.	Pump efficiency %	To be given by vendor
8.	MOC of impeller / casing	SS 316 Impeller / CI body
9.	Type of impeller	As per OEM
10.	Sealing	Gland Packing/ Soft packing
11.	Liquid to be handled	Raw Dairy Effluent with suspended solids
12.	Type of Motor	Energy Efficient IE3, 3 phase, 50 Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation.
13.	Duty conditions	Continuous running
14.	HP /RPM	To be confirmed by OEM.
15.	Other details	The pumps shall be equipped with H/L level control switch, necessary interconnecting Piping & Valves, NRV's etc. Needful protection of pumps and motors to be ensured with suitable interlocking with level switches for the smooth & safe operation of the pumps.
16.	Makes	Kirloskar/KDB/Aqua/Lubi/Grundfos

1.1.3 Auto pH Correction System:

1.1.3.1 pH Sensor & Analyzer: for Equalization Tank – 1 Lot

The automatic chemical dosing system consisting of dosing pumps, pH sensors & electrode, dual channel analyzer/ transmitter module with display, mounting assembly and associated controls, & wiring suitable for field / outdoor installations as per manufacturer's specifications. **The bidders should design a suitable system considering the applications and the dosing requirements.** The main purpose of installing this system is to maintain ideal pH requirement for the raw effluent before it is taken into the biological treatment system. The dosing of chemicals to be done in Equalization tank before the Anaerobic CSTR digesters as per approved process requirement. **The bidders should suitably design the complete system which is proven for similar applications and guarantee the successful operations of the total pH automation system**. Level sensors will be paid under respective item.

Basically, the scope of works consists of providing a set of dosing pumps pH probes & dual channel analyzer with required automation controls, piping, valves, etc. required for the operation of the system in automatic mode.

Provision in piping and valves for manual dosing of chemicals in equalization tank to be provided.

Bidders should submit the detailed specifications of the system units considered by them for approval.

(1 Lot includes all provisions of Auto pH Sensor & Analyzer)

1.1.3.2 Acid & Alkali Chemical Solution Tanks – 2 Nos.

S. No.	Description	Specification
	Alkali Chemical Solution Tank	
1.	Tank Capacity	**1000 liter** minimum for chemical preparation & chemical dosing / As per process design req. subject to minimum indicated tank capacity.
2.	Tank MOC	LLDPE (with inlet, outlet, Drain, overflow arrangement)
3.	Qty.	1 No.
4.	Purpose	To prepare alkali solution
5.	Chemical	Alkali / (Sodium Carbonate orCaustic flakes)
6.	Solid concentration	10%
7.	Level Indicator	Suitable level indicator (manual).
	Mixer for Alkali tank	

S. No.	Description	Specification
1.	Type of mixer	Turbine/ Suitable as per process design requirement with supporting structure
2.	MOC	SS-316
3.	RPM	As per process requirement
4.	Quantity	**1 No.**
	Acid Chemical Solution Tank	
1.	Tank Capacity	**1000 liters** minimum/ As per process design req. subject to minimum indicated tank capacity.
2.	Tank MOC	LLDPE (with inlet, outlet, Drain, overflow arrangement)
3.	Quantity	**1 No.**
4.	Purpose	To prepare acidic solution
5.	Chemical	Acid (33% conc. HCl)
6.	Level Indicator	Suitable level indicator (manual) as perprocess requirement.
7.	Hand operated manual Pump	**Suitable hand operated manual pump for acid loading to the dosing tank is to be provided**

1.1.3.3 Chemicals (Alkali & Acid) Dosing Pumps – 4 Nos.

S. No.	Description	Specification
	Alkali Dosing pump	
1.	Capacity	0-200 LPH minimum/ As per process requirement subject to minimum indicated flow rate.
2.	Pressure	1.5 kg/cm² /As per process design requirement subject to minimum indicated pressure.
3.	Pump type	Positive displacement mechanically actuated diaphragm.
4.	Quantity	**2 Nos. (1 W+ 1 S)**
	Acid Dosing pump	
1.	Capacity	0-10 LPH minimum/ As per process requirement subject to minimum indicated flow rate.
2.	Pressure	1.5 kg/cm² minimum /As per process design requirement subject to minimum indicated

S. No.	Description	Specification
		pressure.
3.	Pump type	Positive displacement mechanically actuated diaphragm
4.	Quantity	**2 Nos. (1 W+ 1 S)**

Note-

a. Pipeline for manual dosing of acid/alkali chemicals from tanks to equalization tank is to be provided for pH correction and MOC of all Piping in CPVC (INDUSTRIAL GRADE SCH-80).

b. Supporting structures (MSEP) for mounting of agitator mixer and dosing pumps is to be provided.

c. The suitable MSEP steps/staircase should be provided to access the top of chemical dosing tanks for transfer of chemicals to tanksfor solution preparation.

d. The pumps shall be equipped with H/L level control switch, necessary interconnecting Piping & Valves, NRV's etc. Needful protection of pumps and motors to be ensured with suitable interlocking with level switches for the smooth & safe operation of the pumps.

e. The automatic chemical dosing system consisting of dosing pumps, pH sensors & electrode, suitable analyzer/ transmitter module with display, mounting assembly and associated controls, & wiring suitable for field / outdoor installations as per manufacturer's specifications. **The bidders should design a suitable system considering the applications and the dosing requirements.** The main purpose of installing of this system is to maintain ideal pH requirement for the raw effluent before it is taken into the biological treatment system. The dosing of chemicals to be done in Equalization tank before the Anaerobic CSTR digesters as per approved process requirement. **The bidders should suitably design the complete system which is proven for similar applications and guarantee the successful operations of the total pH automation system**. Level sensors will be paid under respective item.

   Basically, the scope of works consists of providing a set of dosing, pH probes (1 No.) & analyzer with required automation controls, piping, valves, etc. required for the operation of the system in automatic mode.

   Bidders should submit the detailed specifications of the system units considered by them for approval.

1.1.4 MIXING SYSTEM FOR HYDROLYSING TANKS – 1 & 2:

S. No.	Description	Specification
1.	Civil tank size	As per Design
2.	No. of Tank	1.0 nos.
3.	Purpose	For Effluent Equalization, Homogenization, Hydrolyzing and Mixing of suspended solids
4.	Numbers	1.0 Lot
5.	Type	Through Air mixing with course bubble arrangement
6.	MOC	uPVC/cPVC

1.1.5 Equalized Effluent Transfer Pumps (Digester Feed Pumps) – 2 Nos.

S. No.	Description	Specification
1.	Purpose	To transfer equalized and hydrolyzed effluent to CSTR (MSEP).
2	Numbers	2 (1 W + 1 S)
3	Flow m^3/hr	**Min. 50.0 m^3/hr./ As per process requirement subject to minimum indicated flow rate**
4	Discharge Head MWC	**Min. 19 m /As per process requirement**
5	Type	Non-clog, Horizontal Centrifugal
6	Suction lift/ +ve head	As per site requirement
7	Pump efficiency %	To be given by vendor
8	MOC of impeller / casing	SS 316 Impeller / CI body
9	Type of impeller	As per OEM
10	Sealing	Gland Packing/ Soft packing
11	Liquid to be handled	Raw Dairy Effluent with suspended solids
12	Type of Motor	Energy Efficient IE3, 3 phase, 50 Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation.
13	Duty conditions	Continuous running
14	HP /RPM	To be confirmed by OEM.
15	Other details	The pumps shall be equipped with H/L level control switch, necessary interconnecting

S. No.	Description	Specification
		Piping & Valves, NRV's etc. Needful protection of pumps and motors to be ensured with suitable interlocking with level switches for the smooth & safe operation of the pumps.
16	Makes	Kirloskar/KDB/Aqua/Lubi/Grundfos

16.1.1 Anaerobic Digester:

16.1.1.1 Continuous Stirred Tank Reactor (CSTR) – 1 Lot

S. No.	Description	Specification
1.	No of Anaerobic Digester Tank	1 No. (15.00 m dia x 13.50 m LD + 1.00 m FB)
2.	Material of Construction	Mild Steel Epoxy Painted - All the inside surface shall be cleaned with sand blasting – SA 2.5 followed with min. two coats (DFT- 35 micron/coat Min.) of suitable epoxy primer followed by min two coats (DFT- 80 Micron/coat Min.) of epoxy paint. All the outside surface with sand blasting should be painted with min. two coats (DFT -35 Micron/coat Min.) of suitable primer followed by min. two coats (DFT- 40 Micron/coat min.) of Polyurethane Paint (PU). Paint shall be applied in accordance with paint manufacture's recommendation.
3.	Type	Complete mix anaerobic digester with MSEP tank with fixed dome, with Jet/Eductor mixing arrangement to ensure the complete mixing in Digester Tank as per process design requirement, complete distribution piping, fittings, supporting and accessories in all respect.
4.	Purpose	To digest the organic load & FOG etc. present in raw effluent at

S. No.	Description	Specification
		maximum extent.
5.	Specific Gravity of liquid hold	1.1
6.	Design temperature	20 ^{O}C – 45 ^{O}C
7.	Steel construction Confirming to Standards	As per applicable IS Code.
8.	Total tank volume m3	**2380.00 m^3**
9.	Diameter m	15.00 m
10.	Height m	(13.50m L. D + 1.00 m FB)
11.	Corrosion Allowance mm	1.5 (minimum)
12.	Design Gas Pressure mmwc	400
13.	Tank Plate Thickness mm	As per applicable IS code
14.	Bottom Plate mm	Minimum 6 mm or as per applicable IS code subject to minimum indicated thickness.
15.	All Shells	Minimum 6 mm or more as per applicable IS code subject to minimum indicated thickness as per structural design.
16.	Suitable Anchoring/ grouting/ stiffeners/ Nozzles/ Manholes strengthening arrangements	As per design requirement/ applicable IS code
17.	Tank strengthened suitably to withstand climatic conditions	As per project location ambient conditions, wind velocity as per project site locations and seismic zone.
18.	Mixing arrangement	By Jet Mixer/Eductor 40 mm diameter, makes as approved by IDMC.
19.	Railing	At top along the periphery MSEP pipe 32 mm including kick plate as per GA drawing approved by the Engineer in charge MSEP to be provided in hand railing structure and pipe.
20.	Approach	Peripheral spiral staircase min. 900 mm width and interconnecting platform with De-gasser as per site condition.
21.	Accessories to be provided	**a. Water Seal** **b. Flame arrestor** **c. Moisture Trap** **d. Pressure & vacuum relief valve** **e. Pressure and Vacuum Gauge** **f. Temp Sensor**
22. 2	Backwash line (for cleaning/ unchoking of eductors)	Suitable backwash line to be provided in recirculation line

S. No.	Description	Specification
		with adequate no. (min. 3 nos.) of butterfly valves. This is to connect suction lines to discharge line and discharge to suction lines in Digestor recirculation lines.
23.	Pressure Transmitter	To be provided in recirculation line to monitor total pressure for educators.
24. 2	SS Inline strainer	Suitable SS 304 inline strainer including pipeline and suitable removable type screen to be provided as per operational and process requirement.
25. .	**Microbial Culture Dosing System**	The contractor needs to supply the suitable and effective micro-organism culture dosing system with suitable dosing tank (min. 300 lit), Mixer (SS 304) & dosing pump (10 LPH) required for culture dosing in the feed of CSTR Tank including the all necessary piping and valves.

NOTE:

1) The Bidder should submit the process design of the total **anaerobic system for guaranteeing 75%** or more reduction in inlet organic load. Based on the design considerations, the height and diameter of the digester tank may be changed by the contractor considering **min. volume of Anaerobic Digester tank as 76.93 cum or increased suitably as per process design requirement without any extra cost.**

2) The Digester shall have a standard spiral staircase in MSEP with landing platform. A standard 1.0 m high standard handrail in 32 mm Dia. MS class B pipes shall be provided along the periphery of the digester top.

   In CSTR digester, suitable inserts, SS 304 pipe puddles to be provided for erection of jet mixers/eductors and central hub along with recirculation pipelines. The gas balloon (gas collection zone) of CSTR digester is to be properly anchored to tank.

   The effluent outlet line shall be provided with a suitable water seal arrangement to ensure and avoid any type of gas leakages

and odour and pass through the Flash Mixer, Flocculation unit and sludge thickening system (cross flow separator). The gas collection system shall include the suitable pipe gas header, a flame arrestor and a pressure relief valves and a moisture trap for the digester.

Necessary arrangement for access into the digester shall be included in the form side manhole at least 750 mm dia. At suitable locations, sludge outlets connected to a common sludge line for sampling/excess sludge disposal to the sludge drying beds shall be provided. Suitable Pipe inserts with SS 304 puddle flange shall be provided at all effluent/sludge inlet and outlet points.

The detailed process design, specifications along with layout of distribution grid, jet mixer/Eductors maintaining of complete mixing and homogenization is to be done by the contractor for achieving the desired organic removal of minimum 70 % or more. The anaerobic digester should have platform at the top for maintenance of the gas balloon, air blowers, accessories, safety devices, manhole, etc. The digester design should eliminate the possibility of any objectionable odour problem.

3) After completion of testing, the complete tank (Anaerobic Digester) from inside and outside shall be cleaned. MS - All the inside surfaceshall be cleaned with sand blasting- SA 2.5 followed with min. two coats (DFT- 35 micron/coat Min.) of suitable epoxy primer followed by min two coats (DFT- 80 Micron/coat Min.) of epoxy paint. All the outside surface with sand blasting should be painted with min. two coats (DFT -35 Micron/coat Min.) of suitable primer followed by min. two coats (DFT- 40 Micron/coat min.) of Polyurethane Paint (PU). Paint shall be applied in accordance with paint manufacture's recommendation. Supporting steel, transition pieces & piping being fabricated at site to be applied with suitable coats of corrosion resistance primer before erecting/installing then apply suitablecoats of epoxy paint after erection. The methodologies of painting and sand blasting to be submitted. Performance credential for similar applications to be submitted.

4) Contractor shall take the all necessary precaution in Gas collection zone to eliminate the possibilities of corrosion.

5) Contractor shall make all necessary provisions for mounting the distribution pipes/ distribution internal & external piping grid, Eductor/Jet mixers, nozzles and all internal accessories and over flow launders etc.

6) Necessary MSEP hand railing, safety devices like flame arrestor, Moisture trap (MSEP minimum 5 mm thick), pressure & vacuum relief valve, pressure & vacuum Gauge are to be provided.

7) Flame arrestor is to be spiral type corrugated SS 304 bank with Aluminum die cast body, CASF gasket PVRV is to be of type-, Dead weight, Cast aluminum body, SS304-seat & pallet, PTFE-diaphragm with weather hood- cast Al.

8) In complete mix anaerobic Digester suitable inserts, pipe puddles to be provided for erection of Eductor/ jet mixers and central hub/ Pipe header along with recirculation pipelines. The top dome of anaerobic digester fixed dome.

9) The effluent outlet line shall be provided with a suitable water seal arrangement and pass through the sludge thickening unit before finally taken to the Aeration tank. The gas collection system shall include the SS 304 pipe gas header, a flame arrestor and a pressure relief and a moisture trap for the digester.

10) Sampling ports of digesters at suitable locations, all sampling ports to be provided with ball valves should be located at operational height. Min. 4 nos. of sampling port are to be provided from highest point to lowest point.

11) Bottom sludge outlets should be connected to a common sludge line for excess sludge disposal to the sludge drying beds shall be provided. Pipe inserts with puddle flange shall be provided at all effluent/sludge inlet and outlet points.

12) The anaerobic digestion system design should eliminate the possibility of objectionable odour problem.

13) Suitable chemical dosing tanks with piping for dosing of nutrients and alkali is to be provided.

14) Instrumentation: To know the operating condition of anaerobic digester, 1 No temperature sensor is to be provided in Control Panel for monitoring CSTR.

16.1.1.2 CSTR MIXING SYSTEM

S. No.	Description	Specification
1.	Anaerobic Digester Tank (MSEP) size	15.00 m dia. X 13.50 m L.D + 1.00 m F.B.
2.	Purpose	Anaerobic Digester (CSTR) biomassrecirculation and mixing by jet mixer/ Eductor to maintain the completemix conditions as per process design requirement.

S. No.	Description	Specification
3.	Qty. recirculation pumps of	**2 Nos. (1 W + 1 S)**
4.	Flow (m^3/hr.)	**Min. 250/ As per** Process requirement.
5.	Discharge Head MWC Head	**22 m minimum**/ As per processrequirement subject to minimum indicated flow.
6.	Type	Non-Clog, horizontal (Centrifugal)
7.	Pump efficiency %	To be given by the vendor
8.	MOC of impeller /casing	SS 316 / C.I Body
9.	Type of impeller	As per OEM
10.	Sealing	Gland Packing/ Soft packing
11.	Liquid to be handled	Effluent in bio-digester (anaerobic biomass of combined dairy waste water consisting of FOG & suspended solids) with pH 6.0~9.0, 10 ^{0}C - 45 ^{0}C (refer raw effluent parameters & scheme for accessing the liquid characteristics).
12.	Other Details	STANDARD ACCESSORIES: Comprises of MS base frame + Coupling + Coupling Guard and MS Foundation bolts, suitable drain with proper outlet for collection and storage of leakage effluent from the seal complete in all respect
13.	Type of Motor	Energy Efficient, 3 phase IE 3, 50 Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation.
14.	Duty conditions	Continuous running
15.	HP /RPM	To be confirmed by OEM.
	Jet /Eductor mixing system	
1.	**Distribution Piping Grid with supportingfor Jet Mixer/Eductor**	Jet/Eductor mixing distribution grid piping outside & Inside the Anaerobic digester tank, to bedone by the contractor as perprocess and mixing requirementand the

S. No.	Description	Specification
		internal piping with supporting within the anaerobicdigester tank for Jetmixer/Eductor shall be made of SS 316.
2.	**Properties of Jet Mixers/Eductors**	
	MOTIVE CONDITIONS	
1.	Motive Fluid	Anaerobic biomass of dairy effluent of dairy
2.	Motive Temperature	20 ^{O}C – 45 ^{O}C
3.	Motive Flow Rate	As per OEM Design / processrequirement.
4.	Motive pressure	As per OEM Design/ Process Requirement
	SUCTION CONDITIONS	
1.	Suction Fluid	Anaerobic bio mass of dairy effluent
2.	Suction Temperature	20°C - 45°C
3.	Suction Flow Rate	As per OEM Design
4.	Suction pressure	As per the jet mixer/Eductor location suggested by OEM/ Process requirement.
	DISCHARGE CONDITIONS	
1.	Discharge Pressure	Into the same tank as per OEMdesign and process Requirements
	JET MIXER/EDUCTOR SELECTION	
1.	Model	Suitable as per OEM design andprocess requirement.
2.	Size	Size of 40 mm diameter is preferable as per OEM design andprocess requirement.
3.	Material of Construction	CF8M/SS316
4.	End Connection	Flanged Type
5.	Qty. of Jet Mixers Eductors Mixers/	1 LOT (As per OEM design to meet the process requirement) for Anaerobic Digester Tank
6.	Minimum no. of turns tank volume per hour	One turn as per process requirement approved by OEM / IDMC.

16.1.2 Sludge Thickening System (part of skid):

16.1.2.1 Flash Mixer, Flocculator & Cross Flow Separator – 1 Lot

S. No.	Description	Specification
	Flash Mixer Unit	
1.	Purpose	Coagulation after anaerobic digester and coagulation after aeration tank
2.	Qty.	1 No. (1 no's after anaerobic digester + 1 no's after aeration tank)
3.	Design Flow Rate	As per process requirement subject to minimum indicated design flow rate.
4.	MOC	MS with Internal & External epoxy painted (Minimum 6 mm plate thickness) Mild Steel Epoxy coated (Paint) - All the inside surface shall be cleaned with sand blasting- SA 2.5 followed with min. two coats (DFT - 35 micron/coat Min.) of suitable epoxy primer followed by min two coats (DFT- 80 Micron/coat Min.) of epoxy paint.
5.	HRT (Hydraulic Retention time) & Size	**2 minutes minimum** / As per Process Requirement subject to minimum indicated HRT
6.	Mixer Type	Turbine Blade - SS 316
7.	Electrical Drive	As per process requirement with suitable gear box and motor
8.	Shaft	Solid shaft-SS 316
9.	Rotation Speed	150 rpm/ As per process requirement.
	Flocculator Unit	
1.	Purpose	Flocculation after anaerobic digester
2.	Qty.	1 No. (1 no. after anaerobic digester)
3.	Design Flow	As per process requirement subject to minimum indicated design flow rate.
4.	MOC	MS with Internal & External epoxy painted (Minimum 6 mm plate

S. No.	Description	Specification
		thickness) Mild Steel Epoxy coated (Paint) - All the inside surface shall be cleaned with sand blasting- SA 2.5 followed with min. two coats (DFT - 35 micron/coat Min.) of suitable epoxy primer followed by min two coats (DFT- 80 Micron/coat Min.) of epoxy paint.
5.	HRT (Hydraulic Retention time) & Size	**10 minutes minimum**/ As per Process Requirement subject to minimum indicated HRT.
6.	Mixer Type	Paddle - SS 316
7.	Electrical Drive	As per process requirement with suitable gear box and motor
8.	Shaft	Solid Shaft-SS 304
9.	Rotation Speed	10 rpm/ As per process requirement.
	Cross Flow Separator	
1.	Purpose	Solids Separation and recycling of settable & floating solids back into anaerobic system.
2.	Qty.	**1 No.**
3.	Design Flow	As per process requirement subject to minimum indicated design flow rate.
4.	MOC	• Tank - MS with Internal & External EP (Minimum 6 mm plate thickness) • Mild Steel Epoxy coated (Paint) - All the inside surface shall be cleaned with sand blasting- SA 2.5 followed with min. two coats (DFT - 35 micron/coat Min.) of suitable epoxy primer followed by min two coats (DFT- 80 Micron/coat Min.) of epoxy paint. • Hand railing, Staircase & Platform in MSEP.

S. No.	Description	Specification
		• Lamella Plates/media & Flow distribution baffles - FRP • Chain, shaft, sprocket, scrapper blade- SS 316
10.	Type of Plates	Corrugated/ OEM design
11.	Top Separation device	Mechanized type as per functional requirement/ OEM design.
12.	Size and components	As per OEM Design – including media holding zone, bottom hopper- thickening, pre - separator system with mechanized top skimmer, Free board, MSEP support structure & legs, Nozzles as per site condition.
13.	Feed effluent / Sludge Type	Anaerobic biomass from anaerobic digester
14.	pH	6.0~8.5
15.	Inlet solid concentration to CFS system	0.05 % - 0.8 % / as per process design requirement
16.	Solid concentration in outlet sludge	1 % - 3 % / as per process requirement
17.	Solid concentration in outlet	To meet process requirements.
18.	Solid removal efficiency	80 % - 90 % as per process requirement.

Makes - K PACK SYSTEM / SNP INFRA/ MEEPL/ PARAMOUNT

Note:

1) Contractor to design and consider the suitable size and capacity of cross flow separator system as per process design requirement in all respect.

2) Contractor to arrange the technical presentation by the OEM of CFS system for the required parameters and data sheet.

3) Cross flow separator system to be designed for considering the maximum 0.75 m/hr particles settling velocity.

4) Contractor to provide the suitable piping, and motorized valves- 2 nos. for top and bottom stream of CFS and Piping arrangement

for transfer of scum (FOG) & settled sludge of CFS and separated anaerobic sludge/ FOG to Equalization & Hydrolysis Tank and Sludge Drying Bed with suitable valves as per process requirement.

5) Contractor to provide the all necessary components in CFS system to enhance/maintain the efficiency of system and meet the process requirement without any extra cost.

6) Thickness and structure: Bottom plate, side wall plates, stiffeners, bracings, structural members, supports, base frame, and all allied structural elements shall be minimum 6 mm thick or as per approved design.

7) Accessories: complete with ladder, platform, railing, manhole, lifting lugs and all fittings

16.1.2.2 Coagulants and Flocculants chemical solution tanks – 2 nos.

S. No.	Description	Specification
1.	Tank Capacity	**1000 liters min.** /As per process requirement subject to minimum indicated tank capacity.
2.	Tank MOC	LLDPE (with Inlet, outlet, Drain, Overflow arrangement)
3.	Qty.	**2 Nos.**
4.	Purpose	To prepare Coagulant & Flocculantssolution
5.	Chemicals	Organic chemicals for Coagulation and Flocculation as per process requirement
6.	Level Indicator	Suitable level indicator as per processrequirement.
	Accessories	
1.	Inlet Strainer cum Foot valve	To be provided
2.	Anti-syphoning valve	To be provided
3.	Suction Discharge Tubing	To be provided
	Agitator Mixer – 2 No's	
1.	Type of mixer	Turbine/suitable type impeller mixer
2.	MOC	SS-316

S. No.	Description	Specification
3.	RPM	As per process requirement

Note-

1. The suitable MSEP steps/staircase should be provided to access the top of chemical dosing tanks for transfer of chemicals to the tanks.

2. Supporting structures for mounting of agitator mixers and dosing pumps to be provided.

16.1.2.3 Chemicals (Coagulant & Flocculent) Dosing Pumps – 4 Nos.

S. No.	Description	Specification
1.	Capacity	0-200 LPH minimum/As per process design requirement subject to minimum indicated flow rate.
2.	Head	**1.5 k g/cm² minimum** / As per process design and site condition subject to minimum indicated head.
3.	Pump type	Positive displacement mechanicallyactuated diaphragm dosing
4.	Quantity	**4 Nos. (2 W + 2 S)**

Note:

i. Complete piping and valves for dosing of chemicals (coagulant & flocculants) to flash mixer and flocculation tank are to be provided and MOC of all Piping & valves in CPVC (INDUSTRIAL GRADE SCH-80).

ii. The pumps shall be equipped with H/L level control switch, necessary interconnecting Piping & Valves, NRV's etc. Needful protection of pumps and motors to be ensured with suitable interlocking with level switches for the smooth & safe operation of the pumps.

16.1.3 Sludge Re-circulation Pumps for Sec. Clarifier & Cross Flow Unit – 2 Nos.

S. No.	Description	Specification
1.	Purpose	For recirculation of anaerobic sludge from CFS & buffer tank to Equalization cum hydrolyzing tank (Two Compartment)
2.	Quantity	**2 Nos. (1 W + 1 S)**
3.	Flow m^3/hr.	**10.0 min.**/ As per process design requirement subject to minimum indicated flow rate
4.	Discharge Head mtrs.	**10.0 m min.**/ As per process design requirement subject to min. indicated head.
5.	Type	Non-clog, HorizontalCentrifugal.
6.	Suction lift/ +ve head	Flooded
7.	MOC of impeller / casing	SS 304 Impeller / CI body
8.	Type of impeller	Semi open/ OEM design
9.	Liquid to be handled pH - Temperature ^{0} C	Effluent with suspendedsolids 6.5 –8.5 $20^{O}C – 45^{O}C$ approx.
10.	Sealing	Mechanical Seal.
11.	Other details	As per OEM and functional requirement withhorizontal shaft with Gland packing. Suitable timer in panel to be provided as per process andfunctional requirement of pumps. STANDARD ACCESSORIES: Comprises of MS base frame + Coupling + Coupling Guard and MS Foundation bolts, suitable drain with proper outlet for collection and storage of leakage effluent from the seal complete in all respect
12.	Type of Motor	Energy Efficient, 3 phase IE 3, 50 Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation.
13.	Duty conditions	Continuous running
14.	HP /RPM	To be confirmed by OEM
15.	H/L switches	The pumps shall be equipped with H/L level control switch, necessary interconnecting Piping & Valves, NRV's etc. Needful protection of pumps and

S. No.	Description	Specification
		motors to be ensured with suitable interlocking with level switches for the smooth & safe operation of the pumps
16.	Makes	Kirloskar/KDB/Aqua/Lubi/Grundfos

16.1.4 Air Blower – 2 nos.

Blower package shall include but not be limited to, drive guards, base with vibration isolators, pressure gauges, temperature gauges, temperature switches, inlet filters, inlet & outlet silencers, pressure relief valves and interconnecting piping. Complete air blower unit and motor mounted on a common base plate. Blowers shall provide a firm air supply capacity. The motor shall have an Energy Efficient, IE2, TEFC enclosure and operate on 415 volts, 3 phase, and 50 Hz power supply. Isolation butterfly valves shall be cast-iron wafer-type with a disk of bronze or stainless Steel.

S. No.	Description	Specification
1.	Numbers	2 nos. (1 W + 1SB)
2.	Flow m^3/hr- for each blower for each	1100 minimum/ As per process requirement subject to minimum indicated flow rate.
3.	Discharge Head	5500 mmwc
4.	Type & Make	Screw type blowers.
5.	Suction pressure mm WC	Atmospheric
6.	Temperature	50 ^{0}C/ as per site condition.
7.	Blower efficiency %	To be given by vendor
8.	MOC	CI Body
9.	Fluid to be handled	Air
10.	Other Details	Suction & Discharge of air should be on vertical section with flanged ends. Blowers is to be supplied with all accessories, Rotameter – 2 nos., silencers, suction filter, safety valves, non-return valve, pressure gauge, Temperature switch etc. for both Aeration and Equalization air lines.
11.	Controls	Interconnection of Air blower with temperature switch for blower motor safety. Aeration

S. No.	Description	Specification
		system VFD's for blowers for energy efficient performance of aeration system.
12.	Duty conditions	Continuous running
13.	Makes	IR/Kaessar/Gardener Denver/ Everest/ Kay/Beta

16.1.5 Diffusers for Aeration System – 240 nos.

The contractor should design a retractable floor mounted type tubular diffused air grid and design fine pore tube diffusers required, based on the tank geometry and spacing recommended by the manufacturers. The equipment data sheet for the diffusers is to be got approved from the Engineer in charge. It is preferable to have Silicon pipe diffusers which offer better resistance to organic fouling, temperature, and chemicals.

S. No.	Description	Specification
1.	Civil tank size	As per design and process requirement
2.	Purpose	Supply of oxygen for biological oxidation of organic matter and for proper mixing for Aerobic treatment as per process design requirement.
3.	Numbers	**240 nos.**
4.	Type	Fine bubble air diffuser Tubular
5.	MOC	Silicon based membrane with anti-microbial properties PP Support tube with 4.5 mm thick/As per OEM standard.
6.	Size	67 mm O.D, 1.0 mts long Pipe aerator density / As per OEMstandard design.
7.	Air Quantity	6-7 m^3 air /mtr. /as per OEMstandard design.
8.	Accessories	Pressure gauges, air release valves.
9.	**Retractable type - Hanging**	SS 304- ½" - drop pipe, Tee,

S. No.	Description	Specification
	Grid System	bends, flanges, ball valve, floor supports, **supports to provide for maintaining diffusers in position** etc. as per approved GA drawings
10.	Make	Rehau/OTT/Scogen/SSI

Note –

1. Air in aeration Tank is required for proper mixing as well as to supply Oxygen for biological oxidation of COD/BOD. The bidders should design the complete fine bubble diffused aeration system along with air blower Capacity to meet the process design requirements.

2. All SS pipe welding should be argon welding with inert gas feed.

3. Necessary supports to hanging grid pipeline be provided.

16.1.6 SECONDARY CLARIFIER MECHANISM UNIT

S. No.	Description	Specification
1.	Purpose	To provide effective separation of organic floc from the effluent.
2.	Quantity	01 No.
3.	Civil Tank Size	8.00 m Ø x 3.0 m LD 0.50 m FB
4.	Access Bridge	To be provided full length
5.	Weir Plate	All along the length of peripheral weir in SS 316
6.	Drive	Circular and centrally driven, double arm with skimmer arm.
7.	Gear	Suitable as per OEM design
8.	Walkway	Walkway with suitable MSEP gratings and Extended Maintenance Platform walkway (Walkway width minimum 1000 mm)
9.	Squeezes	Nitrile rubber
10.	Feed Well	FRP/PVC/PP feed well, supported from the bridge.
11.	Inlet pipe	Top entry to central feed well.
12.	Painting	All MS wetted/ no wetted parts will be one coat of epoxy primer & two coats of epoxy paints.
13.	Motor	Energy Efficient, 3-phase IE 3, 50

S. No.	Description	Specification
		Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation.
14.	Rated power KW	To be confirmed by OEM.

16.1.7 ***SLUDGE RE- CIRCULATION PUMPS (SECONDARY CLARIFIER)***

S. No.	Description	Specification
1.	Purpose	For recirculation of aerobic sludge from Secondary Clarifier to Aeration Tank & buffer tank to Equalization cum hydrolyzing tank
2.	Quantity	**2 No's (1W + 1SB)**
3.	Flow m^3/hr	**25.0 Minimum** /As per process design requirement subject to minimum indicated flow rate
4.	Discharge Head mtrs.	**12 m minimum**/As per process design requirement subject to minimum indicated head.
5.	Type	Non clog, Horizontal Centrifugal.
6.	Suction lift/ +ve head	Flooded
7.	MOC of impeller / casing	SS 304 Impeller / CI body
8.	Type of impeller	Semi open/ OEM design
9.	Sealing	Mechanical Seal.
10.	Type of Motor	Energy Efficient, 3 phase IE 2, 50 Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation.

16.1.8 ***FILTER FEED PUMP & TREATED WATER PUMPS.***

S. No.	Description	Specification
1.	Purpose	Treated Water tank to PSF & ACF and final treated water transfer
2.	Numbers	4 No's (1W + 1SB) Filter Feed and (1W + 1SB) for Treated Water Transfers
3.	Flow m^3/hr	**40.0 Minimum** /As per process design requirement subject to minimum indicated flow rate
4.	Discharge Head MWC	**35 m minimum**/As per process design requirement subject to minimum indicated head.
5.	Type	Non-clog, Horizontal Centrifugal
6.	Suction lift/ +ve head	Flooded
7.	Pump efficiency %	To be given by vendor
8.	MOC of impeller / casing	SS 304 Impeller / CI body
9.	Type of impeller	Semi open/ OEM design
10.	Sealing	Mechanical Seal.
11.	Type of Motor	Energy Efficient, 3 phase IE 2, 50 Hz, 415 V, AC supply, TEFC Squirrel cage induction type, IP55 protection, class F insulation
12.	Makes	Kirloskar/KDB/Aqua/Lubi/Grundfos

16.1.9 ***PRESSURE SAND FILTER***

MS Vertical Pressure Sand Filter suitable for 40 cum/hr capacity and comprising of following but not limited to:

#MS Dish end of min. 10 mm thick plate & shell of minimum 8 mm thick plate.

#Minimum 16 mm thick perforated under drain plate with polystyrene strainer Self - Supporting legs Graded filter media of sand, gravel & grit at various height.

 # MS front face piping tree with CI butterfly valves, inlet & outlet pressure gauges, air release valve etc. complete in all respect.

#The filter shall be painted after sand blasting with two coats of epoxy over suitable coats of epoxy primer for external surface and with two coats of bituminous anti corrosive paint for internal surfaces.

16.1.10 *ACTIVATED CARBON FILTER*

MS Vertical Activated Carbon Filter suitable for 40 cum/hr capacity and comprising of following but not limited to:

#MS Dish end of min. 10 mm thick plate & shell of minimum 8 mm thick plate. Minimum 16 mm thick perforated under drain plate with polystyrene/PP strainer Self - Supporting legs.

#Activated Carbon filter should be designed for minimum contact time of 15 min. IV value of activated carbon should not be less than 1000 mg/gm. Suitable capacity chemical regeneration tank with all applicable accessories to be provided for chemical recharging of activated carbon.

#MS front face piping tree with CI butterfly valves, inlet & outlet pressure gauges, air release valve etc. complete in all respect.

#The filter shall be painted after sand blasting with two coats of epoxy over suitable coats of epoxy primer for external surface and with two coats of bituminous anti corrosive paint for interna surfaces.

16.1.11 FLARE STACK.

The flare stack shall be provided in MS pipe in pipe arrangement of suitable height (as per process design requirements) to be designed by the contractor. It consists of an outer protective shell and inner gas transmission line leading to the burner. An approach ladder and platform shall be provided up to the top of the stack with a provision for pilot gas line for gas flaring with auto ignition system. All safety devices like flame arrestor, moisture trap, gauges etc. is include in the scope.

S. No.	Description	Specification
13.	Purpose	For safe disposal of Biogas by burning it.
14.	Numbers	**1 No**
15.	Type	With auto Ignition system
16.	MOC	Mild steel with heat resistance paint.

16.1.12 PIPING & VALVES

S. No.	Description	Specification
01.	Pipping 1 Lot.	Providing, Excavation, laying intrenches, re-filling, fixing and testing approved make (sch 10)/UPVC pipes for various pressure rating as per supporting structures, T & P, welding, jointing, clamping, etc. as required for proper completion of work including the costs of pipes and specials- bends, Tees, and as per the approved P & I drawings for all Interconnecting piping its accessories using suitable fittings.
02.	Valves 1 Lot.	Supply of butterfly valves of approved make wafer type butterfly valve with grey iron body [CI - 210 fg 260] having black / white EPDM liner fitted with gear unit, white nitrile lining to the body and fitted with stainless steel disc and stainless-steel shaft, etc. complete of all sizes as per the P& I and operational /process requirement for the complete ETP.

16.1.13 ***ELECTRICAL & MCC PANEL***

S. No.	Description	Specification
01.	MCC PANEL	**Supply, Installation, Testing and Commissioning (SITC) of Cubicle Type Electrical MCC Panel (Non-Compartmental)** for **Effluent Treatment Plant (ETP) Automation** with **PLC, SCADA and HMI**, as per approved drawings and detailed technical specifications. The work

			shall include design, manufacture, supply, installation, testing and commissioning of the Motor Control Centre (MCC) panel complete with all required switchgear, busbars, wiring, cable termination, earthing arrangements, name plates, danger notices, indicating lamps, meters, relays, PLC interfacing, communication modules, and all accessories required for satisfactory operation. The scope shall also include providing **electrical grade rubber insulating mats** in front of the panel, complete in all respects, as per the directions of the Engineer-in-Charge and in accordance with the approved drawings, technical specifications and relevant IS/IEC standards, ensuring proper completion and satisfactory performance of the entire system.
	02.	Cable 1 Lot	Supply of 1100 V grade Aluminium/copper conductor XLPE insulated and PVC sheathed armored cables of the following size sinstalled in built up trenches/ embedded in floor / cable tray / clamped on wall / ceiling /column /on beam/on MS Structure Supports cleated with GI cleats, GI saddles, binding wires, coach screws etc. or directly buried underground through GI pipe embedded infloor including excavation in soft / hard murrum , backfilling, providing sand bedding, bricks cable route markers etc. in an approved manner.

16.1.14 Electromagnetic flow meter – 4 nos.

The contractor must provide the online electro-magnetic flow meters of suitable range as per process design for Raw Effluent cum Eq. cum Hydrolysis pumps (1 no.), CFS Recirculation pumps (1 no.) and

Treated water transfer pumps.

The flowmeter will of suitable capacity and range with suitable transmitter **having local display mounted at operational height, additionally digital level indication should be displayed in MCC Control Panel including all cablings (control and electric) for monitoring and controlling, etc. complete.**

a. Flow meter system shall consist of a flow element with transmitter mounted at operational height as per process requirement. Additionally, same indication should be displayed in control panel (ETP MCC) described in General notes of electrical works.

b. Liquid Flow Meters: Suitable for Effluent/ waste water applications.

c. Magnetic flow meter shall be provided as per approved P & ID. This will be fixed online in the MS Effluent pipeline flanged as per site requirements

    1. Flow element:
        a. Rated for installation in Class 1, Division 2 environment.
        b. Provide with integral grounding electrode.
        c. Electrodes shall be 316 stainless steel.
        d. Liner shall be PTFE.
        e. Size & Model shall be as per flow requirement.
        f. Rated for outdoor (IP-65), Die. Cast Aluminum housing.
        g. Required length of signal cables as required.
    2. Transmitter:
        a. Microprocessor based.
        b. Provide a 4-20 mA linear output signal proportional to flow.
        c. Type - Integral at operational height.
        d. NEMA 4X enclosure protection.
        e. LCD display for flow, Totalizer, display of flow indicator, Empty pipe detector.
        f. Shall operate from 240V, 1-phase, 50-Hz power source.

    3. Cable: Power and signal cable as per site requirement.

16.1.15 Level sensor with transmitter (Non- contact Type Ultrasonic) – 4 Nos.

The bidders must provide the Level sensor with suitable transmitter with local display, additionally digital level indication should be displayed in control panel (ETP MCC) described in general notes of electrical works. Contactor module providing signals for low level and high level for various pumps and should facilitate automatic stop/ start & stop of the pumps (working + standby) at Raw Effluent cum Equalization cum Hydrolysis Tank (1 no.), Filter Feed tank (1 no.), Treated water tank (1 no.), any other additional tank (1 no.) as per process requirement and site condition.

The level switches will be of suitable capacity and range with suitable transmitter having display mounted at operational height digital level indication should be displayed in MCC Control Panel including all cablings (control and electric) for monitoring and controlling (high level, mid-level and low level for automated operations), etc. complete.

Bidders has to note that the raw dairy effluent consists of floating oil & fat along with suspended organic matter. The proposed level sensors should be able to perform successfully under this condition. It is preferably to have a **Non-contact type Ultrasonic type level Sensorwith suitable transmitter switches system suitable for field / outdoor installations.**

16.1.16 Low Pressure Steam Piping (Insulated), Valves & Fittings

Steam pipeline including insulation from Boiler to CSTR & Equalization cum Hydrolysis Tank including structural design and approval of MS pipe bridge, PRS, instrumentation valves, drain trap assembly, insulation, steam flowmeter, statutory & IBR approval etc. as per IBR, IS specifications, design/process requirement, approved P&ID as directed by the Engineer-in-charge. These works shall be carried out by specialized agency conversant with IBR works. Bidder to design the size and the PRS required for the steam pipeline up to Equalization cum Hydrolysis tank to maintain the desired temperature in the anaerobic process.

The approximate piping distance from Boiler House till CSTR and Equalization Tank is approximately 35 m which may vary either side.

16.1.17 lab for day-to-day testing of raw and treated effluent including making lab operational and training the client manpower Note: equipment as per attached list:

a	pH meter			E&H/ EMERSON/BAUMER	Nos.	1.00
b	TDS Meter				Nos.	1.00
c	COD Digester				Nos.	1.00
d	COD Tube with Air Condenser				Nos.	6.00
e	BOD Incubator				Nos.	1.00
f	BOD bottles	300ml		Borosilicate Glass	Nos.	8.00

g	Hot Air Oven			THERMAX/HEATMAX/ ROSS THERMAL/ FORBES MARSHALL /APPROVED EQUIVALENT	Nos.	1.00
h	Electronic Balance M/C				Set.	1.00
i	Vacuum pump set			PROMINENT/ MILTON ROY/PENTAIR	Nos.	1.00
j	Desiccator			Borosilicate Glass	Nos.	1.00
k	Water distillation unit			Borosilicate Glass	Nos.	1.00
l	Hot plate				Nos.	1.00
m	Magnetic steer			E&H / EMERSON	Nos.	1.00
n	Air pump			IR/KAESSER/ GARDENER DENVER	Nos.	1.00
o	Vacuum pump			PROMINENT / MILTON ROY/PENTAIR	Nos.	1.00
p	COD Flask			Borosilicate Glass	Nos.	6.00
q	Burette with Burette stand	(Burette 50 ml)		Borosilicate Glass	Nos.	1.00
r	Burette with Burette stand	(Burette 25 ml)		Borosilicate Glass	Nos.	1.00
s	Separating funnel with stand	(250 ml)		Borosilicate Glass	Nos.	2.00
t	Glass funnel			Borosilicate Glass	Nos.	2.00
u	Petridis			Borosilicate Glass	Nos.	5.00
v	Pipets with bulb	(0.5 ml)		Borosilicate Glass	Nos.	1.00
		(1 ml)		Borosilicate Glass	Nos.	1.00
		(10 ml)		Borosilicate Glass	Nos.	2.00
w	Graduated cylinder	(50 ml)		Borosilicate Glass	Nos.	2.00
		(100 ml)		Borosilicate Glass	Nos.	2.00
x	Volumetric flask	(100 ml)		Borosilicate Glass	Nos.	3.00
		(200 ml)		Borosilicate Glass	Nos.	5.00
		(500 ml)		Borosilicate Glass	Nos.	5.00

		(1000 ml)		Borosilicate Glass	Nos.	2.00
y	Conical flask	(250 ml)		Borosilicate Glass	Nos.	2.00
		(500 ml)		Borosilicate Glass	Nos.	5.00
z	Beaker	(50 ml)		Borosilicate Glass	Nos.	4.00
		(100 ml)		Borosilicate Glass	Nos.	5.00
		(250 ml)		Borosilicate Glass	Nos.	5.00
		(500 ml)		Borosilicate Glass	Nos.	4.00
		(1000 ml)		Borosilicate Glass	Nos.	2.00
aa	Reagent bottles	(250 ml)		Borosilicate Glass	Nos.	10.00
		(500 ml)		Borosilicate Glass	Nos.	5.00
		(1000 ml)		Borosilicate Glass	Nos.	2.00
ab	Wash bottle			Borosilicate Glass	Nos.	2.00
ac	Distillation assembly (Round bottom flask with stand joint (250 ml), Heating mantle, Distillation unit, Distillation stand).			Borosilicate Glass	Nos.	1.00
ad	Safety Kits.		PPT	Karm/Dupon/Mark Setty	Nos.	1.00

16.1.18 Online Monitoring System – 1 Lot

The Online Continuous Effluent Monitoring System (OCEMS) shall be provided in compliance with CPCB/SPCB guidelines, comprising online analysers, sensors, data acquisition system, and communication interface for continuous monitoring of key effluent parameters viz. pH, COD, BOD, TSS, and flow to the ETP.

The system shall include **a robust IP-based CCTV camera with night vision and minimum 30 days recording backup**, installed to capture real-time visuals of the effluent discharge point, as mandated by CPCB.

The OCEMS shall be capable of secure real-time data transfer to CPCB/SPCB servers using recommended protocols (GPRS/4G with VPN/secure FTP) through an approved Data Acquisition and Handling System (DAHS).

All analysers shall be from approved makes, equipped with automatic calibration and self-cleaning arrangements, and designed for reliable continuous operation under effluent conditions.

The system shall further provide **local display, deviation alarms, and minimum one (1) month data storage with redundancy to avoid data loss**, and shall be integrated with the plant control system/PLC for monitoring and record-keeping.

The **system shall also support secure multi-user login with role-based access control, enabling authorized personnel (Owner, Consultant, Operator, and Regulatory Authorities) to access real-time and historical data simultaneously through web-based and/or centralized platforms**, with provision for user activity logging and data security.

All statutory approvals, calibration certificates, and compliance reporting shall be provided as per CPCB requirements.

General Notes: Applicable for all the Electro- Mechanical works:

1. Bidders to submit the Equipment data sheet and GA drawing with make and capacities of all the ETP equipment for approval.
2. Bidders have to submit the Make, Capacity of lab equipment and glass ware considered by them required for testing of various parameters foreffluent/ sludge/ as per functional requirement.
3. Equipment wise- total power consumption for complete ETP plant is to be submitted along with the bid.
4. Bidder to submit the List of OEM recommended spares for 12 months operations of major equipment's.
5. Essential Special tools and Tackles if any as per OEM recommendations are to be supplied by the contractor along with the respective equipment with no extra cost.
6. The Contractor to submit the Data sheet and applicable items QAP to the IDMC for their approval.
7. Contractor to submit all the process design, flow scheme, GA, Civil & structural (fabrication), electrical, P& ID drawings, layouts for approval from IDMC.
8. Bidders to verify the inlet raw effluent parameters, sizes and capacities of ETP units and equipment suggested in the tender scheme. The responsibility for the ETP Process design, flow scheme and attaining the desired treated effluent parameters lies with theETP Contractor. Bidder to indicate if any changes in the sizes /capacities are desired in their offer itself along with justification /process calculations. In case of NO TECHNICAL DEVIATIONS, it willbe construed that the bidder has agreed for the tender scheme andwill be responsible for the performance of the plant and attaining the desired treated effluent parameters.
9. Bidder to validate the ETP design at parameters **(COD – 5000 mg/l, BOD – 1800 mg/l, TSS – 1000 mg/l, O&G – 900 mg/l) and Flow – 800 cum/day capacity)**.
10. Self -priming centrifugal pumps should be used for Non -flooded suction, for transfer of effluent as per approved hydraulic flow diagram (wherever applicable).
11. Pumps should have foot valves/Y strainers and water pipeline line for priming as per OEM recommendation /functional requirement wherever applicable to be provided.
12. Y strainers to be provided in the effluent pipelines as per process, operational and functional requirement, as directed by Engineer-in-Charge.
13. PP/FRP/GI shrouds hoods to be provided for all outdoor pumps-Motors, instrumentation and push buttons/isolators.
14. Contractor to submit the breakup of LOT items to IDMC with proper documents, proof, etc. to validate the break-up of LOT items.
15. All instruments and safety devices shall be installed as per manufacturer's recommendations and relevant codes.
16. The contractor shall be responsible for providing all accessories, mounting arrangements, fittings, and consumables required for proper functioning.
17. Calibration certificates from NABL accredited laboratory/manufacturer shall be furnished at the time of supply.
18. All supplied items shall carry a minimum warranty of 12 months from commissioning or 18 months from supply, whichever is earlier.

19. The contractor shall demonstrate functionality of each item during commissioning to the Engineer-in-Charge's satisfaction.
20. Contractor to perform the Installation qualification (IQ), Operational qualification (OQ) and Performance qualification (PQ) at site. The format of IQ, OQ & PQ shall be prepared and submitted by Contractor for approval of Engineer in charge.
21. Contractor to prepare and fix the ETP schematic Process flow diagram (Minimum A-1 Size paper) in wooden frame with glass protection as approved by Engineer-In charge.

16.2 Details and Specifications for Interconnecting Piping & Valves.

The Interconnecting piping & valves work covered under this contract is the complete interconnecting piping, supporting structuresand pedestal for the effluent treatment plant between various units. The piping & valves shall be designed based on the design flow of the effluent / sludge / Air / Bio-gas / water / chemicals etc. as perrequirement and the total P & ID, schematic drawing is to be submitted for approval. The piping will be underground/ above ground as per thesite/ process design requirements as directed by engineer in charge and the same shall be executed as per the LOT item rates for Interconnecting Piping & valves quoted by the bidder in Section X.

16.2.1 Interconnecting Pipes & Fittings - 1 Lot

Providing, Excavation, laying in trenches, refilling, fixing & testing approved make HDPE/ Mild Steel ("C" class)/GI & Stainless Steel (Schedule 10)/CPVC pipes for various pressure rating with all specials including supply of all materials such as suitable clamps for fixing on wall, floor/underground etc. & including nuts, bolts, washers, pipe supporting structures, T & P, welding, jointing, clamping, etc. as required for proper completion of work including the supply costs of pipes & special bends, Tees, elbows, flanges (ASA # 150),pipe ends, Puddle flanges, painting as per norms etc., its fabrication, support structure in MS, complete. As per site requirements, IS specs/tender specs, as directed by the Engineer-in-charge, as per Tech. Specs., Section IV-B, process requirement and approved P&ID for all Interconnecting piping in the ETP (Effluent, Sludge, FOG, Filtrate, Chemical dosing, Air, Bio-gas, Service Water, treated water, etc.) for various units.

NOTE: BIDDER HAS TO CONSIDER ELECTRO-FUSION WELDING ONLY FOR ALL HDPE PIPE JOINTING AND ITS ACCESSORIES USING SUITABLE COUPLERS/FITTINGS.

16.2.2 Interconnecting Valves – 1 Lot

a. Supply of butterfly valves of approved make wafer type butterfly valve with grey iron body [CI - 210 fg 260] having black/ white EPDM liner fitted with gear unit (as per requirement), white nitrile lining to the body and fitted with stainless steel disc and stainless-steel shaft, etc. complete of all sizes as per the P& I and operational /process requirement for the complete ETP.
b. Supply of full-bore Ball valve Carbon steel body, suitable piece design, SS 304 ball, PTFE seat, FT at both the ends etc. complete
c. Supply of cast iron sluice valve ASA #150 Flanged ends dimension as per IS:14846-2000 with cap for long stem operated/wheel operated non-rising with SS410 spindle & GM Part of 1.0 inches etc. complete
d. Supply of CI non-return valves made of CI: IS 210 [FG 260] with

pressure rating of min. PN10 double flanged Wafer type check valve, SS Disc etc., complete. Non-return valves of suitable diameter as per process requirement.

As per site requirements, IS specs/tender specs, as directed by the Engineer-in-charge, as per Tech. Specs., Section IV-B, process requirement and approved P&ID for all Interconnecting piping in the ETP for various units.

The supply of pipes, valves, fittings and accessories for utilities and services includes feed water, safeties and drains.

Pipe sizing to be done considering the following flow rates.

(i) Effluent / water line at suction – 1 m/s

(ii) Effluent / water line at suction – 2 m/s

The supply of above service pipes should be inclusive of same quality bends, tees, flanges and with necessary gaskets, bolts, nuts, etc. complete.

A brief list of Interconnecting Piping, Valves & NRV's between the units is provided. The bidders have to consider all the required piping and accessories between various ETP units as per the approved process design & P&ID drawings and nothing extra will be paid for these items of works.

The any modification/repairing work/ rectification/ changes in ETP pipelines, valves/ headers as per process requirement at site will be in scope contractor and nothing extra will be paid for these items of works.

HDPE piping is to be of suggested make and of ISI mark (IS-14333:1996) of suitable grade PE 63/80/100 grade and pressure ratings (PN4 for gravity pipelines/PN6 for pumping pipelines).

MS –C Class, GI medium duty, CPVC (INDUSTRIAL GRADE SCH-80), SS 304- SCH-10, SS 316- SH-10 piping is to be of suggested make.

Effluent valves should be Wafer type butterfly valves with Heavy-duty cast-iron body, flow control lever, seating of EPDM / Nitrile rubber type, and disc of SS of approved makes as per process requirement.

Note:

- Pressure gauges with syphon to be provided for all pump discharge pipelines.
- Sampling port with valves to be provided for all pump discharge pipelines.
- The piping **distance from nearest tap point to ETP area** is **approx. 20 m** which may vary either side. The jointing and laying of service water pipeline from nearest tap to ETP units shall be in scope of bidder.
- The piping **distance from ETP treated water tank to existing gardening network is approx. 20 m**. The jointing and laying of pipeline from treated

water tank to gardening area shall be in scope of bidder.

- The **suitable size of HDPE flexible pipe (self-coupling type) of minimum 30 m** with all necessary fitting shall be in scope of bidder. This HDPE flexible pipe shall be used for general cleaning & gardening purpose inside ETP area.

Above mentioned pipe schedule are the minimum essential requirements desired for execution of project, however the bidders to design and consider any other additional requirements also asper approved process design, P&ID, functioning of all equipment's, requirements for which, no extra payment will be made.

General Notes for Interconnecting Piping & Valves works:

1. As per the actual level of the inlet line the hydraulic levels of all other ETP units will be finalized accordingly. The contractor needs to take all the ground levels of the complete ETP area to finalize the various hydraulic levels of different ETP units.

2. The piping work described in the above scope of work shall include all necessary pipe inserts required to be provided at various places and all the inserts shall be of suitable construction material with puddle flange in the center and properly grouted so as to prevent leakage.

3. The piping work shall also include all necessary excavation of pipe trenches for underground pipe with bedding of sand and shall also include all necessary pipe supports, plate inserts, etc. required as per the process design and site condition.

4. Pipe anchoring works, Brick masonry pillars, RCC pedestals, MS Pipe Bridge etc. As required to support the pipe due to site conditions etc. or as may be required for supporting the various pipes above the ground level within the treatment plant area and up to the disposal point, are included in the scope of work.

5. The suitable core cutting work & sleeves for interconnecting piping with ETP Civil tanks as per approved P&ID and process requirement shall be in scope of work.

6. All the necessary valves for the entire treatment plant piping as required shall be provided. The valves shall conform to the relevant BIS standards and shall be provided as per the design requirements and approved piping drawing.

7. The general specifications for the piping work shall be as given in the piping work specification in the tender.

8. All necessary pipe fittings, specials, flanges, etc. Shall be supplied as required and is included in the respective pipeline items.

9. All the P&ID/ Process Equipment, Manufacturers drawings are to be submitted for approvals along with piping design calculations and basis for

the design.

10. Contractor to submit the breakup of LOT items to IDMC with proper documents, proof, etc. to validate the break-up of LOT items.

11. Bidder have to consider Electro-Fusion welding only for all HDPE pipe jointing and its accessories using suitable couplers/fitting of approved makes. Electrofusion fittings (exposed wire/Embedded wire, confirming to EN1555-3/EN 12201-3) suitable HDPE piping as per process design requirements.

16.3 Details and Specifications of Electrical Works.

The electrical work covered under this contract is the complete system as per SOQ mentioned in the Section-X for the effluent treatment plant between various units. The bidders shall be designed the electrical system based on the process requirement.

The GA drawing, single line diagram, earthing system & cable routing with proper lugs & glands. All drawings to be submitted to IDMC for approval before execution of works. The contractor has to call for inspection of all major electrical items.

Automatic Operation, Controls and monitoring shall include.

- **Interlocking of level sensors with all pumps.**
- **Timer based intermittent operation of clarifier and CFS sludge recirculation pumps.**
- **On/off operation of solenoid valve.**
- **Automatic air blowers stop**
- **Indication of flow meter readings, tank levels, Temperature of anaerobic digesters**
- **Any other also as per process and operation requirements.**

Above mentioned controls and monitoring should be carried out through controlling panel.

This control panel compartment should include suitable relay circuits, timers,hooters, standalone PID modules, digital indicators for all parameters mentioned above, and indicating lamps for power and control supplies, emergency stop.

Contractor to submit the breakup of LOT items to IDMC with supporting documents, proof, invoices, etc. to justify the break-up of LOT items.

The contractor must obtain approval & Consent from relevant authorities like Electrical Inspectorate, all Statutory agencies etc. However, any statutory fees paid by the contractor shall be reimbursed against submission of documentary proof.

Feeder Details: ETP

S. No.	Name of Feeder	Qty	W	SB
1.	**Supply, Installation, Testing and Commissioning (SITC) of Cubicle Type Electrical MCC Panel (Non-Compartmental)** for **Effluent Treatment Plant (ETP) Automation** with **PLC, SCADA and HMI**, as per approved drawings and detailed technical specifications. The work shall include design, manufacture, supply, installation, testing and commissioning of the Motor Control Centre (MCC) panel complete with all required switchgear, busbars, wiring, cable termination, earthing arrangements, name plates, danger notices, indicating lamps, meters, relays, PLC interfacing, communication modules, and all accessories required for satisfactory operation. The scope shall also include providing **electrical grade rubber insulating mats** in front of the panel, complete in all respects, as per the directions of the Engineer-in-Charge and in accordance with the approved drawings, technical specifications and relevant IS/IEC standards, ensuring proper completion and satisfactory performance of the entire system.	1	1	
2.	Raw Effluent Transfer Pumps	2	1	1
3.	Alkali Dosing pump	2	1	1
4.	Acid Dosing pump	2	1	1
5.	Equalized Effluent Transfer Pumps	2	1	1
6.	CSTR (Anaerobic) Digester Tank (Mixing Recirculation Pumps)	2	1	1
7.	Flash Mixer, Flocculator & Cross Flow Separator	1	1	
8.	Chemicals (Coagulant & Flocculent) Dosing Pumps	4	2	2

S. No.	Name of Feeder	Qty	W	SB
9.	Sludge Re-circulation Pumps for Sec. Clarifier & Cross Flow Unit	2	1	1
10.	Air Blowers for Aeration tank	2	1	1
11.	Sludge Re-Circulation Pumps (SECONDARY CLARIFIER)	2	1	2
12.	Filter Feed Pumps cum treated water transfer Pumps	4	2	2
13.	Flare Stack.	1	1	
14.	Spare feeder 2 HP	1		
15.	Spare feeder 1 HP	1		
16.	Spare feeder 0.5 HP	1		
17.	63 Amp 4P MCCB (Lighting and welding machine)	2		
18.	DB for instruments Flow meter – 3 Nos. Level sensor- 3 Nos. Temperature Sensor- 1 No. pH Sensor – 1 No. DO Sensor – 1 No. OCEMS – 1 No. (sensors, transmitters and camera) SLDB – 1 No. Spare – 6 Nos.	16	10	6

Note-

Rating of MPCB, Contactors shall be provided as per type-2 co-ordinationchart of OEM of switchgears.

Automatic power factor improvement panel complete with heavy duty capacitor, APFC relay, instruments, outgoing feeders with suitable switch gear, capacitor duty contactors, detuned harmonic filter (7 % reactor) etc. shall be provided in the ETP MCC to improve the power factor from 0.8 up to 0.99.

Above mentioned Electrical feeder schedule are the minimum essential requirements desired for execution of project, however the bidders to design and consider any other additional requirements also as per approved process design, P&ID & SLD, requirements for which no extra payment will be made.

16.3.1 Supply & Laying of PVC Sheathed Armoured Cable – 1 Lot

Supply, Installation, Testing and Commissioning of 1100 V grade copper conductor XLPE insulated and PVC sheathed armoured cables of the following sizes –

a. 3C or 4C X 1.5 mm2 XLPE insulated, Cu. Conductor, Armoured Control Cable, Power cable & instruments cable.
b. 3C X 2.5 mm^2 XLPE insulated, copper Conductor, Armoured Power Cable for Motors up to & including 7.5 HP.
c. 3C X 4 mm^2 XLPE insulated, copper Conductor, Armoured Power Cable for Motors above 7.5 HP to 10 HP.
d. 3C X 6 mm^2 XLPE insulated, copper Conductor, Armoured Power Cable for Motors above 10 HP to 15 HP
e. 3C X 10 mm^2 XLPE insulated, copper Conductor, Armoured Power Cable for Motors above 15 HP to 20 HP
f. 3C X 16 mm^2 XLPE insulated, copper Conductor, Armoured Power Cable for Motors above 20 HP to 30 HP.

To be provided as per design/process requirement, approved drawings and technical specifications.

16.3.2 Copper Plate Type Earthing – 2 Nos.

Supply, Installation, Testing and Commissioning for connection of Eco Safe Maintenance Free Electrode of 17.2 mm diameter Low Carbon Steel with 250-micron Molecular Copper Bonded Earthing Rod of 3 m Length along with Carbon Based environment friendly back fill Ground Enhancing compound required to fill up the excavated earth with required quantity. It also includes necessary accessories like nuts and bolts, test link, insulators etc. This item includes 100 mm dia. drill in ground, average 8-meter depth in back filled earth and 4-meter depth in virgin earth. It also includes suitable casing for the drill at the backfilled area, Installation of earth electrode, connection of earth strip from electrode to test link, testing and connection complete as per code of practice IS:3043 complete. (Electrode type) including Supply, Excavation and construction for above FRP earth inspection pit with cover and all necessary accessories. (Size 300Lx 300Wx 300D)

16.3.3 Supply & Laying of Earthing Strip/ Wire – 1 Lot

Supply, Installation, Testing and Commissioning of the following hot dip galvanized GI Earth strips/wire for loop earthing of switchboard panels, interconnections between earth electrodes, and earth connections to each electrical equipment run on cable trays, across trenches, within ground along with cable in an approved manner. The work shall include necessary connections, welding, jointing, laying in ground at a depth not less than 600 mm from final ground level, including excavation and backfilling in the soil, or to be fixed on the cable tray or on wall or in cable trench etc. with proper GI clamps, saddles, GI spacers, hardware and jumping materials.

Double earthing to be done for all electrical equipment as per functional requirement.

a. 1 C X 2.5 Sq.mm. flexible CU cable/1C X 6 Sqm.mm flexible CU Cable for earthing of motors as per requirement.
b. But for 25 mm X 3 mm for earthing as per requirement.
c. but for 25 mm X 6 mm for earthing as per requirement
d. but for 50 mm X 6 mm for ETP MCC earthing

To be provided as per design/process requirement, approved drawings and technical specifications.

16.3.4 Push Button Station – 25 Nos.

Supply, installation, testing and commissioning of Wall / M.S. channel mounted, weatherproof type start/stop push button station, made of cast aluminum alloy LM6, as per design/process requirement, approved drawings and technical specifications. Stop button should be of lockable type.

List of suitable capacity Push Button Stations to be submitted for approval to IDMC before execution.

16.3.5 Isolator – 25 Nos.

Supply, installation, testing and commissioning of Wall / M.S. channel mounted, weatherproof type, outdoor type ON/OFF isolator of suitable ratings with rotary handle, with sheet steel enclosure, as per design/process requirement, approved drawings and technical specifications.

List of suitable capacity Isolators to be submitted for approval to IDMC before execution.

16.3.6 MCC Panel – 1 No.

Supply, Installation, Testing & Commissioning of cubical cum wardrobe type electrical panel (MCC) as per approved drawing & detail technical specification, including electrical grade insulating mats as per direction of engineer-in charge for proper completion/fulfilment of requirement of works as specified etc. complete with following feeders:

Incomer Feeder:
Minimum 4P, 100 A MCCB, 35 kA - 1 No, with o/l , s/c & earth fault protection
R, Y, B Indication Lamps, LED Type - 1 Set
ON/OFF/TRIP Indication Lamps LED type -1 Set
Multifunction Digital type Meter-Ampere, Voltage, Frequency, power factor, KWH, KVARH, KVAH with suitable CT 3 no. Separate Digital Ammeter & Volt meter also to be provided.

Outgoing Feeders:
Suitable feeders for all equipment, instrumentation etc. (upto to 10 HP DOL and for higher HP Star Delta as per tender specifications) for all ETP equipment
Additional feeders to be provided.

16.3.7 Human-Machine Interface and PLC – 1 No.

The control system shall comprise a Programmable Logic Controller (PLC) with modular architecture, high-speed CPU, and spare I/O capacity, integrated with all field devices for operation of pumps, clarifier, CFS sludge recirculation, solenoid valves, air blowers, and monitoring instruments. The PLC shall support standard industrial communication protocols (Ethernet/Modbus RTU/TCP) and be equipped with surge protection, isolation modules, and reliable power supply. A Human-Machine Interface (HMI) of minimum 7" color touchscreen shall be provided for real-time operation and monitoring, with process graphics showing **pump operation with interlocking to level sensors, pH dosing system, timer-based intermittent interlocks with operation of clarifier and CFS sludge recirculation pumps, on/off control of solenoid valves, timer-based operations of spreader nozzle of CSTR, and automatic blower stop based on DO/temperature limits. The HMI shall also display flow meter readings, tank levels, and anaerobic digester temperature, along with alarms, trends, and event logs and data of OCEMS**. The control panel shall house all PLC/HMI hardware, relay logic circuits, timers, standalone PID modules (where required), digital indicators for critical parameters, indicating lamps for power/control supply status, hooters, and an emergency stop switch. Both PLC and HMI shall be designed for reliable 24x7 industrial operation and suitable for effluent treatment plant environmental conditions.

16.3.8 Aluminium Conductor, PVC Insulated Armoured Cable – 1100 Volts, 3.5Cx95 sq mm – 60 Rmt

Supply and Installation of 1100 V grade Al. conductor XLPE insulated and PVC sheathed armoured cables of 3.5 C x 95 sq.mm from Dairy Plant MCC room to ETP MCC room of installed through built up trenches / embedded in floor / cable tray / clamped on wall / ceiling /column /on beam/on MS structural support with pedestals including civil works etc. cleated with GI cleats, GI saddles, binding wires, coach screws etc. for Incoming Supply to ETP MCC's including termination at both ends etc. complete with suitable lugs & glands as required. This to be provided as per design/process requirement, approved drawings and technical specifications.

General Notes for Electrical Works:

1. The electrical work covered under this contract is the complete system for

the effluent treatment plant between various units. The bidders shall be designed the electrical system based on the process requirement.

2. The GA drawing, single line diagram, earthing system & cable routing with proper lugs & glands. All drawings to be submitted to IDMC for approval before execution of works. The contractor has to call for inspection of all major electrical items.

3. Automatic Operation, Controls and monitoring shall include.

a. Interlocking of level sensors with pumps.
b. Timer based intermittent operation Secondary of Clarifier and CFS sludge.
c. Recirculation pumps.
d. On/Off operation of solenoid valve.
e. Automatic Air Blowers stop based on DO/ temperature limit.
f. Indication of flow meter readings, tank levels, Temperature of anaerobic digesters, DO in Aeration tank, OMS data (pH, TOC, TSS, COD, BOD, etc.)

Above mentioned controls and monitoring should be carried out through controlling panel.

This control panel compartment should include suitable relay circuits, timers, hooters, standalone PID modules, digital indicators for all parameters mentioned above, and indicating lamps for power and control supplies, emergency stop.

4. Contractor to submit the breakup of LOT items to IDMC with supporting documents, proof, invoices, etc. to justify the break-up of LOT items.

5. The contractor must obtain approval & Consent from relevant authorities like Electrical Inspectorate, all Statutory agencies etc. However, any statutory fees paid by the contractor shall be reimbursed against submission of documentary proof.

16.4 Testing, Performance runs, Commissioning, Training and Coordination for obtaining statutory Approvals.

Scope of Work - Testing, Trial Runs, Commissioning & Handing Over

Testing and Trial runs

The contractor shall submit the protocol and check list of each equipment before commencement of No-load trails. The contractor shall have to test each equipment used for the plant for at least 72 hrs. continuous running with raw effluent load and to the full satisfaction of the Engineer-in-Charge. After no load trails and testing of the individual equipment the raw effluent is to be taken into the ETP units and necessary seeding in the Biological systems needs to be done. The Plant units needs to be stabilized to obtain the desired treatment parameters as directed by the Engineer-in-Charge/ Consultant. Any defects found in design, workmanship or in any of the equipment shall be rectified by the contractor at his own cost within a reasonable time to be decided by the Engineer-in-charge, and beyond this period suitable penalty shall be levied and the plant shall be tested again for faultless running for One month to the entire satisfaction of Engineer-in-Charge.

Necessary instruments, gauges, supervisory personnel etc. shall be furnished/provided by the contractor free of cost for conducting the tests at site. The required spares for all equipment's are to be provided by the contractor till the successful completion of the performance run of the plant. The recording of tests result shall be as per preform to be approved by the Engineer-in-Charge and will form part of the completion documents.

16.4.1 Test-run of the plant

16.4.1.1 After stabilization and attaining the desired treated effluent parameters in ETP Plant and acceptance by Engineer-in-Charge, a One-month performance guarantee test run shall be provided by the Contractor during which daily monitoring of raw and treated effluent quality and effluent throughput shall be done and approved log sheets to be maintained duly signed by the representative of project authority. The bidder should make available all necessary Testing equipment including the lab chemicals, reagents and conduct the tests required to test the essential parameters like, pH, BOD, COD, MLSS, O&G, TSS, TDS, SVI, DO, Alkalinity, VFA, Sludge cake consistency, Biogas etc. at site in order to stabilize and maintain the desired biological treatment parameters in ETP. The monitoring of daily parameters will be as per the approved log sheet format.

Over and above the daily monitoring of effluent quality, the Contractor shall arrange at his own cost, analysis of the composite raw and treated effluent samples for 7 consecutive days for all the

effluent parameters specified in the consent note at an external laboratory approved/ recognized by the State Pollution Control Board / NABL / Engineering college. The results shall confirm to the performance guarantee for the plant which shall be a pre-requisite for the takeover of the plant. In case of non-compliance to the guaranteed treated effluent quality for given design input conditions, the Contractorshall take necessary measures to bring the plant to the desired performance.

16.4.2 Less effluent flow condition

16.4.2.1 In case during the guarantee test run, the effluent flow or organic load shall be found to be less than the rate input, the contractor shall undertake that as and when rated throughput and organic load conditions are available, the contractor shall extend necessary assistance to achieve the guaranteed output quality, through re-deputation of his personnel at a later date at mutually agreed terms.

16.4.3 Training

16.4.3.1 The Contractor shall train the Dairy plant personnel in the Operation & Maintenance practice for the Effluent Treatment Plant units during the One month guarantee test run.

16.4.4 Operation Manual

16.4.4.1 The scope of services shall include the Preparation and Submission of Operation & Maintenance Manual (One soft copy and 3 sets of hard copies) prior to plant commissioning. The Manual shall cover the following aspects:

Brief process description & flow sheet. Unit wise function and description, equipment details with sizes and as build drawings, operational instructions, maintenance procedures. Plant start- up, commissioning, normal operations, effluent parameters testing procedures, emergency operation steps etc required for smooth operation & maintenance of ETP units.

16.4.5 Obtaining approval & Consent from relevant authorities like State Pollution Control Board, Electrical Inspectorate, all statutory agencies etc. However, any statutory fees paid by e contractor shall be reimbursed against submission of documentary proof.

16.4.6 Spares – 1 Lot

Bidder shall consider minimum spares before start of O&M and spares requirement as per respective OEM's. The indicative list is as under:

Sr. No.	Equipment Name	Installed Qty	Parts Description	Qty (nos.)
1	Equalisation Effluent Transfer Pump	2	Gasket Set	3
			Key	3
			Coupling	3
			Bearing	3
			Gland Plate with Packing (in set)	1
2	Acid & Alkali Dosing Pumps	4	Ball Ceramic	4
			Ring Seal Teflon	4
			TI Anti-syphon fitting	4
			Knob Assembly	4
3	Equalized Recirculation Pump	2	Gasket Set	3
			Key	3
			Coupling	3
			Bearing	3
			Gland Plate with Packing (in set)	1
4	CSTR Recirculation Pump	2	Gasket Set	3
			Key	3
			Coupling	3
			Bearing	3
			Gland Plate with Packing (in set)	1
5	Flare Stack	1	Thermo-cable Cable (10 mt)	1
6	CFS	1	Roller Conveyor Chain	1
			Plumber block	1
7	Coagulant Dosing Pumps	2	Ball Ceramic	2
			Ring Seal Teflon	2
			TI Anti-syphon fitting	2
			Knob Assembly	2
8	Flocculant Dosing Pumps	2	Ball Ceramic	2
			Ring Seal Teflon	2
			TI Anti-syphon fitting	2
			Knob Assembly	2
9	Air Blower – Aeration Tank	1	V belt (set)	2
			Gasket set	2

Sr. No.	Equipment Name	Installed Qty	Parts Description	Qty (nos.)
			Air Filter	2
10	VFD for Air Blowers - Aeration	2	Fan	3
11	Tube Settler	1	OEM recommended spares (in lot)	1
12	CFS & Secondary Clarifier Sludge Recirculation Pump	4	Gasket Set	4
			Key	4
			Coupling	2
			Bearing	2
			Gland Plate with Packing (in set)	1
13	Filter Feed Pump cum Treated Water Transfer Pump	4	Ball Ceramic	3
			Ring Seal Teflon	3
			TI Anti syphon fitting	3
			Knob Assembly	3
14	ON/OFF lamps	1	Lamps	5
15	Fuses	1	Fuses (lot)	1
16	Agitators Motors	1	Bearing (set)	7
			Seals	7

Spares to be arranged by the Contractor for all equipment's till commencement of O&M. The above list is only indicative and the contractor to arrange at no extra cost for all required spares for smooth operations of ETP plant.

Further, the contractor will submit a list of spares validated by OEM for all equipment's for arrangement by the client. The contractor will submit, within one month after placement of order, the spares list to IDMC for furnishing to client of procurement before initiating O&M.

16.4.7 Commissioning and handing over

During performance test runs as described above, the contractor shall satisfy the Engineer-in-Charge in all respects regarding the satisfactory quality of effluent, quality of materials, equipment and workmanship used in the plant. Only after satisfying himself, regarding the above points, the Engineer-in-charge/ Client will take over the plant and such date of taking over shall be deemed as date of commissioning. The guarantee period described above will start from this date.

16.5 Operation and Maintenance (O&M) of ETP – 12 Job

1 Job = 1 month of O&M work

Scope of Work

The bidder should consider the following aspects for minimum manpower deployment for O & M of the complete ETP for a period of**12 Months** after successfully completion of the performance test run and handing over of the ETP Plant.

- Chemist cum trained technician for testing of ETP parameters and day to day operation & mitigation- 1 No/day in general shift. **(Contractors scope till completion of O&M period)**
- Manpower deployment: Experienced ETP operators – 3 No's/day (1 No. in each shift) (**Dairy scope)**
- Unskilled & Casual labour for ETP Housekeeping. (**Dairy scope**)
- Electrician/Fitter available at Dairy plant. (**Dairy scope**)
- Water, Electricity, utilities required **(Dairy scope)**
- Laboratory Equipment, Spares, Lubricants, Chemicals, Nutrients, culture required for the plant **(Dairy scope after commencement of O&M)**

16.5.1 Operation of the plant to obtain desired treated effluent qualities.

16.5.1.1 Attending all routine as well as preventive maintenance work in the plant. Record of Attendance to be maintained and signed by Client. The record of attendance sheet is mandatory to be submitted with O&M bill duly sealed and singed by Client Representative. The dairy plants are operational 24 x 7 irrespective of holidays.

16.5.1.2 Keeping records for flow and other parameters like pumps, blower, operation period etc. on daily basis in the prescribed format approved by IDMC/ Project Authority (Dairy).

16.5.1.3 Analysis of influent, treated effluent and unit operations for required effluent parameters on daily basis in a log sheet to IDMC / Project Authority (Dairy).

16.5.1.4 Submission of analysis reports to the concerned in charge in the prescribed format to IDMC / Project Authority (Dairy).

16.5.1.5 Suggesting changes in the treatment scheme, ETP process operation, modifications if any for betterment of ETP operation and performance.

16.5.1.6 Day to day activities for the operations and maintenance is to be coordinated with Client representative and attendance sheet and O & M bill duly signed by client is to be submitted to IDMC.

Note: The Contractor shall ensure uninterrupted 24x7 operation of the Effluent Treatment Plant (ETP) by deploying the requisite qualified personnel, including Operators and Chemists, as specified

in scope of works of O&M. In the event of any personnel availing leave, the Contractor shall make adequate arrangements for relievers of equivalent qualification and competence to maintain continuous operations. A weekly off shall be permitted on National holidays and Sundays only; however, it shall be the sole responsibility of the Contractor to manage manpower rotation without affecting plant operations. The Contractor shall, at its own cost, deploy any additional manpower as may be necessary to meet operational exigencies, and no additional payment shall be claimed on this account. Failure to deploy the required manpower on any working day shall attract proportionate deductions from the Operation and Maintenance (O&M) bills, as determined by the Project Authority, whose decision in this regard shall be final and binding.

1.0 BATTERY LIMITS FOR THE EFFLUENT TREATMENT PLANT WORK

The scope of work described in the Schedule of Requirements shall be governed by the following battery limit (other than all the works as specified in SOQ):

- Raw effluent: the pipeline (HDPE) from last manhole chamber to bar screen chamber at ETP as per process, functional and operational requirements are included in the scope of Interconnecting Piping & Valves as per approved drawings and site conditions. (The approximate piping distance from last manhole chamber to bar screen chamber is up to **5 M** which may vary either side) Bidder to visit site for accessing the length of the aforementioned pipelines. Nothing extra shall be paid. **Nothing extra shall be paid.**

- Pipeline (HDPE) for disposal of ETP treated water from Treated Effluent Tank/ V Notch **till 20 M** is included in the scope of Interconnecting Piping & Valves works. Further, disposal shall be arranged by Project Authority. **Nothing extra shall be paid.**

- Service water pipeline to be tapped from near raw water point **till 20 M** as per process, functional and operational requirements are included in the scope of Interconnecting Piping & Valves works. The service water pipe will be provided at one point only, further distribution is included in scope of Interconnecting Piping and Valve work. **Nothing extra shall be paid.**

- Bidders shall tap power from Dairy LT PCC and shall lay power cables to ETP MCC panel as per respective item specification. Power & Control cabling from MCC panel to the ETP units/ electrical equipment, sub control panel etc. including interconnection interlock control cable between the MCC and the equipment, Earthing etc. are in the scope of ETP Contractor. Earthing of MCC, control panels and other electrical and electronic equipment under this contract lies under the scope of

ETP Contractor. **Nothing extra shall be paid.**

- For steam pipeline to be tapped from existing point at Boiler House **(The approximate piping distance from Boiler House till CSTR and Raw Effluent cum Eq. cum Hydrolysis Tank is approximately 35 m which may vary either side)** required to be executed for successful erection, commissioning in the scope of ETP Contractor. **Nothing extra shall be paid.**

- Bio-gas pipeline till flare stack (should be at least 20 M away from CSTR) is in scope of bidder as per process, functional and operational requirements are included in the scope of Interconnecting Piping & Valves as per approved drawings and site conditions. Bidder to visit site for accessing the length of the aforementioned pipelines. A by-pass tapping point with suitable valve and pipeline is include in the scope of works.

- Further distribution of pipeline for biogas utilization will be arranged by project authority **(Dairy scope)**.

- Disposal of sludge from sludge drying bed as per statutory norms is to be arranged and done by project authority **(Dairy scope)**.

2.0 PLANT GUARANTEES

The under mentioned clauses shall be read in conjunction with Warranty/Guarantee provisions given elsewhere in this document.

18.1 Manufacturer's Guarantees

The manufacturer's guarantee for design, workmanship and performance for all bought out items shall be made available to the purchaser/owner and shall be valid at least for the entire defect's liability period.

In the event of failure of any particular equipment which fails more than three times during the guarantee period as mentioned in clause below, the contractor shall replace at his own cost that equipment. Manufacturer's/Contractor's guarantee, as mentioned in clause above,for such replaced equipment shall also be made available to the purchaser/owner and should be kept at least for one year from the date of last replacement.

18.2 Performance Guarantee

The contractor shall give guarantee for a period of one year from the date of successful commissioning for the treatment plant against design, defective materials, workmanship, performance and guaranteed effluent quality. In the event the commissioning of the plant is not possible due to non-availability of effluent, contractor shall be issued mechanical completion certificate by Engineer-in-Charge provided each equipment is tested satisfactorily with water trails as directed by Engineer-in-Charge. However, the contractor shall have to maintain the plant at his own cost, in such a case for a period of three months beyond which period, if he is required to maintain further, he will be paid extra at mutually agreeable rate.

However, testing and commissioning of the plant shall be carried out by the Contractor during the Defects Liability period. Any defects found in the workmanship materials or performance of the plant shall be madegood by the contractor at his own expense within the time specified byEngineer-in-Charge.

For this purpose, the performance guarantee furnished by successful bidder, as per general conditions of contract shall be retained till the completion of the guarantee period as stated above. The contractor, at his own expense shall start and commission the plant and prove that it is giving satisfactory service and desired characteristics of the treated effluent, for one month before handing over the plant to the IDMC/Owner. During this start up and commissioning period the contractor shall train the IDMC/Owner's operational staff without any extra cost to the IDMC/Owner. The contractor shall also have to guarantee the quality of the treated final effluent to meet the specification in Table-2 of Section IV C. For given

design quantity and quality of untreated effluent, if the Contractor fails to achieve the treated effluent criteria, the Contractor shall rectify the plant at no extra cost, so as to achieve the requisite performance guarantee and satisfy commissioning of the plant to the Engineer-in- Charge. All the above guarantees will be based on collection and analysis of samples as mentioned in clause below.

18.3 Collection and analysis of samples

The guaranteed effluent shall be based on complete analysis of composite samples of raw and treated effluent collected after stabilization of the plant for a period of Seven days.

(TO BE FILLED BY THE BIDDERS and Submitted along with BID)

3.0 DATA SHEET FOR MAJOR ETP EQUIPMENT

Sr. No.	Equipment's	Make of Equipment's Selected	Model No.	Capacity	HP	MOC	Manufactures Specification & Guarantees
1.	Bar Screen						
2.	Raw Effluent Transfer Pumps						
3.	Auto pH Correction System: a. pH Sensor & Analyzer: for Equalization Tank b. Acid & Alkali Chemical Solution Tanks						
4.	Chemicals (Alkali & Acid) Dosing Pumps						
5.	Mixing for Hydrolyzing Tanks						
6.	Equalized Effluent Transfer Pumps (Digester Feed Pumps)						
7.	Anaerobic Digester: a. Continuous Stirred Tank Reactor (CSTR)						
8.	CSTR Mixing System						
9.	Sludge Thickening System (part of skid): a. Flash Mixer, Flocculator & Cross Flow Separator b. Coagulants and Flocculants chemical solution tanks c. Chemicals (Coagulant & Flocculent) Dosing Pumps						
10.	Sludge Re-circulation Pumps for Sec. Clarifier & Cross Flow						

Sr. No.	Equipment's	Make of Equipment's Selected	Model No.	Capacity	HP	MOC	Manufactures Specification & Guarantees
	Unit						
11.	Air Blower						
12.	Diffusers for Aeration System						
13.	Secondary Clarifier Mechanism (Central Driven Mechanism) unit						
14.	Sludge Re-circulation Pump (Secondary Clarifier & CFS)						
15.	Filter Feed Pump and Treated Water Pumps.						
16.	Pressure Sand Filter						
17.	Activated Carbon Filter						
18.	Flare Stack.						
19.	Any other item required for proper completion of ETP works in all respect at Itola. (Please attach the detailed item break up with their UOM, unit price and amount.						
20.	PIPING & VALVES						
21.	ELECTRICAL & MCC PANEL						
22.	Electromagnetic flow meter						
23.	Level sensor with transmitter						
24.	Low Pressure Steam Piping						
25.	Lab for day-to-day testing of raw and treated effluent including making lab operational and training the client						

Sr. No.	Equipment's	Make of Equipment's Selected	Model No.	Capacity	HP	MOC	Manufactures Specification & Guarantees
	manpower.						

SECTION- V

FORM OF BID

SECTION V

FORM OF BID

The Appendices (I to IV) of Form of Bid is a part of the bid. Bidders are required to fill up all the blank spaces in this Form of Bid and Appendices.

Bid Reference No. : **IDMC/ Sourcing & VD/ 2026-27/ Enquiry/ 381 Dated 17.10.2026**

Name and address of
Project Authority / Employer : IDMC Limited.

Design, Engineering, Supply, Installation, Testing and Commissioning (DESITC) of an 800 KLD Effluent Treatment Plant (ETP) at Jagraon, Punjab. The proposed scheme is based on the optimal utilization and integration of the existing 350 KLD ETP unit with new treatment facilities to achieve a total treatment capacity of 800 KLD.

Dear Sirs,

1.0 Having examined the Drawings, Terms & Conditions of Contract, Technical Specifications and Schedule of Quantities for the execution of above mentioned works, we, the undersigned offer to execute, complete and maintain the whole of the said works in conformity with the said Drawings, Terms & Conditions of Contract, Technical Specifications and Schedule of quantities in accordance with the said conditions.

2.0 We undertake, if our bid is accepted, to commence the Works **within_____days** of receipt of the Letter of Acceptance, and to complete and deliver the whole of the above said works comprised in the Contract **within_____(_____) months** calculated from the lastday of the aforesaid period in which the Works are to be commenced.

3.0 If our bid is accepted, we will furnish performance security in the formof a bank guarantee (to be approved by you) / Demand draft, to be jointlyand severally bound with us in **amount of 5%** of the above-named sum in accordance with the Conditions of Contract.

4.0 We agree to abide by this bid for the period of **120 days** from the date of bid opening as prescribed in **clause 13** of the Instruction to Bidders, and it shall remain binding upon us and may be accepted at any time before the expiry of that period.

5.0 Unless and until an Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding Contract between us.

6.0 We understand that you are not bound to accept the lowest or any Bid you may receive.

Date_____ **Signature of bidder with seal**

Place _____

Witnesses:

1. Signature:

   Name:

   Address:

2. Signature:

   Name:

   Address:

APPENDIX – I (FORM OF BID)

Important Conditions of Contract

Sl. No.	Description	Vol-I SEC-II Clause No.	Remarks
1.	Amount of Performance Security	10	**5 (Five)** percent of Total contract value
2.	Minimum amount of Third Party Insurance	23	**Such insurance shall be for 10% of the value of works with number of Occurrence unlimited.**
3.	Minimum amount of insurance of work	21	**110 (Hundred & ten)** percent of contract value
4.	Period for Commencement, from the Date of Letter of Acceptance	41	**15 (Fifteen)** Days.
5.	Time for Completion	43	**08 (Eight)Months.**
6.	Rate of Liquidated Damages	47	**0.5 (Zero point five)** percent per week of total contract value
7.	Maximum Limit of Liquidated Damages	47	**10 (Ten)** percent of total contract value
8.	Rate of Bonus	48	**NOT APPLICABLE**
9.	Period of Maintenance (Defects Liability Period)	50	**12 (Twelve)** Months
10.	Percentage Recovery of Retention	60.3	**5 (Five)** percent

Sl. No.	Description	Vol-I SEC-II Clause No.	Remarks
11	Maximum limit of Retention money	60.3	**5 (Five)** percent
12.	Maximum amount of Secured Advance	60.2	Not Applicable
13.	Maximum amount of Mobilization Advance	60.5	Not Applicable
14.	Time within which the payment would be made after submission of measurement / bill	60	As per clause 60
15.	Price Variation	71	**Refer Clause 11.5 of Section I of this bidding document**
16.	Contractor's Profit & Overhead Cost for settling extra items	53.1	**15 (fifteen)** percent

Date :_____ **Signature of Bidder with Seal**

Place: _____

APPENDIX – II (FORM OF BID)

BIDDING TERMS DEVIATION STATEMENT FORM

1.) The following are the particulars of deviations from the requirements of the bidding conditions/ terms:

CLAUSE	DEVIATION	REMARKS (INCLUDING JUSTIFICATION)

The terms and conditions prescribed in the bidding document shall prevail over those of any other document forming a part of our bid, except only to the extent of deviations furnished in this statement.

Dated:_____ **Signature and Seal of Bidder**

Place: _____

Note :-
Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "NO DEVIATIONS".

APPENDIX – III (FORM OF BID)

TECHNICAL DEVIATION STATEMENT FORM

1.) The following are the particulars of deviations from the requirements of the tender technical specifications:

CLAUSE	DEVIATION	REMARKS (INCLUDING JUSTIFICATION)

The technical specification furnished in the bidding document shall prevail over those of any other document forming a part of our bid, except only to the extent of deviations furnished in this statement.

Dated :_____ **Signature and Seal of Bidder**

Place:_____

Note :-
Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "NO DEVIATIONS".

APPENDIX - IV (FORM OF BID)

LIST OF SUGGESTED MAKES
(for Civil, Structural, Water Supply, Sanitary and other miscellaneous works)

The following is the suggested list of products and name of the manufacturer against each product. The contractor shall quote rates for the various items of works such that their rates should be valid for all makes suggested hereunder. It will be prerogative of IDMC LTD to approve any make out of this list or any other equivalent make. The makes specified in schedule of quantities shall have preference over the makes suggested hereunder. Wherever make is not suggested, the material should be as per relevant BIS specification.

SR. NO.	ITEM DESCRIPTION	SUGGESTED MAKES/MANUFACTURES
1.	TERMITE TREATMENT OF BUILDINGS	PEST CONTROL INDIA OR GODREJ PEST CONTROL
2.	OPC (ORDINARY PORTLAND CEMENT)	ULTRATECH / ACC/ / JK- LAXMI/ / GUJARAT AMBUJA /
3.	WHITE CEMENT	BIRLA WHITE / JK WHITE
4.	WALL PUTTY	BIRLA PUTTY & PRIMER / JK PUTTY & PRIMER
5.	CEMENTATION GROUT	FOSROC/ SIKA/ / BASF/ PIDILITE/
6.	ANTI CORROSIVE PRIMER	ASIAN, BURGER
7.	WATER PROOFING COMPOUND	FOSROC/SIKA /PIDILITE/ ARALDITE /BASF
8.	EPOXY AND RESIN FLOORING CHEMICAL/ HARDNER/ CONCRETE ADMIXTURES/ ACID AND ALKALI RESISTANT POWDER	FOSROC/SIKA/PIDILITE/ ARALDITE/ BASF
9.	CONCRETE ADMIXTURES	SIKA / FOSROC / BASF/
10.	REINFORCEMENT STEEL-IS1786-FE415 OR FE500 OR 550 (ALL DIAMETERS)	SAIL / TATA STEEL / VIZAG (RINL) /JSPL (PANTHER)/ JSW NEOSTEEL
11.	STRUCTURAL STEEL & ALL MS ELEMENTS & PLATES	SAIL / TISCO / VIZAG (RINL)/JSPL/ JSW
12.	LAMINATES, ALL PLY MATERIALS, FLUSH SHUTTERS	FORMICA / MERINO / GREEN LAM / CENTURY/ KITPLY/GREENPLY

SR. NO.	ITEM DESCRIPTION	SUGGESTED MAKES/MANUFACTURES
13.	FLOAT/ PLAIN GLASS	MODIGURARD/SAINT GOBAIN
14.	SS FITTINGS	HETTICH/ HAFELE/ EBCO/KICH
15.	ALUMINIUM SECTIONS	HINDALCO/JINDAL/BANCO
16.	FRICTION STAY	HETTICH/HAFELE/EBCO
17.	HYDRAULIC DOOR CLOSURE/ FLOOR DOOR SPRINGS	GOLDEN/GODREJ/HARDWYN/EVERITE /HYPER/STERLING/OZONE/DORSET/ ENOX/ DORMA
18.	DOOR LOCKS	HETTICH/HAFELE/EBCO /GODREJ /DORMA
19.	ALUMINIUM COMPOSITE PANEL	ALUCOBOND/ALSTONE INDIA/EUROBOND
20.	CERAMIC / VITRIFIED / GLAZED TILE	KAJARIA/SOMANI/H&R JHONSON
21.	INDUSTRIAL TILE /COVING	H&R JOHNSON/BELLGRANITO/PELICAN/ASIAN GRANITO
22.	25MM X 25MM OR 37MMX37MM CERAMIC OR GLASS TILE	ACCURA /SHONE/MRADUL
23.	AC SHEET	EVEREST / CHARMINAR
24.	GYPBOARD	GYPSUM INDIA/ RAMCO
25.	METAL TILES	INTERARCH/SUPERTECH/ARMSTRONG/UNISTEEL
26.	PAINTS (PREMIUM QUALITY)	ASIAN / BERGER /NEROLAC
27.	ANTI FUNGAL ACRYLIC EMULSION PAINT	APEX PROTEX OF ASIAN PAINTS, WEATHERCOAT ALLGUARD OF BERGER PAINTS
28.	PLASTIC EMULSION / ACRYLIC EMULSION PAINT / SYNTHETIC ENAMEL	ASIAN PAINTS / NEROLAC / BERGER
29.	CEMENT PAINT	SUPER SNOCEM / NITCOCEM / DECOCEM
30.	PU PAINTS (INTERNAL WALLS , EXTERNAL WALLS) , TERRACE SLAB PU COATINGS , INJECTION GROUTING CHEMICALS , FOAM ETC.	SIKA/FOSROC/BASF/ASIAN/BERGER/PIDILITE
31.	INJECTION GROUTING CHEMICALS (PU FOAM/ PU RESIN/ CEMENTITIOUS/EPOXY/ETC.)	FOSROC/ SIKA/
32.	MS PIPE	TATA/JINDAL
33.	MS HOLLOW SECTION	TATA / JINDAL

SR. NO.	ITEM DESCRIPTION	SUGGESTED MAKES/MANUFACTURES
34.	STAINLESS STEEL TUBULAR SECTION	JINDAL/ RATNAMANI/RAAJRATNA
34.	UPVC PIPE / CPVC PIPE/ PVC/ ALL SPECIALS AND FITTINGS	FINOLEX/ SUPREME / ASTRAL
36.	POLYSULPHIDE SILICON SEALANT	FOSROC/SIKA/PIDILITE
37.	BITUMEN	IOC / HP
38.	PREMOULDED BITUEMEN FREE FILLER BOARD	SUPREME
39.	ALL SANITARY AND PLUMBING FIXTURES, FITTINGS, ACCESSORIES ETC ALL	JAQUAR /KOHLER/DURAVIT/GROHE
40.	GI FITTINGS	TATA / JINDAL (HISSAR)
41.	GI PIPES	TATA / JINDAL (HISSAR)
42.	GI SHEET	SAIL / TATA / ISPAT (NIPPON)
43.	SS SINK	NIRALI / KOHLER/ZESTA/HINDWARE/RUHE
44.	BRASS/GUN METAL VALVES	AUDCO / BDK / ZOLOTO
45.	CP FLUSH VALVES	ORIENT / JAQUAR / KOHLER/DURAVIT/GROHE
46.	BALL COCK	PRAYAG / LEADER
47.	SW PIPES	PERFECT / BURN / MCI / MYSORE SW PIPES OR EQUIVALENT AS APPROVED
48.	CAST IRON FLOOR TILES / DRAINS	EAST PUNJAB (HISSAR) / METAL CAST (GWALIOR) / KWALITY (RAIPUR)

SR. NO.	ITEM DESCRIPTION	SUGGESTED MAKES/MANUFACTURES
49.	HUME PIPES	INDIAN HUME PIPE CO. / ISI MARKED
50.	LOOKING MIRROR	MODIGUARD / SAINT GOBIN
51.	NIGHT LATCH / MORTISE LOCK/ TUBULAR LOCK	GODREJ / DORMA/ OZON / KICH
52.	POLYCARBONATE SHEET	LEXAN / DANPAL/JINDAL
53.	PRECAST MOSAIC FLOOR TILES	NITCO / ORIENT/H&R JOHNSON
54.	PU COATING	MRF/ ASIAN/ AKZONOBEL/BERGER
55.	PVC SHEETS	FINOLEX
56.	PVC VINYL FLOORING	ARMSTRONG/ TARKET
57.	PVC WATER STOPS	MARUTI /BASF / SIKA / PIDILITE
58.	PVC WATER TANK	SINTEX/ SUPREME
59.	VITREOUS CHINA, SANITARYWARE	JAQUAR/ CERA/KOHLER/DURAVIT/GROHE/
60.	HDPE PIPE (IS 14333)	RIL/ DUTRON/SUPREME
61.	ANTI COCKROACHES SS PERFORATED TRAP	RUHE/NIRALI
62.	FALSE CEILING	HUNTER DOUGLAS/ GYPROC/ARMSTRONG
63.	GALVANISED STEEL PRECOATED PROFILE SHEETS	TATA BLUE SCOPE /JSW/INTERARCH
64.	SS DOOR	METAFLEX/SHAKTI HORMANN/TATA PRAVESH
65.	PVC FOAM PLASTIC SHEET	FLEXIBOND/RAJASHRI PLASTIWOOD
66.	AUTOMATIC SLIDING GATE	GANDHI AUTOMATION/ VISHWAS AUTOMATION
67.	FRP/GRP GRATINGS	THERMODRAIN/ FIBROCAST/ HP-STRONG
68.	SLIDING GATE OPENER MOTOR CONTROL UNIT PCB	GANDHIAUTOMATION/SHAKTI HORMANN/ VISHWAS AUTOMATION
69.	ANCHOR FASTENER	HILTI/FISHER/BOSCH
70.	HDPE ELECTRO FUSION PIPE FITTINGS	DURAFUSE/BENTLAY/SUPREME
71.	AUTOMATIC BOOM BARRIER	GANDHI AUTOMATION/NEPTUNE AUTOMATIVE

NOTE:

1 For the items not indicated above, specific approval to be taken before procurement and use by submitting sample, detail of manufacturer, source of supply etc.

2 Samples of required items (intended to be used) should be brought at site and got approved before procurement.

WE HAVE NOTED THE ABOVE AND CONFIRM THAT OUR TENDER IS BASED ON ABOVE SUGGESTED MAKES.

Date:_____ **Signature and Seal of Bidder**

SECTION- VI

SCHEDULE OF MATERIAL TO BE ISSUED

SECTION VI

SCHEDULE OF MATERIAL TO BE ISSUED BY SERVICE RECIPIENT /IDMC

No material shall be issued by Service Recipient/IDMC unless otherwise specified in the bidding document. All the materials/goods & services are to be arranged by the bidder/contractor for proper completion of the works as per specification, terms & conditions of the bidding document/contract.

SECTION- VII

SCHEDULE OF SUPPLEMENTARY INFORMATION

SECTION - VII, SCHEDULE OF SUPPLEMENTARY INFORMATION

The bidder shall provide the Supplementary Information as Annexed in the form of schedules mentioned hereunder. All these supplementary information shall be considered for the bid evaluation and same in the contract execution. If the requisite information is not supplied by the bidder then the bid may be considered non-responsive and shall be rejected.

a)	Schedule	I	Major items of construction plant to be deployed by the bidder.
b)	Schedule	II	Key Personnel.
c)	Schedule	III	Nominated Sub-Contractors.
d)	Schedule	IV	Major works successfully completed during the last five years.
e)	Schedule	V	Statement of Bonus earned/ Liquidity damages paid in the last five years.
f)	Schedule	VI	Statement of Arbitration & Disputes in the last five years.
g)	Schedule	VII	Financial Business Capability.
h)	Schedule	VIII	Works in hand

SECTION – VII, SCHEDULE – I

Major items of Constructional plant to be deployed by the bidder.

Sl. No.	Description	Specification/Capacity	Machinery Proposed To Be Deployed At Site By Contractor	
			Owned	To Be Hired
1.	**Survey Equipment**			
	Total Station With Accessories			
	Auto Level With Staff			
2.	**Earth Moving Equipment**			
	Backhoe Loader (JCB)	Shovel Capacity :		
	Breaker For Above			
	Poclain With Hydraulic Chisel /Breaker	Bucket Capacity :		
	Front End Loader	Bucket Capacity :		
	Reversible Plate/vibro Roller Earth Compactor			
	Plate Earth Compactor			
	Tamping Rammer			
	Water Sprinkling System			
3.	**Lifting Equipment**			
	Tower Crane			
	Hoist			
	Mobile Crane/Hydra	Capacity :		
4.	**Concreting Equipment**			

Sl. No.	Description	Specification/Capacity	Machinery Proposed To Be Deployed At Site By Contractor	
			Owned	To Be Hired
	PLC Controlled Batching Plant With Printing Facility Of Batching Slip & Cement Silos	Machine Capacity = 15cum/Hr		
		Machine Capacity = 25cum/Hr		
		Machine Capacity = 30cum/Hr		
	Concrete Pump	Suitable For Pumping Concrete Upto 50mtr Vertical Height & 100mtr Horizontal Length		
	Boom Placer	Upto Horizontal Reach 40m		
	Transit Mixers	Capacity=6 CUM		
	Concrete Mixer With Hopper	Batching Capacity = 1 Bag Cement ; Machine Capacity =		
	Vibrator Machine Electric Operated			
	Vibrator Machine Diesel Operated			
	Vibrator Needles	60mm Dia.		
		40mm Dia.		
		25mm Dia.		
	VDF Kit			
	Screed Vibrator			
	Power Trowel			
	VDF Mat			
5.	**Building Work Equipment**			
	Mortar Mixtures (For Mortar Making)	Capacity : Min. 1 Bag		
	Bar Bending Machine	Upto 32mm Dia		
	Bar Cutting Machine	Upto 32mm Dia		
	Chase Cutting Machine			

Sl. No.	Description	Specification/Capacity	Machinery Proposed To Be Deployed At Site By Contractor	
			Owned	To Be Hired
	Rotary Sans Screening Machine			
	Marine Densified Plywood Shuttering (New)	Min. – 600 sqm.		
	Steel Shuttering Plates	Min. – 600 sqm		
	Scaffolding	Min. – 1200 sqm		
	Grinding Machine			
	Hammer Drilling Machine			
	Welding Machine			
	Air Compressor			
	Concrete Breakers			
	De Watering Pumps			
6.	**Road Work Equipment**			
	Tandem Vibratory			
	Smooth Wheeled Roller 8-10 MT			
	Hot Mix Plant			
7.	**Transportation Equipment**			
	Hydraulic Dumpers			
	Trucks /Tractor With Trolley			
	Wheel Borrow			
	Tough Rider			
8.	**De Watering Equipment**			
	De Watering Pump	_____HP		
	Mud pump			
9.	**Power Equipment**			

Sl. No.	Description	Specification/Capacity	Machinery Proposed To Be Deployed At Site By Contractor	
			Owned	To Be Hired
	DG Set	_____KVA		
10.	**Piling Equipment's (not applicable)**			
	Percussion/Rotary Drilling Rigs Using Direct/Reverse Mud Circulation			
	TMR/ Bailer & Chisel Rigs.			
	Winch			
	Derrick			
	Boring/Chiselling Tools			
	Temporary Casings	Pipes-		
11.	**Tremie Arrangements (not applicable)**			
		Concrete Hopper-		
		Hopper Plugs-		
		Tremie Pipe-		
		Holding Clamps-		
		Hoisting Plug-		
	Accessories Like Concrete Placer, Wheel Barrow, Measuring Chain, Bailers, Crow Bars, Dog Clamps With Pins, Steel Measuring Tapes, Mucking Shovel Etc.- 1 Lot			

Note:- Bidder to submit the documents pertaining to ownership of equipment owned by them.

Signature and seal of Bidder

SECTION - VII, SCHEDULE – II, KEY PERSONNEL

1.	**Technical Personnel Requirement**	**No. of persons employed with the bidder**	**No. of persons to be deployed for the project.**
	a) Senior Engineer (Project Manager)- 1 no.		
	b) Site Engineer (Degree holder)- 2 no.		
	c) Billing Engineer (Degree holder)- 1 no. d) Quality control engineer-1 no. e) Electrical engineer – 1 no. f) Safety engineer – 1 no.		
2.	Supervisory Personnel		
	a) Supervisor (Diploma holders) 2		
	b) Foremen		
	c) Technicians		
3.	Other key staff		

Signature and seal of Bidder

SECTION - VII, SCHEDULE – III, Nominated Sub-contractor

(List of works of value more than 10% of the contract value proposed to be sublet)

Sl. No.	Description	Approx. Value Rs.	Name of the Sub-contractor	Place where similar works previously executed.

Signature and seal of Bidder

SECTION - VII, SCHEDULE – IV

Major similar nature of works successfully completed during the past five years:

Similar nature of work means Civil works of industrial buildings in Dairy/ Food or Beverage/Pharma/ Chemical/ Electronics/Frozen Semen station having clean room laboratory/Bio-Containment Laboratory/Bio-Gas/ETP plant having similar finishes, flooring, drainage including or excluding internal electrification works etc. during the last five years.

Sr. No.	Name of work	Place	Contract Ref.	Name of Client	Value of Work	Time of Completion	Date of Completion

Note: Documentary evidence for above information to be attached separately in the form of completion certificate, purchase order, TDS certificate , details of payments etc. issued by the client.

Signature and seal of Bidder

SECTION - VII, SCHEDULE – V

Statement of Bonus earned/ Liquidity damages (L.D.) paid in the past five years :

S. N.	Name of Work	Place	Contr-act ref.	Name of Owner	Value of Work (Rs. Lakh)	Time of Completion (Months)		Bonus / L.D.
						Contract	Actual	

Signature and seal of Bidder

SECTION - VII, SCHEDULE – VI

Statement of Arbitration & disputes in the last five years.

S. N.	Name of Work	Place	Contract reference	Name of Client	Value of Work (Rs. Lakh)	Nature of Dispute	Award of Arbitration

Signature and seal of Bidder

SECTION - VII, SCHEDULE – VII

Financial and business Capability.

1.	Audited annual accounts/ Accounts audited under section 44AB of Income Tax Act of past 3 years	:
2.	Where accounts are not required to be audited following information shall be given for last three years duly attested by a Charted Accountant/ Manager of nationalised Bank.	:
a.	Share Capital	:
	Free Reserves	:
	Other Reserves	:
b.	Term loans from financial institutions & banks	:
c.	Current Liabilities	:
	Bank Cash Credits	:
	Others (Including sundry creditors)	:
d.	Provisions	:
e.	Contingent Liabilities including claims not acknowledged	:
f.	Fixed Assets	:
	Gross	:
	Net	:
g.	Cash and Bank Balances	:
h.	Inventories	:
i.	Debtors & Advances considered good	

More than 6 months :

Less than 6 months :

j. Profit before tax :

k. Loss, if any :

3. Other information

Name of the Bankers :

Bank facilities including credit limits :

4. Projected turn over for the next twoyears

Year 1 :

Year 2 :

NOTE:

Wherever required documentary evidence may be attached separately.

Signature and seal of Bidder

SECTION - VII, SCHEDULE - VIII,
WORKS IN HAND

Sl. No	Name of Work	Contract reference and date	Name of Client (Mobile No. & Email	Place of Contract	Total Value of Contract (Rs. Lakh)	Total Duration of Contract as per PO (Month	Value of Works Completed as on Bid Opening Date (Rs.	Balance Value of Works to be Completed as on Bid	Completion Schedule of Balance Works	
									Period (Months)	Expected date of Complete

SECTION- VIII

FORM OF AGREEMENT

SECTION VIII-FORM OF AGREEMENT FOR CONSTRUCTION WORK

(To be submitted by successful bidder after award of contract On Non-Judicial Stamp Paper of minimum value of Rs. 300/- or as per stamp act of Local State Government)

THIS AGREEMENT is made and executed at Anand on the day of 20 between the IDMC Limited, having its registered office at Anand-388121, _____(hereunder referred as 'Service Recipient') name of the project authority) which expression shall, unlessrepugnant to the context or meaning thereof, include the successors and assignees of the pure agent) of the ONE PART and _____(herein after referred to as the **Contractor,** which expression, shall, unless repugnant to the context or meaning thereof, include the heirs, successors, assignees, executors and administrators of the Contractor) of the OTHER PART.

WHEREAS the service recipient is desirous that certain Works should be executed, viz _____ _____ and has, by Letter of Acceptance/Work Order Acceptance dated_____, accepted a bid by the Contractor in response to the Pure Agent's bidding document ref no._____for carrying out the above job at a cost Rs._____(hereinafter referred as contract price), **NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:**

1.0 In this agreement, words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2.0 The following documents shall be deemed to form and be read and construed as a part of this agreement, viz

i) This Form of Agreement

ii) The Letter of Acceptance/Work Order Acceptance
iii) The said bid and Appendix
iv) The Schedule of Quantities
iv) The Technical Specifications
v) The Drawings
vii) The Schedule of Supplementary information
viii) Special Conditions of Contract
ix) General Conditions of Contract
x) Schedule of Materials to be issued by Project Authority/Pure Agent
xi) Form of Bank Guarantees
xii) Work Order No._____

3.0 The aforesaid documents shall be taken as complementary and mutually explanatory of one another, but in the case of ambiguities and discrepancies shall take precedence in the order set out above.

4.0 In the consideration of the payment to be made by the Pure Agent to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Pure Agent to execute, complete and maintain the works in conformity in all respects with the provisions of the Contract and bidding document.

5.0 The Pure Agent hereby covenants to pay the Contractor in consideration of the execution, completion and maintenance of the works the Contract Price at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this agreement to be executed in accordance with their respective laws the day, month and year first above written.

Signed, sealed & delivered by the Authorized Signatory for the Pure Agent

Signed, sealed & delivered by the Authorized Signatory for the Contractor

Authorized Signatory
IDMC Limited

Authorized Signatory
Contractor

(In the capacity of Pure Agent to ____
_____ Project Authority Name

In the presence of:

WITNESS

1) Signature
Name
Address

2. Signature
Name
Address

In the presence of:

WITNESS

1. Signature
Name
Address

2. Signature
Name
Address

SECTION IX

Acceptable Forms of Bank Guarantees

Table of contract

S. No.	Description	Sequential Page No.
1.0	Performance Security	IX-2 to 4
2.0	Bid Security	IX-5 to 7
3.0	Advance payment	IX-8 to 10
4.0	Retention money	IX-11 to 13
5.0	Solvency Certificate	IX-14

1.0 Bank Guarantee to secure performance

(to be executed on stamp paper of appropriate value - usually Rs. 300/-)

Currency: INR / EURO / USD	Amount in figures		
Amount in words			
Date of execution		Date up to when in force/ Date of expiry	
Date of Claim/ Demand (up to 365 days beyond the date of expiry)			
Name and address of beneficiary	IDMC Limited, Plot no. 124-128, GIDC Estate, Vithal Udyognagar, District Anand, Gujarat -388121		
Name and address of the vendor and/ or service provider (i.e. purchaser of the bank guarantee from the bank)			

THIS deed of guarantee made on this _____ day of _____, 2026 between _____ (name of the bank issuing this guarantee), herein after called 'the bank', on the first part and _____ (hereinafter referred to as 'vendor and/ or service provider in relation to IDMC Limited' and 'purchaser in relation to the bank' respectively) on the second part.

WHEREAS, the purchaser of the bank guarantee has been engaged by IDMC Limited as a vendor and/ or service provider for _____ (e.g. design, manufacture and supply of equipment or installation/ testing/ commissioning/ job work/ preventive maintenance/ break-down maintenance/ consulting or advising services as envisaged in purchase order(s)/ contract(s) _____ dated _____) which is required to be performed in pursuance of the said purchase order(s)/ contract(s);

WHEREAS, the vendor and/ or service provider is required to submit this bank guarantee for a sum of Rs. _____ (Rupees _____only) as security for fulfilling its obligation to secure performance of the _____ (description of goods and/ or services) under the said purchase order(s)/ contract(s).

AND WHEREAS, at the request of the vendor and/ or service provider, the bank has agreed to guarantee the refund of the said amount in case the aforesaid goods and/ or services do not perform to the satisfaction of IDMC Limited as per the terms and conditions of the said purchase order(s)/ contract(s).

NOW THIS DEED OF GUARANTEE DOES WITNESSETH AS UNDER:

1. That in consideration of IDMC Limited having awarded the said purchase order(s)/ contract(s), the bank does hereby irrevocably guarantee and indemnify that if the vendor and/ or service provider has supplied and/ or provided _____ (description of goods and/ or services), which is not to the satisfaction of IDMC Limited, as per the details, terms and conditions contained in the said purchase order(s)/ contract(s), *supra*, the Bank shall, without demur, repay and indemnify IDMC Limited within seven (7) working days as the bank may be called upon to pay subject to a ceiling of Rs. _____ (Rupees _____);

2. We, _____ (name of the bank), further agree that this performance guarantee will remain in full force and effect up to _____ by which duration IDMC Limited believes it may be reasonable to certify that the defect liability period has been successfully completed as per the details contained in the purchase order(s)/ contract(s),supra.

3. That the bank shall not question any of the details, terms and conditions contained in the said purchase order(s)/ contract(s), *supra*, including but not limited to the amount of consideration agreed upon between IDMC Limited and the vendor and/ or service provider for the purposes of determining its acceptance of liabilities under this bank guarantee and forthwith accept the demand of IDMC Limited to determine this bank guarantee;

4. That at the written request of either IDMC Limited or the vendor and/ or service provider, the bank shall renew this bank guarantee before it's date of expiry.

5. That the Bank agrees that the amount hereby guaranteed shall be immediately due and payable to IDMC on serving the bank with a notice before the date of expiry or date of claim/ demand, whichever is earlier. The claim can be lodged by IDMC limited up to 365 days beyond the date of expiry or extended date of expiry.

6. This Bank Guarantee shall be subject to the law as applicable in India.

7. Notwithstanding anything stated herein before:

(i) The Bank's liability under this guarantee is restricted to Rs._____/-(Rupees_____ only);

(ii) This guarantee shall remain in force till _____and;

(iii) The Bank is liable to pay the guaranteed amount or any part thereof under this bank guarantee only if IDMC Limited serves upon the Bank a written claim/ demand on or before_____ (Date of Claim/ Demand) including 365 days of grace period from date of expiry.

IN WITNESS WHEREOF, the bank has signed on this _____ day of _____, 2026.

Signature of Bank Manager

2.0 Form of Bank Guarantee for Bid security (On the Non-Judicial Stamp paper of Rs. 300 minimum or as per the stamp act of Local State Government).

Bank Guarantee No: Date:

This deed of guarantee made this _____ day of _____ (two thousand and _____) by (Name and the address of the Bank), hereinafter referred to as the Bank, which shall unless repugnant to the context and the meaning thereof includes its legal representatives, successors and assignees and the IDMC Limited ,(hereinafter referred to as the IDMC Limited) which expression shall unless repugnant to the context and meaning thereof include its legal representative, successors or assignees.

Whereas the IDMC Limited has invited bids for the Construction of the proposed _____ _____ by the Invitation to bid no._____.

AND WHEREAS M/s _____ _____ (Name and the Address of the bidders) who having submitted their bids (hereinafter referred to as the bidder) and have agreed to deposit to the IDMC Limited an amount indicated in the Invitation to bid as per the terms and the conditions of the bidding documents.

AND WHEREAS the IDMC Limited is also willing to accept a Bank guarantee in lieu of payment by demand draft of an amount equivalent to the amount of bid security required to be deposited by the bidder to the IDMC Limited and the guarantee shall be kept valid for 120 days after the day of the opening of the bids.

In consideration of the IDMC Limited having agreed to consider the bid proposals having submitted by the bidder without depositing the amount of bid security and against this Bank guarantee, we (name and the address of the Bank) hereby undertake and guarantee to make payment to the IDMC Limited the amount of bid security or any part thereof not deposited by the bidder to the IDMC Limited at any time (time being the essence of the Contract) when the IDMC Limited asks for the same as per the terms and the conditions of the bidding documents within 120 days from the date of opening of the bids.

The Bank further undertakes not to revoke this guarantee during its currency except with the previous consent of the IDMC Limited in writing and the guarantee shall be continuous and irrevocable guarantee up to a sum of Rs. _____ (Rupees _____ only) provided always that any indulgence or forbearance on the part of the IDMC Limited

to the said bidder, with or without the consent of the Bank shall not prejudice or restrict remedies against the bank nor shall the same in any event be a ground of defence by the Bank against the IDMC Limited.

In case the IDMC Limited puts forth a demand in writing on the Bank for the payment of the amount in full or in part against this Bank guarantee, the Bank will consider without demur that such demand by itself is a conclusive evidence and proof that the bidder has failed in complying with the terms and conditions stipulated by the IDMC Limited in its bidding document and payment will be made to the without raising any disputes regarding the reasons for such failures on the part of the bidder.

The Bank shall not be discharged or released from this guarantee by any arrangement between the bidder and the IDMC Limited with or without the consent of the Bank or any alterations in the obligations of the parties or by an indulgence, forbearance shown by the IDMC Limited to the bidder.

This guarantee shall be in addition to and without prejudice to any other securities or remedies which the IDMC Limited may have or hereafter possess against the bidder and the IDMC Limited shall be under no obligations to marshal in favour of the Bank any such securities or fund or assets that the IDMC Limited at its absolute discretion may vary, exchange, renew, modify or refuse to complete or enforce or assign any security or instrument.

The Bank agrees that the amount hereby guaranteed shall be due and payable to the IDMC Limited on serving us with a notice before expiry of Bank Guarantee requiring the payment of the amount and such notice shall be deemed to have been served on the Bank either by actual delivery thereof to the Bank or by dispatch thereof to the Bank by registered post at the address of the Bank.

In order to give full effect to the provisions of this guarantee the Bank thereby waives all rights inconsistent with the above provisions and which the Bank might otherwise as a guarantor be entitled to claim and enforce.

The guarantee shall remain in force until _____ and the Bank undertakes to renew the Bank Guarantee provided the request is made by the bidder before the expiry of Bank Guarantee.

Notwithstanding anything stated hereinbefore:(I) our liability under this guarantee is restricted to Rs. _____ (Rupees _____ _____ only) (ii) The bank guarantee shall remain in force till_____ ___ and (iii) The bank is liable to pay the guarantee amount or any part thereof under this bank

guarantee only if the IDMC Limited serves upon the Bank a written claim or demand on or before_____.

Place

Signature

Date:

Bank Seal

Bank Code no.

Note :

(i) Bidders should ensure that the seal and code no. of signatory is put by the Bankers, before submission of the Bank guarantees.

(ii) The value of stamp duty should be minimum Rs. 300 or as per latest stamp act of Local State Government, from where the bank guarantee is issued.

Bank Guarantee to secure advance

(to be executed on stamp paper of appropriate value - usually Rs. 300/-)

Currency: INR / EURO / USD	Amount in figures		
Amount in words			
Date of execution		Date up to when in force/ Date of expiry	
Date of Claim/ Demand (up to 365 days beyond the date of expiry)			
Name and address of beneficiary	IDMC Limited, Plot no. 124-128, GIDC Estate, Vithal Udyognagar, District Anand, Gujarat -388121		
Name and address of the vendor and/ or service provider (i.e. purchaser of the bank guarantee from the bank)			

THIS deed of guarantee made on this _____ day of _____, 2026 between _____ (name of the bank issuing this guarantee), herein after called 'the bank', on the first part and _____ (hereinafter referred to as 'vendor and/ or service provider in relation to IDMC Limited' and 'purchaser in relation to the bank' respectively) on the second part.

WHEREAS, the purchaser of the bank guarantee has been engaged by IDMC Limited as a vendor and/ or service provider for _____ (e.g. design, manufacture and supply of equipment or installation/ testing/ commissioning/ job work/ preventive maintenance/ break-down maintenance/ consulting or advising services as envisaged in purchase order(s)/ contract(s) _____ dated _____) which is required to be supplied/ provided latest by _____ (dd/mm/yyyy) in pursuance of the said purchase order(s)/ contract(s)

WHEREAS, IDMC Limited is required to pay the vendor and/ or service provider a sum of Rs. _____ (Rupees _____only) against submission of this bank guarantee towards part value of _____ (description of goods and/ or services) ordered to be manufactured/ supplied/ provided under the said purchase order(s)/ contract(s);

AND WHEREAS, at the request of the vendor and/ or service provider, the bank has agreed to guarantee the refund of the said amount, in case the aforesaid goods and/ or services do not deliver to the satisfaction of IDMC Limited as per the terms and conditions of the said purchase order(s)/ contract(s).

NOW THIS DEED OF GUARANTEE DOES WITNESSETH AS UNDER:

1. That in consideration of IDMC Limited having agreed to pay an advance of Rs. _____ (Rupees _____) to the vendor, the bank does hereby irrevocably guarantee and indemnify that if the vendor and/ or service provider fails to supplies/ provides to IDMC Limited the goods and/ or services as per the details, terms and conditions contained in the said purchase order(s)/ contract(s), *supra*, the Bank shall, without demur, repay and indemnify IDMC Limited within seven (7) working days all such advances paid by IDMC Limited to the vendor and/ or service provider as the bank may be called upon to pay subject to a ceiling of Rs. _____ (Rupees _____);
2. That the guarantee furnished herein shall be realised and discharged the moment the vendor and/ or service provider supplies/ provides the equipment to the satisfaction of IDMC Limited, as per the details, terms and conditions contained in the said purchase order(s)/ contract(s);

3. That the bank shall not question any of the details, terms and conditions contained in the said purchase order(s)/ contract(s), *supra*, including but not limited to the amount of consideration agreed upon between IDMC Limited and the vendor and/ or service provider for the purposes of determining its acceptance of liabilities under this bank guarantee and forthwith accept the demand of IDMC Limited to determine this bank guarantee;

4. That at the written request of either IDMC Limited or the vendor and/ or service provider, the bank shall renew this bank guarantee before it's date of expiry.

5. That the Bank agrees that the amount hereby guaranteed shall be immediately due and payable to IDMC on serving the bank with a notice before the date of expiry or date of claim/ demand, whichever is earlier. The claim can be lodged by IDMC limited up to 365 days beyond the date of expiry or extended date of expiry.

6. This Bank Guarantee shall be subject to the law as applicable in India.

7. Notwithstanding anything stated herein before:

   a. The Bank's liability under this guarantee is restricted to Rs._____/-(Rupees_____ only);

   b. This guarantee shall remain in force till _____and;

   c. The Bank is liable to pay the guaranteed amount or any part thereof under this bank guarantee only if IDMC Limited serves upon the Bank a written claim/ demand on or before_____ (Date of Claim/ Demand) including 365 days of grace period from date of expiry.

IN WITNESS WHEREOF, the bank has signed on this _____ day of _____, 2026.

Signature of Bank Manager

4.0 Form of Bank Guarantee for Retention Money (on Non-judicial Stamp Paper of Rs. 300 minimum or as per stamp act of local state Govt.)

Bank Guarantee no. Date:

This deed of guarantee made this _____ day of _____ (two thousand _____) by_____ (Name and the address of the Bank), hereinafter referred to as "the Bank", which express where the context and the meaning so require, include its legal representatives, successors and assignees of the bank and IDMC Limited, (hereinafter referred to as the IDMC Limited) which expression shall unless repugnant to the context and the meaning thereof include its legal representative, successors and assignees.

WHEREAS the IDMC Limited has placed its Contract order bearing no. _____ dated _____ on (name and address of the party) hereinafter called the Contractor, for the construction of_____ _____ _____

AND WHEREAS the IDMC Limited has agreed to pay to the Contractor the retention money i.e. **5% of the value of the Contract** on submission of a Bank guarantee of equal amount, which will be kept valid up to _____.

In consideration of the IDMC Limited having agreed to pay to the Contractor Rs._____ (Rupees_____ _____ only) being the retention money we (the Bank), hereby undertake and guarantee to make repayment to the IDMC Limited of the said amount without any demur or any part thereof which does not become payable to the Contractor by the IDMC Limited in accordance with and subject to the terms and conditions of the said Contract. The Bank further undertakes not to revoke this guarantee during its currency except with the previous consent of the IDMC Limited in writing and this guarantee shall be a continuous and irrevocable guarantee up to a sum of Rs. _____ (Rupees _____ _____ _____ only).

The Bank shall not be discharged or released from this guarantee by any arrangement between the Contractor and the IDMC Limited with or without the consent of the Bank or any alterations in the obligations of the parties or by an indulgence, forbearance shown by the IDMC Limited to the Contractor and the same shall not prejudice or restrict remedies against the Bank nor shall the same in any event be a ground of defence by the Bank against the IDMC Limited. We (name of bank) do hereby undertake to pay an amount

equal to Rs. _____ being the amount due and payable under this guarantee without any demur, merely on a demand from the IDMC Limited stating that the amount claimed is due to the IDMC Limited. In case, the IDMC Limited puts-forth a demand in writing on the bank for the payment of amount in full or in the part against this bank guarantee, the bank shall consider that such demand by itself is conclusive evidence and proof that the contractor has failed in compliance with the terms and conditions stipulated by IDMC Limited in the contract and payment shall be made to IDMC Limited without raising any dispute regarding the reasons for any such lapse/ failure on the part of the contractor.

This guarantee shall be in addition to and without prejudice to any other securities or remedies which the IDMC Limited may have or hereinafter possess in respect of the works executed or intended to be executed and the IDMC Limited shall be under no obligation to marshal in favour of the bank any such securities or funds or assets that the IDMC Limited may be entitled to receive or have a claim upon and the IDMC Limited at its absolute discretion may vary, exchange, renew, modify or refuse to complete to enforce or assign any security or instrument.

The Bank agrees that the amount hereby guaranteed shall be due and payable to the IDMC Limited on IDMC Limited's serving us with a notice before expiry of Bank Guarantee requiring the payment of the amount and such notice shall be deemed to have been served on the Bank either by actual delivery thereof to the Bank or by dispatch thereof to the Bank by registered post at the address of the said Bank.

We, _____, undertake to renew the bank guarantee provided the request for renewal is made by the contractor before the expiry of bank guarantee.

In order to give full effect to the provisions of this guarantee the Bank hereby waives all rights inconsistent with the above provisions and which the Bank might otherwise as guarantor be entitled to claim and enforce.

Notwithstanding anything stated herein before : (I) our liability under this guarantee is restricted to Rs. _____ (Rupees _____ _____ only), (ii) The guarantee shall remain in force till _____ _____and (iii) The Bank is liable to pay the guarantee amount or any part thereof under the bank guarantee only if the IDMC Limited serves upon the Bank a written claim or demand on or before_____.

Place Signature

Date

Bank Seal

Bank Code no.

Note:

1: Contractor should ensure that the seal and code no. of signatory is put by the Bankers, before submission of the Bank guarantees.

2: The value of stamp duty should be minimum Rs. 300 or as per latest stamp act of Local State Government from where the Bank Guarantee is issued.

5.0 Format of Solvency Certificate (On the letter head of issuing bank)

Ref: Date:

FORMAT OF SOLVENCY CERTIFICATE FROM THE NATIONALISED / SCHEDULED BANK / FOREIGN BANKS OPERATING IN INDIA

This is to certify that to the best of our knowledge & information M/s. / Shri _____ having the address as per bank records as _____,

a customer of our bank is respectable and can be rated as good for any engagement upto a limit of Rs._____ (Rupees _____).

The certificate is issued without any guarantee and responsibility on behalf of the bank or any of its Officers.

Date_____ (Signature)

(Name & designation of the officer with address of Bank & its branch code)

(Bank's Official Rubber Stamp)

SECTION – X

SCHEDULE OF QUANTITIES

DETAILED BOQ OF SUPPLY

Sl. No.		DESCRIPTION	Specifications / Size	Material / Type	MOC/Make	Unit	QTY.	Unit Rate in INR. (Excl. of	Total Amount in INR. (Excl. of GST)
B.		**Supply of Mechanical /Interconnecting Piping & Valves/Electrical items**							
1	Raw Effluent Transfer Pumps		60 m3/h, 15 m head	SS 316 Impeller / CI body	Kirloskar/KDB/Aqua/ Lubi/Grundfos	Nos.	2.00	-	-
2	Auto Ph Correction System							-	-
	a	pH sensor & Analyses: pH probes and Analyzer	As per site requirement & process design		E&H/ EMERSON/BAUMER	Set	1.00	-	-
	b	Acid & Alkali Chemical Solution Tanks:							
		a. Alkali Chemical Solution Tank	1000 Lt.	LLDPE (with inlet, outlet, Drain, overflow arrangement)	As per Approved make list	Nos.	1.00	-	-
		b Mixer for Alkali tank (Turbine Type)	100–300 RPM (indicative)	SS 316 Impeller / CI body	As per Approved make list	Nos.	1.00		
		c Acid chemical solution Tank	1000 Lt.	LLDPE (with inlet, outlet, Drain, overflow arrangement)	As per Approved make list	Nos.	1.00	-	-
	c	Chemicals (Alkali & Acid) Dosing Pumps:							
		a. Alkali Dosing pump	0-200 LPH; 1.5 KG/CM2			Nos.	2.00	-	-
		b. Acid Dosing pump	0-200 LPH; 1.5 KG/CM2			Nos.	2.00	-	-
3	Mixing System For Hydrolysing Tank					Lot	1.00	-	-
4	Equalized Effluent Transfer Pumps		50 m3/h, 19 m head	SS 316 Impeller / CI body	Kirloskar/KDB/Aqua/ Lubi/Grundfos			-	-
5	CSTR Anaerobic Digester		15.00 m dia x 13.50 m LD + .50 m FB	MSEP	As per Approved make list			-	-
6	CSTR Mixing System		250 m3 / Per hr	SS 316 Impeller / CI body		Nos.	2.00	-	-
	Jet / Eductor mixing System		As per site requirement & process design	SS 304	As per Approved make list	Lot	1.00	-	-
7	Sludge Thickening System							-	-
	a	Flash Mixer Unit	150 RPM	SS 316 Impeller	As per Approved make list	Lot	1.00	-	-
	b	Floculator Unit	10 HRT.	SS 316 Impeller	As per Approved make list	Lot	1.00	-	-
	c	Design Flow		SS304	As per Approved make list			-	-
	d	Cross Flow Separator with pre separator tank						-	-
8	Coagulants And Flocculants Chemical		1000 Lt.	LLDPE (with inlet, outlet, Drain, overflow arrangement)	As per Approved make list	Nos.	2.00	-	-
	a	Accessories	As per site requirement & process design		As per Approved make list	Lot	1.00	-	-
	b	Agitator Mixer	As per site requirement & process design		As per Approved make list	Nos.	2.00	-	-
9	Chemicals Dosing Pumps.		0-200 LPH; 1.5 KG/CM2			Nos.	4.00	-	-
10	Sludge Re-Circulation Pumps (CFS)		20 M3/HR; 12M	SS 304 Impeller / CI Body	Kirloskar/ Johnson/ Grundfos	Nos.	2.00	-	-
11	Air Blowers for Aeration Tank		1100 m3/hr @ 0.55 kg/cm2;	As per OEM	GD / Arzen / Atlas/EVEREST	Nos.	2.00	-	-
12	Diffusers for Areation System		1000 mm Length	As per OEM	REHAU/OTT	Nos.	240.00	-	-
13	Secondary Clarifier Mechahism Unit		8.00 m dia x 3.00 m LD + .50 m FB		As per Approved make list	Lot	1.00	-	-
14	Slude Re-Circulation Pumps (Seconda		25 M3/HR; 12M	SS 304 Impeller / CI Body	Kirloskar/ Johnson/ Grundfos	Nos.	2.00	-	-
15	Filter Feed Pump &Trreated Water Pu		40 M3/HR; 35M	SS 304 Impeller / CI Body	Kirloskar/ Johnson/ Grundfos	Nos.	4.00	-	-
16	Pressure Sand Filter		40 M3/HR	MSEP	As per Approved make list	Nos.	1.00	-	-
17	Activated Carbon Filter		40 M3/HR	MSEP	As per Approved make list	Nos.	1.00	-	-
18	Flare Stack.		80-100 CUM/HR		COMBUSTION RESEARCH ASSOCIATES/APPROVED EQUIVALENT	Lot	1.00	-	-
19	Piping & Valves							-	-
	a	Pipping 1 Lot.	As per site requirement & process design		As per Approved make list	Lot	1.00	-	-
	b	Valves 1 Lot.	As per site requirement & process design		As per Approved make list	Lot	1.00	-	-
20	Electrical & Mcc Panel							-	-

DETAILED BOQ OF SUPPLY

Sl. No.		DESCRIPTION	Specifications / Size	Material / Type	MOC/Make	Unit	QTY.	Unit Rate in INR. (Excl. of	Total Amount in INR. (Excl. of GST)
	a	MCC PANEL	As per site requirement & process design		As per Approved make list	Lot	1.00	-	-
	b	Cable 1 Lot	As per site requirement & process design		As per Approved make list	Lot	1.00	-	-
21	Any other item required for proper co				As per Vendor	Lot	1.00	-	-
22	lab for day to day testging of raw and							-	-
	a	pH meter			E&H/ EMERSON/BAUMER	Nos.	1.00	-	-
	b	TDS Meter				Nos.	1.00	-	-
	c	COD Digester				Nos.	1.00	-	-
	d	COD Tube with Air Condenser				Nos.	6.00	-	-
	e	BOD Incubator				Nos.	1.00	-	-
	f	BOD bottles	300ml		Borosilicate Glass	Nos.	8.00	-	-
	g	Hot Air Oven			THERMAX/HEATMAX/ ROSS THERMAL/ FORBES MARSHALL /APPROVED EQUIVALENT	Nos.	1.00	-	-
	h	Electronic Balance M/C				Set.	1.00	-	-
	i	Vacuum pump set			PROMINENT/ MILTON ROY/PENTAIR	Nos.	1.00	-	-
	j	Desiccator			Borosilicate Glass	Nos.	1.00	-	-
	k	Water distillation unit			Borosilicate Glass	Nos.	1.00	-	-
	l	Hot plate				Nos.	1.00	-	-
	m	Magnetic steer			E&H / EMERSON	Nos.	1.00	-	-
	n	Air pump			IR/KAESSER/ GARDENER DENVER	Nos.	1.00	-	-
	o	Vacuum pump			PROMINENT / MILTON ROY/PENTAIR	Nos.	1.00	-	-
	p	COD Flask			Borosilicate Glass	Nos.	6.00	-	-
	q	Burette with Burette stand	(Burette 50 ml)		Borosilicate Glass	Nos.	1.00	-	-
	r	Burette with Burette stand	(Burette 25 ml)		Borosilicate Glass	Nos.	1.00	-	-
	s	Separating funnel with stand	(250 ml)		Borosilicate Glass	Nos.	2.00	-	-
	t	Glass funnel			Borosilicate Glass	Nos.	2.00	-	-
	u	Petridis			Borosilicate Glass	Nos.	5.00	-	-
	v	Pipets with bulb	(0.5 ml)		Borosilicate Glass	Nos.	1.00	-	-
			(1 ml)		Borosilicate Glass	Nos.	1.00	-	-
			(10 ml)		Borosilicate Glass	Nos.	2.00		
	w	Graduated cylinder	(50 ml)		Borosilicate Glass	Nos.	2.00	-	-
			(100 ml)		Borosilicate Glass	Nos.	2.00	-	-
	x	Volumetric flask	(100 ml)		Borosilicate Glass	Nos.	3.00	-	-
			(200 ml)		Borosilicate Glass	Nos.	5.00	-	-
			(500 ml)		Borosilicate Glass	Nos.	5.00	-	-
			(1000 ml)		Borosilicate Glass	Nos.	2.00	-	-
	y	Conical flask	(250 ml)		Borosilicate Glass	Nos.	2.00	-	-
			(500 ml)		Borosilicate Glass	Nos.	5.00	-	-
	z	Beaker	(50 ml)		Borosilicate Glass	Nos.	4.00	-	-
			(100 ml)		Borosilicate Glass	Nos.	5.00	-	-
			(250 ml)		Borosilicate Glass	Nos.	5.00	-	-
			(500 ml)		Borosilicate Glass	Nos.	4.00	-	-
			(1000 ml)		Borosilicate Glass	Nos.	2.00	-	-
	aa	Reagent bottles	(250 ml)		Borosilicate Glass	Nos.	10.00	-	-
			(500 ml)		Borosilicate Glass	Nos.	5.00	-	-
			(1000 ml)		Borosilicate Glass	Nos.	2.00	-	-
	ab	Wash bottle			Borosilicate Glass	Nos.	2.00	-	-
	ac	Distillation assembly (Round bottom flask with stand joint (250 ml), Heating mantle, Distillation unit, Distillation stand).			Borosilicate Glass	Nos.	1.00	-	-
	ad	Safety Kits.		PPT	Karm/Dupon/Mark Sefty	Nos.	1.00	-	-
								Basic Total in INR. (Excl. of GST)	-
								GST 18%	
								Total Amount in INR (Incl. GST)	

ANX-B

DETAILED BOQ & UNIT RATE

Sl. No.		DESCRIPTION	Unit	QTY.	Unit Rate in INR. (Excl. of GST)	Total Amount in INR. (Excl. of GST)
A.		**Installation Charges of Mechanical /Interconnecting Piping & Valves/Electrical Works**				
1		Raw Effluent Transfer Pumps	Nos.	2.00	-	-
2		Auto Ph Correction System			-	-
	a	pH sensor & Analyses: pH probes and Analyz	Set	1.00	-	-
	b	Acid & Alkali Chemical Solution Tanks:			-	-
		a. Alkali Chemical Solution Tank	Nos.	1.00	-	-
		b Mixer for Alkali tank (Turbine Type)	Nos.	1.00	-	-
		c Acid chemical solution Tank	Nos.	1.00	-	-
	c	Chemicals (Alkali & Acid) Dosing Pumps:			-	-
		a. Alkali Dosing pump	Nos.	2.00	-	-
		b. Acid Dosing pump	Nos.	2.00	-	-
3		Mixing System For Hydrolysing Tanks	Lot	1.00	-	-
4		Equalized Effluent Transfer Pumps			-	-
5		CSTR Anaerobic Digester			-	-
6		CSTR Mixing System	Nos.	2.00	-	-
		Jet / Eductor mixing System	Lot	1.00	-	-
7		Sludge Thickening System			-	-
	a	Flash Mixer Unit	Lot	1.00	-	-
	b	Floculator Unit	Lot	1.00	-	-
	c	Design Flow			-	-
	d	Cross Flow Separator with pre separator tank			-	-
8		Coagulants And Flocculants Chemical Tanks	Nos.	2.00	-	-
	a	Accessories	Lot	1.00	-	-
	b	Agitator Mixer	Nos.	2.00	-	-
9		Chemicals Dosing Pumps.	Nos.	4.00	-	-
10		Sludge Re-Circulation Pumps (CFS)	Nos.	2.00	-	-
11		Air Blowers for Aeration Tank	Nos.	2.00	-	-
12		Diffusers for Areation System	Nos.	240.00	-	-
13		Secondary Clarifier Mechahism Unit	Lot	1.00	-	-
14		Slude Re-Circulation Pumps (Secondary Clarifier	Nos.	2.00	-	-
15		Filter Feed Pump &Trreated Water Pumps	Nos.	4.00	-	-
16		Pressure Sand Filter	Nos.	1.00	-	-
17		Activated Carbon Filter	Nos.	1.00	-	-
18		Flare Stack.	Lot	1.00	-	-
19		Piping & Valves			-	-
	a	Pipping 1 Lot.	Lot	1.00	-	-
	b	Valves 1 Lot.	Lot	1.00	-	-
20		Electrical & Mcc Panel			-	-
	a	MCC PANEL	Lot	1.00	-	-
	b	Cable 1 Lot	Lot	1.00	-	-
21		Any other item required for proper completion o	Lot	1.00	-	-
22		lab for day to day testging of raw and treated effu			-	-
	a	pH meter	Nos.	1.00	-	-
	b	TDS Meter	Nos.	1.00	-	-
	c	COD Digester	Nos.	1.00	-	-
	d	COD Tube with Air Condenser	Nos.	6.00	-	-
	e	BOD Incubator	Nos.	1.00	-	-
	f	BOD bottles	Nos.	8.00	-	-
	g	Hot Air Oven	Nos.	1.00	-	-
	h	Electronic Balance M/C	Set	1.00	-	-
	i	Vacuum pump set	Nos.	1.00	-	-
	j	Desiccator	Nos.	1.00	-	-
	k	Water distillation unit	Nos.	1.00	-	-
	l	Hot plate	Nos.	1.00	-	-
	m	Magnetic steer	Nos.	1.00	-	-
	n	Air pump	Nos.	1.00	-	-
	o	Vacuum pump	Nos.	1.00	-	-
	p	COD Flask	Nos.	6.00	-	-
	q	Burette with Burette stand	Nos.	1.00	-	-

DETAILED BOQ & UNIT RATE

Sl. No.		DESCRIPTION	Unit	QTY.	Unit Rate in INR. (Excl. of GST)	Total Amount in INR. (Excl. of GST)
	r	Burette with Burette stand	Nos.	1.00	-	-
	s	Separating funnel with stand	Nos.	2.00	-	-
	t	Glass funnel	Nos.	2.00	-	-
	u	Petridis	Nos.	5.00		
	v	Pipets with bulb	Nos.	1.00	-	-
			Nos.	1.00	-	-
			Nos.	2.00	-	-
	w	Graduated cylinder	Nos.	2.00	-	-
			Nos.	2.00	-	-
	x	Volumetric flask	Nos.	3.00	-	-
			Nos.	5.00	-	-
			Nos.	5.00	-	-
			Nos.	2.00	-	-
	y	Conical flask	Nos.	2.00	-	-
			Nos.	5.00	-	-
	z	Beaker	Nos.	4.00	-	-
			Nos.	5.00	-	-
			Nos.	5.00	-	-
			Nos.	4.00	-	-
			Nos.	2.00	-	-
	aa	Reagent bottles	Nos.	10.00		
			Nos.	5.00	-	-
			Nos.	2.00	-	-
	ab	Wash bottle	Nos.	2.00	-	-
	ac	Distillation assembly (Round bottom flask w	Nos.	1.00		
	ad	Safety Kits.	Nos.	1.00	-	-
					Basic Total in INR. (Excl. of GST)	-
					GST 18%	
					Total Amount in INR (Incl. GST)	

ANX-C

DETAILED BOQOF SPARES

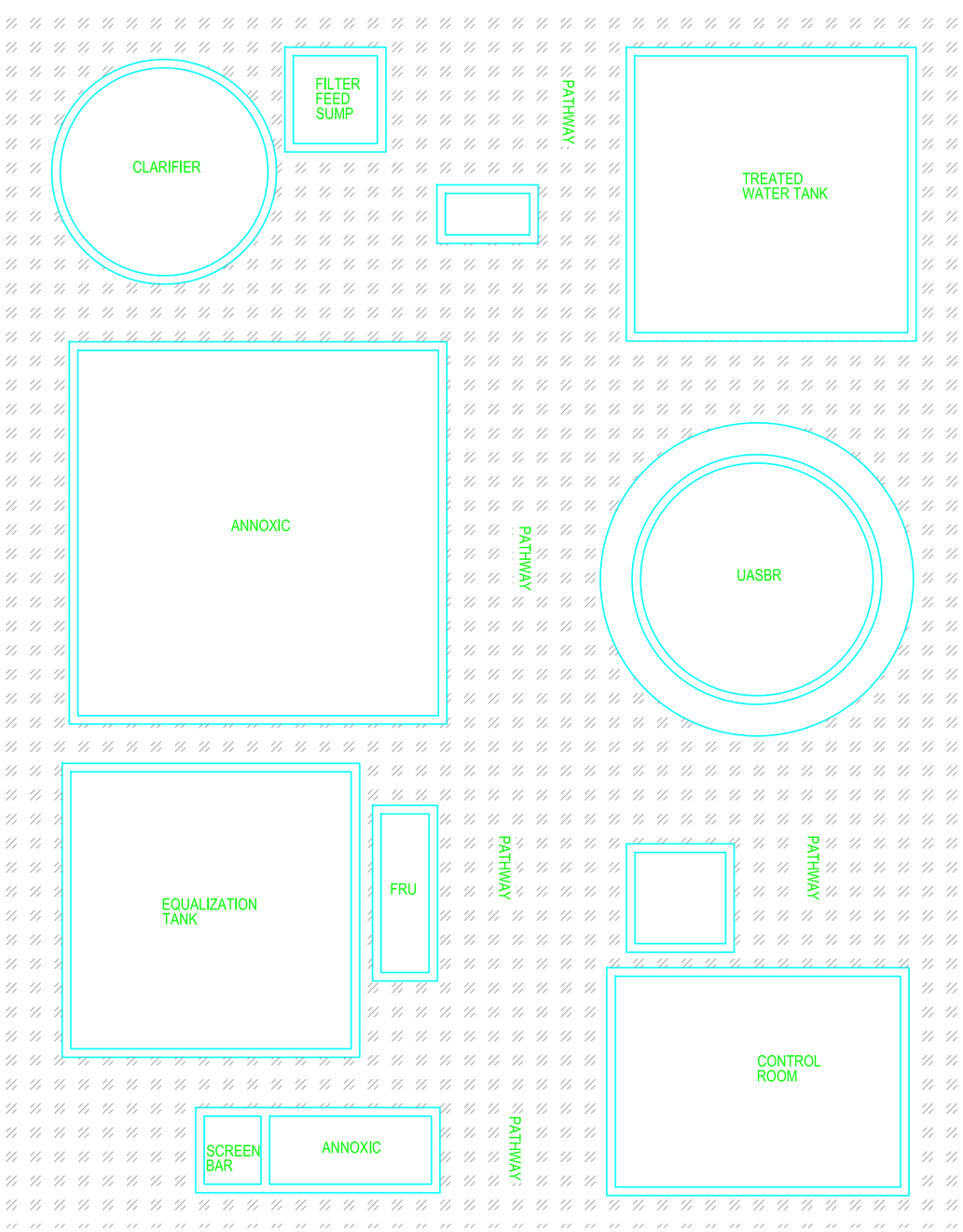
Sl. No.	DESCRIPTION	QTY.	Unit	MOC/Make	Unit Rate in INR. (Excl. of GST)	Total Amount in INR. (Excl. of GST)
C	2 Years of spares for smooth operation of 800 KLD (effluent handling capacity) etp for Dairy and Paneer plant	1.00	Lot	As per Approved make list		-
	Basic Total in INR. (Excl. of GST)					-
	GST 18%					
	Total Amount in INR (Incl. GST)					

ANX-D

DETAILED BOQ O&M ETC.

Sl. No.	DESCRIPTION	QTY.	Unit	Unit Rate in INR. (Excl. of GST)	Total Amount in INR. (Excl. of GST)
D.	Testing, commissioning, stabilization and one month Operation, training & maintenance	1.00	Lot		-
E.	Statutory Approvals-CTO/CC&A (as per PBSPCB norms.)	1.00	Lot		-
F.	12 Months Operation & Maintenance Charges (Nos. of Technical Manpower to be indicated with their discipline)	12.00	Months		-
	Basic Total in INR. (Excl. of GST)				
	GST 18%				
	Total Amount in INR (Incl. GST)				

Inlet-Raw Effluent Parameters			
S. No.	**Parameter**	**Unit**	**Value**
1	pH.	-	6 to 7
2	TSS	mg/l	1000
3	COD	mg/l	5000
4	BOD	mg/l	1800
5	TDS	ppm	2600
6	Oil & Gas	mg/l	900
7	ETP Load	KLD	800
8	Total Effuent	KLD	800
Note:- The inlet parameter may vary 10-20% on either side. Bidders should consider the variation in inlet effluent parameter suitably.			
Outlet-Treated Effluent Parameters			
S. No.	**Parameter**	**Unit**	**Value**
1	pH	-	6.5 – 8.5
2	Total Suspended Solids (TSS)	mg/L	<50
3	Biological Oxygen Demand (BOD)	mg/L	<30
4	Chemical Oxygen Demand (COD)	mg/L	<100
5	Oil & Grease	mg/L	< 10
Note: The treated effuent parameters shall be as per PBSPCB norms.			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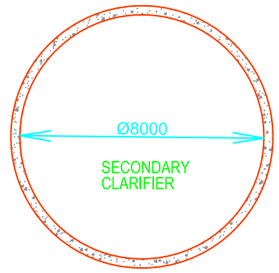
SUMP
CLARIFIER
PATHWAY
TREATED
WATER TANK
ANNOXIC
PATHWAY
UASBR
EQUALIZATION
TANK
FRU
PATHWAY
PATHWAY
CONTROL
ROOM
SCREEN
BAR
ANNOXIC
PATHWAY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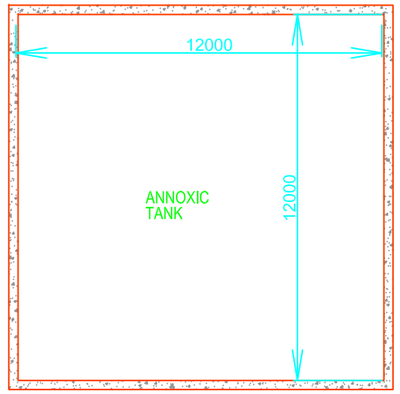
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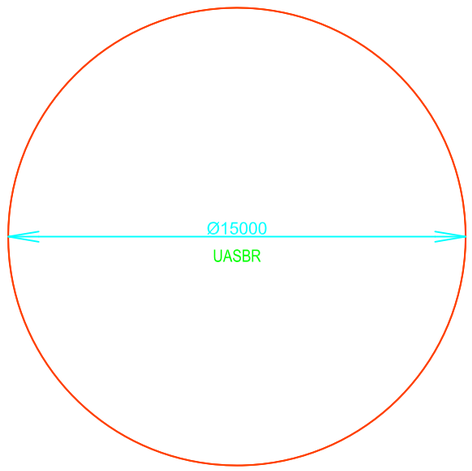
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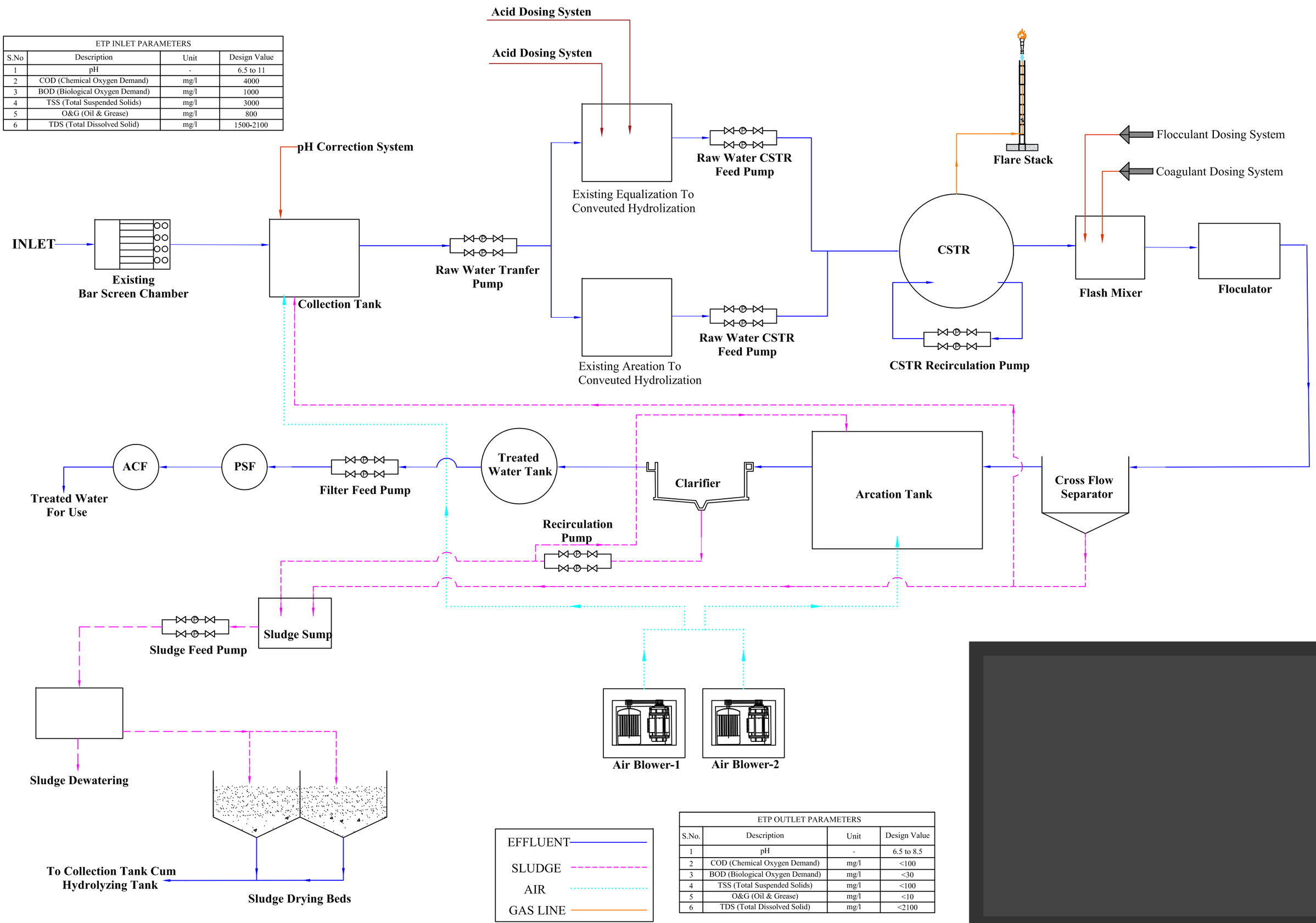
ETP INLET PARAMETERS			
S.No	Description	Unit	Design Value
1	pH	-	6.5 to 11
2	COD (Chemical Oxygen Demand)	mg/l	4000
3	BOD (Biological Oxygen Demand)	mg/l	1000
4	TSS (Total Suspended Solids)	mg/l	3000
5	O&G (Oil & Grease)	mg/l	800
6	TDS (Total Dissolved Solid)	mg/l	1500-2100



ETP OUTLET PARAMETERS			
S.No.	Description	Unit	Design Value
1	pH	-	6.5 to 8.5
2	COD (Chemical Oxygen Demand)	mg/l	<100
3	BOD (Biological Oxygen Demand)	mg/l	<30
4	TSS (Total Suspended Solids)	mg/l	<100
5	O&G (Oil & Grease)	mg/l	<10
6	TDS (Total Dissolved Solid)	mg/l	<2100

CAD DRAWING	IF IN DOUBT ASK	DO NOT SCALE THE DRAWING

N

WIND DIRECTION

WIND DIRECTION

133735

BOUNDARY LINE

OH GUARD POST

1.00M WIDE BICYCLE PATH

21747

65614

4985

135420

BOUNDARY LINE

1.00M WIDE BICYCLE PATH

OH GUARD POST

SET BACK LINE

PLANTATION AREA

S.T.P FUTURE

S.T.P 20.0x10.0

E.T.P

PROPOSED ETP

GATE

BOUNDARY LINE

164544

(Setback line) 10000

(Setback line) 10000

SET BACK LINE

1.00M WIDE BICYCLE PATH

26990

20000

POND 650 CUM CAPACITY IL 97.30M L

30000

83756

6652

59527

1.00M WIDE BICYCLE PATH

73773

BOUNDARY LINE

POTENTIAL NEW FACILITY 1 120.0x108.0 (12960.00 Sqm)

NEW POTENTIAL FACILITY 2 54.0x108.0 (5832.00 Sqm)

FUTRE ROAD

SET BACK LINE

274128

OIL YARD 26.39x20.25

BOILER HOUSE

LUB OIL & CHEM.STORE

PRODUCT REWORK

4.0M WIDE ROAD

EXISTING PIPE BRIDGE

N2 / CO2

WTP 33.0x15.0

EXISTING PIPE BRIDGE

(Setback line) 10000

1.00M WIDE BICYCLE PATH

SET BACK LINE

66 KVA

68241 BOUNDARY LINE

BOUNDARY LINE

LANDSCAPING

LOADING DOCK 696 Sqmts

DESPATCH/ RECEIVING OFFICE

QA INCOMING

WAREHOUSE +100.75

54.0x63.0 3402 Sqmts

FUTURE 21.0x63.0 1323 Sqmts

ACID/LYE-UNLOADING & STORAGE

WEIGH BRIDGE 3.0x12.0

STAFF-SAN 3.0x3.0

PIPE RACK +5.50M VL

CHAIN LINK FENCING/WALL TO BE DECIDED LATER

SOLID WASTE HANDLING

DAY STOCK

DAY STOCK DRY MIX

96.0x24.0 2304 Sqmts

CARTON PALLETISING AREA

CRITICAL HYGIENE CORRIDOR

SPRAY DRYING PLANT

CIP KITCHEN

PASTEURISING

MCC-1 11x9

STANDARD HYGIENE CORRIDOR

FUTURE SPRAY DRYING PLANT

WORKERS CORRIDOR

COVERED WALKWAY

CAR PARK

LANDSCAPING

1.50M WIDE WALKWAY

GROUND FLOOR PLAN

FIRST FLOOR PLAN

LANDSCAPING AREA

AMBULANCE PARKING

40 Nos. CARS

100 Nos. 2 WHEELERS (BICYCLES)

100 Nos. 2 WHEELERS (BICYCLES)

10 Nos. BUS PARKING

GENERAL VISITORS CAR/SCOOTER/BICYCLES PARKING

53756

OH GUART POST

75670

TRUCK WHEEL WASH

2.00M WIDE WALKWAY

1.50M WIDE WALKWAY

85171

38868

SET BACK LINE

FIELD JEEPS/CAR PARKING (12 NOS)

BOUNDARY LINE

307862

KATCHA DRAIN

TRUCK ENTRY

64578

42982

PRIMARY GATE

ROAD GREEN BELT

TO MOGA (25 KM.)

METALLED PORTION

NH- 95

6523

LUDHIANA/ JAGRAON 4KM.

ASSUMED BM 100.0M. ON ROAD

6557

27679

BRY WALL

THE CO-OP. SUGAR MILL JAGRAON

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L&T- NIRO LIMITED,
Plot No. 101, GIDC, Ranoli
NH. No. 8, Dist. Baroda – 391 350.
Ph : 2240 700 Fax : 2240 500

SCALE			
1:1000	Drawn	NH	05.07.05
	Check.	AD	05.07.05
	Appr.	GPJ	05.07.05

* * * CHANGE BY CAD SYSTEM ONLY * * *

Project : DUMEX DAIRY | LTN Ref. No. : VX1–30053 | File : 13469–1_Sh–1_R1

CLIENT : DUMEX INDIA PRIVATE LIMITED

PROJECT : 2 LLPD DAIRY PLANT

200,000 LITERS PER DAY DAIRY PLANT
PLOT PLANT LAYOUT AND KEY PLAN

LTN–13469/1

Rev.

A1 SIZE