



Development of Ship Repair
Facility at Pandu, Guwahati,
Assam



HOOGHLY COCHIN SHIPYARD LIMITED

(A WHOLLY-OWNED SUBSIDIARY OF COCHIN SHIPYARD LTD)

DEVELOPMENT OF SHIP REPAIR FACILITY AT PANDU, GUWAHATI, ASSAM

PLUMBING EXECUTION WORKS FOR SRF AT PANDU, GUWAHATI

FOR

PACKAGE II TENDER FOR PLUMBING WORKS

TENDER NO: HCSL/PANDU/TEN/2026/175 dtd. 29/07/2026

Due Date of Submission: 15.00 Hrs. on 19.08.2026

Date & Time of Opening: 15.30 Hrs. on 19.08.2026

Package II – Tender for Plumbing works





I N D E X

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	1.2	Cost of Tendering	n)	Format of Performance Bank Guarantee
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2.	Tendering Documents			
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3.	Preparation of Tenders		q)	Format for performance of Bank Guarantee for Release off Retention Money
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	3.2	Documents comprising the Tender:	r)	Self-Declaration to be given by the bidder in Letter head
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6.	Tender Validity		u)	Tender declaration
7.	Tender Security		v)	VENDOR DETAILS (to be submitted along with TECHNICAL BID
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	13.1	Tender Opening		Special Conditions of Contract
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14.	Clarification of Tenders			(Including the following)
15.	Employer's Right to Accept any Tender and to reject any or all Tenders			Contract Data
	15.2	Notification of Award and Signing of Agreement		Technical Specifications
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17.	Corrupt or Fraudulent Practices			Preamble to Bill of Quantities
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	a)	Form-A: Qualification Information		Bill of Quantities
	b)	Format-D: Similar works during last five years		
	c)	Format-G: Ongoing works		Tender Drawings:
	d)	Format-J: Proposed subcontracts		
	e)	Format-L: Bank certificate		
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NOTICE INVITING TENDER

TENDER NOTICE NO: HCSL/PANDU/TEN/2026/175 dtd. 29/07/2026		
Tender Document no.:		HCSL/PANDU/TEN/2026/175 dtd. 29/07/2026
Sealed tenders in the prescribed form are invited for the following work:		
1	Name of the work:	PLUMBING EXECUTION WORKS FOR SRF AT PANDU, GUWAHATI
2	Employer:	HOOGHLY COCHIN SHIPYARD LIMITED
3	Design Consultants:	National Technology Centre for Ports, Waterways and Coasts, IIT Madras (NTCPWC - IITM).
4	Completion time:	02(Two) Months from the Start Date specified in the Letter of Acceptance.
5	Tender Security (Earnest money deposit):	INR 1,00,000/- (Rupees One lakh only.)
6	Cost of Tender Document:	NIL
7	Tender Books will be available from:	29.07.2026
8	Last date and time for requests and receipt of Tender	19.08.2026, upto 3.00 PM
	Last date for written queries	On 11.08.2026
9	Pre-bid meeting	11.08.2026
10	Last date and time for submission of Tender Document	19.08.2026, upto 3.30 PM
11	Time and venue for opening of tenders:	19.08.2026 AT 03.30 PM, Hooghly Cochin Shipyard Ltd., Nazirgunge, Satyen Bose Road, PO: Danesh Seikh Lane, Howrah, West Bengal-711109.
12	Delays in submission of tenders:	The Employer will not be responsible for any delay, loss or non-receipt of Tender Documents or tenders during transit by courier or mail.
13	Employer rights:	The Employer reserve the right to issue / refuse Tender Documents and to accept / reject any or all tenders either in part or full or to split and award the work to more than one agency without assigning any reasons thereof and without any liability to the Employer / Design Consultants.
14	Address for requisition and submission of tender document	Hooghly Cochin Shipyard Ltd., Nazirgunge, Satyen Bose Road, PO: Danesh Seikh Lane, Howrah, West Bengal-711109

Tender reference should be clearly indicated on top of the respective envelopes.

Sealed tenders addressed to the Chief Executive Officer, Hooghly Cochin Shipyard Ltd, shall be dropped in the "Hooghly CSL Tender box" located at Hooghly CSL-Nazirgunge Unit at Danesh Sk. Lane, Nazirgunge, Howrah -711109 or courier to Hooghly CSL, Nazirgunge at Danesh Sk. Lane, Nazirgunge, Howrah -711109, West Bengal by the due date and time and the bids should be submitted in **hardcopy**.

Tenders should be submitted in a two separate sealed covers/files as PART – I "TECHNO-COMMERCIAL" & PART – II "PRICE BID" indicating the tender number, due date of the tender and subject as in-line with the scope of work.

Tender documents received after the due date & time will not be considered.



Signature and Seal of the Contractor(s)

Project Officer (Electrical)
For Hooghly Cochin Shipyard Ltd.

INVITATION TO TENDER

The present tender is for Plumbing execution works for Ship Repair Facility at Guwahati. The components of work are listed in the Preamble to Bill of Quantities.

The attached Tender Notice gives details of certain salient points in regard to this tender. Additional details in the form of Instructions to Tenderers are given below.

1. General

1.1 One Tender per Tenderer

Each tenderer shall submit only one tender for one package. A tenderer who submits or participates in more than one Tender (other than as a subcontractor or in cases of alternatives that have been permitted or requested) will cause all the proposals with the Tenderer's participation to be disqualified.

1.2 Cost of Tendering

The tenderer shall bear all costs associated with the preparation and submission of his Tender, and the Employer will in no case be responsible and liable for those costs.

1.3 Site Visit

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

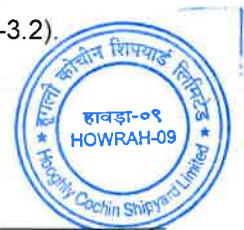
2. Tendering Documents

2.1 Content of Tender Document:

The set of tender documents comprises the documents listed in the table below and addenda issued in accordance with Clause-2.4:

- Tender Notice
- Invitation to Tender, including Instructions to Tenderers
- Forms of Tender and Qualification Information
- Forms of Securities
- General Conditions of Contract
- Special Conditions of Contract
- Contract Data
- Technical Specifications
- Preamble to Bill of Quantities
- Bill of Quantities
- Drawings, termed as Tender Drawings, where enclosed to the Tender Document, or otherwise available with the Employer for perusal by the tenderers.

2.2 The tender document shall be filled in and returned with the Tender (Clause-3.2).



2.3 Clarification of Tender Documents

- a) A prospective tenderer requiring any clarification of the tender documents may notify the employer in writing at the Employer's address indicated in the Invitation to Tender.
- b) The Employer will respond to any request for clarification that he receives earlier than five days prior to the deadline for submission of tenders.
- c) Copies of the employer's response will be forwarded to all purchasers of the tender documents, including a description of the enquiry but without identifying its source.

2.4 Amendment of Tender Documents

- a) Before the deadline for submission of tenders, the Employer may modify the tender documents by issuing addenda.
- b) Any addendum thus issued shall be part of the tender document and shall be communicated in writing to all the purchasers of the tender documents. Prospective tenderers shall acknowledge, in writing, the receipt of each addendum.
- c) To give prospective tenderers reasonable time in which to take an addendum into account in preparing their tenders, the Employer shall extend as necessary the deadline for submission of tenders.

3. Preparation of Tenders

3.1 Language of the Tender:

All documents relating to the tender shall be in the English language.

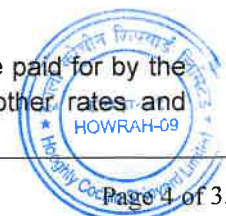
3.2 Documents comprising the Tender: The tender submitted by the tenderer shall comprise the following:

- a) The Tender Document (as described in Clause-2.1), along with the covering letter of the tenderer, as per Format for Tender, on tenderer's letterhead.
- b) Tender Security
- c) Priced Bill of Quantities
- d) Qualification Information Forms and Documents;
- e) And any other material required be completing and submitting by tenderers in accordance with these instructions.

The documents listed under Forms of Tender and Qualification Information, Forms of Securities and the Bill of Quantities shall be filled in without exception.

4. Tender Prices

- 4.1 The contract shall be for the whole works, based on the priced Bill of Quantities submitted by the Tenderer.
- 4.2 The tenderer shall fill in rates and prices and line item total (both in figures and words) for all items of the Works described in the Bill of Quantities, along with total tender price (both in figures and words).
- 4.3 Items for which no rate or price is entered by the tenderer will not be paid for by the Employer when executed and shall be deemed covered by the other rates and



prices in the Bill of Quantities. Corrections, if any shall be made by crossing out, initialing, dating and rewriting.

- 4.4 All duties, taxes, and other levies payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Tenderer.
- 4.5 The rates and prices quoted by the tenderer shall be fixed for the duration of Contract and shall not be subject to adjustment on any account.

5. Currencies of Tender and Payment

- 5.1 The unit rates and the prices shall be quoted by the tenderer entirely in Indian Rupees.

6. Tender Validity

- 6.1 Tenders shall remain valid for a period not less than 120 days after the deadline date for tender submission specified in Clause-11. A tender valid for a shorter period may be rejected by the Employer as non-responsive.
- 6.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the tenderers may extend the period of validity for a specified additional period. The request and the tenderers' responses shall be made in writing. A tenderer may refuse the request without forfeiting his tender security.
- 6.3 A tenderer agreeing to the request will not be required or permitted to modify his tender except that he will be required to extend the validity of his tender security for the period of the extension, and in compliance with Clause-7 in all respects.

7. Tender Security

- a) The Tenderer shall furnish, as part of his Tender, a Tender security, termed as Earnest Money Deposit (EMD), in the amount as indicated in the Tender Notice. This tender security shall be in the form of Bank Guarantee drawn in favour of 'Hooghly Cochin Shipyard Ltd. payable at Kolkata and shall be valid for a period of 6 (Six) months from the due date of opening of Techno-commercial Bids from any Nationalized/Scheduled Bank or paid online through e-gateway of –

**STATE BANK OF INDIA
COCHIN SHIPYARD BRANCH
ACCOUNT NO: 37354232301
IFSC CODE: SBIN0003229**

- 7.1 Any tender not accompanied by an acceptable Tender Security and not secured as indicated at Clause-7(a) and 7.1 above shall be rejected by the Employer as non-responsive.
- 7.2 The Tender Security of unsuccessful tenderers will be returned within 28 days of the end of tender validity period specified at Clause-6.1.
- 7.3 The Tender Security of the successful tenderer will be discharged when the tenderer has signed the agreement and furnished the required Performance Security.
- 7.4 The Tender Security may be forfeited.



- a) If the Tenderer withdraws the Tender after Tender opening during the period of Tender validity;
- b) In the case of a successful Tenderer, if the Tenderer fails within the specified time limit to sign the Agreement or furnish the required Performance Security.

8. Alternative Proposals by Tenderers

- 8.1 Tenderers shall submit offers that comply with the requirements of the tender documents, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered.

9. Format and Signing of Tender

- 9.1 The Tenderer shall prepare the set of documents comprising the tender as described in Clause-3 of these Instructions to Tenderers, bound with the volume containing the Form of Tender.
- 9.2 The Tender shall be typed or written in indelible ink and shall be signed by a person or persons duly authorised to sign on behalf of the Tenderer.
- 9.3 All pages of the tender where entries or amendments have been made shall be initialled by the person or persons signing the tender.
- 9.4 The Tender shall contain no alterations or additions, except those to comply with instructions issued by the Employer, or as necessary to correct errors made by the tenderer, in which case such corrections shall be initialled by the person or persons signing the tender.

10. Submission of Tenders

10.1 Sealing and Marking of Tenders

- a) The Tenderer shall seal the Tender (Clause-3.2) in an envelope, which shall:

• be addressed to the Employer at the following address:	Hooghly Cochin Shipyard Ltd., Nazirgunge, Satyen Bose Road, PO: Danesh Seikh Lane, Howrah, West Bengal-711109.
• bear the following identification:	Tender Notice no. HCSL/ DO NOT OPEN BEFOREat 15:30 HRS.
• bear the identity of the tenderer:	Full name and mailing address of the tenderer.

- b) Where the tender is declared late, pursuant to Clause-11.4, it may be returned unopened to the tenderer, using the identity cited above.
- c) If the envelope is not sealed and marked as above, the employer will assume no responsibility for the misplacement or premature opening of the tender.

11. Deadline for Submission of the Tenders

- 11.1 Tenders must be received by the Employer at the address specified above not later than the date and time indicated in the Tender Notice.



11.2 In the event of the specified date for the submission of tenders being declared a holiday for the Employer, the Tenders will be received upto the appointed time on the next working day.

11.3 The Employer may extend the deadline for submission of tenders by issuing an amendment in accordance with Clause-2.4, in which case all rights and obligations of the Employer and the tenderers previously subject to the original deadline will then be subject to the new deadline.

11.4 Late Tenders

- a) Any Tender received by the Employer after the deadline prescribed in Clause-11 will be returned unopened to the tenderer.

12. Modification and withdrawal of Tenders

12.1 Tenderers may modify or withdraw their tenders by giving notice in writing before the deadline prescribed in Clause-11.

12.2 Each Tenderer's modification or withdrawal notice shall be prepared, sealed, marked, and delivered in accordance with Clause-9 and 10, with the outer and inner envelopes additionally marked "MODIFICATION" or "WITHDRAWAL" as appropriate.

12.3 No tender may be modified after the deadline for submission of Tenders.

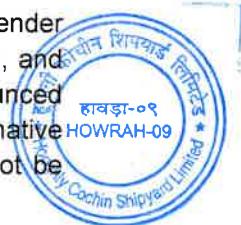
12.4 Withdrawal or modification of a Tender between the deadline for submission of tenders and the expiration of the original period of tender validity specified in Clause-6.1 above or as extended pursuant to Clause-6.2 may result in the forfeiture of the Tender security pursuant to Clause-7.

12.5 Tenderers may only offer discounts to, or otherwise modify the prices of their Tenders, by submitting Tender modifications in accordance with this Clause, or included in the original Tender submission.

13. Tender Opening and Evaluation

13.1 Tender Opening

- a) The Employer may or may not opt to open all the Tenders received (except those received late), including modifications made pursuant to Clause-12, in the presence of the Tenderers or their representatives who choose to attend at the time and on the date and at the place specified in Clause-10. In the event of the specified date of Tender opening being declared a holiday for the Employer, the Tenders will be opened at the appointed time and location on the next working day.
- b) Envelopes marked "WITHDRAWAL" shall be opened and read out first. Tenders for which an acceptable notice of withdrawal has been submitted pursuant to Clause-12 shall not be opened.
- c) The Tenderers' names, the total amount of each Tender and of any alternative Tender (if alternatives have been requested or permitted), any discounts, Tender modifications and withdrawals, the presence or absence of Tender security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening. Any Tender price, discount, or alternative Tender price which is not read out and recorded at Tender opening will not be taken into account in Tender evaluation.



- d) The Employer may prepare minutes of the Tender opening, including the information disclosed to those present in accordance with Clause-13.1.

13.2 Process to be Confidential:

Information relating to the examination, clarification, evaluation, and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced. Any effort by a Tenderer to influence the Employer's processing of Tenders or award decisions may result in the rejection of his Tender.

14. Clarification of Tenders

- 14.1 To assist in the examination, evaluation, and comparison of Tenders, the employer may, at his discretion, ask any Tenderer for clarification of his Tender, including breakdowns of unit rates. The request for clarification and the response shall be in writing.
- 14.2 Subject to Clause-14.1, no Tenderer shall contact the Employer on any matter relating to his tender from the time of the tender opening to the time the contract is awarded. If the Tenderer wishes to bring additional information to the notice of the Employer, he should do so in writing.
- 14.3 Any effort by the Tenderer to influence the Employer in the Employer's tender evaluation, tender comparison or contract award decisions may result in the rejection of the Tenderers' tender.

15. Employer's Right to Accept any Tender and to reject any or all Tenders

- 15.1 Notwithstanding anything else stated in these documents, the Employer reserves the right to accept or reject any Tender, and to cancel the Tendering process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected tenderer or Tenderers of the grounds for the employer's action.

15.2 Notification of Award and Signing of Agreement

- a) The Tenderer whose Tender has been accepted, in whole or part, will be notified of the award by the Employer prior to expiration of the Tender validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion, and maintenance of the Works by the Contractor as prescribed by the Contract called the "Contract Price".
- b) The notification of award will constitute the formation of the contract, subject only to the furnishing of a performance security in accordance with the provisions of Clause-16.
- c) The Agreement will incorporate all agreements between the Employer and the successful Tenderer. It will signed by the Employer and sent to the successful Tenderer, within 28 days following the notification of award along with the Letter of Acceptance. Within 21 days of receipt, the successful Tenderer will sign the Agreement and deliver it to the Employer.

- d) Upon the furnishing by the successful Tenderer of the Performance Security, the Employer will promptly notify the other Tenderers that their Tenders have been unsuccessful.

16. Performance Security

16.1 Within seven days of receipt of the Letter of Acceptance, the successful Tenderer shall deliver to the Employer a Performance Security in any of the forms given below for an amount equivalent to 3% (three percent) of the Contract price:

- a) A bank guarantee in the form given in this Tender Document.

16.2 If the performance security is provided by the successful Tenderer in the form of a Bank Guarantee, it shall be issued either (a) at the Tenderer's option, by a Nationalized / Scheduled Indian Bank or (b) by a foreign bank located in India and acceptable to the Employer.

16.3 Failure of the successful Tenderer to comply with the requirements of Clause-16.1 shall constitute sufficient grounds for cancellation of the award and forfeiture of the Tender Security.

17. Corrupt or Fraudulent Practices

17.1 The Employer, without assigning any reason thereof, reject the tender of a tenderer, who, in the opinion of the Employer has resorted to corrupt or fraudulent practices in presenting his tender.

18. Forms of tender, qualification information and letter of acceptance

18.1 Formats for the following are provided in the pages hereunder:

- a) Contractor's tender
- b) Qualification information
- c) Letter of acceptance
- d) Notice to proceed with the work
- e) Agreement form
- f) Form of Tender Security (Bank Guarantee)
- g) Performance Bank Guarantee*
- h) Bank Guarantee for Release of Mobilisation Advance*
- i) Bank Guarantee for Release of Secured Advance against Materials brought to Site*
- j) Performance Bank Guarantee for Release of Retention Money

18.2 * **Tenderers should not complete the Performance, Mobilisation and Secured Advance forms at the time of submitting the tender.**

18.3 Only the successful Tenderer will be required to provide Performance, Mobilization and Secured Advance Securities in accordance with the respective forms, or in a similar form acceptable to the Employer.





18.4 Pre-Qualification of bidder:

18.4.1 The contractor should have completed during last five years, similar nature of work related to Plumbing Execution Works in any organizations of Govt of India/State Govt/PSU or reputed private organizations, at least one work of not to be less than INR 62 lakhs, or two works of value INR 41 lakhs each or three works of value INR 27 lakhs each. Satisfactory completion certificate from the Client for work done should be submitted along with bid. For ongoing work; relevant certification from client shall be submitted along with copy of Purchase Order.

18.4.2 The Average Annual Turnover of the contractor should be more than INR 34 Lakhs for the last three preceding years. (Audited Balance sheets showing turnover, Profit & Loss account of the firm for the preceding 03 years (2022-23, 2023-24 and 2024-25) should be submitted along with the application for prequalification).

18.4.3 Offers from joint ventures/ consortium will not be accepted.

18.4.4 Bidder shall not be under a declaration of ineligibility issued by Govt. of India/ State govt./ Public Sector Undertakings etc. The bidder shall not have been debarred /black listed / under Termination list by UCSL or by any of the Public Sector Undertaking or Government department etc.

1. **The bidder must visit the HCSL Pandu SRF project site before submission of the bid. The site visit slip must be submitted along with the tender document containing HCSL Officer signature is mandatory else offer will be rejected.**

SRF project location:

***Opposite Assam Railway Police Station,
Pandu Port Road,
Maligaon, Guwahati 781 012,
Assam, India***

Any request for clarification in writing must be addressed to,

Name : Biswajit Ch Das
Designation : Project Officer (Electrical)
Email : biswajitch.das@hooghlycsl.com
Mob : 9804338498

Name : Sreerag G.
Designation : Manager (Materials)
Email : sreerag.g@hooghlycsl.com
Mob : 9482608957



Form-B

Qualification Information

The information to be filled in by the Tenderer in the following pages and their annexures will be used for purposes of post qualification. This information will **not** be incorporated in the Contract.

Sl.no	Parameter	Details	Mark of format / encl.	Instructions
1	This Form-B, duly filled up		A	
2	Constitution or legal status of Tenderer		B	(Attach copy)
3	Place of registration			
4	Principal place of business			
5	Power of attorney of signatory of Tender		C	(Attach copy)
6	Works, similar in nature to that under this Tender, executed in the last five years, in Rs. Lakhs.	2019-20: _____ 2020-21: _____ 2021-22: _____ 2022-23: _____ 2023-24: _____	D E	1. Attach details in format below. 2. Attach certificates from employer's engineer.
7	Payments received in the last five years	2019-20: _____ 2020-21: _____ 2021-22: _____ 2022-23: _____ 2023-24: _____	F	Attach certificates from Chartered Accountant.
8	Existing commitments and on-going works		G H	1. Attach details in format below. 2. Attach certificates from employer's engineer.
9	Works for which tenders already submitted			
10	Proposed subcontracts and firms involved.	Number: _____	J	Attach list



11	Financial reports, balance sheets, profit & loss statements, auditors' reports, etc. for the last five years	---	K	List them and attach copies.
12	Evidence of access to financial resources to meet the qualification requirement (cash in hand, lines of credit, etc.)	1. 2.	L	1. List them below and attach copies of support documents. 2. Letter from bankers.
13	Persons having business relationship with Tenderer, who may provide reference to the Employer.	List (names, addresses, tel & fax numbers)	M	Attach list.
14	Information on litigation history in which the Tenderer is involved.	List:	N	Attach details.
15	List of key manpower		P	Attach details in format below.
16	List of plant & equipment		Q	Attach details in format below.

Format-D Similar works during the last five years: Attach certificates from the employer / his engineer.

Descripti on of work	Price & State	Contra ct no. & Date	Name and Address of Employer	Value of Contract (Rs. Lakhs)	Stipulated period of completi on	Value of works* of remaining to be completed (Rs. Lakhs)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Format-G Ongoing works:

Attach certificates from the employer / his engineer.

Descripti on of work	Price & State	Contra ct no. & Date	Name and Address of Employer	Value of Contract (Rs. Lakhs)	Stipulated period of completi on	Value of works* of remaining to be completed (Rs. Lakhs)	Anticipated date of completion
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)

Format-J Proposed subcontracts:

Sections of the works	Value of Subcontract	Subcontractor (name and address)	Experience in similar works





Development of Ship Repair Facility at Pandu,
Guwahati, Assam



Format-L Bank certificate:

This is to certify that M/s. _____ is a reputed company with a good financial standing. If the contract for the work, namely _____ is awarded to the above firm, we shall be able to provide overdraft / credit facilities to the extent of Rs. _____ to meet their working capital requirements for executing the above contract. Sd.
_____ Senior Bank Manager

Name of Bank Address of the Bank

Format-N Litigation history, involving the Tenderer:

Other party(ies)	Employer	Cause of dispute	Amount involved	Remarks showing present status

Format-P Key personnel: Qualifications and experience of key personnel proposed for administration and execution of the Contract.

Attach biographical data.

Position	Name	Qualifications	Years of experience (general)	Years of experience in the proposed position
Project Manager				
*				
etc.				

Format-Q Equipment & plant:

Required			Availability proposal			Remarks
Item of equipment	Required no.	Required capacity	Owned / leased / to be procured	Nos. / Capacity	Age / Condition	From whom to be purchased



Annexure-1

Format for Tender

(on tenderer's letterhead)

Dated:

To
HOOGHLY COCHIN SHIPYARD LTD
(Govt. of India Enterprise,)
Administrative Building, HCSL Premises,
Satyen Bose Road, Danesh SK Lane (PO),
Nazirgunge, Howrah, West Bengal - 711109.

GENTLEMEN,

Subject: Plumbing Execution Works for Ship Repair Facility at Guwahati, vide Tender Notice
no.

1. We offer to execute the Works described above in accordance with the Conditions of Contract accompanying the Tender for the Contract Price of -----[in figures](-
-----[in letters], as arrived at based on the Bill of Quantities.
2. We understand that the Contract Price stated above is subject to revision in terms of variations in the actual quantities to be executed in respect of the various items in the Bill of Quantities.
3. This Tender and your written acceptance of it shall constitute a binding contract between us, until the signing of the Contract Agreement.
4. We understand that you are not bound to accept the lowest of any Tender you receive.
5. We have examined, understood and hereby undertake to comply with all the requirements of the Contract, as detailed in your Tender Document, including, but not limited to, General Conditions of Contract, Special Conditions of Contract, Specifications, Bill of Quantities and it's Preamble, tender drawings, Tender Notice and Invitation to Tender, as well as all clarifications received by us.
6. We have visited the site and satisfied ourselves of all the present and expected situations.
7. We undertake that, in competing for (and, if the award is made to us, in executing) the above contract, we will abide by the laws of the Republic of India, in so far as they relate to our actions and activities in connection with this tender.
8. We hereby confirm that this Tender complies with the Tender Validity and Tender Security required by the Tendering documents.
9. We attach herewith our current income-tax clearance certificate.





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10. The Tender Document, duly filled up and signed by us, is enclosed herewith in a sealed envelope.

Authorized Signature, with date : _____

Name & Title of Signatory : _____

Name of Tenderer : _____

Address : _____





Annexure-2

Format for Letter of Acceptance
(on Employer / Engineer's letterhead)

Ref. no.:

Dated:

To:

----- [Name and Address of the Contractor]

Dear Sirs,

1. This is to notify you that your Tender dated ----- for execution of the -----
-----[name of the contract and
identification number, as given in the Instructions to Tenderers] for the Contract Price of
Rupees-----[amount
in words and in figures], as corrected and modified in accordance with the Instructions to
Tenderers is hereby accepted by us.
2. You are hereby requested to furnish Performance Security, in the form detailed at para-16 of
Invitation to Tender, for an amount of Rs.-----, within seven days of the receipt
of this letter of acceptance, valid upto 28 days from the date of expiry of Defects Liability
Period i.e., upto----- and sign the Contract, failing which action as stated at para-
16 of Invitation to Tender will be taken.

Yours sincerely,

Authorised Signature
Name and Title of Signatory





Annexure-3

Form of Articles of Agreement
(on non-judicial Stamp Paper)

This Agreement, made the ----- day of ----- 20---,

Between ----- [name and address of Employer] (hereinafter called "the Employer") and ----- [name and address of contractor] (hereinafter called "the contractor") of the other part,

Whereas the Employer is desirous that the Contractor execute-----
-----[name and identification number of Contract] (hereinafter called "the Works") and the Employer has accepted the Tender by the contractor for the execution and completion of such Works and the remedying of any defects therein at a contract price of Rupees-----.

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement, words and expression shall have the same meanings as are respectively assigned to them in the conditions of Contract hereinafter referred to, and they shall be deemed to form and be read and construed as part of this Agreement.
2. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy any defects therein in conformity in all aspects with the provisions of the Contract.
3. The Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying the defects wherein the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.
4. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.
 - a) Letter of Acceptance
 - b) Notice to proceed with the works
 - c) Contractor's Tender
 - d) Contract Data
 - e) Conditions of contract (including Special Conditions of Contract)
 - f) Specifications
 - g) Drawings
 - h) Bill of Quantities and
 - i) Any other document listed in the Contract Data as forming part of the contract.





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5. No amendment to this Agreement shall be valid or be of any affect unless the same is agreed to in writing by both the parties hereto and specifically stated to be an amendment to this Agreement.

In witness whereof the parties hereto have caused this Agreement to be executed the day and year first before written :

The Common Seal of _____ was hereunto affixed
in the presence of : _____ Signed, Sealed and Delivered
by the said _____ in the presence of : _____
_____ Binding signature of Employer: _____
_____ Binding Signature of Contractor : _____





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Annexure-4

Format for Notice to proceed with the work
(on Employer's / Engineer's letterhead)

Ref. no.:

Dated:

To:

----- [Name and Address of the Contractor]

Dear Sirs,

Pursuant to your furnishing the requisite security as stipulated at para-16 of Invitation to Tender and signing of the Contract for ----- at a Contract Price of Rs.-----
-----, you are hereby instructed to proceed with the execution of the said works in accordance with the contract documents. The Contract Price stated above is subject to revision in terms of variations in the actual quantities to be executed in respect of the various items in the Bill of Quantities.

Yours sincerely,

Authorised Signature
Name and Title of Signatory





Annexure-5

Form of Tender Security (Bank Guarantee)

To
HOUGHLY COCHIN SHIPYARD LTD
(Govt. of India Enterprise,)
Administrative Building, HCSL Premises,
Satyen Bose Road, Danesh SK Lane (PO),
Nazirgunge, Howrah, West Bengal - 711109.

WHEREAS, _____ [*name of Tenderer*] (hereinafter called "the Tenderer") has submitted / is submitting his Tender for _____ [*name of Contract*] (hereinafter called "the Tender"),

KNOW ALL PEOPLE by these presents that we _____ [*name of bank*] of _____ [*name of country*] having our registered office at _____ (hereinafter called "the Bank") are bound unto _____ [*name of Employer*] (hereinafter called "the Employer") in the sum of _____ * for which payment well and truly to be made to the said Employer, the Bank binds itself, his successors and assigns by these presents.

SEALED with the common seal of the said bank this _____ day of _____ of 20----.

THE CONDITIONS of this obligation are:

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

then, we undertake to pay, without cavil or argument, to the Employer upto the above amount upon receipt of Employer's first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the two conditions, specifying the occurred condition or conditions.

- 3) This guarantee will remain in force upto and including the date _____, which is 135 days, being the sum of 90 (ninety) days of Tender Validity after the deadline date for tender submission and 45 (fortyfive) days thereafter, as such deadline and stipulations are stated in the Instructions to Tenderers or as it may be extended by the Employer, notice of



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which extension(s) to the Bank is hereby waived. Any demand in respect of this guarantee should reach the Bank not later than the above date.

- 4) This guarantee shall not be vitiated by any change in the constitution of the Bank or the Tenderer or the Employer.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

* The Tenderer should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This Figure should be the same as stipulated in the Tender Notice.





Annexure-6

Format for Performance Bank Guarantee/Warranty Guarantee

To
HOOGLY COCHIN SHIPYARD LTD
(Govt. of India Enterprise,)
Administrative Building, HCSL Premises,
Satyen Bose Road, Danesh SK Lane (PO),
Nazirgunge, Howrah, West Bengal - 711109.

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor" has undertaken, in pursuance of Contract no. _____ dated _____ to execute _____ [name of Contractor and brief description of works] (hereinafter called "the Contractor").

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

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of _____ [amount of guarantee]* _____ [in words], such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

This guarantee shall not be vitiated by any change in the constitution of the Bank or the Tenderer or the Employer.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____





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* An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract as Performance Security and denominated in Indian Rupees.





Annexure-7

Format for Bank Guarantee for Release of Mobilisation Advance

To
HOOGLY COCHIN SHIPYARD LTD
(Govt. of India Enterprise,)
Administrative Building, HCSL Premises,
Satyen Bose Road, Danesh SK Lane (PO),
Nazirgunge, Howrah, West Bengal - 711109.

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor" has undertaken, in pursuance of Contract no. _____ dated _____ to execute _____ [name of Contractor and brief description of works] (hereinafter called "the Contractor").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor may opt to furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for his being eligible for receiving mobilisation advance, in accordance with the Contract.

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of _____ [amount of guarantee]* _____ [in words], such sum being arrived at as the maximum amount of unadjusted advance that may remain with the Contractor at any time during the pendency of the Contract, payable in the types and proportions of currencies in which the Contract Price as per terms of the Contract is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

This guarantee shall not be vitiated by any change in the constitution of the Bank or the Tenderer or the Employer.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____





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* An amount shall be inserted by the Guarantor, representing the amount of mobilisation advance that can be made against this Guarantee and denominated in Indian Rupees.





Annexure-8

**Format for Bank Guarantee for
Release of Secured Advance against Materials brought to Site**

To
HOOGLY COCHIN SHIPYARD LTD
(Govt. of India Enterprise,)
Administrative Building, HCSL Premises,
Satyen Bose Road, Danesh SK Lane (PO),
Nazirgunge, Howrah, West Bengal - 711109.

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor" has undertaken, in pursuance of Contract no. _____ dated _____ to execute _____ [name of Contractor and brief description of works] (hereinafter called "the Contractor").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor may opt to furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for his being eligible for receiving advance against materials brought by him to Site, in accordance with the Contract.

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of _____ [amount of guarantee]* _____ [in words], such sum being arrived at as the maximum amount of unadjusted advance that may remain with the Contractor at any time during the pendency of the Contract, payable in the types and proportions of currencies in which the Contract Price as per terms of the Contract is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

This guarantee shall not be vitiated by any change in the constitution of the Bank or the Tenderer or the Employer.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____





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* An amount shall be inserted by the Guarantor, representing the amount of unadjusted / unrecovered advance that can be maintained against this Guarantee and denominated in Indian Rupees.





Annexure-9

**Format for Performance Bank Guarantee
for Release of Retention Money**

To
HOUGHLY COCHIN SHIPYARD LTD
(Govt. of India Enterprise,)
Administrative Building, HCSL Premises,
Satyen Bose Road, Danesh SK Lane (PO),
Nazirgunge, Howrah, West Bengal - 711109.

WHEREAS _____ [name and address of Contractor] (hereinafter called "the Contractor" has undertaken, in pursuance of Contract no. _____ dated _____ to execute _____ [name of Contractor and brief description of works] (hereinafter called "the Contractor").

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor may opt to furnish you with a Bank Guarantee by a recognised bank for the sum specified therein as security for compliance with his obligations during the Defect Liability Period, in accordance with the Contract.

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, upto a total of _____ [amount of guarantee]* _____ [in words], such sum being payable in the types and proportions of currencies in which the Retention Money as per terms of the Contract is payable, and we undertake to pay you, upon your first written demand and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee]* as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

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

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

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

This guarantee shall not be vitiated by any change in the constitution of the Bank or the Tenderer or the Employer.

Signature and seal of the guarantor _____

Name of Bank _____

Address _____

Date _____





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* An amount shall be inserted by the Guarantor, representing the amount of Retention Money sought to be released against this Guarantee and denominated in Indian Rupees.





Annexure – 10

Self-Declaration to be given by the bidder in Letter head

Bid's Reference No. & Date:

Bidder's Name & Address:

Person to be contacted:

Designation:

Telephone No.:

Fax No.:

Email:

1. We do hereby declare that we have not been debarred/black listed by Hooghly CSL or by any of the Public Sector Undertaking or Government department etc.
2. If Hooghly CSL finds that, we have been blacklisted/ debarred by any of the Public Sector Undertaking or Government department, and then Hooghly CSL can reject the offer or terminate the contract at any point of time. In such case, we are aware that, EMD, security deposit, performance guarantee etc will be forfeited by Hooghly CSL. Further we are confirming herewith that, any loss that has happened to Hooghly CSL due to this will be compensated by us.

For and on behalf of the firm

(Firms Name & Address)

(Signature of Authorized
Signatory)

Name:

Designation

Phone No.:

Seal:

Date:

Place:.....





Annexure - 11

COMPLIANCE STATEMENT- List of Deviations		PAGE 1 OF 1
Tender Name: Supply and Commissioning of Marine Main Engines with accessories for 02 no. of 80 Pax River Cruise Vessel at Hooghly Cochin Shipyard Limited, Nazirgunge Unit, Howrah.		
TENDER NO:HCSL/PUR/TEN/2025/074 Dated: 16.08.2025		
We hereby confirm and truly declare that our Offer / Bid No.datedis in full compliance with the documents issued against the Tender No. -----dated -----, except for the deviations listed below:		
LIST OF DEVIATIONS (HOOGHLY CSL reserves the right to reject offers with deviations)		
Sl. No.	Description / Tender Reference	Reasons for Deviation
Name of tenderer:		
Date:	Name & Designation	Seal & Signature
(Company Seal)		



Annexure - 12

(Sample Format)

Details of legal cases pending against the firm for the last five years

SL. NO.	ORGANISATION AGAINST WHOM THE LITIGATION IS INVOLVED	BRIEF DETAILS OF DISPUTE	AMOUNTS INVOLVED (Rs.)	PRESENT STATUS	Remarks



Annexure - 13

TENDER DECLARATION

This is to certify that I have completely read and understood the tender enquiry /
numberand we/I,
M/s....., hereby declare that will
abide by all the tender conditions. Deviations, if any in the techno-commercial
offer from that of the tender enquiry and subsequent corrigendum in any form will
be clearly furnished by us in a separate document which will be titled as "List of
Deviations".

If we are not providing any separate document titled as "List of Deviations" then it
is to be considered that all the terms and conditions are acceptable to us.

Signature of Supplier/Authorized signature of firm/agency:

Name of Supplier or authorized signatory of firm/agency:

Designation:





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Annexure-14

VENDOR DETAILS (to be submitted along with TECHNICAL BID)

1	Name of Bidder/Firm	
2	Registered office Address of Company/firm in Kolkata/Howrah: Local office address at Kolkata/Howrah (if held):	
3	Telephone No./Fax No./Mobile No:	
4	E-mail address:	
5	Names of the contact person & Designation:	1) 2) 3)
6	Type of Entity-Pro praetorship/Partnership firm/company/NSIC/MSME Category etc. (Please attach registration certificate of Firm/Partnership agreement/proprietorship documents)	
7	Cost of Tender Details (DD No. Name of Bank)	N/A
8	EMD Details (DD No. Name of Bank)	N/A
9	PAN Card Number (Self-attested copy of PAN card has to be Submitted)	
	GST Registration No. (Self-attested copy has to be Submitted)	
10	Whether the agency has been blacklisted/debarred or given tender holiday or contract terminated before expiry of the contract period by any govt. autonomous bodies/organizations where bidder has provided services earlier due to deficiencies in service or misconduct etc.	Yes/No (Please tick as applicable) If yes, please furnish details on a separate sheet

Certified that the above information is true to the best of our belief and information.

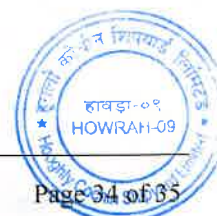
Place:

Date:

Signature of Supplier/Authorized signature of firm/agency:

Name of Supplier or authorized signatory of firm/agency:

Designation:





Annexure – 15



HOOGHLY COCHIN SHIPYARD LIMITED

A wholly owned Subsidiary of Cochin Shipyard Limited,

A Government of India Enterprise under Ministry of Ports, Shipping and Waterways

SITE VISIT SLIP

I authorized

representative of

..... address:

..... Visited the site on

.....and understood the work completely related to the work of
procurement of **ELECTRIFICATION WORKS FOR SHIP REPAIRING FACILITY AT
PANDU, GUWAHATI.**

.....
Stamp and Signature of the representative of the firm

.....
Signature of HCSL officer





SHIP REPAIR FACILITY AT GUWAHATI

GENERAL CONDITIONS OF CONTRACT





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GENERAL CONDITIONS OF CONTRACT

1.0 Definition, interpretations, etc.

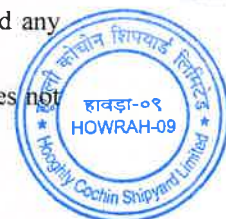
- 1.1 Terms, which are defined in the Conditions of Contract, are not also defined in the Contract Data and vice versa, but keep their defined meanings. Capital initials are used to identify defined terms. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined.
- 1.2 Where the context so requires, words importing the singular only also include the plural and vice versa, words importing persons include firms and corporates and vice versa and words importing masculine gender include the feminine gender and neuter and vice versa.
- 1.3 **Definitions:** 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. The terms Employer and Engineer are interchangeable in their meaning as the context requires and are purported to mean the same to the extent that such meaning is not at conflict with the rights, duties, responsibilities and functions attributable to the Employer or the Engineer.
- Approved means approved in writing including the subsequent written confirmation of previous verbal approval and Approval means approval in writing including as aforesaid.
 - Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.
 - Compensation Events are those defined in Clause-20.17 hereunder.
 - Completion Date is the date of completion of the Works as certified by the Engineer.
 - Constructional Plant means all appliances or things of whatsoever nature required in or about the execution, completion or maintenance of the works or temporary works (as hereinafter defined) but does not include materials or other things intended to form or forming part of the permanent work.
 - Consultant means Jeganath JB Architects, No.6, 6th Floor, Ram Swathi Towers, Durghabai Deshmukh Road, R.A.Puram, Chennai - 600 028, and their personal representatives or successors or assignees.
 - Contract Data defines the documents and other information that comprise the Contract and may be forming part of either the General Conditions of Contract or the Special Conditions of Contract, irrespective of which it is applicable to the whole of the Contract.
 - Contract is the contract between the Employer and the Contractor, whereby the Contractor agrees to execute, complete and maintain the works and comprises invitation to tender, instructions to tenderers, tender with all the enclosures thereto, articles of agreement, general conditions of contract, special conditions of contract, technical specifications, preamble to bill of quantities, bill of quantities, schedule of rates and prices (if any), tender drawings together with the letter of intent or letter of acceptance, notice to proceed with the works, and other documents that may be specified in any of the above.
 - Contract Price is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.
 - Contractor is a person or partnership or body corporate whose tender to carry out the works has been accepted by the Employer and includes the Contractor's heirs, executors, administrators, legal representatives, personal representatives, successors and permitted assignees, where the context requires.
 - Contractor's Account means any moneys in the Employer's hands due or which may become due to the Contractor under this Contract. As the context and circumstances require, this also means any moneys in the Employer's hands due or which may become due to the Contractor under any other contract or business between the Contractor and the Employer or Employer's subsidiary unit / companies / associates. Further, all moneys of the Employer lying with the Contractor, for whatever reason or cause, are directly relatable to the Contractor's Account.
 - Contractor's Bid is the completed tender document submitted by the Contractor to the Employer.



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- Corrupt practice means the offering, giving, receiving or soliciting of any thing of value to influence the action of an official or individual or body in the tendering process or in contract execution.
- Fraudulent practice means a misrepresentation of facts in order to influence a tendering process or the execution or the execution to the detriment of the Employer, and includes collusive practice among tenderers, prior to or after bid submission, designed to establish tender prices at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.
- Days are calendar days; months are calendar months.
- Defect is any part of the works not completed in accordance with the Contract.
- Defects Liability Period is the period named in the Contract Data and calculated from the Completion Date.
- Drawings means the drawings and tracings or prints there-of, annexed to the Contract or referred to in the specification 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 Engineer.
- Employer is the party who will employ the Contractor to carry out the Works.
- Engineer is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing variations to the Contract, awarding extensions of time, and valuing Compensation Events.
- Engineers Representative means any assistant of the Engineer or any clerk of works / employee or agent appointed from time to time by the Employer / Consultant or the Engineer.
- Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.
- Initial Contract Price is the Contract price listed in the Employer's Letter of Acceptance.
- Intended Completion Date is the date on which it is intended that the Contractor shall complete the Works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer by issuing an extension of time.
- Letter of Intent / Letter of Acceptance mean an intimation, by a letter, to a tenderer that his tender has been accepted in accordance with the provisions contained in that letter.
- Materials are all supplies, including consumables, used by the contractor for incorporation in the works.
- Notice in Writing or Written Notice means a notice in written, typed or printed characters sent (unless delivered personally or otherwise proved to have been received) by registered post to the last known private or business address or 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.
- Owner / Employer means and includes Owner's / Employer's personal representatives or successors, permitted assignees, heirs, executors, administrators, legal representatives, personal representatives, where the context requires.
- Site is the area meant for executing the Works.
- Site means the lands and other places envisaged by the employer on, under, in or through which the works are to be executed or carried out and any other lands or places provided by the employer for the purpose of the contract.
- Specification means the Technical specification of the works included in the Contract and any modification or addition thereof made or approved by the Engineer.
- Start Date is the date when the Contractor shall commence execution of the works and does not necessarily coincide with any of the Site Possession Dates.





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- Subcontractor is a person or partnership or body corporate who has a contract or understanding with the Contractor to carry out a part of the work in the Contract which includes work on the Site or outside the Site.
- Telegraphic Acceptance means an intimation by a telegram / cablegram that the tender has been accepted in accordance with the provisions contained in the telegram / cable.
- Temporary Works means all temporary works of every kind required in or about the execution, completion or maintenance of the works.
- Variation is an instruction given by the Engineer that varies the Works.
- Virtual completion means that the work is, in the opinion of the Engineer, substantially completed and has satisfactorily passed any final test that may be prescribed in the Contract.
- Works shall mean and include all works specified or set forth and required in and by the specifications, drawings and other documents hereto annexed or to be implied therefrom or incidental thereto or to be hereafter specified or required in such explanatory instructions and drawings and also such additional instructions and drawings as shall from time to time be supplied by the Engineer during the progress of the work hereby contracted for.

1.4 Communications

- 1.4.1 Communications between parties, which are referred to in the Contract, are effective only when in writing. A notice shall be effective only when delivered (in terms of Indian Contract Act).

1.5 Queries about the Contract Data

- 1.5.1 The Engineer will clarify queries on the Contract Data.

1.6 Notices

- 1.6.1 Service of Notices on Contractor: Any notice to be given to the Contractor under the terms of the Contract shall be considered duly served if the same shall have been delivered to, left for or posted by registered post to the Contractor's principal place of business (or in the event of the Contractor being a company to or at its Registered Office) or at the site.
- 1.6.2 Service of Notices on Owner: Any notice to be given to the Employer under the terms of the Contract shall be considered as duly served, if the same shall have been delivered to, left for, or posted by registered post to the Employer's last known address.

2.0 Extent and scope of Contract

- 2.1 The Contract comprises the plumbing execution and maintenance of the Works by the Contractor, in accordance with the various provisions in the Contract, complete in all respects as per drawings, specifications and instructions of the Engineer and any other details to be furnished from time to time and as broadly indicated in the bill of quantities, in consideration of which the Employer pays the Contractor for the aforesaid.

2.2 Contractor's obligations

- 2.2.1 The Contractor's obligations and responsibilities include providing everything whether of a temporary or permanent nature required for due carrying out of the Contract, including but not limited to arranging for water, power, consumables, materials, transport and facilities for storage, shifting, handling and installation, tools and tackles, testing, documentation, labour, supervision and Temporary Works, insurance coverages, taxes, duties, royalties and overheads in that connection, save anything of the aforesaid that the Employer may provide at the terms and conditions as specified in the Contract.

2.3 Coverage of costs

- 2.3.1 Except where it is expressly provided that the cost will be borne by the Employer, the various obligations of the Contractor under the Contract shall be at the cost of the Contractor and are deemed to be fully covered under the Contracted rates or amounts.

2.4 Employer's obligations

- 2.4.1 The Employer's obligations and responsibilities are making available the Site and necessary instructions and drawings as required and to make payments to the Contractor in time and at times as specified in the Contract.



- 2.4.2 The Employer shall bear the cost in respect of approvals required for the drawings supplied by him and in obtaining clearances from aviation, firefighting, explosives & boilers and environmental departments and building inspectors of the local / state/ central government, only so far as they pertain to the permanent Works.

2.5 Contract Agreement

The Contractor shall enter into and execute a Contract agreement in the prescribed form within the time specified in the Contract Data and / or the Letter of Acceptance of the Employer.

2.6 Language of the Contract and applicable law

- 2.6.1 The language of the Contract shall be English and the Contract shall be governed by the Law for the time being in force in the Republic of India.

2.7 Documents forming part of the Contract

- 2.7.1 The documents forming part of the Contract are listed under the format for Articles of Agreement.

2.8 Documents mutually explanatory

- 2.8.1 The several documents forming the Contract are to be considered as mutually explanatory of one another and in case of ambiguities or discrepancies, the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions directing as to in what manner the work is to be carried out and in what manner the Contract is to be operated.

2.9 Interpretation of Contract documents

- 2.9.1 In case any portion of the Contract documents is repugnant to or at variance with provisions of any other portion, the documents that shall prevail over the other shall be as detailed hereunder, unless the Engineer, taking into account the peculiarities of the context, directs to a different interpretation:

- a) Special Conditions of Contract prevail over provisions of General Conditions of Contract.
- b) Provisions in the Bill of Quantities including the preamble thereof shall prevail over the provisions of specifications, drawings and Special Conditions of Contract.
- c) Between two issues of the same document, the document revised or re-issued as of the later date shall prevail.

- 2.9.2 All specifications, drawings and other documents shall be interpreted in conformity with the General Conditions of Contract as supplemented and / or modified by the Special Conditions of Contract.

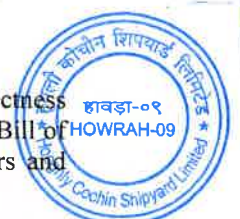
- 2.9.3 In case of any conflict of meaning either in the same document or between other documents (other than the above stipulations), the Engineer's decision will be final, binding and conclusive.

- 2.9.4 Notwithstanding the aforesaid, the documents forming the Contract shall be interpreted in the following order of priority:

- a) Contract Agreement
- b) Letter of acceptance, notice to proceed with the works
- c) Contractor's Bid
- d) Contract Data
- e) Conditions of Contract including Special Conditions of Contract
- f) Specifications
- g) Drawings
- h) Bill of Quantities
- i) Any other document listed in the Contract Data as forming part of the Contract.

2.10 Sufficiency of Tender

- 2.10.1 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 he has stated in the Bill of Quantities and that the same cover all his obligations under the Contract and all matters and





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things necessary for the proper construction completion and maintenance of the Works and compliance to all his obligations under the Contract.

2.11 Sufficiency of Contract

- 2.11.1 The Contract is deemed to have been entered into after both parties to it have mutually agreed as to its sufficiency in enabling both parties to fully and adequately perform their respective duties and meet their obligations under the Contract.

2.12 Securities

- 2.12.1 The securities and /or deposits, in terms of money and / or guarantees from banks, that are required to be maintained by the Contractor for his due fulfillment of his various responsibilities and obligations, both at the time of tendering and during the period of Contract, including during Plumbing execution works and maintenance period, are specified elsewhere in this document under the respective heads and chapters.

2.13 Change in Employer / Engineer

- 2.13.1 If for any reason the Contract is transferred or the Work is transferred from the jurisdiction of the Employer to another Company or a project Authority or vice versa while the Contract is in subsistence, the Contract shall continue to be binding on the Contractor and the successor company / project authority in the same manner and take effect in all respects as if the Contractor and the successor company / project authority were parties thereto from the inception and the corresponding office or the competent authority in the successor company / project authority will exercise the same powers and enjoy the same authority as conferred to the predecessor company / project authority under the original Contract Agreement entered into.

2.14 Subcontracting

- 2.14.1 The Contractor may subcontract or sublet parts of the Work only with the approval of the Engineer.
- 2.14.2 The execution of the details of Works by petty contracts under the direct and personal supervision of the Contractor or his agent shall not be deemed to be subcontracting under this clause.
- 2.14.3 Subcontracting does not alter the Contractor's obligations.
- 2.14.4 Subcontracting or sub-letting shall not establish any contractual relationship between the Subcontractor and the Employer and shall not relieve the Contractor of any of his responsibilities, liabilities or obligations under the Contract, and the Contractor is deemed responsible for the acts and deeds of the Subcontractors or their agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor or his agents, servants or workmen.

2.15 Assignment and transfer of Contract

- 2.15.1 The Contractor shall not assign or transfer the Contract or any part thereof or any benefit or interest herein or hereunder without the written consent of the Employer. In the event of the Contractor contravening this condition, the Employer shall be entitled to place the Contract elsewhere on the Contractor's account and at his risk and the Contractor shall be liable for any loss or damage which the Employer may sustain in consequence of or arising out of such replacing of Contract.

2.16 Employer's and Contractor's Risks

- 2.16.1 The Employer carries the risks which this Contract states are Employer's risks and the Contractor carries the risks which this Contract states are Contractor's risks.
- 2.16.2 **Employer's Risks**
- a) The Employer is responsible for the Excepted Risks which in so far as they directly affect the execution of the works are riot, war, invasion, act of foreign enemies, hostilities (whether war be declared or not), civil war, rebellion, revolution, insurrection or military or usurped power (in so far these are un-insurable) or disorder (unless restricted to the Contractor's employees or work force or Subcontractor's work force) or a cause solely due to use or occupation by the employer of any portion of the Works in respect of which a Certificate of Completion has been issued or contamination from any nuclear fuel or nuclear waste or radioactive / toxic





explosive material, or a cause solely due to the design of the works (all of which are herein collectively referred to as 'Excepted Risks').

2.16.3 Contractor's Risks

- a) All risks of loss of or damage to physical property and of personal injury and death, which arise during and in consequence of the performance of the Contract, other than the Excepted Risks, are the responsibility of the Contractor.

3.0 Engineer

3.1 Identity

- 3.1.1 In so far as this Contract is concerned, Engineer shall denote any nominee or employee or any organisation or firm or body or team appointed by the Employer to operate this Contract.
- 3.1.2 All the rights and privileges held by the Employer under this Contract are deemed to be vested with the Engineer.
- 3.1.3 The Engineer shall act as he deems fit in safeguarding and furthering the interests of the Employer. In this Contract, the terms Employer and Engineer are used to denote either of them as the context requires and are interchangeable as to the meaning implied.

3.2 Delegation

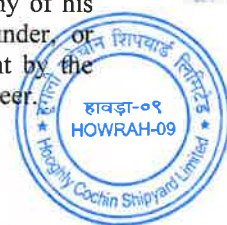
- 3.2.1 The Engineer may delegate any of his duties and responsibilities to others, except to the Adjudicator, after notifying the Contractor and may cancel any delegation after notifying the Contractor.

3.3 Works to the satisfaction of Engineer

- 3.3.1 The Contractor shall fulfill his obligations and duties under this Contract and execute, complete 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. The Contractor shall take instructions and directions only from the Engineer.

3.4 Duties and powers of Engineer

- 3.4.1 The Engineer shall have the right of general supervision and direction of the Work, including authority to stop the Work or parts of it whenever such stoppage may be necessary, to ensure the proper execution of the Contract, to reject all work and materials which do not conform to the Contract, to direct the application of Contractor's labour and machinery forces to any portion of the work as in his judgment is required, to order the labour and machinery forces increased or diminished, to take actions consequent to the Contractor's failure to comply with statutory requirements and to decide on questions which arise in the execution of the work and operation of the Contract, unless otherwise provided for in this Contract.
- 3.4.2 Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.
- 3.4.3 The duties of Engineer or his representative are to watch and supervise the Works and to call for or carryout tests and examine any materials to be used or workmanship employed in connection with the Works.
- 3.4.4 Any instruction or approval given by the Engineer's Representative to the Contractor in connection with the Works shall bind the Contractor as though it had been given by the Engineer provided always as follows:
- a) The Engineer's representative shall have no authority to relieve the Contractor of any of his duties or obligations under the Contract not except as expressly provided hereunder or elsewhere in the Contract, to order any work involving delay or any extra payment by the Employer or to make any variation in the works, except with concurrence by the Engineer.



- b) Failure of the Engineer's Representative to disapprove any work or materials shall not prejudice the Engineer to disapprove such work or materials and to order the pulling down, removal or breaking up thereof at the cost of the Contractor.
- c) The decision, opinion, certificates or valuation of the Engineer in respect of any matter under this Contract shall be final, binding and conclusive.
- d) 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 thereupon confirm, reverse or vary such decision.

3.5 Instructions

3.5.1 The Engineer may, in his absolute discretion from time to time, issue further drawings and / or written instructions, details, directions and explanations which are hereafter collectively referred to as the Employer's instructions in regard to:

- a) Variation or modification of the design, quality or quantity of Works or the addition or omission or substitution of any works.
- b) Any discrepancy in the drawings or between the Bill of Quantities and / or Drawings and / or specifications.
- c) Removal from the site of any materials brought thereon by the Contractor and the substitution of any other materials thereof.
- d) Removal and / or re-execution of any work executed by the Contractor.
- e) Dismissal from the Works of any person employed thereupon.
- f) Opening up for inspection any work covered up.
- g) Amending and making good of any defects.
- h) Inspection and carrying out of tests of materials and finished work on site.
- i) Deducting / recovering any amounts in respect of defective plant, materials, labour and finished work for which advance payments had been made, from any amounts due to the Contractor.

3.6 Form of instructions

- 3.6.1 Instructions from the Engineer or his Representative shall be in the form of orders / letters, as he deems fit.
- 3.6.2 Further, where convenient, such orders shall be in the form of entries made by them in the Site Order Book.

3.7 Site Order Book

- 3.7.1 The Contractor shall maintain a site order book, with numbered pages, at the Site. This book shall always be accessible to the Engineer and his Representative and shall never be taken out of the Site. The Contractor shall sign all orders and instructions written down in this book in token of his having seen and noted the same. The site order book, comprising all its volumes, will be the property of the Employer and shall be handed over to him at the end of the Work.

3.8 Compliance by Contractor

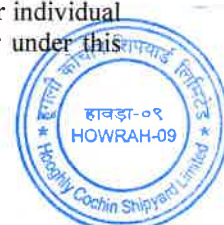
- 3.8.1 The Contractor shall forthwith comply with and duly execute any work comprised in the Engineer's orders and instructions, provided always that verbal directions and explanations given to the Contractor or his representative upon the work by the Engineer shall if, involving a variation, be confirmed in writing by the Contractor within seven days and if not dissented by the Engineer in writing within a period of seven days from the date of receipt of such confirmation in writing, such instructions shall be deemed to be the Engineer's instructions within the scope of the Contract.
- 3.8.2 If compliance with the Engineer's instructions as aforesaid involves work and / or loss beyond that contemplated by the Contract then, unless the same were issued owing to some breach of this Contract by the Contractor, the Employer shall pay to the Contractor the price of the said work as a extra to be valued by the Engineer and as provided in this Contract.

4.0 Drawings

4.1 Supply of Drawings



- 4.1.1 Drawings for the Works shall be provided by the Employer / Engineer to the Contractor, free of cost, in the number of copies stated in the Contract Data, from time to time during the progress of the Works as shall be necessary for the purpose of execution and maintenance of the Works and the Contractor shall carry out the Works accordingly and be bound by the same. Extra copies, if available, shall be supplied by the Employer, at rates to be fixed by him.
- 4.1.2 The Contractor shall provide, at his cost, drawings for Temporary Works, vendor drawings for manufactured and fabricated items and support them with design calculations as directed by the Engineer. All these shall be in four copies. These are to be revised and re-submitted by the Contractor, at his cost, where found necessary by the Engineer. The Contractor is deemed to be responsible for all matters pertaining to patents or copyrights in respect of the contents of his submissions and the actual materials, components and items represented therein and the Engineer / Employee shall stand indemnified from all claims in this regard.
- 4.1.3 The Engineer shall have the right 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 purpose of the proper and adequate execution and maintenance of the Works and the Contractor shall carry out the Works accordingly and be bound by the same.
- 4.1.4 The Engineer reserves the right to alter or modify the drawings at any time. No claim will be entertained on account of such modifications or alterations made in the drawings. However, all elements of Works as actually executed will be measured and paid for. The opinion / decision of the Engineer in all such matters shall be final, binding and conclusive.
- 4.2 Return of Drawings**
- 4.2.1 The drawings and specifications and copies thereof furnished by the Employer to the Contractor, with the exception of the signed Contract set, shall be returned by the Contractor to the Employer on completion of the Works or termination of the Contract.
- 4.2.2 In case the Contractor does not return the drawings in full, the Engineer shall withhold the amounts stated in the Contract Data from payments due to the Contractor.
- 4.3 As-built drawings**
- 4.3.1 As-built drawings, in three sets, incorporating (in red ink) all the changes, etc. along with approval references, are to be prepared by the Contractor, free of cost and furnished to the Engineer, on completion of the Works or termination of the Contract. The Engineer may instruct for submission of these pertaining to parts of the Works, at any earlier times. The Engineer shall provide to the Contractor, at appropriate times, free of cost, three sets of base drawings, to enable the Contractor to prepare the As-built drawings.
- 4.3.2 In case the Contractor does not supply the As-built drawings, or they do not receive the Engineer's approval, the Engineer shall withhold the amount stated in the Contract Data from payments due to the Contractor.
- 4.4 Drawings to be available at Site**
- 4.4.1 One copy of all the drawings shall be kept by the Contractor at the site and the same shall at all reasonable times be available for perusal and use by the Engineer or his representative.
- 4.5 Ownership of drawings and documents**
- 4.5.1 All the drawings and the documents and copies thereof provided by the Employer to the Contractor, or those supplied by the Contractor, including the informations therein, are deemed to be the property of the Employer.
- 4.6 Confidentiality of drawings and documents**
- 4.6.1 The Contractor is under obligation to ensure that he, his representatives, his Subcontractors and suppliers maintain strict confidentiality of the drawings and their contents and are prohibited from copying them in any manner or from passing them or their contents to any other individual or party or to use them for any purpose other than for the Works of the Employer under this Contract.
- 4.7 Tender drawings**



- 4.7.1 The Special Conditions of Contract specify whether any drawings are enclosed to the Tender Document and whether any drawing is being made available for the perusal of the tenderer at the Employer's / Engineer's premises.

5.0 Measurements

- 5.1 Except where any general or detailed description of the work in the Bill of Quantities expressly shows to the contrary, Bill of Quantities shall be deemed to have been prepared and measurements shall be made according to the procedure set forth in Indian Standard Method of Measurement for Building Work IS1200, wherever applicable, and any subsequent amendment or modification thereof, notwithstanding any general or local custom.
- 5.2 The Engineer shall, except as otherwise stated, ascertain and determine by measurement the quantities and value of work done in accordance with the Contract.
- 5.3 The Engineer shall when he requires that any part or parts of the Works be measured give notice to the Contractor who shall forthwith attend or send a qualified agent, with necessary measuring tools and instruments and adequate assistance in the form of necessary labour, to assist the Engineer in making such measurement and shall furnish all particulars required by him. Should the Contractor not attend or neglect or fail to comply as above on the dates fixed by the Engineer for taking measurement as per notice given to the Contractor, then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of the work.

6.0 Alterations, additions and omissions

6.1 Variations

- 6.1.1 The Engineer shall have the right to make any variation 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 and the Contractor shall do any of the following:
- Increase or decrease the quantity of any work included in the Contract;
 - Omit any such work;
 - Change the character or quality or kind of any such work;
 - Change the levels, lines, position and dimensions of any part of the works;
 - Execute additional work of any kind necessary for the completion of the Works.
- 6.1.2 No such variation as aforesaid 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 account of the Contract Price.

6.2 Orders for variations to be in writing

- 6.2.1 No such variation 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 any order given under this clause, but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities.
- 6.2.2 If for any reason the Engineer shall consider it desirable or adequate to give any such order verbally, the Contractor shall comply with such order and confirmation by the Contractor in writing of such verbal order given by the Engineer shall be deemed to be an order in writing.

6.3 Valuation of variations and Power of the Engineer to fix rates

- 6.3.1 The Engineer shall determine the amount, if any, to be added to or deducted from the sum named in the tender in respect of any extra or additional work done or work omitted by his order.
- 6.3.2 All such work shall be valued at the rates set out in the Contract, if in the opinion of the Engineer the same shall be applicable.



- 6.3.3 If in the opinion of the Engineer the Contract does not contain any rates applicable to the additional, altered, omitted or substituted items, then the rates shall be fixed by the Engineer for such items by deriving the rates from the analogous items, if any, in the Contract.
- 6.3.4 In the absence of analogous items, the rates shall be fixed by the Engineer taking due consideration of the analysis of rates to be drawn up and furnished by the Contractor, on the basis of basic rates and norms as available in the schedules / Analysis of Rates of Central Public Works Department, adopting approved rates of materials and wages, all supported by vouchers and other relevant documents.
- 6.3.5 The cost element on account of provisions of profit including overheads shall not exceed 12.50% of the direct cost.
- 6.3.6 Further, no increase of the Contract price shall be made unless the Contractor notifies the Engineer his intention to claim extra payment within one month from the date of his receipt of the contract variation intimation from the Engineer.
- 6.4 Day work**
- 6.4.1 Where a particular item of work has not been included in the Bill of Quantities and where an analogous rate cannot be computed or a reasonable rate cannot be determined or agreed with the Engineer, then if such item of work shall not be measurable, the Engineer may, if in his opinion it is necessary or desirable, order in writing that any additional or substituted work shall be executed on a day work basis.
- 6.4.2 In such cases, the Contractor shall be paid for such work under the conditions set out in the day work items in the Bill of Quantities and at the rates and prices affixed thereto by him in his tender. In the absence of day work items in the Bill of Quantities, the day work rates shall be arrived at by the Contractor, based on basic input costs acceptable to the Engineer.
- 6.4.3 In respect of all work executed on a day work basis, the Contractor shall, during the continuance of such work, furnish the following to the Engineer, everyday, so that one copy each of the same, if correct or when agreed, be signed by the Engineer and returned to the Contractor, based on which, at the end of each week the Contractor shall deliver to the Engineer a priced statement of the labour, material and plant used:
- Exact list in duplicate of the names, occupation and time of all workmen employed on such work and statement also in duplicate showing the description and quantity of all materials used thereon or therefore.
 - Quotations for material etc., before ordering the same.
 - Receipts or other vouchers as may be necessary to prove the amounts paid.

7.0 Site

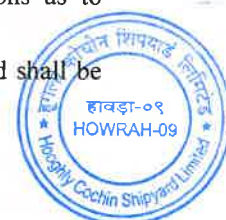
7.1 Possession of the Site

- 7.1.1 The Employer shall give possession of all parts of the Site to the Contractor. If possession of a part is not given by the date stated in the Contract Data, the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event as described elsewhere in this document.

7.2 Awareness of Site

- 7.2.1 The Contractor shall visit, inspect and examine the site and its surroundings and shall satisfy himself before submitting his tender as to the form and nature of the site conditions, facilities necessary for the completion of Plumbing execution works and maintenance of the Works and the means of access to the site, the accommodation and other facilities that may be required, statutory requirements and in general shall himself obtain all necessary informations as to working conditions, risks and contingencies.
- 7.2.2 The tender is deemed to have taken all these aspects into account and all rates quoted shall be deemed to be inclusive of all costs thereof.

7.3 Access to Site and Works





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7.3.1 The Contractor shall allow at all times the Engineer and any person authorised by the Engineer access to the Site and do the Works, to any place where work or any activity in connection with the Contract is being carried out or is intended to be carried out and to any place where materials are being sourced / assembled for the Works.

7.3.2 The Contractor is obliged to ensure adequate technical manpower to answer queries of the Engineer or his representative at all such venues and at all such times as the Engineer desires.

7.4 Land for Contractor

7.4.1 The Employer will, at his discretion and for the duration of the Plumbing execution / maintenance period, make available land and / or structures, free of charge, within and / or near the site of Work, for the Contractor to establish his site office, stores, site storage yard and the like, as required for the execution of the Contract.

7.4.2 The costs incurred by the Contractor in setting up of temporary utilities, fencing, accesses, etc., shall be fully borne by him and no payment is due from the Employer in this regard.

7.4.3 It is obligatory on part of the Contractor to ensure hygienic conditions in regard to the Temporary Facilities set up by him. Good sanitation and cleanliness shall be ensured.

7.4.4 Land or any other facilities for lodging the supervisory staff of the Contractor and the labour shall not be made available by the Employer and the Contractor has to make his own arrangements, including conveyance. Where, in the opinion of the Engineer, such land needs to be provided in the interests of the Work and is also available, it shall be provided to the Contractor free of charge to the extent and for periods as decided by the Engineer.

7.5 Clearing the Site

7.5.1 On completion of Works and / or termination of Contract, utilities, fencing, accesses, etc., set up by the Contractor and all Temporary Works shall be dismantled and removed from the site by the Contractor, leaving the site and Works clear and cleaned of all obstructions, at his cost. In the event of Contractor's failure to do so, the Employer reserves the right to clear the site in the manner as he may deem necessary and the costs and expenses thereof as incurred by the Employer shall be debited to the Contractor's Account, without prejudice to any other measures the Employer is empowered to take under the Contract

7.6 Discoveries

7.6.1 All discoveries, including fossils, coins, articles of value or antiquity and structures and other remains or items of geological or archaeological and other interest encountered within the site shall be deemed to be the absolute property of the Employer and the Contractor shall take all precautions to prevent his workmen or any other persons from removing or damaging any such article or item and shall immediately upon discovery thereof, before any action or removal by him or his personnel and labour, except for ensuring proper security for the same, acquaint the Engineer of such discovery and carry out at the expense of the Employer, the Engineer's order as to the dealing with or disposal of the same.

7.7 Unauthorised use

7.7.1 The Contractor and his employees / workmen and the Contractor's Subcontractors and their employees / workmen are forbidden to unauthorisedly use or misuse the Employer's / Public property or utility and if any such misuse / unauthorised use occurs, the Employer may take severe actions against the Contractor including setting the direct and indirect damages / losses, etc., onto the payments due to the Contractor, removal of their workmen concerned and forfeiture of their entry passes, in addition to statutory and legal actions on the Contractor. Such recurrent action by the Contractor will also be considered as persistent negligence on the part of the Contractor to carryout his obligations under the Contract.

8.0 Temporary Works and utilities

8.1 The Contractor shall arrange for and provide, at his own cost, all necessary temporary facilities and utilities and Temporary Works in manner and quality as approved by the Engineer.

8.2 Any facilities created by the Contractor to this end are deemed to be enabling works and are covered in the Contract Price, no extra being paid by the Employer.



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8.3 On completion of the work, or at earlier times as directed by the Engineer, the Contractor at his own cost shall remove all the temporary facilities and temporary utilities set up by him, including items such as bore wells, pipelines, storage facilities, enclosures and sheds, unless their retention is permitted by the Employer.

8.4 The Employer reserves the right to takeover any part or all of the above, at prices to be mutually agreed upon, which in any case will not be more than the actual cost incurred by the Contractor less depreciation at standard rates and also considering the condition and level of wear and tear thereof.

8.5 Approval by the Engineer

8.5.1 The Contractor shall, at his cost, be responsible for the design of Temporary Works and shall submit specifications, design back up and drawings showing the proposed Temporary Works to the Engineer for his approval. The methodology and conditions specified under the clauses in this GCC in respect of Drawings shall apply.

8.5.2 The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works, their durability and stability and serviceability during erection and usage.

8.5.3 The Contractor shall, at his cost, obtain approval of third parties to the design of the Temporary Works where so directed by the Engineer.

8.6 Water

8.6.1 The Contractor, at his own cost, shall make arrangements for sourcing, storage, handling and conveyance of water for Plumbing execution and maintenance works, as well as for the consumption of his men and plant, from the existing wells, if any, or public utilities where available and permitted, or by setting up, with the approval of the Engineer.

8.6.2 The Employer reserves the right to draw water from the storage setup or installation / distribution lines laid by the Contractor, if he requires the same for any of his other works executed directly or through other contractors, in which case the Contractor's Account would be credited, at mutually agreed rates.

8.6.3 If water is made available by the Employer, which in any case is purely at the discretion of the Engineer, the same shall be at charges fixed by the Engineer and on conditions stipulated by him and on other conditions for the installations and the supply organisation. In such case, the Employer does not guarantee to maintain uninterrupted supply of water and it will be incumbent on the Contractor to make alternative arrangements for water at his own cost to take care of any breakdown in the supply as aforesaid. No claim of damage or refund of the charges against water shall be entertained on account of such breakdown.

8.7 Electricity

8.7.1 No electrical power supply will be provided by the Employer and the Contractor shall make his own arrangements for the power required for the Works and Temporary Works.

8.7.2 If electrical power is made available by the Employer, which in any case is purely at the discretion of the Engineer, the same shall be at charges fixed by the Engineer and on conditions stipulated by him and on other conditions for the installations and the power supply organisation.

8.7.3 In such cases, the Contractor shall, at his cost, tap the power at one or more points as decided by the Engineer and set up and operate his own electrical system downstream, including metering, control gear, safety gadgets, cabling and wiring and end points. All electrical work thus carried out or installed by the Contractor shall be set up and maintained by qualified personnel holding appropriate license for the voltage class involved and shall be in conformity with statutory regulations, rules and recommended practices thereof.

8.7.4 The Contractor shall ensure that the electrical equipments employed by him are such that the aggregate power-factor does not fall below 0.85 and to this end shall install, at his own cost, power-factor improving equipment.

8.7.5 Notwithstanding anything hereinabove, the Employer does not guarantee to maintain uninterrupted supply of power and it will be incumbent on the Contractor to make alternative arrangements for power at his own cost to take care of any breakdown in the supply as aforesaid. No claim of damage or refund of the charges against power shall be entertained on account of such breakdown.

8.8 Lighting





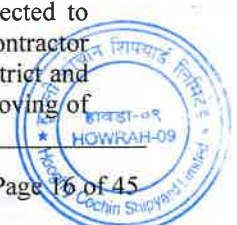
- 8.8.1 The Contractor shall, at his own cost, make his own arrangement for the required lighting in and around the work spots, for the purpose of Plumbing execution works, including movement of persons and inspection by the Engineer and other authorities and general safety and security.
- 8.8.2 The presence of any lighting arrangements made by the other contractors or by the Engineer or public utilities shall not in any way relieve the Contractor of his responsibility to provide his own lighting arrangements.
- 8.9 Rectification of utilities**
- 8.9.1 The Contractor shall ensure that utilities, including those for water, electricity and barriers of the Employer or public concerns or utility companies or other contractors shall be used to the extent permitted, with utmost care. All damages occurring to these due to the use or misuse by the Contractor, his Subcontractors or his men or machinery or vehicles shall be rectified by the Contractor, where he is not barred from doing so, at his own cost. This shall not relieve or indemnify the Contractor from any claims for his payment of damages or penalties or charges that the Employer or utility company or others concerned may call for.
- 8.10 Construction yards and premises**
- 8.10.1 Where the Contractor is permitted by the Engineer to set up a yard or enclosure for the purposes of the former's activities in respect of this Contract, it shall be limited to demarcating appropriate extent of land or the spaces within an existing enclosure or building, for a specified period.
- 8.10.2 The Contractor shall provide at his own cost necessary utilities and other facilities, including barriers for safety and security, where he is not barred to do so, and watch and ward and lighting. The level of security provided by the Contractor, in terms of keeping the above premises under lock & key, etc., shall be to the extent approved by the Engineer. Where directed by the Engineer, the Contractor shall keep the accesses to and into these premises open, continuously or from time to time, to facilitate the Engineer's activities outside this Contract or for any other reason.
- 8.10.3 With progress of time, the Engineer may de-allot a particular location and / or re-allot at another location as he deems fit and the Contractor shall forthwith shift his establishment at his own cost.
- 8.11 Site Office, stores and work places**
- 8.11.1 The Contractor shall organise his activities at Site from within the Site, by operating a Site Office therein, unless otherwise stated in the Contract Data or Special Conditions of Contract.
- 8.11.2 The Site Office, store and work place premises shall be at locations as approved by the Engineer and shall be allotted by the Engineer. The Engineer shall demarcate either land or spaces within an existing enclosure, all the conditions relevant to yard as herein above being applied.
- 8.11.3 Where called for by the Engineer, the Contractor shall, at his own cost, provide space for the Engineer's activities, within the Site Office herein above described. The Contractor shall furnish this space, provide light, ventilation and toilet facilities, as directed by the Engineer.

9.0 Cooperation and coordination

- 9.1 The Contractor shall plan and execute his work in a phased manner as approved / directed by the Engineer from time to time and shall fully cooperate with and share the Site with other agencies working simultaneously thereon as well as with the Employer's operations so as not to obstruct or retard the work being executed by other agencies and the Employer's operations in any way.

9.2 Interference

- 9.2.1 All operations necessary for the execution of the Works and any Temporary Works shall, so far as compliance with the requirements of Contract permits, be carried on so as not to interfere unnecessarily or improperly with public convenience and the access to use and occupation of public or private roads and footpaths or of properties whether in possession of the Employer or of any other person and the Contractor shall save harmless and indemnify the Employer in respect of all claims, demands, proceedings, damages, costs, charges and expenses whatsoever arising out of or in relation to any such matters.
- 9.2.2 The Contractor shall use every reasonable means to prevent any of the public roads, highways, culverts or bridges communicating with or on the routes to the Site from being subjected to extraordinary traffic, within the meaning of the Road Traffic Act, by any traffic of the Contractor or any of his Subcontractors and in particular shall select routes and use vehicles and restrict and distribute loads so that any such extra-ordinary traffic as will inevitably arise from the moving of



the plant and materials to and from the Site shall be limited as far as reasonably possible and so that no unnecessary damages or injury may be occasioned to such roads, highways, culverts and bridges. Where instructed by any local authority or the police in regard to traffic, the Contractor shall abide by such instructions at his own cost and risk in terms of time and any extra mobilisation thereof.

9.3 Facilities for others

- 9.3.1 The Contractor shall in accordance with the requirement of the Engineer afford all reasonable facilities for any other contractors or parties employed by the Employer and their workmen and for workmen of the Employer and of any other properly authorised authorities or statutory bodies who may be employed or deployed in execution or inspection on, within or near the Site of any work included or not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works.

9.4 Coordinating work

- 9.4.1 The Contractor shall carry out at his own cost final finishing to the portions of his Works, where such portions such as surfaces and / or sections have experienced in, on or about, the work of other contractors. He shall ascertain all particulars relating to the other works with regard to the order of their execution and the position in which chases, holes, etc., will be required before any particular portion of his Work is taken in hand. He shall be particularly careful about the position of concealed work. Until and unless he is satisfied with the position and placing of all the concealed work of the Contractor or other contractors or parties, the Contractor may not be allowed by the Engineer to take up certain parts of the Works or other associated works. The Contractor's rate shall include for any losses due to any likely delay or shortfall in coordinating with the other contractors or parties. No claim will be admissible on account of lack of co-ordination and / or any loss arising thereof.
- 9.4.2 Where the work of other contractors and parties or the Employer's operations are effected by the Work of the Contractor, to the extent of creating undue obstruction or damage, the same shall be made good by the Contractor at his own cost and within reasonable time as decided by the Engineer.

9.5 Engineer's decision

- 9.5.1 The decision of the Engineer on any point of dispute between the various contractors, or parties deployed or any authorities shall be final and binding on all the parties to the dispute.

10.0 Safety and Security

- 10.1 The Contractor shall be responsible for the safety of all his activities on the Site and those relating to his Work of the Site and shall abide by all the safety and security regulations of the Employer in force and brought into force from time to time and other statutory requirements as per law or local Government promulgation and recommendations thereof. This applies to the safety of all labour and supervisory staff, work under progress, enabling works, Temporary Works, plant, equipment, tools, tackles, vehicles, etc. and speed restrictions for vehicles, traffic restrictions, etc.
- 10.2 The Contractor shall at all times ensure adherence to stipulations and recommendations laid down by the Bureau of Indian Standards in regard to safety, guarding of works, sequence of works, etc.
- 10.3 The Contractor shall further ensure that his workmen observe the safety rules, regulations and precautions and ensure observance of all necessary measures to prevent accidents.
- 10.4 The Contractor shall, in connection with the Work, provide, maintain and use at his own cost first-aid kits, safetyware, lights, guards, cautionary boards, fencing, watch & ward when and where necessary or required for the safety and convenience of the public, safety of his or Employer's personnel engaged on the Plumbing execution, maintenance and protection and safety of Works against damage on account of fire and other occurrences and acts.
- 10.5 In case of failure on the part of the Contractor to implement the above measures to the satisfaction of the Engineer, the Employer is at liberty to get them done by others at the Contractor's cost.
- 10.6 The Contractor shall keep the Employer indemnified in all respects, including legal and financial, in regard to all matters pertaining to safety, loss, pilferage and accidents. This shall apply to such of



those cases involving the material, plant, vehicles, equipment, labour, workmen, tradesmen or any individual either directly or indirectly deployed by the Contractor or the Engineer.

- 10.7 All costs towards complying with the safety and security requirements set forth herein shall be borne by the Contractor and no payment from the Employer is admissible under any circumstances.
- 10.8 The Contractor shall, as promptly as reasonably possible and in writing, bring to the notice of the local legal authority and the Engineer, the occurrence of accidents, thefts, sabotage or acts of vandalism and forthwith take all steps and measures required in such an exigency and implement the directions of the Engineer.
- 10.9 Only bonafide individuals shall be allowed access into or around the site. The Engineer may issue non-transferable admit / gate passes, with or without photograph, in favour of bonafide individuals, including the labour force, supervisory staff, etc. Nominal charges towards issue of admit / gate passes, their re-issue in case of damage, etc., shall be borne by the Contractor. The Contractor shall return such passes to the Employer from time to time when an individual's deployment has ceased and at the end of the Work.
- 10.10 The Employer / his security force reserve the right to prohibit entry of any individual into or near the site, at their sole discretion and without assigning any reasons, any individual being bound to forthwith leave the Site, where so demanded by them, without assigning any reasons.
- 10.11 Visitors shall be permitted into the Site only after necessary approval by the Engineer.
- 10.12 All materials, plant, tools, tackles, etc., brought into or near the site by the Contractor or his representative are liable for check by the Engineer and / or his security force. These shall be got registered with them at the time of their entry into the Site. The withdrawals from Site shall be based on permit to be issued by the Engineer. This shall also apply to any other items to be taken out of the site by the Contractor. Any material, plant etc., or individual not related to the due execution of the Contract shall not be allowed into the site.

10.13 Explosives

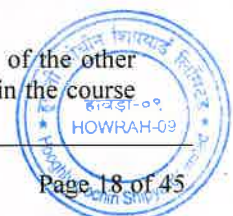
- 10.13.1 Explosives shall not be used on the work by the Contractor without the permission in writing of the Engineer and then only in the manner and to the extent to which he has prescribed. Where explosives are used the same shall be stored in special magazine to be provided by and at the cost of the Contractor who shall be liable for all damages, loss or injury to any person or property and shall be responsible for complying with all statutory requirements / obligations in these respects.

11.0 Protection of Environment

- 11.1 The Contractor shall take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his activities and methods of operation.
- 11.2 During continuance of the Contract, the Contractor and his Subcontractors shall abide at all times by all existing enactments on environmental protection and rules made thereunder, regulations, notifications and bye-laws of the State or Central Government or local authorities, and any other law, bye-law, regulations that may be passed or notification that may be issued in this respect in future by the State or Central Government or the local authority.
- 11.3 The Contractor shall bear all costs pertaining to the protection of environment, in so far as they concern or relate to his activities and shall indemnify the Employer against all actions, penalties or such other actions that are attracted by his activities.

12.0 Care of Works

- 12.1 From the commencement to the completion of the works, and maintenance thereof, the Contractor shall take full responsibility of the care of the Works and of all Temporary Works.
- 12.2 In case any damage, loss or injury shall happen to them from any cause whatsoever, save and except the Expected Risks as defined elsewhere herein, the Contractor shall at his own cost repair and make good the same so that at completion the Works, or any other earlier instant of time as required by the Engineer, they shall be in good order and condition and in conformity in every respect with the requirements of the Contract and the Engineer's instructions.
- 12.3 The Contractor shall also be liable for any damage to the Works or any other works of the other contractors or the Employer or public bodies or utility companies occasioned by him in the course



of any operations carried out by him for the purpose of complying with his obligations under this Contract.

- 12.4 Notwithstanding the aforesaid, 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, repair and make good at the cost of the Employer.

12.5 Damages to persons and property

- 12.5.1 The safety and security aspects to be taken care of by the Contractor are elaborated elsewhere in this document.
- 12.5.2 The Contractor shall, except in so far as the Contract otherwise provides, indemnify and keep indemnified the Employer and Engineer against all losses and claims for injuries or damages to any person or property whatsoever, including surface or other damage to land or trees or crops being on the site, suffered in consequence of the Plumbing execution and maintenance of the works, and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, provided always that nothing herein contained shall be deemed to render the Contractor liable for or in respect of or to indemnify the Employer against any compensation of damages for or with respect to:
- a) The permanent use or occupation of land by the Works or any part thereof, save in respect of damages to crops as aforesaid.
 - b) The right of the Employer to construct the Works or any part thereof on over, under, in or through any land.
 - c) Interference, whether temporary or permanent, resulting in the dilution or hindrance to or negation of any right or light, airway, way or other easement or quasi-easement which is the unavoidable result of the construction of the Works in accordance with the Contract.
 - d) Injuries or damages to persons or property resulting from any act or neglect done or committed during the currency of the Contract by the Employer, his agents, servants, other contractors (not being employed by the Contractor) or for or in respect of any claim demands, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto.

12.6 Insurance

- 12.6.1 Before commencing the execution of the works the Contractor, without limiting his obligations and responsibilities under this Contract, shall insure, in terms of third party insurance coverage, against any damage, loss or injury which may occur to any property (including that of the Employer) or to any Person (including any employee of the Employer) by or arising out of the execution of the Works or Temporary Works or in the carrying out of the Contract other than due to the matters referred to in the provisions under the clause herein above titled Damages to persons and property.
- 12.6.2 Minimum amount of third party insurance is stated in the Contract Data and the Contractor shall whenever required produce to the Engineer the valid policy or policies of insurance and the receipts for payment of the current premium.
- 12.6.3 The Contractor shall maintain and shall require his Subcontractors to maintain in full force and effect, from insurance companies in India acceptable to the Engineer, from the time of execution of his Agreement:
- a) All such insurances as are required by law for the purpose of the Contract at the cost of Contractor.
 - b) All such insurances required in respect of equipment purchased out of advance received from Employer at the cost of Contractor.
 - c) Any additional insurance required specifically by the Employer / Engineer at the cost of Employer.
- 12.6.4 The Contractor shall provide, in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractor's risks:
- a) Loss of or damage to the Works, Plant and Materials.





- b) Loss of or damage to equipment.
 - c) Loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract.
 - d) Personal injury or death.
- 12.6.5 Contractor shall ensure that the insurer shall furnish to the Engineer and Employer as evidence of such insurance a copy of the issued policy and any amendments thereto and prompt notification of any cancellation or termination thereof.
- 12.6.6 Alterations to the terms of an insurance coverage shall not be made without the approval of the Engineer.
- 12.6.7 Both parties shall comply with any conditions of the insurance policies.
- 12.6.8 Should Contractor default in paying any premium when due, Engineer or Employer, without prejudice to other remedies set forth in this Contract shall be at liberty to pay such premium and recover the same from Contractor.
- 12.6.9 Any such insurance requirements are hereby established as the minimum policies and coverages, which Contractor must secure and keep in force. Contractor shall at all times be free to obtain additional or increased coverage at Contractor's sole expense.
- 12.6.10 The provisions contained within this Article are not intended and do not impair or in any manner limit the liabilities or obligation assumed by Contractor as may be set forth more fully elsewhere in this Agreement.
- 12.6.11 Policies and certificates for insurance shall be delivered by the Contractor to the Engineer for the Engineer's approval before the Start Date. All such insurance shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.0 Plant, Materials & Labour

- 13.1 Except where otherwise specified, the Contractor shall at his own expense, supply and provide all the Plumbing execution works materials, both for Temporary and permanent Works and maintenance work, necessary manpower and labour, including the supervision thereof, transport to or from site and in and about the Works and other things of every kind required for the Plumbing execution and maintenance of the Works. The Contractor shall promptly arrange spare parts, consumables, fuel, lubricants, etc. for the equipment, etc., as and when necessary at his own cost.
- 13.2 A non-exclusive list of plant, equipments, machinery, gadgets, tools and tackles is specified in the Special Conditions of Contract.

13.3 Adequacy

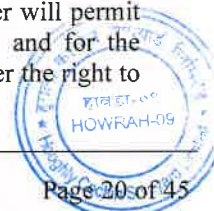
- 13.3.1 If, in the opinion of the Engineer, the tools, tackles, plant and equipment, instruments, gadgets, materials, etc., brought to site or arranged by the Contractor, are not sufficient or are inadequate, the Engineer shall have the right to direct the Contractor and the Contractor shall comply with the directions and arrange to bring such additional tools, tackles, plant and equipment, instruments, gadgets, materials, etc., to the site and employ the same for the work at his own cost.

13.4 Liability against loss or injury to plant

- 13.4.1 The Employer shall not at any time be liable for the loss or of injury to any of the Plant, Temporary Works or materials, irrespective of them being deemed to having been vested with him.

13.5 Irremovability

- 13.5.1 All materials, equipments and Temporary Works, or any part thereof, shall not be removed from the Site without the written consent of the Engineer.
- 13.5.2 Such consent shall not be unreasonably withheld where the aforesaid items are no longer immediately required for the purposes of completion of the Work, but the Employer will permit the Contractor the exclusive use of all such Temporary Works and materials in and for the completion of the Works until the occurrence of any event which gives the Employer the right to exclude the Contractor from the Site and proceed with the completion of the Works.





- 13.5.3 Similarly, all enabling or Temporary Works built or setup by the Contractor are not to be dismantled without the written approval of the Engineer.

13.6 Plant, Equipment, Tools and Tackles

- 13.6.1 The Contractor shall mobilise and maintain in working condition adequate numbers of plant, equipments, machinery, gadgets, tools and tackles during the period of Plumbing execution work, some of these being required during the period of maintenance also.
- 13.6.2 The cost of mobilising, maintaining, manning, operating, using and withdrawing them after completion of the work is deemed to be fully covered under the Contract amount and separate payment or reimbursement is not to be made by the Employer.

13.7 Plant and Machinery by employer

- 13.7.1 Where, in the opinion of the Engineer, requirement exists for deployment of certain plant or machinery or gadgets and the Contractor is unable to mobilise the same, and the Engineer has at his disposal such items, either directly or as part of the mobilisation of other contractors, the Engineer may, at his discretion, offer the same on hire and / or sharing basis to the Contractor.

13.8 Engineers discretion

- 13.8.1 The Engineer reserves the right to give on hire or arrange on hire or share basis particular Plumbing execution works equipment to a particular contractor without assigning any reason whatsoever.

13.9 Obligations of the Contractor

- 13.9.1 The Employer's inability to provide requisite Plumbing execution equipments on hire or share to the Contractor shall not be taken as an excuse for slow progress and non-performance of the work or for bad workmanship or for non-fulfillment of contractual obligations of the Contractor.
- 13.9.2 Further, this does not absolve the Contractor of his obligation to mobilise his own plant or machinery or gadgets and he shall have no right in this regard or have a claim against any decision of the Engineer to offer or not to offer the same.

13.10 Charges

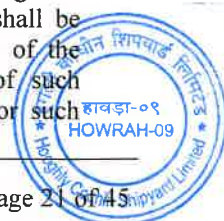
- 13.10.1 The hire or share charges for such equipments, if made available to the Contractor, the arranging for and cost of operating manpower and consumables, upkeep and maintenance and related aspects and the debiting of account shall be as approved by the Engineer from time to time.
- 13.10.2 Where such hire or share is directly from or with another contractor, the Engineer shall decide on the methodology for debiting and crediting the accounts of the contractors.

13.11 Materials

- 13.11.1 The quality aspects of the materials to be used by the Contractor are elaborated elsewhere in this General Conditions of Contract.
- 13.11.2 The Contractor shall furnish the Employer with vouchers for any material on demand within seven days to prove that the materials are as specified.

13.12 Substitution

- 13.12.1 Should the Contractor desire to substitute any materials of work, he must secure the approval of the Engineer in writing for any such substitution well in advance.
- 13.12.2 Materials described in the specification or in the bill of quantities indefinitely, by such terms as 'equivalent' or 'other approved', etc. shall be considered as coming under the provision of this clause as substitution and no such materials shall be used until specific approval of Engineer has been received in writing.
- 13.12.3 Where the name / names of manufactures are specified in the Bill of Quantities, the tendered rates shall cover supply of materials of such manufacturers only. In the case, where the Engineer accepts or directs use of substitute manufacture of those materials, the tender rates shall be suitably adjusted by the amount equivalent to the difference of the cost of materials of the specified manufacture and of substitute manufacture. For deciding the amount of such adjustment in rate, the manufacturers' latest price lists shall be taken as the basis for such



calculation and the Engineer's decision in interpreting the price lists and / or the calculations thereof shall be final and binding.

13.13 Materials obtained from dismantling, excavation, etc.

- 13.13.1 All materials, including stone, rubble and other materials, obtained in the work of dismantling, excavation, etc., will be considered as Employer's property.
- 13.13.2 The Engineer may, as deemed fit by him, issue the same to the Contractor for use in the Works, at rates approved by the Engineer, or call for their disposal by the Contractor to the best advantage of the Employer.
- 13.13.3 Costs against disposal, handling and related activities, if covered in a separate and specific item in the Bill of Quantities, are deemed to be covered in the corresponding item rate in the Bill of Quantities, whereas in all other cases they shall be borne by the Contractor, no payment from the Employer being admissible.

13.14 Patent Rights & Royalties

- 13.14.1 The Contractor shall save harmless and indemnify the Employer 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 machine, work or material used for or in connection with the Plumbing execution works and / or Temporary Works and from and against all demands, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.
- 13.14.2 Except where otherwise specified, the Contractor shall pay all tollages and other royalties, rent and other payments, if any, for getting materials to the site required for the Plumbing works and / or Temporary Works.

13.15 Materials by Employer

- 13.15.1 The Employer may arrange to issue materials to be incorporated in the permanent Works, as may be stipulated in the Preamble to Bill of Quantities, wherein the aspect as to their issue by the Employer either as on free-issue basis or as on recovery basis is also stated. All other materials required for the Works shall be arranged for by the Contractor at his own cost.
- 13.15.2 In cases where, in the opinion of the Engineer, the Employer can issue materials for Temporary Works and / or maintenance works, the terms and conditions and methodology for such issue shall be as in the case of such material for permanent Works.
- 13.15.3 Where issued by the Employer, the Contractor shall at his own cost, take delivery of the materials from the places of issue and the Contractor's quoted rates shall be deemed to include all costs for taking delivery, loading, transporting, unloading, handling, stacking and storage including rehandling as required, insurance, watch & ward and security.
- 13.15.4 All the materials issued by the Employer shall remain the absolute property of the Employer and at all times shall be open for inspection by the Engineer, who shall be free to make any surprise check of the Contractor's stores to verify the stock and condition of the materials. The responsibility in case of any loss, damage or theft of these materials after they have been issued to the Contractor shall rest entirely with the Contractor.

13.16 Requisition

- 13.16.1 The Contractor shall keep the Engineer informed regarding his requirement of materials to be supplied by the Employer. He shall also submit every month to the Engineer in writing, in the prescribed proforma, three months requirement of materials, indicating quantities and the backup details / calculations thereof. In case of Contracts with a work-duration of less than three months, this periodicity shall be one week.
- 13.16.2 The Contractor shall keep himself in touch with the day-to-day position regarding the supply of materials from the Engineer and to so adjust the progress of the work such that his labour and plant may not remain idle nor there be any other claim due to or arising from delay in obtaining the materials. No claim whatsoever shall be admitted by the Employer on account of delay in supplying materials.

13.17 Emergency procurement



13.17.1 Notwithstanding the above, where materials to be issued by the Employer are delayed for whatever reason, the Contractor may, as the situation requires and with specific permission of the Engineer, procure on his own such of those materials in such of those quantities as mutually agreed, at prices approved by the Engineer, in which case necessary adjustment shall be made in the account of the Contractor.

13.17.2 The Engineer's decisions in all aspects of this matter shall be final and binding.

13.18 Intertransfer

13.18.1 The Engineer reserves the right to intertransfer materials issued by the Employer from one contractor to another if it becomes necessary during the course of execution of Works and the Contractor shall abide by such decisions and extend all necessary assistance in this regard.

13.18.2 Such transfer of materials shall be regularised by issue of suitable material return notes and stores issue notes and recorded in the registers pertaining to the materials.

13.19 Bonafide use

13.19.1 The Contractor shall not divert or convert any materials issued by the Employer for his own use or for any other use not connected with the Works entrusted.

13.19.2 These materials shall not be removed from the site by the Contractor for any reason whatsoever without the written permission of the Employer.

13.20 Accounting

13.20.1 The system and methodology of accounting the materials issued by the Employer to the Contractor and related aspects are laid down in the Special Conditions of Contract.

14.0 Manpower

14.1 The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or otherwise and for their payment, housing, feeding, welfare and transport.

14.2 The Contractor shall be deemed to be the principal Employer for the purpose of determining the responsibility under the statute and he shall get registered with the concerned statutory authority and shall be directly responsible to the authorities thereunder for compliance with the provisions thereof.

14.3 The employees of the Contractor and the Subcontractor in no case shall be treated as the employees of the Employer at any point of time.

14.4 Compliance with Labour Regulations

14.4.1 During continuance of the Contract, the Contractor and his Subcontractors shall abide at all times by all existing labour enactments and rules made thereunder, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules), regulations, bye laws that may be passed or notifications that may be issued under any labour law in future either by the State or the Central Government or the local authority.

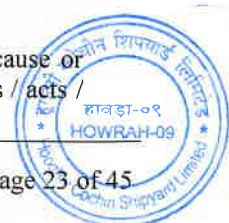
14.4.2 Salient features of some major labour laws applicable to establishments engaged in Plumbing works are listed elsewhere in this document. These include but are not limited to stipulations on the protection of health, sanitary arrangements, wages, fair wages, provident fund, welfare, amenities, safety measures, maintenance of registers, etc.

14.4.3 The Contractor shall also be fully responsible for the observance of the above provisions by his Subcontractors.

14.5 Indemnity

14.5.1 The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made thereunder, regulations or notifications including amendments thereof.

14.5.2 If the Employer is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications / bye laws / acts /





regulations including amendments, if any, on the part of the Contractor, the Engineer / Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer / Engineer shall also have the right to recover from the Contractor any sum required or estimated to be required for making good the loss or damage suffered by the Employer.

14.6 Returns of Labour

- 14.6.1 The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the several classes of labour from time to time employed by the Contractor and his Subcontractors on the Site, and / or off the Site in connection with this Work, and such other informations as the Engineer calls for.
- 14.6.2 Where directed by the Engineer or any statutory authority, the Contractor shall submit in the prescribed proforma periodical statements of labour and workmen employed by him, either directly or indirectly, indicating the details of persons categorised as per locally applicable statute, displaced persons, persons belonging to scheduled castes / tribes, etc. Local statute in regard to employment of persons shall be adhered to.

14.7 Authorised Agent

- 14.7.1 The Contractor shall have a duly authorised agent at site, to be constantly on the Works giving his whole time to the same, from the commencement to the completion of the work and as long thereafter as the Engineer may consider necessary.
- 14.7.2 The agent shall not be changed (unless required by the Engineer) and shall be continued till completion of the Contract unless the consent of the Engineer has been previously obtained for the change of the Agent.
- 14.7.3 Such agent shall be of an acceptable designation and authorised to act on behalf of the Contractor, to accept notices under the Contract and to agree to extra and varied items of works and rates for the same and to receive on behalf of the Contractor, directions and instructions from the Engineer or his representative. Such agent shall be in charge of the coordination with the Engineer and other contractors and parties at site and superintendence of the Work and shall maintain in his staff qualified Engineers and such other personnel as may be required for efficient execution of the Works and compliance with the Contract.
- 14.7.4 Any notice under the Contract shall be deemed to have been served on the Contractor if served upon such agent at site or sent by registered letter to the agent's address.

14.8 Competent personnel

- 14.8.1 The Contractor shall employ in and about the execution of the Works only such persons as are careful, skilled and experienced in their respective trades.
- 14.8.2 The Contractor shall deploy competent and qualified Engineers constantly on the work who will be responsible for carrying out the work to the satisfaction of the Engineer. Any directions or instructions given to them shall be deemed to have been given to the Contractor.
- 14.8.3 The Contractor shall send at his own cost a duly authorised competent representative to meet the Employer at his office or at any other place within the country in connection with his Works whenever called upon to do so by the Employer or Engineer and any instructions, directions or explanations given by the Employer or by the Engineer to such representatives shall be deemed to have been given to the Contractor for compliance.

14.9 Removal of Workmen

- 14.9.1 The Engineer shall be at liberty to object to and require the Contractor to remove from the Works and ensure no further connection with the Work in the Contract, any person either directly or indirectly employed by the Contractor in or about the execution of the Works who in the opinion of the Engineer misconducts himself or is incompetent or negligent in the proper performance of his duties and such persons shall not be again employed upon the Works in any capacity without the prior written permission of the Engineer.

14.10 Accident or injury to Workmen





- 14.10.1 The Employer shall not be liable for in respect of any damages or compensation payable at Law in respect of or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or any Subcontractor save and except an accident or injury resulting from any act or default of the Employer, his agents or servants and the Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation (save and except as aforesaid) and against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect or in relation thereto.
- 14.10.2 In cases where, due to the exigency of the situation, the Employer has borne any costs, expenses or compensation or paid any amounts against penalties in connection with any accident or injury, against which the Employer / Engineer stand indemnified, the Employer shall (without prejudice to any other means of recovery) be entitled to debit the same to the Contractor's Account.

14.11 Salient features of some major labour laws applicable to establishments engaged in building and other construction work

- a) Workmen Compensation Act 1923: The Act provides for compensation in case of injury by accident arising out of and during the course of employment.
- b) Payment of Gratuity Act 1972: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed five years service or more or on death the rate of 15 (fifteen) days wages for every completed year of service. The Act is applicable to all establishments employing 10 (ten) or more employees.
- c) Employees PF and Miscellaneous Provisions Act 1952: The Act Provides for monthly contributions by the Employer plus workers @ 10% or 8.33%. The benefits payable under the Act are:
 - i) Pension or family pension on retirement or death, as the case may be.
 - ii) Deposit linked insurance on the death in harness of the worker
 - iii) Payment of PF accumulation on retirement / death, etc.
- d) Maternity Benefit Act 1951: The Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.
- e) Contract Labour (Regulation & Abolition) Act 1970: The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 (twenty) or more contract labour.
- f) Minimum Wages Act 1948: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment. Construction of Buildings, Roads, and Runways are scheduled employments.
- g) Payment of Wages Act 1936: This Act lays down as to be what date the wages are to be paid, when it will be paid and what deductions can be made from the wages of the workers.
- h) Equal Remuneration Act 1979: The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not making discrimination against Female employees in the matters of transfers, training and promotions, etc.
- i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 (twenty) or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs.3,500/- per month or less. The bonus to be paid to employees getting Rs.2,500/- per month or above upto Rs.3,500/- per month shall be worked out by taking wages as Rs.2,500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.



- j) Industrial Disputes Act 1947: The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- k) Industrial Employment (Standing Orders) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central government to 50). The Act provides for laying down rules governing the conditions of employment by the Employer on matters provided in the Act and get the same certified by the designated Authority.
- l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and Employers. The Trade Unions registered under the Act have been given certain immunities from civil and criminal liabilities.
- m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of Child Labour is prohibited in Building and Construction Industry.
- n) Inter-State Migrant Workmen's (Regulation of Employment & Conditions of Services) Act 1979: The Act is applicable to an establishment which employs 5 (five) or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upto the establishment and back, etc.
- o) The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employ 10 (ten) or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% (two percent) of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-aid facilities, Ambulance, Housing accommodations for workers near the work place, etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.
- p) Factories Act 1948: The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 (ten) persons or more with aid of power or 20 or more persons without aid of power engaged in manufacturing process.

15.0 Time

- 15.1.1 Time is the essence of this Contract, even if this Contract empowers the Employer to grant extension of time in certain circumstances, in which case the existing terms and conditions of this Contract shall apply, without any additional financial liability to the Employer.
- 15.1.2 The work covered under this Contract is to be executed in a sequential and well-coordinated manner so as to give fronts for work to other Contractors or Employer's activities. With this objective, the Contractor has to execute the work as per the Programme, as herein below defined, making all necessary arrangements including planning for executing the work in as many shifts as necessary and also on Sundays and holidays as per the requirement as well as carrying out the Works intermittently wherever called for or found necessary.
- 15.1.3 The Contractor is in no way entitled to any extra payment on account of implementing the Programme and following any particular sequence of work, intervals in work, work on holidays or Sundays, overtime payments and idling charges for men and machinery, establishment, overheads or any aspect thereof.

15.2 Dates

- 15.2.1 The Contract Data specifies the Start Date and the Intended Completion Date.



- 15.2.2 The Contractor shall commence execution of the Works on the Start Date and complete them by the Intended Completion Date, as specified by the Employer and / or in accordance with the Program, as valid and in force at any particular instant of time,
- 15.2.3 The Start Date may be revised before acceptance of the Tender, at the sole discretion of the Employer, in which case revision of the Intended Completion Date is also at the sole discretion of the Employer. The Contractor is bound to adhere to such revised dates.

15.3 Programme

- 15.3.1 Within the time stated in the Contract Data, the Contractor shall submit to the Engineer for approval a Programme showing the general methods, arrangements, order and timing for all the activities in the Works along with monthly / weekly cash flow forecast.
- 15.3.2 All time-based data and informations in the Programme shall be depicted with a week as the unit of time.
- 15.3.3 An update of the Programme shall be a Programme showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities, invariably showing the effect of Variations and Compensation Events, if any.
- 15.3.4 The Contractor shall submit to the Engineer, for approval, updated Programmes at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Programme in time, the Engineer may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Programme has been submitted.
- 15.3.5 In this Contract, at any instant of time, an updated Programme is the Programme, in so far as interpretation of any time-related matters is concerned.
- 15.3.6 The Engineer's approval of the Programme shall not alter any of the Contractor's obligations under this Contract.

15.4 Extension of the Intended Completion Date

- 15.4.1 The Engineer shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work, such acceleration causing the Contractor to incur additional cost.
- 15.4.2 The Engineer shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation along with detailed supporting information.
- 15.4.3 If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.
- 15.4.4 Without prejudice as to the meaning and contractual implications of the Intended Completion Date, the Contract Data may specify or the Engineer may, at any time before or after the Start Date, specify or approve, completion dates for individual parts of the Work, these being termed as In-part Completion Dates and always being earlier to or co-terminus with the Intended Completion Date.

15.5 Early Warning

- 15.5.1 The Contractor is to warn the Engineer at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works.
- 15.5.2 The Engineer may require the Contractor to provide, as soon as reasonably possible, an analysis and estimate of the expected effect of the future event or circumstance on the Contract Price and Completion Date.
- 15.5.3 The Contractor shall cooperate with the Engineer in making and considering proposals as to how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instructions of the Engineer.



15.6 Delays and suspensions ordered by the Engineer

- 15.6.1 The Engineer may instruct the Contractor to delay the start or progress of any activity within the Works.
- 15.6.2 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 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.
- 15.6.3 Provided that the Contractor shall not be entitled to recover any such extra cost unless he gives notice in writing of his intention to claim to the Engineer within 21 days of the Engineer's order, the extra cost, if any, incurred by the Contractor in giving effect to the Engineer's instructions under this clause shall be borne and be paid by the Employer, as decided by the Engineer, unless such suspension is:
- a) otherwise provided for in the Contract, or
 - b) necessary for the proper execution of the work or by reason of weather or other conditions or by some Default on the part of the Contractor, or
 - c) Necessary for safety of Works or any part thereof.

15.7 Suspension lasting more than three months

- 15.7.1 If the progress of the Works or any part thereof is suspended on the written order of the Engineer for more than three months, the Contractor may serve a written notice on the Engineer requiring permission within 30 days from the receipt thereof to proceed with the Works or that part thereof in regard to which the progress is suspended.
- 15.7.2 If permission as aforesaid is not granted within that time as aforesaid, the Contractor by a further written notice so served may, but is not bound to, elect to treat the suspension, where it affects part only of the Works as an omission of such part under the clause pertaining to Alterations, additions and omissions, or where it affects the whole Works as an abandonment of the Contract by the Employer, without attaching any liability thereof on the Employer.
- 15.7.3 If at any time the Employer finds that any particular work is not progressing properly according to the Programme, the Employer will have the right, without prejudice to applying any other of his rights or invoking any other provisions of this Contract, to take over the particular work for execution by himself or through any other contractor or agency at the risk and cost of the Contractor.

15.8 Possession of site and instructions for work

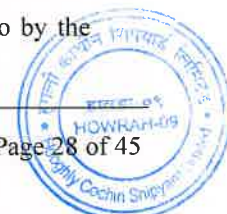
- 15.8.1 Save in so far as the Contract may prescribe the extent of portions of the Site of which the Contractor is to be given possession from time to time and the order and sequence in which such portions shall be made available to him and subject to any requirement in the Contract as to the order and sequence in which the work shall be executed, the Employer will, with the Engineer's written order to commence the works, give to the Contractor possession of so much of the site and drawings and instructions as may be required to enable the Contractor to commence and / or proceed with the Works in accordance with the Programme. If there is delay in handing over the possession of the site to the Contractor, in accordance with the terms of this clause, the Engineer shall grant suitable extension of time for the completion of the works.

15.9 Management Meetings

- 15.9.1 Either the Engineer or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the planning for remaining work and to deal with matters raised in accordance with the early warning procedure.
- 15.9.2 The Engineer shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer.
- 15.9.3 The responsibility of the parties for actions to be taken is to be decided by the Engineer either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

15.10 Liquidated damages for delay

- 15.10.1 Liquidated Damages shall constitute a genuine pre-estimate of damages duly agreed to by the parties to this Contract.





- 15.10.2 If the Contractor fails to complete the Works within the Intended Completion Date or the In-part Intended Completion Dates, then the Contractor shall pay to the Employer the sum stated as Liquidated Damages in the Contract Data for such default, and not as a penalty, for every week or part of a week which shall elapse between the time prescribed herein above.
- 15.10.3 Liquidated damages pertain to a situation where completion of the Works has been delayed and in no way substitute or get substituted by any other penalties, such as for not achieving milestones, which might have been levied on the Contractor. The milestones, as described elsewhere in these documents, are therefore linked to intermediate stages of Plumbing execution works only and not to the completion of Works.
- 15.10.4 The Employer may, without prejudice to any other method of recovery, debit the Contractor's Account to the extent of the Liquidated Damages.
- 15.10.5 The payment or deduction or debiting of Liquidated 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.
- 15.10.6 The total amount of Liquidated Damages shall not exceed the amount defined in the Contract Data.

15.11 Reduction and adjustment of Liquidated Damages

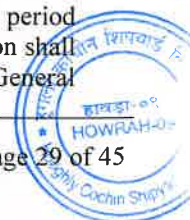
- 15.11.1 If before the completion of the whole of the Works, any part of the Works has been certified by the Engineer as completed pursuant to this Contract and occupied or used by the Employer, the liquidated damages for delay shall for any period of delay after such certification be reduced in the proportion which the value of the part so certified bears to the value of the whole of the works.
- 15.11.2 If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any overpayment of liquidated damages by the Contractor by adjusting the next payment certificate.
- 15.11.3 The Contractor shall be paid interest on such over payment calculated from the date of payment to the date of repayment at the rates specified under the clause titled Interest on Late Payment.

15.12 Certificate of completion of works

- 15.12.1 As soon as in the opinion of the Engineer the Works shall have been virtually completed Engineer shall on receiving a written undertaking by the Contractor to finish any outstanding work during the period of maintenance, issue a certificate of virtual completion in respect of the Works and the period of maintenance of Works shall commence from the date of such certificate provided that the Engineer may give such a certificate with respect to any substantial part of the Works which has been both completed to the satisfaction of the Engineer and occupied or used by the Employer and when any such certificate is given in respect of a part of the Works such part shall be considered completed and the period of maintenance of such part shall commence from the date of such certificate. Provided always that a certificate of virtual completion given in accordance with the foregoing provisions of any part of the Works occupied and used aforesaid shall not be deemed to certify completion of any ground or surface requiring reinstatement unless such certificate shall expressly so state.

15.13 Milestones

- 15.13.1 Various Milestones as indicated in the Contract Data are required to be achieved during execution of work. Non-achievement of a Milestone within the specified time shall attract penalties as indicated against each activity of works. The penalties shall be non-refundable and not in any way connected with Liquidated Damages that shall be imposed as per terms of Contract. These penalties shall also be an "Excepted Matter" as defined under General Conditions of Contract.
- 15.13.2 In the event of non-fulfillment of Milestones during the specified period, the penalty as indicated against each shall be levied / recovered from the next Bill which shall not be refunded to the Contractor irrespective of completion of the overall work.
- 15.13.3 However, due to any reason attributable to the Employer, if it is not possible to achieve a particular Milestone / Milestones within the specified period, a suitable amendment in the period of affected / related Milestones shall be made as deemed fit by the Engineer whose decision shall be final, binding and conclusive and shall be an Excepted Matter as defined in General





Conditions of Contract. In such cases, the Levy of penalty shall be linked with the fulfillment of the amended Milestones(s). The Contractor shall not have any claim on account of such changes / postponement of Milestones.

- 15.13.4 Three successive failures of fulfilling Milestones by the Contractor may entail cancellation of Contract and getting the work done at his Risk and Cost. This is also an Excepted Matter as per General Conditions of Contract.

16.0 Quality

16.1 Responsibility

The Contractor is fully and solely responsible for the quality of the Works and their components and no particular action or absence of action by the Engineer shall absolve him of this responsibility. To this end, the Contractor shall implement quality assurance and quality control measures which shall encompass the following:

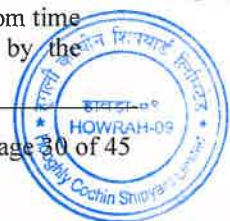
- 16.1.1 Material, whether of manufactured, fabricated.
- 16.1.2 Workmanship, in incorporating the material in the Works, in ensuring intended dimensions, line and level and in ensuring that the Works or parts thereof do not get affected by subsequent or allied or other activities.
- 16.1.3 Achieving intended levels of operation and serviceability.
- 16.1.4 Systems and practices to be adhered to by the Contractor and the mechanism to implement the same as spelt out in the various parts of this Contract documents, including, but not necessarily limited to the following aspects:
 - a) Skilled and competent labour and supervisory manpower.
 - b) Careful selection of materials.
 - c) Good practices in putting together the Works and their components.
 - d) Good practices in maintaining the Works and their components, during the Plumbing execution work as well as during the Period of Maintenance.
 - e) Testing of materials and components of work, including inspection of all items comprising moving / mechanical / electrical items, including testing for their performance in their unconstructed or unassembled state as well as finished state in the Works.
 - f) Ensuring and enforcing guarantees and warranties against manufactured items.
 - g) Documentation.

16.2 Quality Assurance Plan

- 16.2.1 The Contractor shall, within two weeks of the receipt of the Letter of Acceptance from the Employer, submit to the Engineer, a detailed quality assurance plan (QAP) envisaged by him for ensuring due and proper adherence to quality as required by the Contract.
- 16.2.2 The QAP shall describe in detail the organisation and methodology, checks and controls, as well as the correction mechanisms built into the QAP system to be implemented at the Site and elsewhere, for ensuring quality inputs into the work and quality outputs and results.
- 16.2.3 The Engineer shall be entitled, from time to time and at any time, to make or cause to be made such additions, modifications or alterations in the QAP as he considers necessary to improve the QAP, the decision of the Engineer in this regard being final and binding on the Contractor, and the Contractor shall thereafter follow the QAP as added, modified or altered by the Engineer.

16.3 Defects

- 16.3.1 In so far as quality is concerned, any deviation of the Works, or any component and part thereof, from that intended in the Contract is termed as a Defect.
- 16.3.2 A Defect, when noticed or notified by the Engineer, shall be rectified by the Contractor without demur, notwithstanding any certification or measurement made or certified by the Engineer prior to such instance.
- 16.3.3 All materials and workmanship shall conform to the specifications and drawings issued from time to time and be free of all Defects. In case any aspect of quality is not covered by the



specifications and drawings issued, it shall conform to the relevant codes of the Bureau of Indian Standards and / or as directed by the Engineer.

- 16.3.4 The Engineer may at any time check the Contractor's work and notify the Contractor of any Defects that are found. The Engineer may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer considers may have a Defect.
- 16.3.5 Every time notice of a Defect is given, the Contractor shall correct the notified Defect within the short length of time specified by the Engineer's notice.
- 16.3.6 The Defect Liability Period shall be extended for as long as Defects remain to be corrected.
- 16.3.7 If the Contractor has not corrected a Defect within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor's account debited, without prejudice to any other action the Engineer may enforce.
- 16.3.8 The Engineer shall, during the progress of the Works have the right to order in writing from time to time the removal from the site, within such time or times as may be specified in the order, of any materials or items, which, in the opinion of the Engineer, are not in accordance with the Contract.

16.4 Covered-up works

- 16.4.1 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 items before their concealment.
- 16.4.2 The Contractor shall give due notice to the Engineer whenever any such work is ready or about to be ready for examination and the Engineer shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such work or of examining such items.
- 16.4.3 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.
- 16.4.4 If any such part or parts have been covered up or put out of view after compliance with the requirements of the preceding clause 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 Employer, but in any other case all such expenses shall be borne by the Contractor and shall be recoverable from him by the Employer or may debited by the Engineer to the Contractor's Account.

16.5 Tests

- 16.5.1 The specifications prescribe various tests at specified intervals for ascertaining the quality of the Work done. Mandatory tests, if indicated in the Specifications, shall be conducted, without fail.
- 16.5.2 If the Work is found unsatisfactory or if the tests prove unsatisfactory, the Engineer shall have the authority to order the Contractor to re-do the work done in that period and / or to order such alternations that may be necessary at the cost of the Contractor, and the Contractor shall be bound to carryout such orders, failing which the Engineer shall be at liberty to get the rectification / re-doing done through other agencies and debit the costs thereof to the Contractor's Account.
- 16.5.3 If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has Defect and the test shows that it does, the Contractor shall pay for the test and any samples. If there is no Defect, the test shall be a Compensation Event.
- 16.5.4 Notwithstanding anything indicated in this Contract, all materials shall be subject to inspection and approval by the Employer from time to time and the Contractor shall provide all facilities for inspection free of cost.
- 16.5.5 The Engineer will reject such materials which do not conform to the specifications and no claims for compensation on this account, including any plea that order for the material has already been placed by the Contractor on the manufacturer / supplier, will be entertained. Notwithstanding the above, the Contractor is under obligation to submit samples for approval, well ahead of his actual procurement.



16.5.6 The Contractor shall, at his own cost, provide and use and make available for the use of the Engineer, all necessary instruments, appliances and labour in connection with quality control / assurance or testing therewith.

16.5.7 The Contractor is under obligation to afford the Engineer all opportunities to be physically present and certify all sampling, testing and reporting of results or the workmanship in execution.

16.6 Laboratory

16.6.1 The Contractor shall set up, at his cost, a laboratory at Site, or elsewhere if permitted by the Engineer, complete with all necessary gadgets, instruments and qualified manpower, for the purpose of testing materials, components and systems. The requirement of such site laboratory and the minimum requirement of facilities thereof are indicated in the Contract Data.

16.6.2 Notwithstanding the site laboratory, the Engineer may call for testing at any third-party laboratory or institution, at the cost of the Contractor.

16.6.3 Cost of all samples, sampling, all testing and all costs incidental thereto are to be borne by the Contractor, no other payment being admissible and the Contract Price being deemed to cover all of them.

16.7 Samples

16.7.1 Samples of all bought-out items and such other items as may be indicated by the Engineer, shall be furnished by the Contractor, at his own cost, for approval of the Engineer, accompanied by complete details as to their source / mark / intended position in the Works, etc.

16.8 Guarantees and warranties

16.8.1 All guarantees / warranties such as those for manufactured items, water proofing etc., for the entire Works as obtained from the manufacturers or specialist agencies shall be transferred to the Employer by the Contractor prior to acceptance of such works, and the Contractor shall be responsible for such works during the guarantee period also.

16.8.2 The Contractor shall ensure that the terms and conditions and effective commencement and closing dates for the guarantees / warranties are to the best advantage of the Employer and he shall be bound by the Engineer's directions in this regard.

16.9 Documents

16.9.1 The following documents shall be furnished by the Contractor to the Engineer, from time to time and not later than the time limits that may be indicated by the Engineer, failure to do so attracting penal action and / or debiting of the Contractor's account, to the extent indicated in the Contract Data and / or omitting the related parts of the Works from the measurements thereof. These shall be furnished notwithstanding any copies or partial copies that may be already available with the Engineer:

- a) Manufacturer's certificates and test certificates for materials and items.
- b) Guarantees and warranties for both electrical and mechanical items, etc. and procedure-intensive works, including waterproofing, cable-jointing etc., a list and formats of these being furnished by the Contractor not later than two weeks from such an item or work being identified as being part of the Work.
- c) Certificates on control, checking and test of materials.
- d) Test reports.
- e) Quality assurance records.

16.9.2 In case of systems involving mechanical or other devices or processes, and where the Contract specifies that performance testing and / or commissioning is under the scope of the Contract, performance and acceptance tests shall be carried out by the Contractor at his own cost, subject to any stipulation as to the contrary in the Bill of Quantities, as detailed elsewhere in this Contract, more specifically in the Special Conditions of Contract.

16.10 Preliminary and final acceptance tests

16.10.1 Where preliminary and final acceptance tests are required for the Works, these have been described in the Special Conditions of Contract.





17.0 Defect Liability Period

- 17.1 This Contract is for Plumbing execution Works as intended and spelt out in the Contract, fulfilling all the requirements, including and not limited to quality and workmanship.
- 17.2 The Contractor is required to maintain the Works for a specified period, herein referred to as Defect Liability Period or Period of Maintenance, during which he shall rectify, free of cost to the Employer, all defects that may come to notice.

17.3 Commencement

- 17.3.1 On completion, the Works will be taken over by the Employer as per the handing over / commissioning sequence by listing out any defects to be attended / rectified within a time limit as brought out by the inspection committee or by the Engineer.
- 17.3.2 The taking over will be certified by the Engineer. The maintenance period will be counted from the date of such taking over and as elaborated below.

17.4 Duration

- 17.4.1 The duration of the Defect Liability Period is specified in the Contract Data, calculated from the date of completion of the Works as per Completion Certificate or in the event of more than one certificate having been issued by the Engineer, from the respective dates of the Completion Certificates for parts of the Work.

17.5 Execution of Work or repair, etc

- 17.5.1 The Contractor shall deploy, to the extent required and desired by the Engineer, his organisation and manpower throughout the Defect Liability Period, ensuring adequate superintendence and tradesmen with necessary tools, tackles, plant and material.
- 17.5.2 Where the Engineer has noticed an apparent defect, he shall direct the Contractor to attend to the same and rectify the same within a stipulated time.
- 17.5.3 The Engineer's action in this regard shall not absolve the Contractor's obligation to continuously and systematically search for defects and attend to the same.
- 17.5.4 The Contractor shall ensure that his activities during this period do not hinder, impinge upon, adversely effect or damage any of the activities of the Employer or other Contractors or agencies or parts of the structure and Works.
- 17.5.5 To the extent that the Works shall, at or as soon as practicable after the expiration of the Period of Maintenance, be not delivered to the Employer in as good and as perfect a condition (fair wear and tear expected) to the satisfaction of the Engineer as that in which they were at the commencement of the Period of Maintenance, the Contractor shall forthwith execute all such work of repair, amendment, rectification and making good of defects or other faults as may be required of the Contractor in writing by the Engineer during the period of maintenance or within fourteen days after its expiration.

17.6 Cost of execution of repair, etc.

- 17.6.1 All repair and rectification work pertaining to the Defect Liability Period, inclusive of any consumables thereof, shall be carried out by the Contractor at his own expense if the necessity thereof is in the opinion of the Engineer due to the use of materials or workmanship not in accordance with the Contract or to the 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.

17.7 Remedy on Contractor's failure to carry out repair

- 17.7.1 If the Contractor shall fail to do any such work as aforesaid required by the Engineer, the Employer shall be entitled to carry out such work by his own workmen or through other contractors and against such work which the Contractor should have carried out at the Contractor's own cost, the Employer shall be entitled to recover from the Contractor the cost thereof or may debit the same to the Contractor's Account.
- 17.7.2 The Contractor shall indemnify the Employer against any loss or liability that may be incurred by him on account of any failure on the part of the Contractor for timely rectification of the defects pointed out within the Defect Liability Period.





- 17.7.3 The release of retention money / security deposit against each unit / Work shall be after completion of the Defect Liability Period of such unit / parts of the Work as per discretion of the Engineer.

18.0 Cost and payment

18.1 Contract Price

- 18.1.1 The Bill of Quantities is used to calculate the Contract Price.
- 18.1.2 The initial Contract Price is the aggregate of the amounts against the individual items in the Bill of Quantities as referred to upto the stage of Letter of Acceptance and formalising the Contract agreement.
- 18.1.3 The Contract Price is in no way a fixed figure, being subject to revisions from time to time in respect of the actual quantities executed and / or any other changes as may be incorporated in the Contract, in the manner and to the extent provided for in the Contract, subsequent to the Letter of Acceptance issued by the Engineer.

18.2 Bill of Quantities

- 18.2.1 The Bill of Quantities contains the items, along with rates thereof, which the Contractor has to install, test, commission and hand over.
- 18.2.2 The Contractor is to be paid for the actual item-wise quantities of the work done at the item-wise rates in the Bill of Quantities.
- 18.2.3 Items of work for which no rate or price has been entered in the Contract will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.
- 18.2.4 Bill of Quantities Account denotes the account of the Contractor comprising the item-wise amounts and their aggregate, including the valuation of Variations and Compensation Events, only, but not applying the amounts pertaining to securities, retentions, advances, recoveries, deductions, penalties and adjustments.
- 18.2.5 The Bill of Quantities Account shall be the basis for computing the retention as hereinafter defined and the amounts of securities that the Contractor is required to provide and maintain.

18.3 Changes in the Quantities

- 18.3.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for a particular item by more than 50 percent, provided the change exceeds 3% of initial Contract Price, the Engineer shall adjust the rate for the particular item only to allow for the change.
- 18.3.2 In case the final quantities of any items stand nil at completion of Work, adjustment of any kind in the rates of other items is not permitted.
- 18.3.3 The Engineer shall not adjust rates for changes in quantities, if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Employer.
- 18.3.4 If requested by the Engineer, the Contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of Quantities.

18.4 Variations in cost

- 18.4.1 All Variations shall be included in updated Programs and cash flow projections produced by the Contractor, showing inter alia changes in the Cost and time.
- 18.4.2 As soon as information demonstrating the effect of each Compensation Event upon the Contractor's forecast of cost has been provided by the Contractor, it is to be assessed by the Engineer and the Contract Price shall be adjusted accordingly.
- 18.4.3 If the Contractor's forecast is deemed unreasonable, the Engineer shall adjust the Contract Price based on Engineer's own forecast.
- 18.4.4 The Engineer will assume that the Contractor will react competently and promptly to the event.
- 18.4.5 The Contractor shall not be entitled to compensation to the extent that the Employer's interests are adversely affected by the Contractor not having given early warning or not having cooperated with the Engineer.



18.5 Payments for Variations

- 18.5.1 The Contractor shall provide the Engineer with a quotation (with breakdown of unit rates) for carrying out the Variation when requested to do so by the Engineer. The Engineer shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the work pertaining to the Variation is done.
- 18.5.2 If the work in the Variation corresponds with an item description in the Bill of Quantities and if, in the opinion of the Engineer, the quantity of work above the limit stated in Clause hereinabove titled Variation in Quantities, or the timing of its execution do not cause the cost per unit of quantity to change, the rate in the Bill of Quantities shall be used to calculate the value of the Variation. If the cost per unit of quantity changes, or if the nature or timing of the work in the Variation does not correspond with items in the Bill of Quantities, the quotation by the Contractor shall be in form of new rates for the relevant items of work.
- 18.5.3 If the Contractor's quotation is unreasonable, the Engineer may order the Variation and make a change to the Contract Price which shall be based on Engineer's own forecast of the effects of the Variation on the Contractor's costs.
- 18.5.4 If the Engineer decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
- 18.5.5 The Contractor shall not be entitled to additional payment for costs that could have been avoided by giving early warning.

18.6 Retention

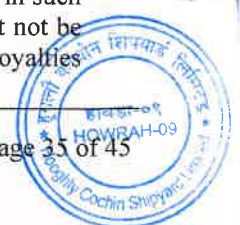
- 18.6.1 The Employer shall retain from each payment due to the Contractor, the proportion stated in the Contract Data until Completion of the whole of the Works.
- 18.6.2 The methodology for release of retention money and the conditions thereof are described elsewhere in this document under the clauses pertaining to closure of contract.

18.7 Bills

- 18.7.1 The Contractor shall submit to the Engineer periodical statements of the value of the work completed less the cumulative amount certified previously.
- 18.7.2 In this Contract, these statements, when appended with and comprising detailed measurements and calculations for the quantities thereof and corresponding amounts as per rates in the Contract, including the valuation of Variations and Compensation Events, together with statements of account for all financial transactions in respect of securities, indemnity bonds, retentions, advances, recoveries, deductions, penalties and adjustments, are termed as Bills.
- 18.7.3 The measurements of all the items of work shall be taken regularly and submitted every running by the Contractor for checking and certification by the Engineer; which the Engineer will normally check and return with corrections, if any, within a period of seven days, subject to the measurements being submitted in proper order and in approved format. All the bills prepared by the Contractor shall be based on these measurements certified by the Engineer. If the Contractor fails to submit proper measurement sheets in time, the Engineer has the option of not certifying the bills.
- 18.7.4 Payments against Bills, except in the case of Final Bill, shall be considered as progress payments and shall be regarded as payment by way of advance against final payments only and not as payment for the work completed till the date of progress payment.
- 18.7.5 The progress payments made shall not preclude the liability of the Contractor to finally complete the work strictly in accordance with the specifications and drawings, if required, by reconstructing or re-erecting and ensuring that all Defects, even where discovered subsequent to the payment, are eliminated.

18.8 Documents along with Bills

- 18.8.1 All Bills shall be accompanied by statements and records to establish the Contractor's adherence to all aspects pertaining to quality of Work and all applicable laws, rules and regulations, in such detail and in such formats as may be insisted upon by the Engineer and shall include but not be limited to test records and certificates, remittances in respect of all taxes, duties, cess, royalties





and seignorages, proof of payments made to subcontractors, labour and workmen and insurance coverages.

- 18.8.2 Bills are liable to be treated as incomplete and not fit for certification in the event of any shortfall in respect of the above statements and records.

18.9 Periodicity of Bills

- 18.9.1 The Contractor shall submit his Bills at intervals not less than the period specified in the Contract Data.
- 18.9.2 The Engineer may require of the Contractor to submit Bills on specified dates, in the interests of discipline in checking and reconciling measurements and ease of coordination between the Contractor and the Engineer in sorting out points that may need clarifications from either side.

18.10 Minimum amount for certification

- 18.10.1 Bills, except Final Bills, which, before or after checking by the Engineer, fall short of the amount specified in the Contract Data may not be certified for payment by the Engineer and will have to be treated as cancelled and their contents incorporated into subsequent Bills.

18.11 Period of certification

- 18.11.1 The Engineer shall check the Contractor's Bills and within 14 days of the Contractor's submission of the Bills, complete with all corrections called for and clarification of all their contents, certify the amount to be paid to the Contractor.
- 18.11.2 The final measurements, valuations and certification thereof in respect of the Contract are described in the clause hereof titled Final Bill.

18.12 Amending previous certifications

- 18.12.1 The Engineer may, in any of the Bills, make necessary entries to exclude any item certified in a previous Bill or reduce the proportion of any item previously certified in any Bill or carryout amendments and corrections in the light of later information.

18.13 Payments

- 18.13.1 Payments shall be adjusted for deductions pertaining to advance payments, retention, other recoveries in terms of the Contract and taxes, at source, as applicable under the law. In case of any ambiguity in the rates at which such deductions at source are to be made, the benefit of doubt shall be exercised to deduct at the higher of such rates.
- 18.13.2 The Employer shall pay the Contractor the amounts certified by the Engineer within the number of days from the date of each certificate, as indicated in the Contract Data.
- 18.13.3 Notwithstanding the above, where specified in the Contract Data, the Employer shall pay to the Contractor a fixed percentage of the amount billed by the Contractor, within the time also specified in the Contract Data, reckoned from the date of submission of the Bill, subject to the Engineer not having notified the Employer to desist from the same for any reason whatsoever. In such cases, the payment subsequent to the Engineer's certification of the Bill shall be adjusted for the amount already paid as above.

18.14 Mode of payment

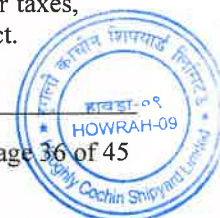
- 18.14.1 All payments by the Employer to the Contractor shall, unless otherwise specified in the Contract Data, be in Indian Rupees, in the form of account payee cheques or demand drafts or bank pay orders or NEFT or RTGS, as the Employer opts from time to time, all bank charges thereof being to the Contractor's Account.

18.15 Interest on late payment

- 18.15.1 If the payments by the Employer are delayed by more than one month from the due date, the Employer may consider payment of interest to the Contractor on the late payment and release it along with the next payment.
- 18.15.2 Interest shall be calculated from the date by which the payment should have been made upto the date when the late payment is made, at normal bank rates.

18.16 Tax

- 18.16.1 The rates quoted by the Contractor shall be deemed to be inclusive of the sales and other taxes, duties, seignorages that the Contractor will have to pay for the performance of this Contract.



- 18.16.2 The Employer will perform such duties in regard to the deduction of such taxes at source as per applicable law.

19.0 Closing the Contract

- 19.1.1 The Contract shall, except where otherwise provided for under the other clauses in this Contract, be deemed to be completed and fit for closure when the Engineer has satisfied himself as to the due completion by the Contractor of all the requirements of the Contract, including the due maintenance of the Works and all other activities as provided for in the Contract.
- 19.1.2 The actions to be taken by the Contractor and the Engineer as a pre-requisite for closure of the Contract are specified in the other clauses of this document.

19.2 Completion Certificate

- 19.2.1 Save for the requirements as to the Defect Liability Period, the Contractor shall fulfill all other requirements of the Contract, whereupon the Engineer shall issue a Completion Certificate.
- 19.2.2 The Engineer shall decide whether any uncorrected Defect can reasonably be classified as one that can be expected to be taken care of during the Defect Liability Period or to the contrary whether its correction shall be a prerequisite for issue of Completion Certificate.
- 19.2.3 Issue of Completion Certificate shall denote the readiness of the Works for their taking over by the Employer, the commencement of the Defect Liability Period and shall be deemed as authorising the Contractor to raise his Final Bill, while in no way absolving the Contractor of obligations and duties in respect of Defect Liability.

19.3 Multiple Completion Certificates

- 19.3.1 Where completion of Works in parts is specified in the Contract Data or specifically provided for in the Contract, the Engineer shall issue completion certificates for each of such parts.
- 19.3.2 In such cases, the Defect Liability Period for each of the parts shall commence at the issue of each such completion certificate
- 19.3.3 The last completion certificate shall be deemed as authorisation to the Contractor to raise his Final Bill.
- 19.3.4 Notwithstanding the aforesaid, the Programme for the work may indicate further multiple completion dates, consistent with the order and sequence and efficiency of Plumbing execution work or specific requirement of the Employer during the course of Plumbing execution works.
- 19.3.5 The matter of further multiple completions calling for corresponding further multiple Completion Certificates shall be mutually agreed, well ahead of such dates.
- 19.3.6 In such cases, all other conditions as to a single completion certificate as specified hereinabove shall apply.

19.4 Taking over ahead of issue of Completion Certificate

- 19.4.1 Any part of the work may be put to his own use by the Employer, even in the absence of the corresponding completion certificate, based on his urgency and requirement, in which case the Contractor is bound to fulfill his obligations as if this does not in any way denote Completion or taking over.

19.5 Period of maintenance

- 19.5.1 The period of maintenance, also termed as Defect Liability Period, for this Contract is specified in the Contract Data. The obligations, duties and responsibilities of the Contractor in this regard and other details are specified elsewhere in this document.

19.6 Maintenance Certificate

- 19.6.1 The Contract shall not be considered as completed until a maintenance certificate shall have been signed by the Engineer and delivered to the Employer stating that the Works have been completed and maintained to his satisfaction.
- 19.6.2 The maintenance certificate shall be issued by the Engineer fourteen days after the expiration of the Defect Liability Period, which is the period of maintenance, or as soon thereafter as any works ordered during the Defects Liability Period shall have been completed to the satisfaction of



the Engineer and full effects shall be given to this clause notwithstanding any previous entry on the Works or the taking possession, working or using thereof of any part by the Employer.

19.7 Approval only by maintenance certificate

19.7.1 No certificate other than the maintenance certificate defined hereinabove shall be deemed to constitute approval of any work or other matter in respect of which it is issued or shall be taken as an admission of the due performance of the Contract or any part thereof or of the accuracy of any claim or demand made by the Contractor or of additional or varied work having been ordered by the Engineer nor shall any other certificate abridge or prejudice any of the powers of the Engineer.

19.8 Cessation of Employer's Liability

19.8.1 The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or the execution of the Works unless the Contractor shall have made a claim in writing in respect thereof before requesting for issue of the Maintenance Certificate under the above clauses.

19.9 Multiple maintenance certificates

19.9.1 Where applicable due to existence of multiple completion certificates as specified hereinabove, multiple completion certificates shall be issued.

19.9.2 The last maintenance certificate shall be deemed to be the last certification by the Engineer for closing all financial matters pertaining to this Contract and closure of the Contract.

19.10 Retention Money

19.10.1 The Employer shall retain from each payment due to the Contractor, the proportion stated in the Contract Data until Completion of the whole of the Works, as a surety and guarantee of proper performance by the Contractor.

19.11 Release of Retention

19.11.1 The parts and proportions of the Retention Money, for the purposes of its release, are specified in the Contract Data.

19.11.2 The first part of the retention money shall become due to the Contractor when the Engineer issues Completion Certificate and the second, being the last, part thirty days after the issue of the Maintenance Certificate.

19.11.3 The Employer shall be entitled to withhold, and the Contractor is bound to forfeit, so much of the first or second parts of the retention money as shall in the opinion of the Engineer represent the cost of the works not executed to the Engineer's satisfaction.

19.11.4 Where multiple completion certificates or multiple maintenance certificates exist, the amounts due to the Contractor shall be in multiple fractions of the above parts, each fraction valued based on the value of Plumbing execution works as done and / or as per the discretion of the Engineer as to the relative values of the repairs and risks thereof.

19.11.5 The Contractor may substitute the second part of the retention money, in a form and style specified in this Contract or as may be approved by the Engineer.

19.12 Completion

19.12.1 The Contractor shall request the Engineer to issue a Certificate of completion of the Works and the Engineer will do so upon deciding that the Work is completed.

19.13 Taking Over

19.13.1 The Employer shall take over the Site and the Works within seven days of the Engineer issuing a certificate of Completion.

19.14 Final Account

19.14.1 The Contractor shall supply to the Engineer, in the form and style of the Final Bill, a detailed account of the total amount that the Contractor considers payable under the Contract, fifteen days after the end of the Defects Liability Period.

19.15 Components of Final Bill





19.15.1 The Final Bill shall be complete in all respects, showing all details as to the following accounts:

- a) The Bill of Quantities Account.
- b) Advances that may have been made by the Employer to the Contractor.
- c) Materials, if any, provided by the Employer, including reconciliation details.
- d) Account of all penalties and / or damages payable to the Employer by the Contractor.
- e) Payments by the Contractor to the Employer in respect of any plant, machinery, etc., water, electrical power and the like.
- f) Payments or costs incurred by the Employer in respect of any payments or dues to third parties or bodies or statutory bodies, where such costs were to be borne by the Contractor.

19.16 Documents to accompany Final Bill

19.16.1 The Final Bill shall be accompanied by the following, which may have been elaborated upon elsewhere in this document, in formats approved by the Engineer, failing which the Engineer may decide not to accept the Final Bill and treat it as due from the Contractor:

- a) Completion certificates and maintenance certificates.
- b) Records of Quality Assurance, including test certificates and all records thereof.
- c) Original Guarantees and Warranties obtained from others.
- d) As-built drawings.
- e) List and copies of all change / variation orders issued by the Engineer, to the extent as may be specified by the Engineer at that time.
- f) Clearance certificate from Labour Department.
- g) Clearance certificate from PF authorities.
- h) Clearance certificate from insurance authorities.
- i) Certificates of payment in respect of sales tax or other applicable taxes.
- j) No-claim undertaking by the Contractor.

19.17 Action on Final Bill

19.17.1 The Engineer shall certify Final Bill and any final payment that is due to the Contractor within 56 days of receiving the Contractor's Final Bill, if it is correct and complete. If it is not, the Engineer shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary.

19.17.2 If the Final Bill remains unsatisfactory after it has been resubmitted, the Engineer shall decide on the amount payable to the Contractor and issue a payment certificate, within 56 days of receiving the Contractor's corrected Final Bill.

19.17.3 In case the Contractor fails to submit a corrected Final Bill within 28 days of being called for, the Engineer, at his discretion may close the Contractor's Account, debiting and /or crediting it with the sums he deems fit, in which case the Employer may, notwithstanding the Engineer's certification, opt not to make any payments to the Contractor for as long as he deems fit. Such withheld payments shall not attract any interest whatsoever.

19.17.4 If the Engineer's certification as aforesaid indicates that money is due from the Contractor to the Employer, it shall be treated as a debt and shall be recoverable, with interest and / or damages, as per law, not in any way comforted by any provisions in this Contract, which anyway in such an event, shall be deemed as closed.

20.0 Termination of Contract

20.1.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

20.2 Fundamental breach of Contract

20.2.1 Fundamental breaches of Contract include, but shall not be limited to the following:



- a) The Contractor stops work for 28 days when no stoppage of work is shown on the current Programme and the stoppage has not been authorised by the Engineer.
- b) The Engineer instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days.
- c) The Employer or the Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation.
- d) A payment certified by the Engineer is not paid by the Employer to the Contractor within 56 days of the date of the Engineer's certificate.
- e) The Engineer gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer.
- f) The Contractor does not maintain a security that is required.
- g) The Contractor has delayed the completion of Works by the number of days for which the maximum amount of liquidated damages can be paid as defined in the Contract Data; and
- h) The Contractor, in the judgment of the Employer, has engaged in Corrupt or Fraudulent practices in competing for or in the executing the Contract.

20.2.2 When either party to the Contract gives notice of a breach of Contract for a cause other than those stated herein above as fundamental breach of contract, the Engineer shall decide whether the breach is fundamental or not.

20.2.3 If the Contract is terminated, the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

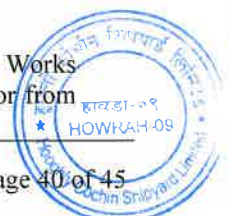
20.3 Termination of Contract by the Employer

20.3.1 Notwithstanding the above, the Employer may terminate the Contract for convenience.

20.3.2 The Employer may terminate the Contract after giving seven days notice in writing to the Contractor, such action caused due to, but not limited to:

- a) Contractor shall become bankrupt or have a receiver's order made against him or shall present his petition in bankruptcy or shall make an arrangement with or assignment in favour of his creditors or shall agree to carry out the Contract under a committee of inspection of his creditors or (being a corporation) shall go into liquidation (other than a voluntary liquidation for the purpose of amalgamation or reconstruction) or if the Contractor shall assign the Contract without the consent in writing of the Employer first obtained or shall have an execution levied on his goods.
- b) The Engineer certifies in writing to the Employer that in his opinion the Contractor has not fulfilled his obligations to the following extent, some of these hereinabove being defined as fundamental breach of Contract:
 - i) Has abandoned the Contract, or
 - ii) Without reasonable excuse has failed to commence the Works or has suspended the progress of the Works for 28 days in a month at a stretch or intermittently after receiving from the Engineer written notice to proceed, or
 - iii) Has failed to execute the work according to the Programme agreed upon or,
 - iv) Has failed to proceed with the Works with due diligence, or
 - v) Has failed to remove materials from the site or to pull down and replace work for 14 days after receiving from the Engineer written notice that the said materials or work have been condemned and rejected by the Engineer, or
 - vi) Is not executing the Works in accordance with the Contract, or is persistently or flagrantly neglecting to carry out his obligations under the Contract, or
 - vii) 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,

20.3.3 In the event of termination of the Contract, the Employer may enter upon the site and the Works and expel the Contractor therefrom without avoiding the Contract releasing the Contractor from



any of his obligations or liabilities under the Contract or affecting the right and powers conferred on the Employer or the Engineer by the Contract and may himself complete the Works or may employ any other Contractor to complete the Works and the Employer or such other Contractor may use for such completion so much of the Plumbing execution work, Temporary Works and materials which, anyway, have been deemed to become the property of the Employer under the provisions of clause titled Vesting of Plant, etc., all as deemed fit by the Engineer and the Employer may at any time sell any of the said constructional plant, Temporary Works and unused materials and apply the proceeds of sale in or towards the satisfaction of any sum due or which may become due to him from the Contractor under the Contract, without prejudicing any other means available to the Employer to preserve his rights under the Contract.

20.4 Valuation at date of termination of Contract

- 20.4.1 The Engineer shall as soon as may be practicable after any such entry and expulsion by the Employer fix and determine exparte or by or after reference to the parties or after such investigation or 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 or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract and what was the value of any unused or partially used materials, any Plumbing execution work and Temporary Works upon the site which, anyway, have been deemed to become the property of the Employer as per the relevant clauses in this Contract.
- 20.4.2 In arriving at the amount of such payment or value, the net rates contained in the Contract shall be followed or where the same may not apply valuation shall be made in accordance with the provisions in this Contract for valuation of variations.
- 20.4.3 Provided always that the Employer shall not be liable for payment of any claims or losses arising on account of suspension or stoppage of work under force majeure circumstances beyond the sum payable for the work already executed.

20.5 Termination of Contract by Contractor:

- 20.5.1 If the Employer commits any act of insolvency or if the Employer shall be adjudged an insolvent or shall make an assignment or composition for the benefit of the greater part in number or amount of his creditors or shall have an order made against him or pass as effective resolution for winding up either compulsory or subject to the supervision of the court or voluntarily or if the official assignee of the Employer shall repudiate the Contractor, if the official assignee or the liquidator in any such winding up shall be unable within 14 days after notice to him requiring him so to do to show to the reasonable satisfaction of the Contractor that he is able to carry out and fulfill the Contract and to make all payments due and to become due thereunder and if the work be stopped for three months or more at a stretch under the order of the Engineer or by an injunction or other order of any court of law for reasons not attributable to the Contractor then and in any of the said cases the Contractor, subject to provision contained in the clause hereof titled Suspension Lasting more than Three Months, shall be at liberty to determine the Contract by notice in writing to the Employer through the Engineer and he shall be entitled to recover from the Employer payment for all Works executed and for any loss he may sustain upon any plant or materials supplied or purchased or prepared for the purpose of the Contract.

20.6 Payment after termination of Contract

- 20.6.1 If the Employer shall enter and expel the Contractor under this clause, he shall not be liable to pay to the Contractor any money on account of the Contract until the expiration of the period of maintenance and thereafter until the costs of completion and maintenance, damages for delays in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum or sums (if any) as the Engineer may certify would have been due to him upon due completion by him after deducting the said amount. But if such amount shall exceed the sum, which would have been payable to the Contractor, the Contractor shall upon demand pay to the Employer the amount of such excess and it shall be deemed a debt due by the contractor to the Employer and shall be recoverable accordingly.

20.7 Urgent Repairs

- 20.7.1 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 security and the Contractor is unable, unwilling at once to do such work or repair; the Employer may by own or other workmen do such work or repair as the Engineer may consider necessary. If the work or repair so done by the Employer is work which in the opinion of the Engineer the Contractor was liable to do at his own expense under the Contract, all costs and charges properly incurred by the Employer in so doing shall on demand be paid by the Contractor to the Employer or may be debited to the Contractor's Account, provided always that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

20.8 Frustration of Contract

- 20.8.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Employer or the Contractor the Engineer shall certify that the Contract has been frustrated. The Contractor shall make the Site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

20.9 Works to be continued for 28 days on outbreak of war

- 20.9.1 If during the currency of the Contract there shall be an outbreak of war, whether war is declared or not, in which India shall be engaged on a scale involving general mobilisation of the armed forces of the Republic, the Contractor shall for a period of 28 days reckoned from midnight of the date on which the order for general mobilisation is given continue so far as is physically possible to execute the Works in accordance with the Contract.

20.10 Effect of completion within 28 days

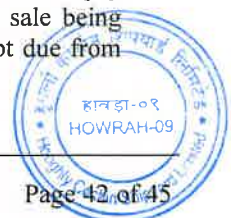
- 20.10.1 If at any time before the expiration of the said period of 28 days, the Works shall have been completed or completed so far as to be usable, all the provisions of the Contract shall continue to have full force and effect save that.
- 20.10.2 The Contractor shall in lieu of fulfilling his obligations under the period of maintenance, i.e., Defects Liability Period, be entitled at his option to allow against the same, to the extent of allowing the Engineer to debit the Contractor's Account the sum due to him under the provisions hereof, the cost, calculated at the prices ruling at the beginning of the said period of 28 days, as certified by the Engineer at the expiration of the period of maintenance of repair, rectification and making good any work for the repair, rectification or making good of which the Contractor would have been liable under the said clauses had they continued to be applicable.
- 20.10.3 The Employer shall not be entitled at the expiration of the period of maintenance to withhold the payment of the second half of the retention money or any part thereof except such sum as may be allowable by the Contract under the provisions of the last preceding paragraphs, which sum may, without prejudice to any other mode of recovery thereof, be deducted by the Employer from such second half.

20.11 Right of Employer to determine

- a) If the Works shall not have been complete as aforesaid, the Employer shall be entitled to determine the Contract by giving notice in writing to the Contractor at any time after the aforesaid period of 28 days has expired and upon such notice being given the Contractor shall forthwith determine, but without prejudice to the claims of either party in respect of any antecedent breach thereof.

20.12 Removal of plant on determination

- a) If the Contract shall be determined under the provision of the last preceding clause, the Contractor shall, with all reasonableness and despatch, remove from the site all his constructional plant and shall give facilities to his Subcontractors to remove similarly all constructional plant belonging to them and in the event of any failure to do so the Employer shall have the power to sell any such constructional plant and after deducting from any proceeds of sale the costs, charges and expenses of and in connection with such sale shall pay the balance, if any, to the Contractor but to the extent that the proceeds of any sale being insufficient to meet all such costs, charges and expenses, the excess shall be a debt due from the Contractor to the Employer and shall be debited to the Contractor's Account.





20.13 Payment on determination:

- a) If the Contract shall be determined as aforesaid, the Contractor shall be paid by the Employer, in so far as such amounts of items shall not have been already covered by payments on account made to the Contractor, for all work executed prior to the date of determination at the rates and prices provided in the Contract and in attention.
- b) The amounts payable in respect of any preliminary items so far as the work or service comprised therein has been carried out or performed and a proper portion of any such items as certified by the Engineer the work or service comprised therein has been partially carried out or performed.
- c) The cost of materials or goods reasonably ordered for the Works or temporary 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 Employer upon such payment being made by him).
- d) 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 in so far as such expenditure shall not have been covered by the payments on account made to the Contractor, for all work executed prior to the date of determination at the rates and prices provided in the Contract and in attention.
- e) Any additional sum payable under the clauses herein below pertaining to provisions to apply as from outbreak of war.
- f) The reasonable cost of removal under the preceding clause.

20.14 Provisions to apply as from outbreak of war

- a) Whether the Contract shall be determined under the provisions of the right of Employer to determine, or not, the following provisions shall apply or be deemed to have applied as from the date of the said outbreak of war, notwithstanding anything expressed in or implied by the other terms of the Contract, viz.
 - i) The Contractor shall be under no liability whether by way of indemnity or otherwise for or in respect of damage to the Works or to the property, other than property of the Contractor or property hired by him for the purpose of executing the works, whether of the Employer or of third parties or for or in respect of injury or loss of life to persons, which is the consequence whether direct or indirect of war, hostilities, whether war has been declared or not, invasion, act of India's enemies civil war, rebellion, revolution, insurrection, military or usurped power.
 - ii) If the Works or Temporary Works or any materials on the site, whether for the former or the latter, shall sustain destruction or any damage by reason of any of the causes mentioned in the last preceding paragraph, the Contractor shall nevertheless be entitled to payment for any permanent work, executed by the Contractor, so destroyed or damaged and the Contractor shall be entitled to be paid by the Employer the cost of making good any such destruction or damage whether to permanent work or to the temporary Works so far as may be required by the Engineer or as may be necessary for the completion of the work on a prime cost basis plus such profit as the Engineer may certify to be reasonable.

20.15 Payment upon Termination

- 20.15.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received upto the date of the issue of the certificate, less other recoveries due in terms of the Contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as may be indicated in the Contract Data. Additional Liquidated Damages shall not apply.
- 20.15.2 If the total amount due as above to the Employer exceeds any payment due to the Contractor the difference shall be a debt payable to the Employer.

20.16 Property, upon termination





- 20.16.1 All materials on the Site, Equipment, Temporary Works and Works are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.
- 20.16.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done, the reasonable cost of removal of equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and less advance payments received upto the date of the certificate, less other recoveries due in terms of the Contract, less any monies due to be paid by the Contractor to public utilities and statutory bodies and less taxes due to be deducted at source as per applicable law.

20.17 Compensation Events

20.17.1 The following are Compensation Events unless they are caused by the Contractor:

- a) The Employer does not give access to a part of the Site as per the Site Possession Date stated in the Contract Data.
- b) The Employer modifies the schedule of other contractors in a way that affects the work of the Contractor under the Contract.
- c) The Engineer orders a delay or does not issue drawings, specifications or instructions required for execution of Works on time.
- d) The Engineer instructs the Contractor to uncover or to carry out additional test upon work that is then found to have no Defects.
- e) The Engineer unreasonably does not approve for a subcontract to be let.
- f) The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.
- g) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract, and they cause delay or extra cost to the Contractor.
- h) The advance payment is delayed.
- i) The effect on the Contractor of any of the Employer's Risks.
- j) The Engineer unreasonably delays issuing a Certificate of Completion.
- k) Other compensation Events listed in the Contract Data or mentioned in the Contract.

20.17.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, either the Contract Price shall be increased or the Intended Completion Date extended, at the Engineer's discretion.

20.17.3 The Engineer shall decide whether and by how much the Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

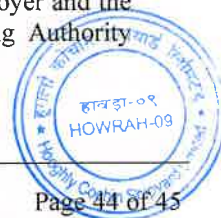
21.0 Disputes

21.1 Reference to Adjudicator

- 21.1.1 If the Contractor believes that a decision taken by the Engineer, except any of his decisions under the purview of Excepted Matters as referred to in this Contract, was either outside the authority given to the Engineer by the Contract or that the decision was wrongly taken, the decision shall be referred to the Adjudicator within fourteen days of the notification of the Engineer's decision.
- 21.1.2 The Adjudicator shall give a decision in writing within 28 days of receipt of a notification of a dispute.

21.2 Appointment of Adjudicator

- 21.2.1 The Adjudicator shall be jointly appointed by the Employer and the contractor from a panel of three names drawn up by the Employer. In case of disagreement between the employer and the Contractor, within 30 days, the Adjudicator shall be designated by an appointing Authority jointly chosen, within 14 days, by the Employer and the Contractor.





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- 21.2.2 Should the Adjudicator resign or die, or should the Employer and the Contractor agree that the Adjudicator is not fulfilling his functions in accordance with the provisions of the Contract, a new Adjudicator shall be jointly appointed by the Employer and the contractor.

21.3 Costs of Adjudication

- 21.3.1 The Adjudicator shall be paid daily at the rate agreed upon and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Adjudicator.

21.4 Arbitration

- 21.4.1 Either party may refer a decision of the Adjudicator to an Arbitrator within 28 days of the Adjudicator's written decision. If neither party refers the dispute to arbitration within the above 28 days, the Adjudicator's decision will be final and binding.
- 21.4.2 The arbitration shall be conducted in accordance with the procedure stated in the Arbitration and Conciliation Act, 1996 of the Republic of India and any amendments or rules framed under it.





SHIP REPAIR FACILITY AT GUWAHATI

SPECIAL CONDITIONS OF CONTRACT



I N D E X for S C C

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1.0 Context

- 1.1 These Special Conditions of Contract are complementary to the other parts of the tender document and the Contract and shall be read in conjunction with them.
- 1.2 All the conditions herein below refer to related clauses and conditions and stipulations in the Invitation to Tender, General Conditions of Contract, Specifications, Preamble to Bill of Quantities, Bill of Quantities, Schedule of Key Material Inputs, drawings and / or other supplementary documents detailing the work and the Contract.

2.0 Design

- 2.1 The design for the system, items, equipments, materials and accessories covered in this Contract are the responsibility of the Contractor, at his cost.
- 2.2 The design parameters specified in this tender document shall form the basis for such design and details, in so far as they are relevant and shall be treated as a guide and a means for the Employer to obtain bids of fairly equitable and technically comparable nature.
- 2.3 Anything in the design parameters stipulated in this tender document that requires review by the Engineer, to facilitate proper manufacture / installation / functioning of the work under this Contract shall forthwith be brought to the Engineer's notice, by the Contractor, in writing.

3.0 Drawings

- 3.1 Before submission of tender, the tenderer may see the relevant drawings and site plan in the Office of Hooghly Cochin Shipyard Limited,
- 3.2 Where tender drawings are enclosed with the tender documents issued by the Employer, these shall be taken to indicate broadly the type of work to be carried out, the exact scope, location and nature being determined by the construction/working drawings which shall be issued during work execution period only.
- 3.3 Anything in the drawings that requires review by the Engineer, to facilitate proper functioning / installation / drawing details pertaining to the work under this Contract, shall forthwith be brought to the Engineer's notice, by the Contractor, in writing.
- 3.4 The Contractor shall examine all architectural, structural, plumbing and electrical and other services drawings, pertaining to works by other Contractors and as available for perusal with the Engineer, before starting his work under this Contract and report to the Engineer anything that does not correlate with the work under this Contract or any rules / regulations / norms.
- 3.5 All Work shall correlate well with the dimensions and conditions actually available at site, irrespective of anything in the drawings enclosed to this tender document or any drawings made available by the Engineer. To this end, the Contractor is required to physically ascertain the dimensions and site conditions, at his own responsibility and cost and bring to the Engineers' notice anything that does not correlate well with the drawings. Communication of such instances shall be in writing and with sufficient detail that would enable the Engineer or consultant to clarify the issue or issue amendments to the work or drawings, as to be decided by them.
- 3.6 Within one week after the award of the contract, the Contractor shall furnish, for the approval of the purchaser, samples of the various items required to complete the project as per specification and as required by this Contract.
- 3.7 The samples shall be properly indexed and the accompanying documentation shall contain name plate particulars of the individual items and the details of construction, size, arrangement, operating clearances, performance characteristics and also the details of all related items of work by other contractors, if any.





- 3.8 In addition to the above stipulations, all other stipulations in the General Conditions of Contract in respect of drawings, including as-built / completion drawings, shall be applicable.

4.0 Advances

4.1 Mobilisation advance

- 4.1.1 The Contractor is eligible for receiving mobilisation advance from the Employer at the commencement of Work, subject to the conditions specified hereinafter.
- 4.1.2 Mobilisation advance shall be a one-time advance, its value being at the rate specified in the Contract Data.
- 4.1.3 The Contractor desiring the mobilisation advance shall furnish the Employer with a Bank Guarantee issued by a bank acceptable to the Employer and in the format provided in this Tender Document, for a value equal to the advance amount and valid for a period co-terminus with the Defect Liability Period.
- 4.1.4 The mobilisation advance shall be recovered by the Employer by debiting the Bills of the Contractor, on pro rata basis applied to the Bill of Quantities account, the rate of recovery being equal to the percentage applied to the Contract Price to arrive at the advance amount figure.

4.2 Secured advance on materials

- 4.2.1 The Employer shall pay the Secured Advance to the Contractor, based on the recommendations of the Engineer.
- 4.2.2 The amounts of Secured Advances shall be to the extent of 75% (seventy five percent) of the assessed value of materials brought to site from time to time, provided the Contractor insures the materials and signs Indenture Bonds in the form prescribed by the Employer and remains responsible for proper upkeep of the materials and also provided that the materials are not of perishable nature.
- 4.2.3 The assessed value of the materials will be decided by the Engineer, such decision being final, binding and conclusive.
- 4.2.4 Where the aggregate value of Secured Advances at any point of time exceeds ten percent of the Contract Value, the Contractor shall, in addition to the Indenture Bonds, furnish bank guarantees, in the form provided in these documents, for the value beyond the above ten percent.
- 4.2.5 The assessed value of the materials will be decided by the Engineer, such decision being final, binding and conclusive.
- 4.2.6 As and when the materials are utilized and payment is claimed for the work against the Bill of Quantities, proportionate recovery will be made for the materials so utilized on the items of works billed for. The decision of the Engineer in this regard shall be final.
- 4.2.7 No claim for non-payment, delayed payment or short payment shall be entertained.

5.0 Selection of items and installation practices

- 5.1 Items for this Work shall be carefully selected, to conform to the requirements of this tender document and shall be standard catalog products of established manufacturers, unless specifically mentioned to the contrary in the specifications and price schedules of this tender document.
- 5.2 Preferred makes, wherever specified in this tender document, shall only be selected.
- 5.3 Where the Work involves a composite system formed by installing together various items, the system as a whole shall be well balanced, each item affording good compatibility under various working conditions.
- 5.4 Safety, energy efficiency and ease of operation, inspection and maintenance shall be ensured in respect of individual equipment / items as well as the overall system and its installation.





6.0 Bye Laws, Regulations and Statutory Clearances

- 6.1 The Work shall be in conformity with the Bye Laws, Regulations and Standards of the local or other authorities concerned in so far as these become applicable to the Work.
- 6.2 If the drawings or Specifications or design require something which violates the Bye Laws and Regulations, then the Bye Laws and Regulations shall govern the requirement of this Work.
- 6.3 All fees and payments in regard to inspections and / or clearances from statutory authorities shall be borne by the Contractor, at his cost. Proof of remittance in all such cases shall be furnished to the Engineer without any delay.

7.0 Patent Rights & Royalties

- 7.1 The Contractor shall save harmless and indemnify the Employer 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 item, work or material used for or in connection with the Works and from and against all demands, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

8.0 Inspection

- 8.1 The Work is subject to independent and / or joint inspection by the Engineer / in team with the Contractor, as the case may be, to assess conformity with the specifications and drawings in respect of no. of items of particular types, their technical details, general arrangement, spacing, etc. at all stages of fabrication and / or installation, as the case may be.
- 8.2 Such inspections are apart from the various tests, including acceptance tests, and may or may not be in conjunction with the same and are in addition to inspections by any statutory or local authority.
- 8.3 In this regard, all stipulations in the General Conditions of Contract shall apply.
- 8.4 All testing and measuring instruments shall be arranged by the Contractor in good calibration as certified by third parties acceptable to the Engineer.
- 8.5 The Engineer's representative may opt to witness the tests on the system and associated items at the manufacturing points, towards which the contractor shall arrange for lodging, boarding and local conveyance for the required durations. The Engineer's representative, for this purpose, shall denote a team of two to four persons.

9.0 Inspection by Engineer:

- 9.1 The contractor has to offer the works in staged manner for inspection like conduiting, wiring, cabling, panel erection, DB erection and switch box erection.
- 9.2 General: Notwithstanding what is stated above or in the various tender documents.
- 9.3 All materials, workmanship, inspection, sampling and testing and interpretations of test results and their applications shall be in accordance with the latest editions of the Indian Standard specifications and / or codes or practice. In case where Indian Standard specifications are not available equivalent British Standard specifications and / or codes of practice shall be applicable.
- 9.4 No claim shall be entertained due to escalation on rates for labour and materials, statutory or otherwise, and the contractor's rates shall be held to cover any such price fluctuations.

10.0 Acceptance Tests

- 10.1 The Work under this Contract is subject to acceptance tests, termed as Preliminary Acceptance Tests (PAT) and Final Acceptance Tests (FAT).



10.2 The details and methodology for PAT and FAT shall be as described in the Specifications, or other parts of this tender document.

10.3 The timing of the PAT and FAT shall be decided by the Engineer, based on his own assessment of the feasibility on any particular dates and times and his own / Employers activities around / about or concerning his dependency on the system.

11.0 Testing and commissioning facilities

11.1 The Contractor has to make his own arrangements for testing and commissioning of the works at his own cost, to the satisfaction of the Engineer. The requirements of site laboratory are indicated in the Contract Data.

12.0 Electricity:

12.1 Normally no power supply will be given by the employer and the contractor shall make his own arrangements for the power required for progress of the work as per schedule. If power is made available, which in any case is purely at the discretion of the Employer, the same shall be at charges fixed by the Engineer and on conditions stipulated by him and on other conditions for the installations.

12.2 Three phase power supply shall be made available to the contractor by the Employer at one point in the site.

12.3 The contractor shall bear the entire electricity charges as per the meter installed at this point during the period of the work execution of the project (including maintenance period).

12.4 The contractor shall ensure that the electrical equipments employed by him are such that the aggregate power factor does not fall below 0.9 at the employer's terminal points and to this end shall install power factor improving equipment wherever necessary to maintain the power factor not below 0.9, at his own cost.

13.0 Stores at the Site:

13.1 The contractor shall provide for all necessary storage at the site in specified areas for all materials such as panels, switchgears, switches, wires cables and such other materials, which are likely to deteriorate by the action of sun, winds, rain or other natural cause due to the exposure in the open, either in the compounds or in stores, in such manner that all such materials, tools etc., shall be duly protected from damage by weather or any other. All such stores shall be cleared away and the whole site left in good order on completion of the contract. All materials which are stored on the site such as switches or similar materials, wires etc., shall be stacked in such a manner as to facilitate rapid and easy checking of quantities of such materials. The contractor will not be permitted to store any of his material in the building under execution or already executed by him without prior approval of the Engineer in writing. All materials issued by the Employer shall be stored properly and safely. A register showing daily stock and receipts and issued duly signed by the representative of the contractor shall be kept at the stores for these materials. These materials shall be subject to check / inspection by the Engineer or his representative or Employer's representative.

14.0 Material Substitution:

14.1 Should the contractor desire to substitute any materials of work, he must secure the approval of the Engineer in writing for any such substitution well before making such substitution.

14.2 Materials described in the specification or in the schedule / bill of quantities indefinitely, by such terms as 'equivalent' or 'other approved', etc. shall be considered as coming under the provision of this clause as substitution and no such materials shall be used until specific approval of Consultant / Engineer has been received in writing.

15.0 Maintenance Period:





- 15.1 The maintenance period for the work shall be 12 (Twelve) months which shall be counted from the date of completion work as mentioned in completion certificate by the Engineer.

16.0 Works not to be Misused:

- 16.1 All works under or in course of execution or executed shall not be used by the contractor for any of his purposed storing materials, using as residential or office accommodation etc. without the written approval of the Engineer.

17.0 Guarantees obtained from Manufacturers to be Transferred to the Employer:

- 17.1 All the test certificates and guarantees such as for wires, switches, switchgears, panels and cables etc., for the entire works as obtained from the manufacturer's shall be transferred to the Employer by the contractor after completion of the work.

18.0 Carriage of Materials:

- 18.1 All materials if transported by vehicles, other than vehicles belonging to the contractor for this work should be carried by public carrier vehicles. The carriage of such materials by a private carrier is illegal and the contractor and the contractor will accordingly be responsible for employing public vehicles instead of private carrier vehicles. The contractor shall have to comply with the provision of the Motor vehicles Act fully and any expense arising on this account shall be borne by the Contractor himself.

19.0 Taxes:

- 19.1 The rates quoted shall include all taxes, levies, duties as applicable from time to time. Deduction shall be made towards income tax as per the prevailing income tax rules from each payment released to the contractor.
- 19.2 Recovery at source towards Income Tax calculating at the rates prescribed from time to time under Section 1940 of the Income Tax Act 196 and other relevant provisions of Income Tax shall be made from the bills of the contractor and the amount so recovered shall be deposited with the Income Tax Department.

20.0 Time of completion:

- 20.1 Time is the essence of the contract. The contractor shall complete all works under this contract within specified time from the date of placement of order.
- 20.2 Even if the different periods of completion are stipulated for the various parts of the work, this will be treated as a single contract.

21.0 No claim for reduction of Work:

- 21.1 In case of reduction in the scope of the work, either in part or full at any stage of work due to unforeseen circumstances or any other reasons beyond the control of the employer, the contractor shall have no claim whatsoever against the employer.
- 21.2 While recruiting the labour and the supervisory staff for his works, the contractor has to notify the vacancies to the concerned employment exchange and recruit the staff in accordance with the rules and regulations in force. Preference shall be given to displaced persons.
- 21.3 The contractor shall comply with all rules, regulations and legislations covered under contract labour (regulations and abolition) Act 1979, notwithstanding anything contained to the contrary in the General Conditions of the contract or any other document forming part of the tender.

22.0 Bills :





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- 22.1 The contractor shall prepare bills, on account as well as final based on agreed measurements and at contract rates in approved printed forms and shall submit to the Engineer in 3 (three) copies in individual folders along with original triplicate measurement sheets for payment. After the bills have been passed for payment. One copy of the bill shall be returned to the Contractor for his record.
- 22.2 The final bill shall be submitted by the contractor within 2 (two) months from the date of completion certificate to be issued by the Engineer. The final payment shall be made by the Employer with 3 (three) months from the date of contractor's submission of 'No demand certificate' and in the case of dispute if any, within 2 (two) months from the date of settlement of all disputes.

23.0 Performance Guarantee

- 23.1 In addition to the guarantees and warranties to be furnished to the Engineer, the Contractor shall expressly guarantee the performance of the system installed as a whole and the Work under this Contract.
- 23.2 All guarantees and warranties, as described herein and in the General Conditions of Contract and the Specifications, are to be considered as complementary to each other and none of them shall absolve the Contractor of his responsibilities in any way and more particularly in respect of the Defect Liability and maintenance.
- 23.3 Demonstration of satisfactory performance shall be witnessed during the PAT and FAT, under simulated and / or actual conditions of duty.
- 23.4 Any shortcoming in the performance shall be considered as a Defect in terms of this Contract and shall be rectified by the Contractor, at his cost and within reasonable time that may be allowed by the Engineer, irrespective of whether such making good involves redesign, new manufacture, supply for replacement / addition, fabrication, installation and testing and any or all other attendant activities and costs.
- 23.5 Instances where performance is not immediately affected, but the situation as existing may lead to a potential defect or under-performance or compromise on safety, if allowed to continue, shall also be considered as Defects.

24.0 Training of Employer's personnel

- 24.1 The Contractor shall, during execution of work and commissioning of the system, arrange to train, free of cost, personnel of the Employer in the following and relevant aspects:
- 24.2 Good operating practices, documentation and logging.
- 24.3 Safety related procedures and handling of emergencies.
- 24.4 Diagnosing and attending to minor faults and defects which may generally occur during operations.
- 24.5 The above shall in no way discharge the Contractor of his responsibilities during the Defect Liability Period and any subsequent period where further maintenance is assigned to him.

25.0 Maintenance during Defects Liability Period

- 25.1 The Contractor is under obligation to maintain the system in good condition during the Defects Liability Period, its duration being as specified in the Contract Data.
- 25.2 This maintenance includes preventive maintenance and setting the system to good operating conditions, trouble-shooting, repair, rectification, testing and re-commissioning as necessary.
- 25.3 Fair wear and tear during this period shall also be attended to by the Contractor, at his own cost.
- 25.4 Spares and substitutes, consumables, gadgets, tools, tackles, plant and equipment, supervision, documentation and labour shall be arranged by the Contractor, at his own cost. However, the Employer shall arrange for any electricity / water at his cost.



- 25.5 Where required, the Contractor shall carryout maintenance activities during holidays / off-peak hours / nights, to ensure least disturbance to the activities of the Employer.
- 25.6 Prompt attention shall be forthcoming from the Contractor and the system down-time shall not exceed eight hours or such other duration that may be indicated by the Employer from time to time.
- 25.7 The Contractor and his representative shall be accessible at all hours and on all days to receive any complaints from the Employer and initiate immediate action on the same.
- 25.8 Non-compliance of any of the above conditions shall attract penal action in terms of this Contract, as well as any other action as the Employer deems fit and at his sole discretion.

26.0 Taking over / use of system

- 26.1 Takingover of the Work shall be as described in the General Conditions of Contract.
- 26.2 The Engineer reserves the right to put to use the whole or parts of the system, ahead of its formal acceptance, to meet exigencies of the situation, in which case also the Defects Liability Period shall commence upon formal acceptance and taking-over only.

27.0 Other terms & conditions

- 27.1 Save for anything expressly stated to the contrary in these Special Conditions of Contract and / or Contract Data appended hereto, all the stipulations made in the General Conditions of Contract, Specifications, etc. as forming part of this tender document shall be applicable.
- 27.2 These include, inter alia, aspects pertaining to temporary works and utilities, cooperation & coordination, safety & security, protection of environment, care of works, plant, materials & labour, manpower, time, quality, defects liability period, cost & payment and closing the contract.
- 27.3 No plea of the Contractor, citing ignorance or misinterpretation or dilution of meaning, shall be entertained in this regard.

28.0 Uniformity of rates

- 28.1 Where more than one schedule of quantities form part of the same tender and where, in such cases, similar items appear, the tenderer shall quote same rate for the same item of work in all schedules of quantities.
- 28.2 In case of any extra work in respect of any schedule of quantities being executed, the rate for such extra work shall be the same in for such items of work if so included in the other schedule of quantities.
- 28.3 In case there is any conflict of meaning between the Special Conditions of Contract and the General Conditions of Contract the provisions of the Special Conditions shall override corresponding provisions of the General Conditions of the Contract. Similarly the specific stipulations in BOQ and Preamble shall override the stipulations in Specifications and Special Conditions of Contract. In case of any conflict of meaning either in the same documents or between the other documents (other than the above stipulations), the Engineers decision shall be final, binding and conclusive.





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29.0 CONTRACT DATA

Sl. no.	Parameter	Detail / value specific to this Tender
1	Engineer	Project Officer (Electrical), HCSL
2	Time allowed for executing Contract Agreement.	Fifteen days from the date of issue of Letter of Acceptance.
3	Date for Engineer giving possession of Site to Contractor.	Same as Start Date.
4	Start Date for the work. (SD)	Same as date of issue of Letter of Acceptance, or any other date specified in Letter of Acceptance.
5	Completion Date for the work.	2 (Two) months from the Start Date.
6	In-part Completion Dates.	None.
7	Duration of Defect Liability Period.	Twelve months, reckoned from the corresponding Completion Certificate.
8	Time allowed for Contractor for submitting Programme.	Five working days from issue of Letter of Acceptance.
9	Intervals at which programme has to be updated by the Contractor.	Fortnight.
10	Amount to be withheld for non-submission of updated Programme.	Rs. 5,000/-
11	Liquidated Damages against failure to complete work.	One percent (1%) of Contract Value for delay of every week or part thereof.
12	Maximum amount of Liquidated Damages.	Five percent of value of Work.
13	Minimum amount of third party insurance	Rs. 2,00,000/- (Rupees Two lakh only)
14	Insurance coverage for Contractor's risks.	At least ten percent of Initial Contract Price.
15	Requirements of site laboratory.	Facilities to determine continuity, resistance, micrometers for determining conductor sizes.
16	Tender Drawings	Certain drawings are attached to the Tender Document. These are to be considered as only for the guidance of the tenderer.
17	Number of copies of drawings to be provided by Engineer to Contractor.	Three.
18	Amount to be withheld against Contractor not returning drawings.	Rs. 3,000/- per drawing.
19	Amount to be withheld against Contractor not furnishing As-built drawings.	Rs. 3,000/- per drawing.
20	Penalty for non-submission of documents by Contractor.	Twenty percent of value of work represented or covered by the respective document.
21	Interval between submissions of bills by contractor.	Two months.





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22	Maximum amount of bills for certification.	Fifteen percent of the figure arrived at as the overall average of Contract Price (as stated in the Letter of Acceptance)
23	Number of days from the date of certification of Bill by which Employer shall pay the Contractor the amounts certified by the Engineer.	Fifteen days.
24	Proportion of bill amount to be paid upon submission of bill, ahead of certification.	Sixty percent of Net, before TDS.
25	Time for payment of the above.	Thirty days from submission of bill by Contractor.
26	Mode of payments by Employer to Contractor.	In Indian Rupees, in the form of NEFT or RTGS.
27	Retention money against each payment to contractor.	Five percent of the aggregate of the Bill of Quantities Account.
28	Parts and proportions of the Retention Money, for the purposes of its release.	Two parts. Each part shall be 50% of the total retention money.
29	Amount of mobilisation advance for which the Contractor is eligible.	Ten percent of the Contract Value.





SECTION – 01: SANITARY FIXTURES & FITTINGS

1. SCOPE

The scope of this section consists of but is not necessarily limited to supply, installation, testing and commissioning of following items:

- a. Sanitary appliances and fixtures for toilets.
- b. Chromium plated brass fittings
- d. Accessories e.g. towel rods, toilet paper holders, liquid soap dispensers, coat hooks etc.
- e. Hand driers and etc.

Whether specifically mentioned or not the Contractor shall provide for all appliances and fixtures all fixing devices, nuts, bolts, screws, hangers as required.

All exposed pipes within toilets and near appliances/fixtures shall be of chromium plated brass or copper unless otherwise specified.

2 GENERAL REQUIREMENT

Sanitary appliances and fixtures for toilets, chromium plated brass fittings, stainless steel sinks, bathroom accessories like towel rods, toilet paper holders, soap dish, liquid soap dispensers, towel rails coat hooks etc., and mirrors, hand driers, drinking water fountains etc as listed in the relevant items in the Schedule of Quantities shall **be supply by Owner / Plumbing Contractor**. The rates shall be inclusive of accessories (in such case) required for installation.

All appliances, fixtures and fittings shall be provided with all such accessories as are required to complete the item in working condition whether specifically mentioned or not in the Schedule of Quantities, specifications, and drawings. Accessories shall include proper fixing arrangements, brackets, nuts, bolts, washers, screws and required connection pieces.

The sanitary fixtures and fittings shall be installed at the correct assigned position as shown on the drawings and as directed by the Architect / Owner's Site Representative and shall fully meet with the aesthetic and symmetrical requirements as demanded by the Architect / Interior Designer

All fixtures and accessories shall be fixed in accordance with a set pattern matching the tiles or interior finish as per Architect requirements. Wherever necessary, the fittings shall be centered to dimensions and pattern as called for.

Fixing screws shall be half round head chromium plated (CP) brass screws, with CP brass washers unless otherwise specified.



All appliances, fittings and fixtures shall be fixed in a neat workmanlike manner true to level and to heights shown on the drawings and in accordance with the manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished floor, tiling, plaster, paint, insulation or terrace shall be made good by the Contractor at his own cost. Fixtures shall be mounted rigid, plumb and true to alignment.

Wall flanges shall be provided on all walls, floors, columns etc. wherever supply and disposal pipes pierce through them. These wall caps shall be or chromium plated brass fittings and the receiving pipes and shall be large enough to cover the punctures properly.

- i. Contractor shall, during the entire period of installation and afterwards protect the appliances by providing suitable cover or any other protection so as to absolutely prevent any damage to the appliances until handing over (The original protective wrapping shall be left in position for as long as possible)
- ii. The appliances shall be placed in correct position or marked out in order that pipe work can be fixed or partially fixed first.
- iii. The appliance shall be fixed in a manner such that it will facilitate subsequent removal if necessary.
- iv. The appliance shall be securely fixed. Manufacturer's brackets and fixing methods shall be used wherever possible. Compatible rust-proofed fixings shall be used. Fixing shall be done in a manner that minimizes noise transmission.
- v. Appliances shall not be bedded (e.g. WC pans, pedestal units) in thick strong mortar that could crack the unit (e.g. ceramic unit)
- vi. Pipe connections shall be made with demountable unions. Pipe work shall not be fixed in a manner that it supports or partially supports and appliance.



- vii. Appliances shall be fixed true to level firmly fixed to anchor or supports provided by the manufacturer and additional anchors or supports where necessary.

Sizes of sanitary fixtures given in the Specifications or in the Schedule of Quantities are for identification with reference to the catalogues of make considered. Dimensions of similar models of other makes may vary within $\pm 10\%$ and the same shall be provided and no claim for extra payment shall be entertained NOR shall any payment be deducted on this account.

The contractor shall fix all plumbing fittings such as water faucets, shower fittings, mixing valves etc. in accordance with manufacturer's instructions and connect to piping system. The contractor shall supply all fixing materials such as screws, rawl plugs, unions, collars, compression fittings etc., as required.

Joints / gaps between all sanitary appliances / fixtures and the floor / walls shall be caulked with an approved mildew resistant sealant, having antifungal properties, of colour and shade to match that of the appliances / fixture and the floor / wall to the extent possible.

2.1 Water Closet

Water Closet shall be wash down or symphonic wash down type wall mounted set, as shown in the drawings, designed for low volume flushing from 2 - 4 / 3 - 6 liters of water, flushed by means of a flushing valve 32 mm size CP brass flush valve with regulator valve. Flush pipe / bend shall be connected to the WC by means of a suitable rubber adaptor. Wall hung WC shall be supported by MS or CI brackets, fisher bolts with CP bolts, nuts as approved by the Owners Site Representative.

Each WC set shall be provided with approved quality of seat, rubber buffers and chromium plated hinges. Seat shall be so fixed that it remains absolutely stationary in vertical position without falling down on the WC.

Each WC shall be provided with 110 mm DIA (OD) PVC Pan Connector connecting the ceramic outlet of WC to drain pipe.

2.2 Urinal

Urinals shall be lipped type half stall with glazed vitreous China of size as called for in the Bill of Quantities.

Urinals shall be provided with 15mm dia CP spreader, 32mm dia CP domical waste and CP cast brass bottle trap with pipe and wall flange and shall be fixed to wall by CI brackets, CI wall clips and CP brass screws as recommended by manufacturer complete as directed by the Owner's Site Representative.



Flushing for urinals shall be by means of no hand operation, infrared electric flush valve with complete kit of plumbing, electrical and electronic items, infrared photo cells, solenoid valve transformer and electrical connection. The automatic flush sensor plate shall be flush and press fitted and is of high quality mirror polish finish. Each urinal shall be provided with one flush valve unit.

Urinal Partitions

Urinal partitions shall be granite and colour / size specified in the Schedule of Quantities.

Granite partitions shall be fixed at proper heights with CP brass bolts, anchor fasteners and MS clips as recommended by the manufacturer and directed by the Owner's Site Representative.

2.3 Cistern

Low level flushing cistern (exposed or concealed) shall be provided for WC in specified toilets. Contractor shall install cistern in accordance to the manufacturer's specification to the satisfaction of the Owner Site Representative.

2.5. Wash Basin

Wash basins shall be white glazed vitreous china of size, shape and type specified in the Schedule of Quantities.

Each basin shall be provided with painted MS angle or CI brackets and clips and the basin securely fixed to wall/counter slab. Placing of basins over the brackets without secure fixing shall not be accepted. The MS angle shall be provided with two coats of red oxide primer and two coats of synthetic enamel paint of make, brand and colour as approved by the Owner's Site Representative. The cost of fixing the basin shall be inclusive of supply and installation of brackets as described above.

Each basin shall be provided with 32mm dia CP waste with overflow, pop-up waste or rubber plug and CP brass chain as specified in the Schedule of Quantities.

Each basin shall be provided with hot and cold water mixing fitting or as specified in the Schedule of Quantities.

2.8. Toilet Paper Holder

Toilet paper holder shall be white glazed vitreous china or chrome plated of size, shape and type specified in the Schedule of Quantities.

Porcelain toilet paper holder shall be fixed in walls and set in cement mortar 1:2 (1 cement : 2 coarse sand) and fixed in relation to the tiling work.



The latter (chrome) shall be fixed by means of screws/capping having finish similar to the toilet paper holder in wall/temper partitions with raw l plugs or nylon sleeves. When fixed on timber partition, it shall be fixed on a solid wooden base member provided by the Owner's Site Representative.

2.9. Towel Rail

Towel rail shall be chromium plated brass or of stainless steel or powder coated brass of size, shape and type specified in the Schedule of Quantities.

Towel rail shall be fixed with screws/capping having finish similar to the towel rail in wall with rawl plugs or nylon sleeves and shall include cutting and making good as required or directed by the Owner's Site Representative.

2.11 Liquid Soap Dispenser

Liquid Soap Dispenser shall be wall/counter mounted suitable for dispensing liquid soaps, lotions, detergents. The cover shall lock to body with concealed locking arrangement, opened only by key provided.

Liquid soap dispenser body and shank shall be of high impact resistance material. The piston and spout shall be stainless steel with 1 liter capacity polyethylene container.

The valve shall operate with less than 2.27 Kg (5 lbs) of force.

2.12 Hand Drier

The hand drier shall be no touch operating type with solid state time delay to allow user to keep hand in any position. The hand drier shall be fully hygienic, rated for continuous repeat use (CRU). The rating of hand drier shall be such that time required to dry a pair of hands up to wrists is approximately 30 seconds. The hand drier shall be of wall mounting type suitable for 230 V, single phase, 50 Hz, AC power supply.

3. TOILETS FOR THE DISABLED

Where specified, in washroom facilities designed to accommodate physically disabled, accessories shall be provided as directed by the Owner's Site Representative.

Stainless steel garb brass of required size suitable for concealed or exposed mounting and opened non-slip gripping surface shall be provided in all washroom. The flushing cistern/valve shall be provided with chromium plated long handles.



4. MOCKUP AND TRIAL ASSEMBLY

The installation of the sanitary fixtures and fittings shall be as per the shop drawings approved by the Architect/Consultant.

The contractor shall have to assemble at least one set of each type of sanitary fixtures and fittings in order to determine precisely the required supply and disposal connections. Relevant instructions from manufacturers shall be followed as applicable. This trial assembly shall be developed to determine the location of puncture holes, holding devices etc. which will be required for final installation of all sanitary fixtures and fittings. The above assembly shall be subject to final approval by the Architect / Interior Designer.

The fixtures in the trial assembly can be re-used for final installation without any additional payments for fixing or dismantling of the fixtures.

5. SUPPORTING AND FIXING DEVICES

The contractor shall provide all the necessary supporting and fixing devices to install the sanitary fixtures and fittings securely in position. The fixing devices shall be rigidly anchored into the building structure. The devices shall be rust resistant and shall be so fixed that they do not present an unsightly appearance in the final assembly SS:304 Nut Bolts & screw. Where the location demands, the Architect may instruct the contractor to provide chromium plated or other similarly finished fixing devices. In such circumstances the contractor shall arrange to supply the fixing devices and shall be installed complete with appropriate vibration isolating pads, washers and gaskets.

6. FINAL INSTALLATION

The contractor shall install all sanitary fixtures and fittings in their final position in accordance with approved trial assemblies and as shown on drawings. The installation shall be complete with all supply and waste connections. The connection between building and piping system and the sanitary fixtures shall be through proper unions and flanges to facilitate removal/replacement of sanitary fixtures without disturbing the built in piping system. All unions and flanges shall match in appearance with other exposed fittings.

Fixtures shall be mounted rigid, plumb and to alignment. The outlets of water closet pans and similar appliances shall be examined to ensure that outlet ends are butting on the receiving pipes before making the joints. It shall be ensured that the receiving pipes are clear of obstruction. When fixtures are being mounted, attention shall be paid to the possibility of movement and settlement by other causes. Overflows shall be made to ensure that necessary anchoring devices have been provided for supporting water closets, wash basins, sinks and other appliances.



7. PROTECTION AGAINST DAMAGE

The contractor shall take every precaution to protect all sanitary fixtures against damage, misuse, cracking, staining, breakage and pilferage by providing proper wrapping and locking arrangement till the completion of the installation. At the time of handing over, the contractor shall clean, disinfect and polish all the fixtures and fittings. Any fixtures and fittings found damaged, cracked chipped stained or scratched shall be removed and new fixtures and fittings free from defects shall be installed at his own cost to complete the work.

8. MEASUREMENT

- 8.1. Rate for fixing only of sanitary fixtures accessories, CP fittings shall etc. include all items, and operations stated in the respective specifications and bill of quantities and nothing extra is payable.
- 8.2. Rates for all items under specifications para above shall be inclusive of cutting holes and chases and making good the same, CP screws, nuts, bolts and any fixing arrangements required and recommended by manufacturers, testing and commissioning and making good to the satisfaction of the Owner's Site Representative.

9. TESTING

All appliances, fixtures and fittings shall be tested before and after installation. Water seals of all appliances shall be tested. The contractor shall block the ends of waste and ventilation pipes and shall conduct an air test.

SECTION – 02: WATER SUPPLY

1. SCOPE

The scope of this section comprises the supply, installation, testing and commissioning of piping network for water supply for internal & external services as follows:

- a. Bore well / Tanker water /Metro water.
- b. Strom water collection and disposable system.

The Contractor shall make all necessary application and arrangements for his work to be inspected by the Local Authorities.

The Contractor shall be solely responsible for obtaining the Authorities approval of his works prior to the handing over of the complete water supply / distribution installation to the Owner.



2. PIPING MATERIALS

The piping system shall consist of any of the below, subject to the approval of Project Manager.

S.No	Material	Sizes (in mm)	IS / ASTM reference
1	CPVC- Chlorinated Poly Vinyl Chloride, SDR-11 pipes and fittings	15 dia to 50 dia	IS :15778 & ASTM-D 2846
2	Schedule 40 / 80 pipes and fittings.	65 dia to 150 dia	ASTM-F441 & ASTM-F439
3	uPVC-Un plasticized Polyvinyl Chloride, pipes and fittings / class-3 / 6Kg/Cm ²	20 dia to 250 dia	IS :4985 & IS :7834
4	GI pipes and fittings- Heavy.	15 dia to 250 dia	IS :1239

For any internal works, the CPVC pipes / UPVC pipes and fittings shall be embedded in the wall chase or run on the floor/ceiling to the satisfaction of project manager unless otherwise specified. No unsightly exposed runs shall be permitted. The sizes are specified in the Drawings, Schedule of Quantities and the makes. Refer the related appendix for details.

2.1 CPVC Pipes & Fittings

The pipes shall be CPVC (Chlorinated Poly Vinyl Chloride) material for Cold Water Supply, Hot Water Supply & return with pipes as per CTs SDR -11 at a working pressure of 27.6 Kg/cm² at 23^o C and 6.8 Kg/cm² at 82^o C, using solvent welded CPVC fittings i.e. Tees, Elbows, Couples, Unions, Reducers, Brushing etc. including transition fittings (connection between CPVC & Metal pipes / GI) i.e. Brass adapters (both Male & Female threaded) and all conforming to ASTM D-2846 with only CPVC solvent cement conforming to ASTM F-493 / manufacturer recommended, with clamps / structural metal supports as required /directed at site including cutting chases & fitting the same with cement concrete / cement mortar as required, including painting of the exposed pipes with one coat of desired shade of enamel paint. All termination points for installation of faucets shall have brass termination fittings. Installation shall be to the satisfaction of manufacturer & Project Manager. Pipes from 65 mm to 150 mm dia shall be Schedule 40 for CWC & Schedule 80 for HWS / HWR.

2.1.1 Technical Details

Outside diameters and Wall Thickness for CPVC 4120, SDR 11 Plastic Pipe



Nominal Size		Outside diameter, in. (mm)		Wall Thickness, in. (mm)		Pressure Rating, PSI (Kg/Cm ²)			
(in.)	(mm)	Average	Tolerance	Minimum	Tolerance	73.4°F	(23°C)	180°F	82°C
½	(15)	0.625 (15.9)	±0.003 (±0.08)	0.068 (1.73)	+0.020 (+0.51)	400	(28.1)	100	(7.0)
¾	(20)	0.875 (22.2)	±0.003 (±0.08)	0.080 (2.03)	+0.020 (+0.51)	400	(28.1)	100	(7.0)
1	(25)	1.125 (28.6)	±0.003 (±0.08)	0.102 (2.59)	+0.020 (+0.51)	400	(28.1)	100	(7.0)
1 ¼	(32)	1.375 (34.9)	±0.003 (±0.08)	0.125 (3.18)	+0.020 (+0.51)	400	(28.1)	100	(7.0)
1 ½	(40)	1.625 (41.3)	±0.004 (±0.10)	0.148 (3.76)	+0.020 (+0.51)	400	(28.1)	100	(7.0)
2	(50)	2.125 (54.0)	±0.004 (±0.10)	0.193 (4.90)	+0.023 (+0.58)	400	(28.1)	100	(7.0)

Outside diameters and Wall Thickness for CPVC 4120, SDR 13.5 Plastic Pipe									
Nominal Size		Outside diameter (in mm)		Wall Thickness (in mm)		Pressure Rating, PSI (Kg/Cm ²)			
(in.)	(mm)	Average	Tolerance	Minimum	Tolerance	73.4°F	(23°C)	180°F	82°C
½	(15)	0.625 (15.9)	±0.003 (±0.08)	0.055(1.40)	+0.020 (+0.51)	320	(22.5)	80	(5.6)
¾	(20)	0.875 (22.2)	±0.003 (±0.08)	0.065(1.65)	+0.020 (+0.51)	320	(22.5)	80	(5.6)
1	(25)	1.125 (28.6)	±0.003 (±0.08)	0.083(2.12)	+0.020 (+0.51)	320	(22.5)	80	(5.6)
1 ¼	(32)	1.375 (34.9)	±0.003 (±0.08)	0.102(2.59)	+0.020 (+0.51)	320	(22.5)	80	(5.6)
1 ½	(40)	1.625 (41.3)	±0.004 (±0.10)	0.120(3.06)	+0.020 (+0.51)	320	(22.5)	80	(5.6)
2	(50)	2.125 (54.0)	±0.004 (±0.10)	0.157(4.00)	+0.023 (+0.58)	320	(22.5)	80	(5.6)



Outside diameters and Wall Thickness for CPVC SCHEDULE 40 (AS PER ASTM F 441)

Part No.	Nom (in.)	Size (mm)	Average OD (inch)	Average OD (mm)	Min. Wall Thick	Min. Wall Thick	Max. work Pre. At 23°C PSI	Max. work Pre. At 23°C (kg/cm ²)
FP40-212	2 ½"	65	2.875	73.02	0.203	5.16	300	21.09
FP40-003	3"	80	3.500	88.90	0.216	5.49	260	18.28
FP40-004	4"	100	4.500	114.30	0.237	6.02	220	15.47
FP40-006	6"	150	6.625	168.28	0.280	7.11	180	12.66
FP40-008	8"	200	8.625	219.08	0.322	8.18	160	11.25
FP40-100	10"	250	10.750	273.05	0.365	9.27	140	9.84
FP40-120	12"	300	12.750	323.55	0.406	10.31	130	9.14

Outside diameters and Wall Thickness for CPVC SCHEDULE 80 (AS PER ASTM F 439)

Part No.	Nom (in.)	Size (mm)	Average OD (inch)	Average OD (mm)	Min. Wall Thick	Min. Wall Thick	Max. work Pre. At 23°C PSI	Max. work Pre. At 23°C (kg/cm ²)
FP40-212	2 ½"	65	2.875	73.02	0.276	7.01	420	29.53
FP40-003	3"	80	3.500	88.90	0.300	7.062	370	26.01
FP40-004	4"	100	4.500	114.30	0.337	8.56	320	22.50



FP40-006	6"	150	6.625	168.28	0.432	10.97	280	19.69
FP40-008	8"	200	8.625	219.08	0.500	12.70	250	17.57
FP40-100	10"	250	10.750	273.05	0.593	15.06	230	16.17

2.1.2 Joining Pipes & Fittings

a. Cutting:

Pipes shall be cut either with a wheel type plastic pipe cutting or hacksaw blade and care shall be taken to make a square cut which provides optimal bonding area within a joint.

b. De burring / beveling:

Burrs and fittings should be removed from the outside and inside of pipe with a pocket knife or file otherwise burrs and fittings may prevent proper contact between pipe and fittings during assembly.

c. Fitting preparation:

A clean dry rag/cloth should be used to wipe dirt and moisture from the fitting sockets and tubing end. The tubing should make contact with the socket wall 1/3 or 2/3 of the way into the fitting socket.

d. Solvent Cement Application:

Only CPVC solvent cement confirming to ASTM-F493/ manufacturer recommended should be used for joining pipe with fittings. An even coat of solvent cement should be applied on the pipe end and a thin coat inside the fitting socket, otherwise too much of cement solvent can cause clogged water ways.

e. Assembly:

After applying the solvent cement on both pipe and fitting socket, pipe should be inserted into the fitting socket within 30 seconds, and rotating the pipe $\frac{1}{4}$ to $\frac{1}{2}$ turn while inserting so as to ensure even distribution of solvent cement with the joint. The assembled system should be held for 10 seconds (approximately) in order to allow the joint to set up.

An even bead of cement should be evident around the joint and if this bead is not continues remake the joint to avoid potential leaks.



Set & Cure times:

Solvent cement set and cure times shall be strictly adhered to as per the below mentioned table.

Minimum Cure prior to pressure testing at 10 Bar (150 PSI)

Ambient Temperature during Core period	Pipe Size	
	½ " - 1"	1.¼" - 2"
Above 15 deg. C	1 Hr	2 Hrs
4-15 deg.C	2 Hrs	4 Hrs
Below 4 deg C	4 Hrs	8 Hrs

Special care shall be exercised when assembling systems in extremely low temperature (below 4°C) or extremely high temperature (above 45°C) In extremely hot temperatures, make sure that both surfaces to be joined are till wet with cement solvent when putting them together.

Further to above, contractor should adhere to the manufacturer recommendation for joining pipes and fittings as per their installation manual or training.

f. Testing

Once an installation is completed and cored as per above mentioned recommendations, the system should be hydrostatically pressure tested at 150 psi(10 Bar) for one hour. During pressure testing, the system should be fitted with water and if a leak is found, the joint should be cut out and replacing the same with new one by using couplers.

i. **Transition of CPVC to Metals:**

When making a transition connection to metal threads, special Brass / plastic transition fitting (Male and female adapters) should be used. Plastic threaded connections should not be over torqued Hard tight puts one half turn should be adequate.

ii. **Threaded Sealants:**

Teflon tape shall be used to make threaded connections leak proof.

iii. **Solvent Cement-** manufacturer recommended:

Only CPVC solvent cement conforming to ASTM F 493 should be used for joining pipe with fittings and valves. Flow guard CPVC cement solvent have a minimum shelf life of 1 year. Aged cement solvent will often change colour or being to thicken and become gelatinous or jelly like and when this



happens, the cement should not be used. The cement solvent should be used within 30 days after opening the company's seal and tightly close the seal after using in order to avoid its freezing. The freezed cement solvent should be discarded immediately and fresh one should be used. The CPVC solvent cement usage should be adhered to as given in table below and manufacturer recommendation as per their manual.

diameter of pipe in inch (flow guard)	½"	¾"	1"	1¼"	1½"	2"
Approx. nos. of joints which can be mode per litre of solvent cement.	200 Nos	180 Nos	150 Nos	130 Nos	100 Nos	70 Nos

iv. **Hangers and supports:**

For Horizontal runs, support should be given at 3 foot (90 cm) intervals for diameters of one inch and below and at 4 foot (1.2m) intervals for larger sizes.

Hangers should not have rough or sharp edges which come in contact with the tubing.

Supports should be as per the below mentioned table:

Size of Pipe	21°C	49°C	71°C	82°C
Inch	Ft.	Ft.	Ft.	Ft.
½"	5.5	4.5	3.0	2.5
¾"	5.5	5.0	3.0	2.5
1"	6.0	5.5	3.5	3.0
1¼"	6.5	6.0	3.5	3.5
1½"	7.0	6.0	3.5	3.5
2"	7.0	6.5	4.0	3.5

SCHEDULE - 40							
Recommended Support spacing (in feet)							
Nom. Pipe Size		Temperature °C					
(In)	(mm)	23	38	49	60	71	82
2 ½	65	7 ½	7	7	6 ½	6	3 ½
3	80	8	7	7	7	6	3 ½
4	100	8 ½	7 ½	7 ½	7	6 ½	4
6	150	9 ½	8	8	7 ½	7	4 ½
8	200	9 ½	8	8	7 ½	7	5
SCHEDULE - 80							



Recommended Support spacing (in feet)							
Nom. Pipe Size		Temperature °C					
(In)	(mm)	23	38	49	60	71	82
2 ½	65	8	7 ½	7 ½	6 ½	4 ½	4
3	80	8	8	7 ½	7	4 ½	4
4	100	9	9	8 ½	7 ½	5	4 ½
6	150	10	9 ½	9	8	5 ½	5

3 SPECIFICATIONS OF VARIOUS TYPES OF PIPES, SPECIALS AND THEIR LAYING AND JOINTING SYSTEM

PLASTIC PIPES

Conformance of Plastic Pipes:

- Indian Standard – 3076/1985 Low density polyethylene (LDPE) pipes for potable water supply.
- Indian Standard – 4984/1987 High density polyethylene (HDPE) pipes for potable water supply, Sewage and Industrial Effluents.
- Indian Standard – 4985, Unplasticised Polyvinylchloride (PVC) pipes for potable water supply.

The Plastic pipes shall conform to the following properties:

Table 231 Properties of Plastic Pipes

Property & Unit	Low Density (LDPE) IS-3076	High Density (HDPE) IS-4984	Polyvinyl Chloride (PVC) IS-4985
Softening point. C°	80-100	110-130	75-80
Ultimate tensile strength at 23°, Kg/cm²	115-170	265-280	445-600
Recommended temperature range for pressure pipe C°	-40 to +38	-18 to +38	-1 to +60
Flammability.	Slow	Slow	Self extinguish
Weathering characteristics	Flairs	Fair	Excellent
Effect of low temperature	Good low temp. Properties, unaffected by large number of freezing thaw cycles	Same as For low density	Tendency to become brittle at low temperature. Repeated freezing and thawing reduces working pressures.
	Good alround	Good alround	Good chemical



	chemical resistance	chemical resistance	resistance
Chemical resistance	32 2.5, 4.6, 10 Low	50 2.5, 4, 6, 10	100 2.5, 4, 6, 10 Good
Safe working stresses at 20C kg/cm ²	Highly flexible, can be coiled.	Fair	Relatively rigid
Pressure Rating. Kg/cm ²		Same as for low density	Only small bore pipe may be coiled.
Abraison resistance	Heat welding and be compression fittings.	-do-	Solvent welding and by rubber gaskets.
Flexibility.	12 to 140 Internal plumbing of building,s water supply distribution lines.	100 to 400 Underground W.S. lines. Also for Plumbing in buildings with special precautions.	16 to 311 Substitute for Conventional pipes for plumbing of buildings except for hot water, also substitute for conventional pipes in distribution systems.
Common jointing Method			
Available sizes mm			
Application			

Testing: After pressurizing the test pressure continues to fall for about 12 hours before establishing. About 1 to 2 percent of the total volume of test water in the pipe will be needed as make up water due to the expansion of pipe in the initial phase. It is recommended that the plastic pipes shall be tested only upto 1.5 times the rated working pressure for a duration of 1 to 2 hours without any leakage and thus drop in pressure being within the limit as mentioned above. The maximum allowable leakage should not exceed 0.365/1000 m length of pipe/cm dia of nominal bore/Kg of test pressure.

Plastic pipes shall conform to the following as per various Indian Standards.

Unplasticized Polyvinyl Chloride (uPVC) Pipes for Potable Water Supply

Table 237 PVC Pipes (IS-4985 / 1981)

Outside dia mm	Maximum working pressure Kg/cm ²	Wall Thickness, mm			Remarks
		Min	Max.	Working pressure feet of water	
16	10	1.1	1.5	340	Class Working
20	10	1.1	1.5	340	
25	10	1.4	1.8	340	
32	10	1.8	2.2	340	
40	10	2.2	2.7	340	



40	6	1.4	1.8	200	Of pipe Pressure At 27° C
50	6	1.7	2.1	200	
50	4	1.2	1.6	140	Class 1 0.25 MPa Class 2 0.40 MPa Class 3 0.6 MPa Class 4 1.0 MPa
63	6	2.2	2.7	200	
63	4	1.5	1.9	140	
75	6	2.6	3.1	200	
75	4	1.8	2.2	140	(1 MPa = 10.1972 Kg/cm ²)
90	6	3.1	3.7	200	
90	4	2.1	2.6	140	Pipes are supplied in straight lengths of 4,5 and 6 m with a Tolerance of ± 10
110	6	3.7	4.3	200	
110	4	2.5	3.0	140	
125	6	4.3	5.0	200	
125	4	2.9	3.4	140	
140	4	3.2	3.8	140	
140	6	4.8	5.5	200	
160	4	3.7	4.3	140	
160	6	5.4	6.2	200	

Specials and Jointing System of Plastic Pipes: The details of specials and the jointing system for three categories of pipes is as under:

Special for Unplasticized Polyvinyl Chloride (uPVC) Pipe (IS-4985)

- (a) **Permanent Type Joints:** Solvent welding technique shall be used in spigot and socket type joints. The socket may be in the form of injection molded fittings or may be made at site by heat application method. In this type of method a thin coat of cement solvent solution shall be applied evenly on both the inside surface of the spigot or socket and outside surface of pipe ends to be inserted. The organic solvent based cement dissolves the matting surfaces. The pipe end fully pushed into the socket, after drying forms a permanent joint.

The slow drying cement shall be used in hot climates. Low Viscosity quick drying cement shall be used in hot climates. Full load shall however, be given only 48 hours after the jointing process. The solvent welded joints with non-heat application method is easier and is recommended for water supply installations. The PVC pipes are very notch sensitive and therefore cutting of threads into PVC pipes are not recommended.

- (b) **Jointing Material for- uPVC Pipes Solvent Cement Joints:**

Table 239 Consumption of Solvent Cement Paste



Outside dia of Pipe, mm	No. of completed coupler Joints per Kg of lubricant (Solvent cement paste)
63	100
75	95
90	90
110	55
125	50
140	45
160	35
180	25
200	18

- (c) **Flanged joints or connection of Plastic pipes to valves:** All connections of plastic pipes to valves shall be done by flanged joints.

Most important step in valve connections is to provide valve anchors in order to prevent any damage to plastic pipe ends by transfer of torque while repairing or maintaining the valves.

4. WATER METERS

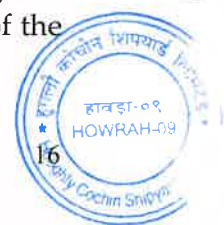
Water meters of approved make and design shall be supplied for installation at locations as shown. The water meters shall meet with the approval of local supply authorities. Suitable valves and chambers or wall meter box to house the meters shall also be provided along with the meters.

The meters shall conform to Indian Standard IS:779 and IS:2373. Calibration certificate shall be obtained and submitted for each water meter.

Provision shall also be made to lock the water meter. The provision shall be such that the lock is conveniently operated from the top. Where the provision is designed for use in conjunction with padlocks, the hole provided for padlocks shall be a diameter not less than 4mm.

4.1 Installation of Water Meter And Stop Cock

The G.I. lines shall be cut to the required lengths at the position where the meter and stop cock are required to be fixed. Suitable fittings shall be attached to the pipes. The meter and stop cock shall be fixed in a position by means of connecting pipes, jam nut and socket etc. The stop cock shall be fixed near the inlet of the water meter. The paper disc inserted in the ripples of the meter shall be removed. And the meter installed exactly horizontal or vertical in the flow line in the direction shown by the arrow cast on the body of the meter. Care shall be taken that the factory seal of the



meter is not disturbed. Wherever the meter shall be fixed to a newly fitted pipe line, the pipe line shall have to be completely washed before fitting the meter.

Water meter installation, location and arrangement to comply with authority requirements.

5. TESTING

The Contractor shall notify the Architect three days in advance of any test so that the Architect can witness the tests if he so wishes.

All water supply system shall be tested to hydrostatic pressure test of at least one and a half (1.5) times the maximum pressure but not less than 10Kg/Sq.cm for a period of not less than 8 hours. All leaks and defects in joints revealed during the testing shall be rectified and got approved at site by retest. Piping required subsequent to the above pressure test shall be retested in the same manner.

System may be tested in sections and such sections shall be entirely retested on completion.

The Contractor shall make sure that proper noiseless circulation of fluid is achieved through the entire piping network of the system concerned. In case of improper circulation, the contractor shall rectify the defective connections. He shall bear all expenses for carrying out the above rectifications including the tearing up and refinishing of floors and walls as required.

In addition to the sectional testing carried out during the construction, contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the contractor during the defects liability period without any cost.

After commissioning of the water supply system, contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above.

A test register shall be maintained and all entries shall be signed and dated by Contractor(s) and Owner's site representative.

6. DISINFECTION OF PIPING SYSTEM AND STORAGE TANKS

Before commissioning the water supply system, the contractor shall arrange to disinfect the entire system as described in the succeeding paragraph.



The water storage tanks and pipes shall first be filled with water and thoroughly flushed out. The storage tanks shall then be filled with water again and disinfecting chemical containing chlorine added gradually while tanks are being filled to ensure thorough mixing. Sufficient chemical shall be used to give water a dose of 50 parts of chlorine to one million parts of water.

If ordinary bleaching powder is used, the proportions will be 150 gm of power to 1000 liters of water. The power shall be mixed with water in the storage tank. If a proprietary brand of chemical is used, the proportions shall be specified by the manufacturer. When the storage tanks is full, the supply shall be stopped and all the taps on the distributing pipes are opened successively working progressively away from the storage tank. Each tap shall be closed when the water discharged begins to smell of chlorine. The storage tank shall then be filled up with water from supply pipe and added with more disinfecting chemical in the recommended proportions. The storage tank and pipe shall then remain charged at least for three hours. Finally the tank and pipes shall be thoroughly flushed out before any water is used for domestic purpose.

The pipe work shall be thoroughly flushed before supply is restored.

7. STERILIZATION OF MAIN

After the pipe work has been tested and approved, but before it is coupled, it shall be sterilized with a solution of chloride of lime.

8. CUTTING CHASES IN MASONARY WALLS

Cold water distribution pipes to fixtures and equipment exposed to view in the bathrooms, kitchens, and sanitary compartments shall be chased into walls or floors or placed in wall cavities. The Contractor shall be responsible for cutting all notches, chases, and recesses in walls and floors and only a diamond cutter shall be used. The maximum size of conduit or pipe permitted to be concealed in floor slabs shall be 32 mm diameter unless otherwise approved by the Architect.

The chases upto 7.5 x 7.5 cm shall be made in the walls for housing GI pipes etc. These shall be provided in correct positions as shown in the drawings or directed by the Architects. Chases shall be made by chiselling out the masonry to proper line and depth. After the pipes etc are fixed in chases, the chases shall be filled with cement mortar 1:2:4 or as may be specified, and made flush with the masonry surface. The concrete surface shall be roughened with wire brush to provide a key for plastering.

Where pipes pass through beams or structural walls, subject to the approval of the Structural Consulting Engineer, the Contractor shall ensure that sizes and locations of openings required are formed in when the relevant beams or walls are cast.

VALVE CHAMBERS



Provision of suitable brick masonry chambers in cement mortar 1:5 (1 cement : 5 coarse sand) on cement concrete foundations 150 mm thick 1:5:10 mix (1 cement:5 fine sand : 10 graded stone aggregate 20 mm nominal size) with 15 mm thick cement plaster inside and outside finished with a plaster inside and outside finished with a floated coat of neat cement inside with cast iron surface box approved by fire brigade including excavation, back-filling complete shall be made.

9. VALVES

All valves (gate, globe, check, safety) shall be of gun metal suitable for the particular service as specified. All valves shall be of the particular duty and design as specified. Valves shall either be of screwed type or flanged type, as specified, with suitable flanges and non-corrosive bolts and gaskets. Tail pieces as required shall be supplied along with valves. Gate, globe and check valves shall conform to Indian Standard IS:776 and non-return valves and swing check type reflux to IS:5312.

9.1 Sluice valves

Sluice valves, where specified shall be flanged sluice valves of cast iron body. The spindle, valve seat and wedge nuts shall be gunmetal. They shall generally have non-rising spindle and shall be of the particular duty and design as specified. The valves shall be supplied with suitable flanges, non-corrosive bolts and asbestos fibre gaskets. Sluice valves shall conform to Indian standard IS:780 and IS:2906.

9.2 Butterfly valve

The butterfly valve shall be suitable for waterworks and rated Pressure requirement as mentioned in the Schedule of quantities.

The body shall be of cast iron to IS:210 in circular shape and of high strength to take the water pressure. The disc shall be heavy duty cast iron with anti corrosive epoxy or nickel coating.

The valve seat shall be of high grade elastomer or nitrile rubber. The valve is closed position shall have complete contact between the seat and the disc throughout the perimeter. The elastomer rubber shall have a long life and shall not give away on continuous applied water pressure. The shaft shall be EN 8 grade carbon steel.

The valve shall be fitted between two flanges on either side of pipe flanges. The valve edge rubber shall be projected outside such that they are wedged within the pipe flanges to prevent leakages.

9.3 Ball valve

The ball valve shall be made forged brass and suitable for test pressure of pipe line. The valve shall be internally threaded to receive pipe connections.



The ball shall be made from brass and machined to perfect round shape and subsequently chrome plated. The seat of the valve body-bonnet gasket and gland packing shall be of Teflon.

The handle shall be provided with PVC jacket. The handle shall also indicate the direction of 'open' and 'closed' situations. The gap between the ball and the teflon packing shall be sealed to prevent water seeping.

The handle shall also be provided with a lug to keep the movement of the ball valve within 90°. The lever shall be operated smoothly and without application of any unnecessary force.

9.4 Ball float valve

Ball valves with floats to be fixed in storage tanks shall consist of cast brass lever arm having copper balls (26 SWG) screwed to the arm integrally. The copper ball shall have bronze welded seams. The closing/opening mechanism incorporating the piston and cylinder shall be non-corrosive metal and include washers. The size and construction of ball valves and float shall be suitable for desired working pressure operating the supply system. Where called for brass valves shall be supplied with brass hexagonal back nuts to secure them to the tanks and a socket to connect to supply pipe.

Globe valves on Hot-water line shall be union bonnet with stem/disc and body seat ring of SS. Suitable for temperature upto 80° C.

S.No	Type of Valve	Size	Construction	Ends
a.	Isolating Valve	15 mm to 50 mm 65 mm and above	Gun Metal Gun Metal	Screwed Flanged
b.	Sluice Valve & Butterfly Valve	65 mm and above	Cast Iron	Flanged
c.	G.M. non return valve	15 mm to 50 mm 65 mm above	Gun Metal Gun Metal	Screwed Flanged
d.	Flap Type – Non return valve	65 mm and above	Cast Iron	Flanged

All valves shall be suitable for the working pressure involved.

9.5 Gun metal valve

Gun metal Valves shall be used for smaller dia pipes, and for threaded connections. The Valves shall bear certification as per IS : 778.

The body and bonnet shall be of gun metal to IS : 318. The stem gland and gland nut shall be of forged brass to IS : 6912. The hand wheel shall be of cast iron to IS : 210.



The Hand wheel shall be of high quality finish to avoid hand abrasions. Movement shall also be easy. The spindle shall be non rising type.

9.6 Non-return valve

Non-Return valves shall be cast iron double flanged with cast iron body and gunmetal internal parts conforming to IS : 5312.

9.7 Pressure Reducing Valve Set

Each pressure reducing valve set shall be complete with pressure reducing or pressure regulating valve, isolating valves, pressure gauges (fix with symphonic check) on inlet and outlet, pressure relief valve on outlet and filter on inlet.

Each pressure reducing valve shall contain loading neoprene diaphragm and a full floating, self-aligning, ignition resistant seat and shall be of the single stage, pressure reduction type with provision for manually adjusting the delivery pressure. The valve shall fail safe to the low pressure.

Valves shall be capable of operating at the maintaining automatically the respective delivery pressure and flow rates as indicated and shall not be liable to creep. Valves shall also be capable of maintaining the pre-set downstream pressure under static condition.

The filter on each inlet to a pressure reducing valve shall be of replaceable porous, sintered metal type.

9.8 Pressure Relief Valves

Each pressure relief valve shall be of the fully enclosed type and fitted with hand easing gear. Each pressure relief valve in a pressure reducing station shall have a flow capacity equal to that of the pressure reducing valve. Pressure relief valves in locations other than reducing stations shall have flow capacities equal to that of the associated equipment.

9.9 Pressure Gauge

The pressure gauge shall be constructed of die cast aluminium and stove enamelled. It shall be weather proof with an IP 55 enclosure. It shall be a stainless steel Bourden tube type pressure gauge with a scale range from 0 to 16 Kg / cm square and shall be constructed as per IS:3524. Each pressure gauge shall have a siphon tube connection. The shut off arrangement shall be by Ball Valve.

Calibration certificate shall be obtained and submitted for each pressure gauge.



10. WATER FITTINGS

Unless otherwise specified all Gunmetal fittings such as gate, globe, check & safety valves shall be fitted in pipe line in workman like manner. Necessary unions shall be provided on both ends of the valves for easy replacement. The joints between fittings and pipes shall be leak-proof when tested to desired pressure rating. The defective fittings and joints shall be replaced or redone.

11. PAINT

Used paints and coatings that comply with the following limits for VOC content and the following chemical restrictions:

- Non-Flat Paints and Coatings: VOC not more than 150 g/L.
- Anti-Corrosive Coatings VOC not more than 250 g/L.
- Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- Paints and coatings shall not contain any of the following:
 - Acrolin
 - Acrylonitrile
 - Antimony
 - Benzene
 - Butyl benzyl phthalate
 - Cadmium
 - Di (2-ethylhexyl) phthalate
 - Di-n-butyl phthalate
 - Di-n-octyl phthalate
 - 1,2-dichlorobenzene
 - Diethyl phthalate
 - Dimethyl phthalate
 - Ethyl benzene

Painting:

Water supply pipes in exposed, in shafts shall be painted with two or more coats of ready mix Low-VOC oil paint to give an even shade before painting all dust and extraneous matter shall be removed.

Paint shall be of approved quality and shade. Where directed by the Owner's site representative pipes shall be painted in accordance with approved pipe colour code.



Pipe in chase shall be painted with two coats of bitumen paint, covered with polythene tape and a final coat of bitumen paint. Exposed pipes shall be painted with synthetic enamel paint after removing dust and extraneous matter.

Water supply pipes below ground and covered in cement concrete shall not be painted.

12. CONNECTIONS TO VARIOUS MECHANICAL EQUIPMENT SUPPLIED BY OTHER AGENCIES

All inlets, outlets, valves, piping and other incidental work connected with installation of mechanical equipment supplied by other agencies all be carried out by the contractor in accordance with the drawings, requirements for proper performance of equipment, manufacturer's instructions and the directions of the Owner's site representative / Architect. The equipment's to be supplied by the other agencies consist mainly for Kitchen, Back-of-the-House area and other similar areas. The work of connections to the various equipment's shall be effected through proper unions and isolating valves. The work of effecting connections shall be executed in consultation with and according to the requirement of equipment suppliers, under the directions of the Owner's site representative / Architect. The various aspects of connection work shall be executed in a similar way to the work of respective trade mentioned elsewhere in these specifications.

13. CONNECTIONS TO RCC WATER TANKS

The contractor shall provide all inlets, outlets, washouts, vents, ball cocks, overflows control valves and all such other piping connections including level indicator to water storage tanks as called for. All pipes crossing through RCC work shall have puddle flanges fabricated from MS/GI pipes of required size and length and welded to 6/8 mm thick MS plate. All puddle flanges must be fixed in true alignment and level to ensure further connection in proper order.

Full way gate valves of a approved make shall be provided as near the tank as practicable on every outlet pipe from the storage tank except the overflow pipe. Overflow and vent pipes shall terminate with mosquito proof grating.

The overflow pipe shall be so placed to allow the discharge of water being readily seen. The overflow pipe shall be of size as indicated. A stop valve shall also be provided in the inlet water connection to the tank. The outlet pipes shall be fixed approximately 75mm above the bottom of the tank towards which the floor of the tank is sloping to enable the tank to be emptied for cleaning.

The floor and the walls of the tank shall be tiled with glazed tiles upto the overflow level. Alternatively food grade epoxy to be applied.

Tiling of Walls



The floor and the walls of the tanks shall be tiled with glazed tiles up to the overflow level. Alternatively food grade epoxy to be applied to the floor and the walls of the tanks.

14. MEASUREMENTS

The length above ground shall be measured in running meter correct to a cm for the finished work, which shall include pipe and fittings such as coupling, bends, tees, elbows, reducers, crosses, plugs, sockets, nipples and nuts, unions. Deductions for length of valves shall be made. Rate quoted shall be inclusive of all fittings, clamps, cutting holes chased and making good the same and all items mentioned in the specifications and Bill of Quantities.

All pipes below ground shall be measured per linear meters (to the nearest cm) and shall be inclusive of all fittings e.g. coupling, tees, bends, elbows, unions, deduction for valves shall be made rate quoted shall be inclusive of all fittings, excavation, back filling and disposal of surplus earth, cutting holes and chase and making good all item mentioned in Bill of Quantities.

15. LAWN HYDRANTS

Lawn hydrants shall be of 25mm size unless otherwise indicated. All hydrants shall be provided with gate valves and threaded nipple to receive hose pipes. Lawn hydrant valves shall be of approved make and design. Where called for lawn hydrants shall be located in masonry chambers of appropriate size.

17. THRUST BLOCKS

In case of bigger pipes (80 mm dia and above), 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 as directed by the Owner's site representative.

18. MASONRY CHAMBER

- i. All masonry chambers for stop cocks, sluice valves and meter etc. shall be built as per supplied drawings.
- ii. The excavation for chambers shall be done true to dimension and level indicated on plans or as directed by the Owner's site representative.
- iii. Concrete shall be of cement concrete 1:3:6 (1 cement : 3 coarse sand : 6 graded stone aggregate 40 mm nominal size).
- iv. Brick shall be of class designation 75 in cement mortar 1:5 (1 cement : 5 fine sand)



- v. Inside Plastering not less than 12 mm thick shall be done in cement mortar 1:3 (1 cement : 3 fine sand) finished with a floating coat of neat cement.

19. SHIFTING OF EXCAVATED SURPLUS MATERIAL

Contractor shall make his own arrangement to shift the surplus excavated material within the site limits as directed by Owner's site representative at free of cost within time limit.

SECTION – 03 : DRAINAGE (SOIL, WASTE, VENT & RAIN WATER PIPES)

1. SCOPE

The scope of this section comprises the supply, installation, testing and commissioning of internal drainage services.

Work under this section shall consist of furnishing all labour, materials, equipments and appliances necessary and required to completely install all soil, waste, vent and rainwater pipes and fittings as required by the drawings, and given in the schedule of quantities.

The Contractor shall make all necessary application and arrangements for his work to be inspected by the Local Authorities.

The Contractor shall be solely responsible for obtaining the Authorities approval of his works prior to the handing over of the complete water supply / distribution installation to the Owner.

2. UPVC PIPES AND FITTINGS

The pipes shall be round and shall be supplied in straight lengths with socketed ends. The internal and external surfaces of pipes shall be smooth, clean, free from groovings and other defects. The ends shall be cleanly cut and square with the axis of the pipe. The pipes shall be designed by external diameter and shall conform to IS:4985-1981 or IS:13592. The pipes shall be of Class-III; 6 Kg/sqm sq.cm pressure rating.

S.No	Material	Sizes in mm	IS / ASTM reference
1	uPVC-Un plasticized Polyvinyl Chloride, Pressure pipes and fittings, class-III, 6 Kg/Cm ²	dia 40 & dia 50	IS :4985 & IS :1983
2	uPVC-Un plasticized Polyvinyl Chloride, pipes and fittings – class-III, 6 Kg/Cm ² for Rain water application	75 dia above	IS :4985
3	uPVC-Un plasticized Polyvinyl	75 dia above	IS :13592 & IS :4985



	Chloride, pipes and fittings – class-III, 6 Kg/Cm ² / Type-B for Soil, Waste & Vent and Discharge application		
4	Ring fit with manufacturer recommended rings	15 dia to 250 dia	IS : 5382 or equivalent
5	Solvent fit with manufacturer recommended lubricant		Solvent as recommended by manufacturer
6	uPVC-Un plasticized Polyvinyl Chloride, SDR-34, for underground drainage and sewage pipes.	110 dia above	IS :15328 & Solvent as recommended by manufacturer

Laying and Jointing

The pipes shall be laid and clamped to wooden plugs fixed above the surface of the wall. Alternatively plastic clamps of suitable designs shall be preferred. Provision shall be made for the effect of thermal movement by not gripping or disturbing the pipe at supports between the anchors for suspended pipes. The supports shall allow the repeated movements to take place without abrasion.

Jointing for UPVC pipes shall be made by means of solvent cement for horizontal lines and 'O' rubber ring for vertical line. The type of joint shall be used as per site conditions / direction of the Owner's site representative. Where UPVC pipes are to be used for rain water pipes, the pipe shall be finished with GI adopter for insertion in the RCC slab for a water proof joint complete as directed by Owner's site representative.

Supports

UPVC pipes require supports at close intervals. Recommended support spacing for unplasticised PVC pipes is 1400 mm for pipes 50 mm dia and above. Pipes shall be aligned properly before fixing them on the wooden plugs with clamps. Even if the wooden plugs are fixed using a plumb line, pipe shall also be checked for its alignment before clamping, piping shall be properly supported on, or suspended from clamps, hangers as specified and as required. The Contractor shall adequately design all the brackets, saddles, anchors, clamps and hangers and be responsible for their structural sufficiency. Pipe supports shall be primer coated with rust preventive paint.

Repairs

While temporary or emergency repairs may be made to the damaged pipes, permanent repairs shall be made by replacement of the damaged section. If any split or chip out occur in the wall of the pipe, a short piece of pipe of sufficient length to cover the damaged portion of the pipe is cut. The sleeve is cut longitudinally and heated sufficiently to soften it so that it may be slipped over the damaged hard pipe.



3. PIPES HANGERS, SUPPORTS, CLAMPS ETC.

All vertical pipes shall be fixed by galvanized clamps and galvanized angle brackets truly vertical. Branch pipes shall be connected to the stack at the same angle as that of the fittings. No collars shall be used on vertical stacks. Each stack shall be terminated at top with a cowl (terminal guard).

Horizontal pipes running along ceiling shall be fixed on galvanized structural adjustable clamps of special design shown on the drawings or as directed. Horizontal pipes shall be laid to uniform slope and the clamps adjusted to the proper levels so that the pipes fully rest on them.

Contractor shall provide all sleeves, openings, hangers, inserts during the construction. He shall provide all necessary information to the building contractor for making such provisions in the structure as necessary. All damages shall be made good to restore the surfaces.

All pipes clamps, supports and hangers shall be galvanized. Factory made prefabricated clamps shall be preferred. Contractor may fabricate the clamps of special nature and galvanize them after fabrication but before installation. All nuts, bolts, washers and other fasteners shall be factory galvanized.

Clamps shall be of approved design and fabricated from MS flats (which shall be galvanized after fabrication) of thickness and sizes as per drawings or contractor's shop drawings. Clamps shall be fixed in accordance to manufacturer's details/shop drawings to be submitted by the contractors.

When required to be fixed on RCC columns, walls or beam they shall be fixed with approved type of galvanized expansion anchor fasteners (Dash fasteners) of approved design and size according to load.

Structural clamps e.g., trapeze or cluster hangers shall be fabricated by electro-welding from MS structural members e.g. rods, angles, channels flats as per contractors shop drawings shall be galvanized after fabrication. All nuts, bolts and washers shall be galvanized.

Galvanized slotted angle/channel of approved sizes supports on walls shall be provided wherever shown on shop drawings. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with anchor fasteners mentioned above. The spacing of support bolts on support members fixed horizontally shall not exceed 1 m.

4. INSTALLATION OF SOIL, WASTE & VENT PIPES

Soil, waste & vent pipes in shafts under the floors / suspended below slab shall consist of cast iron pipes as described earlier. Waste pipes from bottle trap to floor/urinal traps for wash basin, urinal and sink shall be GI pipes and fittings.



All Horizontal pipes running below the slab and along the ceiling, shall be fixed on structural adjustable clamps, sturdy hangers of the design as called for in the drawings. The pipes shall be laid in uniform slope and proper levels. All vertical pipes shall be truly vertical fixed by means of stout clamps in two sections, bolted together, built into the walls, wedged and neatly jointed. The branch pipes shall be connected to the stack at the same angle as that of fittings. All connections between soil, waste and ventilating pipes and branch pipes shall be made by using pipe fittings with inspection doors for cleaning. Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts. Where the horizontal run off the pipe is long or where the pipes cross over building expansion joints etc. suitable allowance shall be provided for any movements in the pipes by means of expansion joint etc. such that any such movement does not damage the installation in any way.

All cast iron pipes and fittings shall be jointed with drip seal / Best Quality pig lead free from impurities confirming to IS 27.

Before jointing, the interior of the socket and exterior of the spigots shall be thoroughly cleaned and dried. The spigot end shall be inserted into the socket right up to the back of the socket and carefully centered by two or three laps of threaded spun yarn, twisted into ropes of uniform thickness, well caulked into the back of the socket. No piece of yarn shall be shorter than the circumference of the pipe. The jointed pipe line shall be at required levels and alignment. The remainder of the socket is left for the lead caulking. Where the gasket has been tightly held, a jointing ring shall be placed round the barrel against the face of the socket. Molten Lead shall be poured to the remainder of the socket.

The depth of the lead joints for the cast iron pipes shall be 45mm for the pipes upto 100mm dia and 50mm for the pipes beyond 100mm dia respectively.

The joint shall not be covered till the pipe line has been tested under pressure. Rest of pipe line shall be covered so as to prevent the expansion and contraction due to variation in temperature.

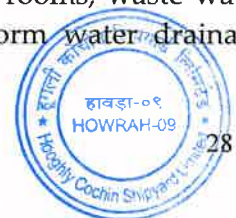
Rain water Pipes

All open terraces shall be drained by rain water down takes.

Rainwater down takes are separate and independent of the soil and waste system and will discharge into the underground storm water drainage system of the complex.

Rainwater in open courtyards shall be collected in catch basins and connected to the Storm Water Drains.

Any dry weather flow from waste appliances, e.g. AHU's pump rooms, waste water sumps shall connected to sewers after traps and not in the storm water drainage systems.



Balcony / Planter drainage

Wherever required, all balconies, terraces, planters and other frontal landscape areas will be drained by vertical down takes or other type of drainage system shown on the drawings and directed by the Project Manager.

5. TRAPS

5.1 Floor Traps

Floor traps where specified shall be siphon type full before P or S type cast iron having a minimum 50 mm deep seal. The trap and waste pipes when buried below ground shall be set and encased in cement concrete blocks firmly supported on firm ground or when installed on a sunken RCC structural slab. The blocks shall be in 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 20 mm nominal size).

Contractor shall provide all necessary shuttering and centering for the blocks. Size of the block shall be 30 x 30 cms of the required depth.

5.2 Floor Trap Inlet /Hopper

Bath room traps and connection shall ensure free and silent flow of discharging water. Where specified, contractor shall provide a special type of floor inlet fitting fabricated from GI pipe, with one, two or three inlet sockets welded on side to connect the waste pipe. All joint between waste hopper and CI inlet socket shall be drip seal/Lead Caulked. Inlet shall be connected to a CI "P" trap. Floor trap inlet and the traps shall be set in cement concrete blocks where burried in floors without extra charge. Floor trap for the shower cubicle shall suit site and as per the approval of Owner's site representative. All fabricated hopper shall be hot dip galvanized.

5.3 Floor Trap Grating

Floor and urinal traps shall be provided with 100 – 150 mm square or round stainless steel gratings, with frame and rim of approved design and shape or as specified in the schedule of quantities approved by the Owner's site representative.

5.4 Cleanout Plugs

Floor Clean Out Plug

Clean out plug for soil, waste or rain water pipes laid under floors shall be provided near pipe junctions bends, tees, "Y" and on straight runs at such intervals as required as per site conditions. Cleanout plugs shall terminate flush with the floor level. They shall be threaded and provided with key holes for opening. Cleanout plugs shall be cast brass suitable for the pipe dia. With screwed to a GI socket. The socket shall be drip seal joined/ Lead Caulked to the drain pipes.



Cleanout on Drainage Pipes

Cleanout plugs shall be provided on head of each drain and in between at locations indicated on plans or directed by Owner's site representative. Cleanout plugs shall be of size matching the full bore of the pipe but no exceeding 150 mm dia CO plugs on drains of greater diameters shall be 150 mm dia. Fixed with a suitable reducing adapter.

Floor cleanout plugs shall be cast brass.

Cleanouts provided at ceiling level pipe shall be fixed to a CI flanged tail piece. The cleanout doors shall be specially fabricated from light weight galvanized sheets and angles with hinged type doors with fly nuts, gasket etc. as per drawing.

6. PIPE SLEEVES

Pipe sleeves, next larger diameter than pipes shall be provided wherever pipes pass through walls & slabs and annular space filled with fiberglass & finished with retainer rings. All pipes shall be accurately cut to the required sizes in accordance with relevant BIS codes and burrs removed before laying. Open ends of the pipe shall be closed as the pipe is installed to avoid entrance of foreign matter.

7. PIPE PROTECTION

Cast iron soil and waste pipes under floor in sunken slabs and in wall chases (when cut specially for the pipe) shall be encased in cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate of 12 mm size) 10 cm bed and around. When pipes are running well above the structural slabs, the encased pipes shall be supported with suitable cement concrete pillars of required height and size at intervals directed by the Project Manager.

8. CUTTING AND MAKING GOOD

Pipes shall be fixed and tested as building proceeds. The contractor shall provide all necessary holes, cutouts and chases in structural members as building work proceeds. Wherever holes are cut or left originally they shall be made good with cement concrete 1:2:4 (1 cement: 2 coarse sand : 4 stone aggregate 20 mm nominal size) or cement mortar 1:2 (1 cement : 2 coarse sand). Cured and the surface restored to original condition.

9. PAINTING

Used paint and coatings that comply with the following limits for VOC content and the following chemical restrictions:

- Non-Flat Paints and Coatings: VOC not more than 150 g/L.



- Anti-Corrosive Coatings VOC not more than 250 g/L.
- Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
- Paints and coatings shall not contain any of the following:
 - Acrolien
 - Acrylontrile
 - Antimony
 - Benzene
 - Buty benzyl phthalate
 - Cadmium
 - Di (2-ethylhexyl) phthalate
 - Di-n-butyl phthalate
 - Di-n-octyl phthalate
 - 1,2-dichlorobenzene
 - Diethyl phthalate
 - Dimethyl phthalate
 - Ethyl benzene

Soil, waste, vent and rain water pipes in exposed location, in shafts shall be painted with two or more coats of ready mix Low – VOC oil paint to give an even shade. Before painting all dust and extraneous matter shall be removed.

Paint shall be of approved quality and shade. Where directed by the Owner's site representative pipes shall be painted in accordance with approved pipe colour code.

Pipe in chase shall be painted with two coats of bitumen paint, covered with polythene tape and a final coat of bitumen paint. Exposed pipes shall be painted with synthetic enamel paint after removing dust and extraneous matter.

C.I. Soil and waste pipes below ground and covered in cement concrete shall not be painted.

10. TESTING

Testing shall be done in accordance with IS:1172 and IS:5329 except as may be modified herein under.

Entire drainage system shall be tested for water tightness and smoke tightness during and after completion of the installation. No portion of the system shall remain untested. Contractor must have adequate number of expandable rubber bellow plugs, manometers, smoke testing machines, pipe and fitting work tests,



All materials obtained and used on site must have manufacturer's hydraulic test certificate for each batch of materials used on the site.

Before use at site all CI pipes shall be tested by filling up with water for at least 30 minutes. After filling, pipes shall be struck with a hammer and inspected for blow holes and cracks. All defective pipes shall be rejected and removed from the site within 48 hours. Pipes with minor sweating may be accepted at the discretion of the Project Manager.

Soil and waste pipes shall be tested in sections after installation, by filling up the stack with water. All openings and connections shall be suitably plugged as approved by the Project Manager. The total head in the stack shall be 4.5 m at the highest point of the section under test. The period of test shall be minimum for 30 minutes or as directed by the Project Manager. If any leakage is visible, the defective part of the work shall be cut out and made good.

On completion of the work the entire installation shall be tested by smoke testing machine. The test shall be conducted after the plumbing fixtures are installed and all traps have water seal or by plugging the outlets with bellow plugs. Apply dense smoke keeping the top of stack open and observe for leakages. Rectify or replace defective sections.

After the installation is fully complete, it should be tested by flushing the toilets, running atleast 20% of all taps simultaneously and ensuring that the entire system is self draining, has no leakages, blockages etc. rectify and replace where required.

A test register shall be maintained and all entries shall be signed and dated by the Contractor and the Project Manager or his representative.

All pipes in wall chase or meant to be encased or buried shall be hydro tested before the chase is plastered or the pipe encased or buried.

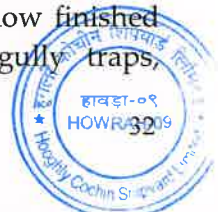
SECTION – 04 : EXTERNAL DRAINAGE (SEWAGE & STORM WATER DISPOSAL)

1. SCOPE

The scope of this section comprises the supply, installation, testing and commissioning of external drainage & sewage disposal services.

1.1 General Scheme

The contractor shall install a drainage system to effectively collect; drain and dispose all soil and waste water from various parts of the buildings, appurtenances and equipment. The piping work mainly consists of laying of Salt glazed stoneware pipes, reinforced cement concrete pipes and cast iron soil pipes as called for on the drawings. All piping shall be installed at depth greater than 80 cm below finished ground level. The disposal system shall include construction of gully traps,



manholes, intercepting chambers as indicated. The piping system shall be vented suitably at the starting point of all branch drains, main drains, the highest/lowest point of drain and at intervals as shown. All ventilating arrangements shall be unobstructive and concealed. The work shall be executed strictly in accordance with IS: 1742. The sewage system shall be subject to smoke test for its soundness as directed by the Project Manager. Wherever the sewerage pipes run above water supply lines, same shall be completely encased in cement concrete 1:2:4 all round with the prior approval of the Project Manager.

Without restricting to the generality of the foregoing, the drainage system shall inter-alia include:

- a. Sewer lines including earth work for excavation, disposal, back filling and compaction, pipe lines, manholes, drop connections and connections to the municipal or existing sewer.
- b. Storm water drainage, earth works for excavation, disposal, backfilling and compaction, pipe lines, manholes, catch basins and connections to the existing municipal storm water drain or connected as indicated by the Project Manager.

General Requirements

All materials shall be new and of quality conforming to specifications and subject to the approval of the Owner's site representative. Wherever particular makes are mentioned, the choice of selection shall remain with the Architect / Consultant / Owner's site representative.

Drainage lines and open drains shall be laid to the required gradients and profiles.

All drainage work shall be done in accordance with the local municipal bye-laws.

Contractor shall obtain necessary approval and permission for the drainage system from the municipal or any other competent authority.

Location of all manholes, etc. shall be got confirmed by the Project Manager before the actual execution of work at site. As far as possible, no drains or sewers shall be laid in the middle of road unless otherwise specifically shown on the drawings or directed by the Project Manager in writing.

All materials shall be rust proofed; materials in direct or indirect contact shall be compatible to prevent electrolytic or chemical (bimetallic) corrosion.

2. TRENCHING FOR PIPES AND DRAINS

2.1 General



All the material shall be new of best quality conforming to specifications and subject to the approval of the Architects. Drainage lines shall be laid to the required gradients and profiles. All drainage work shall be done in accordance with the local municipal by-laws.

Contractor shall obtain necessary approval and permission for the drainage system from the municipal or any other competent authority. Location of all manholes, catch basins etc. shall be finalized and shown in approved shop drawings before the actual execution of work at site. All work shall be executed as directed by the Project Manager.

2.2 Alignment & Grade

The sewer and storm water drainage pipes shall be carefully laid to levels and gradients shown in the plans and sections but subject to modifications as shall be ordered by the Architects from time to time to meet the requirements of the works. Great care shall be taken to prevent sand etc. from entering the pipes. The pipes between two manholes shall be laid truly in straight lines without vertical or horizontal undulations. The body of the pipes shall rest on an even bed in the trench for its length and places shall be excavated to receive collar for the purpose of jointing. No deviations from the lines, depths of cuttings or gradients as called for on the drawings shall be permitted without the written approval of the Architect. All pipes shall be laid at least 60cms below the finished ground level or as called for on the drawings.

2.3 Setting out Trenches

The contractor shall set out all trenches, manholes, chambers and such other works to true grades and alignments as called for. He shall provide the necessary instruments for setting out and verification for the same. All trenches shall be laid to true grade and in straight lines and as shown on the drawings. The trenches shall be laid to proper levels by the assistance of boning rods and sight rails which shall be fixed at intervals not exceeding 10 meters or as directed by the Project Manager.

2.4 Trench Excavation

The trenches for the pipes shall be excavated with bottoms formed to level and gradients as shown on the drawings or as directed by the Project Manager. In soft and filled in ground, the Project Manager may require the trenches to be excavated to a greater depth than the shown on the drawings and to fill up such additional excavation with concrete (1:4:8) consolidated to bring the excavation to the required levels as shown on the drawings.

All excavations shall be properly protected where necessary by suitable timbering, piling and sheeting as approved by the Project Manager. All timbering and sheeting when withdrawn shall be done gradually to avoid falls. All cavities be adequately filled and consolidated. No blasting shall be allowed without prior approval in



writing from the Architect. It shall be carried out under thorough and competent supervision, with the written permission of the appropriate authorities taking full precautions connected with the blasting operations. All excavated earth shall be kept clear of the trenches to a distance equal to 75 cms.

2.5 Timbering of Sewer and Trenches

The Contractor shall at all times support efficiently and effectively the sides of all the trenches and other excavations by suitable timbering, piling and sheeting and they shall be close timbered in loose or sandy starta and below the surface of the sub soil water level.

All timbering, sheeting and piling with their wallings and supports shall be of adequate dimensions and strength and fully braced and strutted so that no risk of collapse or subsidence of the walls of the trench shall take place.

The Contractor shall be held responsible and shall be accountable for the sufficiency of all timbering, bracings, sheeting and piling used and also for, all damage to persons and property resulting from improper quality strength placing, maintaining or removing of the same.

2.6 Shoring of Buildings

The Contractor shall shore up all buildings, walls and other structures, the stability of which is liable to be endangered by the execution of the work and shall be fully responsible for all damages to persons or property resulting from any accident.

2.7 Obstruction Road

The contractor shall not occupy or obstruct by his operation more than one half of the width of any road or street and sufficient space shall then be left for public and private transit. He shall remove the materials excavated and bring them back again when the trench is required to be refilled. The contractor shall obtain the consent of the Project Manager in writing before closing any road to vehicular traffic and the foot walks must be clear at all times.

2.8 Protection of Pipes etc.

All pipes, water mains, cables etc. met in the course of excavation shall be carefully protected and supported. Care shall be taken not to disturb the cables, the removal of which shall be arranged by the contractor with the written consent from the Project Manager.

2.9 Trench Back Filling



Refilling of the trenches shall not be commenced until the length of pipes therein has been tested and approved. All timbering which may be withdrawn safely shall be removed as filling proceeds. Where the pipes are unprotected by concrete hunching, selected fine material shall be carefully hand-packed around the lower half of the pipes so as to buttress them to the sides of the trench.

The refilling shall then be continued to 150mm over the top of the pipe using selected fine hand packed material, watered and rammed on both sides of the pipes with a wooden hammer. The process of filling and tamping shall proceed evenly in layers not exceeding 150mm thickness, each layer being watered and consolidated so as to maintain an equal pressure on both sides of the pipe line. In gardens and fields the top solid and turf if any, shall be carefully replaced.

2.10 Contractor to restore settlement and Damages

The contractor shall at his own costs and expenses, make good promptly during the whole period for the works in hand if any settlement occurs in the surfaces of roads, beams, footpaths, gardens, open spaces etc. in the public or private areas caused by his trenches or by his other excavations and he shall be liable for any accident caused thereby. He shall also, at his own expense and charges, repair (and make good) any damage done to building and other property. If in the opinion of the Project Manager he fails to make good such works with all practicable dispatch, the Project Manager shall be at his liberty to get the work done by other means and the expenses thereof shall be paid by the contractor or deducted from any money that may be or become due to him or recovered from him by any other manner according to the laws of land.

The contractor shall at his own costs and charges provide places for disposal of all surplus materials not required to be used on the works. As each trench is refilled, surplus soil shall be immediately removed, the surface shall be properly restored and roadways and sides shall be left clear.

2.11 Removal of Water from Sewer, Trench etc.

The contractor shall at all times during the progress of work keep the excavations free from water which shall be disposed by him in a manner as will neither cause injury to the public health nor to the public or private property nor to the work completed or in progress nor to the surface of any road or streets, nor cause any interference with the use of the same by the public.

If any excavation is carried out at any point or points to a greater width of the specified cross section of the sewer with its cover, the full width of the trench shall be filled with concrete by the contractor at his own expense and charges to the requirements of the Project Manager.

2.12 Removal of Filth



All night soil, filth or any other offensive matter met with during the execution of the works, shall not be deposited on the surface of any street or where it is likely to be a nuisance or passed into any sewer or drain but shall be immediately, after it is taken out of any trench, sewer or cess pool, put into the carts and removed to a suitable place to be provided by the Contractor.

2.13 Width of Trench

The Project Manager shall have power by giving an order in writing to the Contractor to increase the maximum width/depth for excavation and backfilling in trenches for various classes of sewer, manholes and other works in certain length to be specifically laid down by him, where on account of bad ground or other unusual conditions, he considers that such increased width/depths are necessary in view of the site conditions.

3. PIPING MATERIAL

3.1 RCC pipes

All pipes shall be centrifugally spun RCC pipes NP2. Pipes shall be true and straight with uniform bore throughout. Cracked, warped pipes shall not be used on the work. All pipes shall be tested by the manufacturer and the Contractor shall produce, prior to use on site, a certificate to that effect from the manufacturer.

The pipes shall be with or without reinforcement as required and of the class as specified. These shall conform to IS:458-1971.

All pipes shall be true to shape, straight, perfectly sound and free from cracks and flaws. The external and internal surface of the pipes shall be smooth and hard. The pipes shall be free from defects resulting from imperfect grading of the aggregate mixing or moulding.

Laying

RCC spun pipes shall be laid on cement concrete bed or cradles as specified and shown on the detailed drawings. The cradles may be precast and sufficiently cured to prevent cracks and breakage in handling. The invert of the cradles shall be left 12 mm below the invert level of the pipe and properly placed on the soil to prevent any disturbance. The pipe shall then be placed on the bed concrete or cradles and set for the line and gradient by means of sight rails and boning rods, etc. Cradles or concrete bed may be omitted, if directed by the Project Manager.

Jointing



Semi flexible type collar joint. : Hemp rope soaked in neat cement wash shall be passed round the joint and inserted in it by means of caulking tool. More skein of yarn shall be added and rammed home. Cement mortar with one part of cement and two part of sand and with minimum water content but on no account soft or sloppy, shall be carefully inserted, punched and caulked into the collar and more cement mortar added until the space of the collar has been filled completely with tightly caulked mortar. Provision of rubber sealing ring in the collar joint shall also be made. The joint shall then be finished off neatly outside the socket at an angle of 45 deg.

Curing

The joint shall be cured for at least seven days. Refilling at joints will be permitted only on satisfactory completion of curing period.

Cement Concrete for Pipe Supports

- a. Unless otherwise directed by the Project Manager cement concrete for bed, all round or in haunches shall be as follows:

Description	upto 1.5 m depth	upto 3 m depth	beyond 3 m depth
Stoneware pipes buried in open ground (no sub soil water)	All round (1:3:6)	In Haunches (1:3:6)	In Haunches (1:3:6)
RCC or SW in sub soil water	All round (1:3:6)	In Haunches (1:3:6)	In Haunches (1:3:6)
PVC / HDPE pipe	All round (1:2:4)	In Haunches (1:3:6)	In Haunches (1:3:6)
CI Pipes (in all conditions)	All round (1:4:8)	In Haunches (1:4:8)	In Haunches (1:4:8)
All pipes under building	All round (1:2:4)	All round (1:2:4)	All round (1:2:4)

- b. Pipes may be supported on brick masonry or precast RCC or in situ cradles. Cradles shall be as shown on the drawings.
- c. Pipes in loose soil or above ground shall be supported on brick or stone masonry pillars as shown on the drawings.

Measurement



a. Excavation

Measurement for excavation of pipes trenches shall be made per linear meter.

b. Trenches shall be measurement between outside walls of manholes at top and the depth shall be the average depth between the two ends to the nearest cm. The rate quoted shall be for a depth upto 1.5 metre or as given in the Bill of Quantities.

Payment for trenches more than 1.5 m in depth shall be made for extra depth as given in the Bill of Quantities and above the rate for depth upto 1.5 m.

c. RCC pipes shall be measured for length of the pipe line per linear meter.

- i. Length between manholes shall be recorded from inside of one manhole or inside of other manhole.
- ii. Length between gully trap and manhole shall be recorded between socket of pipe near gully trap and inside of manhole.

3.2 UPVC Pipes and Fittings

The pipes shall be round and shall be supplied in straight lengths with socketed ends. The internal and external surfaces of pipes shall be smooth, clean, free from grooving and other defects. The ends shall be cleanly cut and square with the axis of the pipe. The pipes shall be designed by external diameter.

Fittings

Fittings shall be of the same make as that of pipes, injection moulded and shall conform to Indian Standard.

Laying in Trenches

UPVC pipes shall be laid on cement concrete bed of width 300mm over the outside diameter of pipe, and 100 mm thickness. Fine sand shall be carefully filled around the lower half of the pipes so as to buttress them to the sides of the trench.

The filling shall then be continued to 150mm over the top of the pipe using fine sand, watered and rammed on both sides of the pipes. The process of filling and ramming with fine hand-picked material shall proceed evenly in layers not exceeding 150mm thickness, each layer being watered and consolidated so as to maintain an equal pressure on both sides of the pipe line.

4. CONSTRUCTION OF MANHOLE



Where manholes are to be constructed, the excavation, filling back and ramming, disposal of surplus earth, preparation of bottom and sides etc. shall be carried out as described earlier under trench excavation. Manhole shall be sized and depths as called for in the drawings and Bill of Quantities.

The manhole shall be built on a base concrete 1:3:6 of 150mm thickness for manholes up to 1500mm depth and 250mm thickness for manholes from 1500 to 2500mm depth and 300mm thickness manholes of depth greater than 2500mm. Reinforcement as shown shall be provided in the base slabs.

The walls shall be of brick work of thickness as shown in drawings built in cement mortar 1:5. The joints of brick work shall be raked and plastered internally in cement mortar 1:3 (at least 12 mm thick) and finish with a coat of neat cement, external plaster shall be rough plaster in 1:3, PCC benching & semicircular channels of the same diameter as the pipes shall be provided and finished with neat cement coating.

Above the horizontal diameter, the sides of channel shall be extended vertically to the same level as the crown of the outgoing pipe and the top edge shall be suitably rounded off. The branch channels shall also be similarly constructed with respect to the benching but at their junction with the main channel an appropriate fall suitably rounded off in the direction of flow in the main channel shall be given. All manholes / sumps shall be provided with poly propylene coated steel reinforced foot rest. The polypropylene shall conform to ASTM D-4101 specification, injection moulded around 12 mm dia. IS-1786 grade FE-415 steel reinforcing bar. These rungs shall be set at 30cms interval in two vertical runs at 380mm apart horizontally. The top rung shall be 450mm below the manhole cover. Unless otherwise mentioned, manholes shall be constructed to the requirements of Indian Standard IS:4111 (Part I). All manholes shall be constructed so as to be water tight under test. All angles shall be rounded to a 75mm radius with cement plaster 20mm thick. The benching at the side shall be carried out in such a manner so as to provide no lodgment for any splashing in case of accidental flooding. Manhole cover with frame shall be of cast iron of an approved make. The covers and frame shall generally be double seal as specified in the Bill of Quantities.

4.1 Measurements

Manhole shall be measured in numbers as indicated in the Bill of Quantity. The depth of manhole shall be measured from invert of channel to the top of manhole cover.

Manhole with depth greater than specified under the main item shall be paid for under 'Extra Depth' and shall include all items as given for manholes depth will be measured to the nearest cm. Depth of the manholes shall be measured from top of the manhole cover to bottom of channel. The following are inclusive in the cost of manhole viz;

- i. Bed concrete
- ii. Brick work.



- iii. Plastering (inside & outside)
- iv. R C C top slab, benching and channeling including drop connections.
- v. Supply and fix foot rests.
- vi. Keeping holes and embedding pipes for all the connections.
- vii. Excavation, refilling, necessary de-watering and disposing off surplus soil to a places as directed by Project Manager.
- viii. Curing.
- ix. Cost of angle frame and embedding the frame in concrete bed.
- x. Testing.
- xi. De-watering of chambers.

4.2. Drop Connection

Drop connection shall be provided between branch sewer and main sewer in the main sewer itself in steep ground when the difference in invert level of two exceeds 60 cms. of the required sizes. Drop connections from gully traps to main sewer in rectangular shall be made inside the manholes and shall have CI special types door bend on to top and heel rest bend at bottom connected by a CI pipe. The pipe shall be supported by holder bat clamps at 180 cms. intervals with at least one clamp for each drop connection. All joints shall be lead caulked joints 25mm deep.

Drop connections from branch sewer to main sewer shall be made outside the manhole wall with CI / CI class LA pipe, connection, vertical pipe and bend at the bottoms. The top of the tee shall be finished up to the surface level and provided with a CI hinges type frame and cover 30cms x 30cms. The connection and tee up to the surface chamber of the tee.

Drop connection made from vertical stacks directly into manholes shall not be considered as drop connections.

Road Gully chambers

The chamber shall be of brick masonry with Bricks of class designation 75 in cement mortar 1:5 (1 cement : 5 coarse sand) and shall have a PCC/SFRC/D.I gully grating with frame fixed in 150mm thick cement concrete 1: 2 :4 (1 cement : 2 coarse sand : 4 hard stone ballast 20mm nominal size) on top. The size of the chamber shall be taken as the clear internal dimension as specified in the schedule of quantities. The brick walls on the top of the bed concrete 1:4:8 (1 cement : 4 coarse sand :8 hard stone ballast 40 mm and down gauge) of the chamber shall be plastered with 12mm thick cement plaster 1:3 (1 cement : 3 coarse sand) internally and externally and finished with a floating coat of neat cement . The excavation shall be done true to dimension and level shown in the drawing.

Masonry Drains



Brick masonry drains shall be of a minimum width of 30cms for depth up to 45cm and a maximum width of drains shall be 45cms for depths beyond 45cms. However, in special cases where the depth is very high, the width of drain shall be in proportion of 1:5 with the depth. Brick masonry drains shall be constructed in brick masonry in cement mortar 1:5 in cement concrete foundations as specified in the schedule of quantities. Where ever specified, masonry drains shall be plastered with cement mortar inside. The outer surface shall be flush pointed without additional charge.

All brick masonry covered drains shall be provided with Cast Iron perforated cover with frame or cast in situ or precast RCC slabs as specified in drawings. All drains shall be plastered with cement mortar 1:4, 12mm thick with a coat of neat cement. All finished work shall afford specified gradient to ensure free and efficient discharge.

Payment for masonry drains shall be made under individual items of masonry, cement concrete and plaster by volume of area as given in the drawings and schedule of quantities.

4.3 Making Connections

Contractor shall connect the new sewer line to the existing manhole by cutting the walls benching and restoring them to the original condition. A new channel shall be cut in the benching of the existing manhole for the new connection. Contractor shall remove all sewage and water if encountered in making the connection without additional cost.

SECTION – 05 : COMMISSIONING & GUARANTEE

1. SCOPE OF WORK

Work under this section shall be executed without any additional cost. The rates quoted in this tender shall be inclusive of the works given in this section.

Contractor shall provide all tools, equipment, metering and testing devices required for the purpose.

On award of work, Contractor shall submit a detailed proposal giving methods of testing and gauging the performance of the equipment to be supplied and installed under this contract.

All tests shall be made in the presence of the Architect or his representative or any inspecting authority. At least five working days' notice in writing shall be given to the inspecting parties before performing any test.



Water flow rates of all equipment and in pipe lines through valves shall be adjusted to design conditions. Complete results of adjustments shall be recorded and submitted.

Contractor shall ensure proper balancing of the hydraulic system and for the pipes / valves installed in his scope of work by regulating the flow rates in the pipe line by valve operation. The contractor shall also provide permanent Tee connection (with plug) in water supply lines for ease of installing pressure gauge, temperature gauge & rota meters. Contractor shall also supply all required pressure gauge, temperature gauge & rotameter for system commissioning and balancing. The balancing shall be to the satisfaction of Consultant / Project Manager.

Three copies of all test results shall be submitted to the Engineer in A4 size sheet paper within two weeks after completion of the tests.

2. PRECOMMISSIONING

On completion of the installation of all pumps, piping, valves, pipe connections, insulation etc. the Contractor shall proceed as follows:

- a. Prior to start-up and hydraulic testing, the Contractor shall clean the entire installation including all fittings and pipe work and the like after installation and keep them in a new condition. All pumping systems shall be flushed and drained at least once through to get rid of contaminating materials. All pipes shall be rodded to ensure clearance of debris, cleaning and flushing shall be carried out in sections as the installation becomes completed.
- b. All strainers shall be inspected and cleaned out or replaced.
- c. When the entire systems are reasonably clean, a pre-treatment chemical shall be introduced and circulated for at least 8 hours. Warning signs shall be provided at all outlets during pre-treatment. The pre-treatment chemical shall:
 - Remove oil, grease and foreign residue from the pipe work and fittings;
 - Pre-condition the metal surfaces to resist reaction with water or air.
 - Establish an initial protective film;
 - After pre-treatment, the system shall be drained and refilled with fresh water and left until the system is put into operation.
 - Details and procedures of the pre-treatment shall be submitted to the Architect for approval.
- d. Check all clamps, supports and hangers provided for the pipes.



- e. Check all the equipment, piping and valves coming under hot water system and operate each and every valve on the system to see if the valves are functioning properly. Thereafter conduct & hydro test of the system as for (b) above.
- f. Fill up pipes with water and apply hydrostatic pressure to the system as given in the relevant section of the specification. If any leakage is found, rectify the same and retest the pipes.

3. STATUTORY AUTHORITIES' TESTS AND INSPECTIONS

As and when notified in writing or instructed by the Architect, the Contractor shall submit shop drawing and attend all tests and inspections carried out by Local Fire Authorities, Water Authority and other Statutory Authorities, and shall forthwith execute free of charge any rectification work ordered by the Architect as a result of such tests and inspections where these indicate non-compliance with Statutory Regulations. Some of these tests may take place after the issue of Practical Completion of the Main Contract and the Contractor shall make all allowances in this respect.

The Contractor shall be responsible for the submission of all necessary forms and shop drawings to the Statutory Authorities which shall conform in layout to the latest architectural plans submitted to and kept by these Authorities.

The submission shall comply with the requirements set forth in the current Codes of Practice and circular letters of the Statutory Authorities. The shop drawings to be submitted shall be forwarded to the Architect for checking before submission.

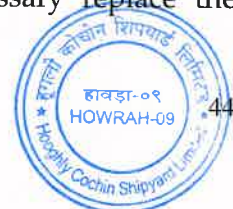
The Contractor shall allow for at least two submissions of complete sets of shop drawings to the Authorities, one to be made within six months after the award of the Contract but not less than six weeks before the inspection. The Architect may at his discretion instruct the Contractor for additional submissions to the Local Authorities whenever necessary.

The Contractor shall notify the Architect at least seven days in advance of his application for local Authority tests and inspections. On receipt of a confirmed date for test and inspection the Contractor shall inform the Architect without delay.

4. FINAL ACCEPTANCE TESTS

Following commissioning and inspection of the entire installation, and prior to issue of the Completion Certificate, the Contractor shall carry out final acceptance tests in accordance with a programme to be agreed with the Architect.

Should the results of the acceptance tests show that plant, systems and/or equipment fail to perform to the efficiencies or other performance figures as given in this Specification, the Contractor shall adjust, modify and if necessary replace the



equipment without further payment in order that the required performance is obtained.

Where acceptance tests are required by the relevant Authorities having jurisdiction, these tests shall be carried out by the Contractor prior to the issue of Completion Certificate to the acceptance of the Authorities.

5. REJECTION OF INSTALLATION / PLANT

Any item of plant or system or component which fails to comply with the requirements of this Specification in any respect whatsoever at any stage of manufacture, test, erection or on completion at site may be rejected by the Architect either in whole or in part as he considers necessary/appropriate. Adjustment and/or modification work as required by the Architect so as to comply with the Authority's requirements and the intent of the Specification shall be carried out by the Contractor at his own expense and to the satisfaction of the Authority/Architect.

After works have been accepted, the Contractor may be required to carry out assist in carrying out additional performance tests as reasonably required by the Architect/Employer.

6. WARRANTY AND HANDOVER

The Contractor shall warrant that all plant, materials and equipment supplied and all workmanship performed by him to be free from defects of whatsoever nature before handover to the Owner.

7. HANDING OVER OF DOCUMENTS

All testing and commissioning shall be done by the Contractor to the entire satisfaction of the Owner's site representative and all testing and commissioning documents shall be handed over to the Owner's site representative.

The Contractor shall also hand over all maintenance and operation manuals, all certificates and all other documentation as per the terms of the contract to the Owner's site representative

8. PIPE COLOUR CODE:

Note: All colours and code refer to Synthetic Enamel colours. The painting shall be with synthetic enamel paint unless otherwise specified.

8.1 IDENTIFICATION

The system of colour coding shall consist of a ground colour and colour bands superimposed on it.

8.1.1 Ground Colours



The ground colour shall identifies the basic nature of the fluid carried (see Fig.1) and also distinguishes one fluid from another. The various ground colours are indicated in Table above.

- 8.1.2 Ground colour shall be applied throughout the entire length for un-insulated pipes, for insulated pipes, on the metal cladding or on the pipes of material such as non-ferrous metals, austenitic stainless steel, plastic, etc., ground colour coating of minimum 2m length or of adequate length, not to be mistaken as colour band, shall be applied.

S.No	Services/Equipments	Ground Colour	First Colour Band	Second Colour Band	Band	
					Width (mm)	Spacing (mm)
A.	WATER					
2.	Municipal Raw water	Sea Green	-	-	-	-
3.	Treated Domestic water	Sea Green	Light Orange	-	25	1500
4.	Drinking water	Sea Green	French blue	Signal Red	25	1500
5.	Cold water downtakes from Overhead storage tanks	Sea Green	French blue	Canary Yellow	25	1500
6.	Domestic Hot water from localised heaters	Sea Green	Light Grey	-	25	1500
7.	Centralised heating below 60°C	Sea Green	Canary Yellow	-	25	1500
9.	Recycled treated water for Flushing	Sea Green	Light Brown	-	25	1500
B.	DRAINAGE					
1.	Soil	Black	-	-	-	-
2.	Waste	Black	White	-	25	1500
3.	Vent	Black	White	-	25	1500
4.	Rain water	Black	-	-	25	1500
D.	Equipments and others					
1.	Pumps and Motors	Canary Yellow	-	-	-	-
2.	Pipe supports	Black or as	-	-	-	-



		directed				
3.	Electric panels	Steel Grey	-	-	-	-

8.2 Colour Bands

Colour bands shall be superimposed on the ground colour.

Wherever the ground colour is not applied throughout the entire length, it shall be applied near valves, junctions, joints, service appliances, bulkheads, walls, etc. (see Fig. 3)

They shall be superimposed on ground colour at the following location:

- At battery limit points;
- Intersection points and change of direction points in piping ways;
- Other points such as midway of each piping way, near valves, junction joints of service appliances, walls, on either side of pipe culverts;
- For long stretch yard piping at 50m interval; and
- At start and terminating points.

The relative proportional widths of the first colour band to the subsequent bands shall be 4:1

Minimum width of colour band shall confirm to the following Table;

Nominal Pipe Size	Width L (mm)
80 NB and below	25
Over 100 NB upto 150 NB	50
Over 200 NB upto 300 NB	75
Over 350 NB	100

For insulated pipes nominal pipe size means the outside diameter of insulation.

Valves shall be painted with the same colour as the main pipelines except when the pipeline has been provided with the safety colour, the valves shall be painted red, for firefighting; yellow, with black diagonal stripes, for warning of danger; and French blue in conjunction with the green basic colour, to denote pipes carrying fresh water, either potable or non-potable.

9 CHECKLIST FOR COMMISSIONING

Water Supply, Drainage



- a) Operate each and every valve on the system to see if the valves are functioning properly.
- b) Check all clamps, support and hangers provided for the pipes.
- c) Check rotation of each motor and correct the same if required.
- d) All the pumps shall run continuously for one hour. Record the pressure and motor current and voltage readings.
- e) Check all annunciations by simulating the alarm conditions if any at site.
- f) Remove grease trap manhole covers. Check for cleanliness, check for partitions, and put back the cover.
- g) Remove manhole covers on sewer lines, inspect for cleanliness. After they are found to be clean, pour water into the first manhole and see that all the lines are clear. Make sure that all the covers are put back after the inspection.
- h) Check gully traps by opening of covers and check that water seal in the traps are maintained. Check for general cleanliness.
- i) Check installation of proper vents and cowls at the roof level for all soil and waste pipes.

(Similar Readings shall be taken for all other pumps)

- 10 Simulate low level in the domestic water tanks to trip domestic Filter Feed Pumps. Simulate high level in treated water tanks to trip softener feed pumps. Simulate low level in treated water tanks to trip treated water hydro-pneumatic pumps.

APPENDIX – A :: LIST OF STANDARDS

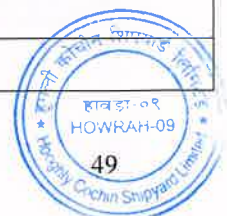
LIST OF BUREAU OF INDIAN STANDARDS AND OTHER INTERNATIONAL CODES

All equipment, supply, erection, testing and commissioning shall comply with the requirements of Indian Standards and code of practices given below as amended up to latest date. All equipment and material being supplied by the contractor shall meet the requirements of IS and other specified.

Tariff advisory committee's regulation (fire insurance), electrical inspectorate and Indian Electricity rules and other Codes / Publications as given below:

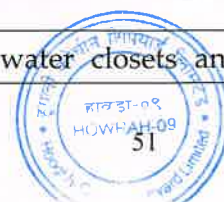


S.No	Description / Ref	Specification
1.	<u>Pipes and Fittings</u>	
	IS : 458	Specification for precast concrete pipes (with and without reinforcement)
	IS : 651	Salat glazed stone ware pipes and fittings.
	IS : 1239 (Part 1)	Mild steel, tubes, tubulars and other wrought steel fittings : Part 1 Mild Steel tubes.
	IS : 1239 (Part 2)	Mild Steel tubes, tubulars and other wrought steel fittings : Part 2 Mild Steel tubulars and other wrought steel pipe fittings.
	IS : 1536	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage.
	IS : 1537	Vertically cast iron pressure pipes for water, gas and sewage.
	IS : 1538	Cast Iron fittings for pressure pipes for water, gas and sewage.
	IS : 1729	Sand Cast iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.
	IS : 1879	Malleable cast iron pipe fittings.
	IS : 1978	Line pipe
	IS : 1979	High test line pipe.
	IS : 2501	Copper tubes for general engineering purposes
	IS : 2643 (Part 1)	Dimensions for pipe threads for fasterning purposes : Part 1 Basic profile and dimensions.
	IS : 2643 (Part 2)	Dimensions for pipe threads for fastening purposes : Part 2 Tolerances.
	IS : 2643 (Part 3)	Dimensions for pipe threads for fastening purposes : Part 3 Limits of sizes.
	IS : 3468	Pipe nuts.
	IS : 3589	Seamless or electrically welded steel pipes for water, gas and sewage (168.3 mm to 2032 mm outside diameter).
	IS : 3989	Centrifugally cast (sun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.
	IS : 4346	Specifications for washers for use with fittings for water services.
	IS : 4711	Methods for sampling steel pipes, tubes and fittings.
	IS : 6392	Steel pipe flanges
	IS : 6418	Cast iron and malleable cast iron flanges for general engineering purposes.
	IS : 7181	Specification for horizontally cast iron double flanged pipe for water, gas and sewage.
	IS:782	Specification for caulking lead (3 rd rev.)

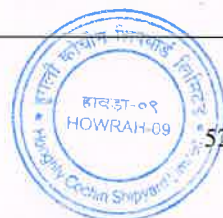


S.No	Description / Ref	Specification
	IS:6163	Cast Iron Low Pressure Pipes
	IS:13592	PVC Pipes
	IS:4989	HDPE Pipes for Potable water supply, Sewage and Ind. Effluent
	I.S:985	UPVC Pipes for Potable water supply
	IS:110221	Code of Practise for coating and wrapping of U.G M.S Pipelines
	IS:3114	Code of Practise for laying C.I Pipes (2 nd rev.) (Amendment 2)
2.	<u>Valves</u>	
	IS : 778	Specification for copper alloy gage, globe and check valves for water works purposes.
	IS : 780	Specification for sluice valves for water works purposes (50 mm to 300 mm size).
	IS : 1703	Specification copper alloy float valves (horizontal plunger type) for water supply fittings.
	IS : 2906	Specification for sluice valves for water works purposes (350 mm to 1200 mm size)
	IS : 3950	Specification for surface boxes for sluice valves.
	IS : 5312 (Part 1)	Specification for swing check type reflux (non return) valves : part 2 Multi door pattern.
	IS : 5312 (Part 2)	Specification for swing check type reflux (non return) valves : part 2 Multi door pattern.
	IS : 12992 (Part 1)	Safety relief valves, spring loaded : Design
	IS : 13095	Butterfly valves for general purposes.
3.	<u>Sanitary Fittings</u>	
	IS : 771 (Part 1 to 3)	Specification for glazed fire clay sanitary appliances.
	IS : 774	Specification for flushing cistern for water closets and urinals (other than plastic cistern)
	IS : 775	Specification for cast iron brackets and supports for wash basins and sinks
	IS : 781	Specification for cast copper alloy screw down bib taps and stop valves for water services.
	IS : 1700	Specification for drinking fountains.
	IS : 2548 (Part 2)	Specification for plastic seats and covers for water closets : Part 1 Thermoset seats and covers.
	IS : 2556 (Part 1)	Specification for vitreous sanitary appliances (Vitreous china) : Part 1 General requirement.
	IS : 2556 (Part 2)	Specification for vitreous sanitary appliances (vitreous china) : Part 2 Specific requirements of wash-down water closets.

S.No	Description / Ref	Specification
	IS : 2556 (Part 3)	Specification for vitreous sanitary appliances (vitreous china) : Part 3 Specific requirements of squatting pans.
	IS : 2556 (Part 4)	Specification for vitreous sanitary appliances (vitreous china) : part 4 specific requirements of wash basins.
	IS : 2556 (Part 6 Sec 2)	Specification for vitreous sanitary appliances (vitreous china) : part 6 Specific requirements of urinals, section 2 half stall urinals.
	IS : 2556 (Part 6 Sec 4)	Specification for vitreous sanitary appliances (vitreous china) : Part 6 specific requirements of urinals, section 4 partition slabs.
	IS : 2556 (Part 6 Sec 5)	Specification for vitreous sanitary appliances (vitreous china) : Part 6 Specific requirements of urinals, section 5 waste fittings.
	IS : 2556 (Part 6 Sec 6)	Specification for vitreous sanitary appliances (vitreous china) : Part 6 Specific requirements of urinals, section 6 water spreaders for half stall urinals.
	IS : 2556 (Part 7)	Specification for vitreous sanitary appliances (vitreous china) : Part 7 Specific requirements of half round channels.
	IS : 2556 (Part 8)	Specification for vitreous sanitary appliances (vitreous china) : Part 8 Specific requirements of siphoning wash down water closets.
	IS : 2556 (Part 11)	Specification for vitreous sanitary appliances (vitreous china):Part 11 Specific requirements for shower rose.
	IS : 2556 (Part 12)	Specification for vitreous sanitary appliances (vitreous china) : Part 12 Specific requirements of floor traps.
	IS : 2556 (Part 15)	Specification for vitreous sanitary appliances (vitreous china) : Part 15 Specific requirements of universal water closets.
	IS : 2692	Specification for ferrule for water services
	IS : 2717	Glossary of terms relating to vitreous enamelware and ceramic metal systems
	IS : 2963	Specifications for waste plug and its accessories for sinks and wash basins.
	IS : 3311	Specification for waste plug and its accessories for sinks and wash basins.
	IS : 5961	Specification for cast iron gratings for drainage purposes.
	IS : 6249	Specification for gel-coated glass fiber reinforced polyester resin bath tubs.
	IS : 6411	Specification for gel-coated glass fiber reinforced polyester resin bath tubes.
	IS : 8931	Specification for copper alloy fancy single taps, combination tap assembly and stop valves for water services.
	IS : 9758	Specification for flush valves and fitting for water closets and



S.No	Description / Ref	Specification
		urinals.
4	<u>Water Quality Tolerance and latest local authority requirements</u>	
	IS : 3025 (Parts 1 to 44)	Method of sampling and test (physical and chemical) for water and waste water.
	IS : 4764	Tolerance limits for sewage effluents discharged into inland surface waters.
	IS : 10500	Drinking Water
5.	<u>Pumps & Vessels</u>	
	IS : 1520	Specification for horizontal centrifugal pumps for clear cold fresh water.
	IS : 2002	Steel plates for pressure vessels for intermediate and high temperature service including boilers.
	IS : 2825	Code for unfired pressure vessels.
	IS : 4648 (Part 1)	Code of practice for lining of vessels and equipment for chemical processes Part 1 : Rubber lining.
	IS : 5600	Specification for sewage and drainage pumps
	IS : 8034	Specification for submersible pump sets for clear, cold, fresh water.
	IS : 8418	Specification for horizontal centrifugal self-priming pumps.
6.	<u>General</u>	
	National Building Code of Indian 2005 Part IV and Part IX	
	Uniform Plumbing Code of Indian 2008	
	SP : 6 (1)	Structural Steel Sections
	IS : 325	Three Phase Induction Motors
	IS: 456	Code of practice for plain and reinforced concrete (3 rd rev.) (Amendment 2)
	IS : 554	Dimensions for pipe threads where pressure tight joints are required on the threads.
	IS : 694	PVC insulated cables for working voltages upto & including 1100 V.
	IS : 779	Specification for water meters (domestic type).
	IS : 782	Specification for caulking load.
	IS : 800	Code of practice for general construction in steel
	IS : 1068	Electroplated coatings of nickel plus chromium and copper plus nickel plus chromium.
	IS : 1172	Code of Basic requirements for water supply drainage and sanitation



S.No	Description / Ref	Specification
	IS : 1367 (Part 1)	Technical supply conditions for threaded steel fasteners : Part 1 introduction and general information.
	IS : 1367 (Part 2)	Technical supply conditions for threaded steel fasteners : Part 2 product grades and tolerances.
	IS : 1554 (Part 1)	PVC insulated (heavy duty) electric cables : Part 1 for working voltages upto and including 1100 V.
	IS : 1554 (Part 2)	PVC insulated (heavy duty) electric cables : Part 2 for working voltages from 3.3 KV upto and including 11 KV.
	IS : 1726	Specification for cast iron manhole covers and frames.
	IS : 1742	Code of practice for building drainage.
	IS : 2064	Selection, installation and maintenance of sanitary appliance code of practice.
	IS : 2065	Code of practice for water supply in buildings.
	IS : 2104	Specification for water meter for boxes (domestic type)
	IS : 2373	Specification for water meter (bulk type)
	IS : 2379	Colour code for identification of pipe lines.
	IS : 2527	Code of practice for fixing rainwater gutters and down pipes for roof drainage.
	IS : 2629	Recommended practice for hot dip galvanizing on iron and Steel.
	IS : 3114	Code of practice for laying of cast iron pipes
	IS : 4111 (Part 1)	Code of practice for ancillary structures in sewerage system : Part 1 manholes.
	IS : 4127	Code of practice for laying glazed stoneware pipes.
	IS : 4853	Recommended practice for radiographic inspection of fusion welded butt joints in steel pipes.
	IS : 5329	Code of practice for sanitary pipe work above ground for buildings.
	IS : 5455	Cast iron steps for manholes.
	IS : 6159	Recommended practice for design and fabrication of material, prior to galvanizing.
	IS : 7558	Code of practice for domestic hot water installations.
	IS : 8321	Glossary of terms applicable to plumbing work.
	IS : 8419 (Part 1)	Requirements for water filtration equipment : Part 1 Filtration medium sand and gravel.
	IS : 8419 (Part 2)	Requirements for water filtration equipment : Part 2 under drainage system.
	IS : 9668	Code of practice for provision and maintenance of water supplies and fire fighting.

S.No	Description / Ref	Specification
	IS : 9842	Preformed fibrous pipe insulation.
	IS : 9912	Coal tar based coating materials and suitable primers for protecting iron and steel pipe lines.
	IS : 10221	Code of practice for coating and wrapping of underground mild steel pipelines.
	IS : 10446	Glossary of terms relating to water supply and sanitation.
	IS : 11149	Rubber Gaskets
	IS : 11790	Code of practice for preparation of butt-welding ends for pipes, valves, flanges and fittings.
	IS : 12183 (Part 1)	Code of practice for plumbing in multistoried buildings : Part 1 water supply.
	IS : 12251	Code of practice for drainage of building basements.
	IS : 5572	Code of practice for sanitary pipe work.
	BS : 6700	Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their cartilages.
	BS : 8301	Code of practice for building drainage.
	BSEN : 274	Sanitary tap were, waste fittings for basins, bidets and baths. General technical specifications.



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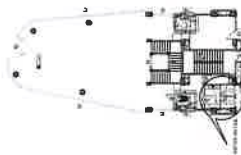
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PRINTS

REVISIONS

NOTES

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DRAWINGS GIVEN BY CLIENT
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ANY ARE TO BE BROUGHT TO THE NOTICE
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PROJECT

CLIENT
BOCHIN SHIPYARD LIMITED
WINTCPWC - IIT/National Technology

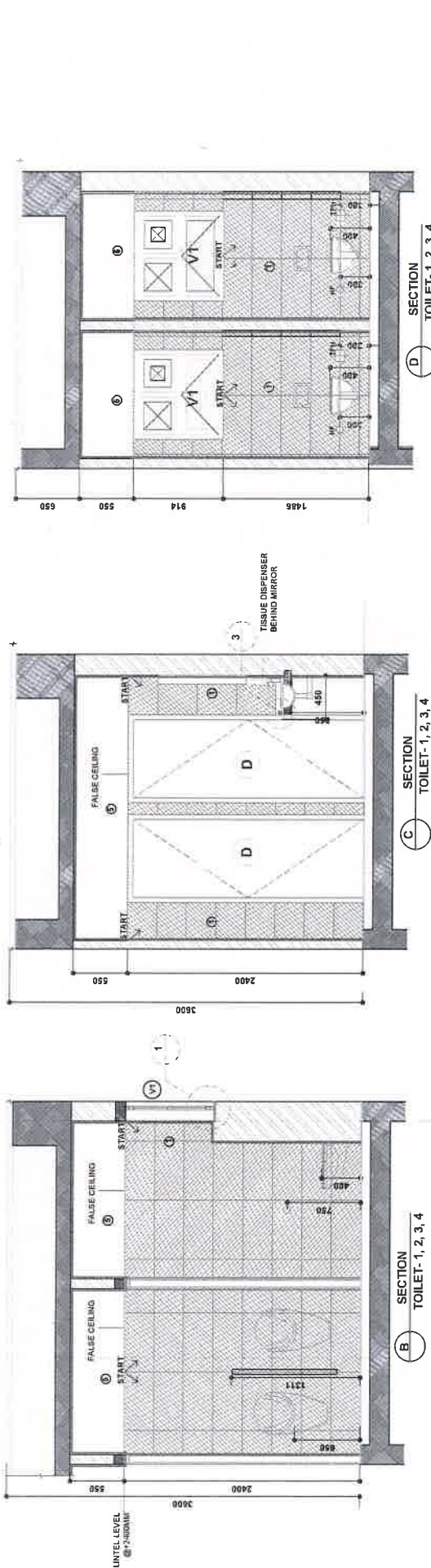
STRUCTURAL CONSULTANTS
AA Engineering Consultant

DRAWING TITLE
TOILET DETAILS - 1.2.3.4

DATE	SCALE	DRAWN BY
03/11/2025	A2-1/32	MONITHA
PROJECT NO.	DRAWING NO.	REV. NO.


 CHECKED BY
 Dr. Kanya Kamesh
 APPROVED BY

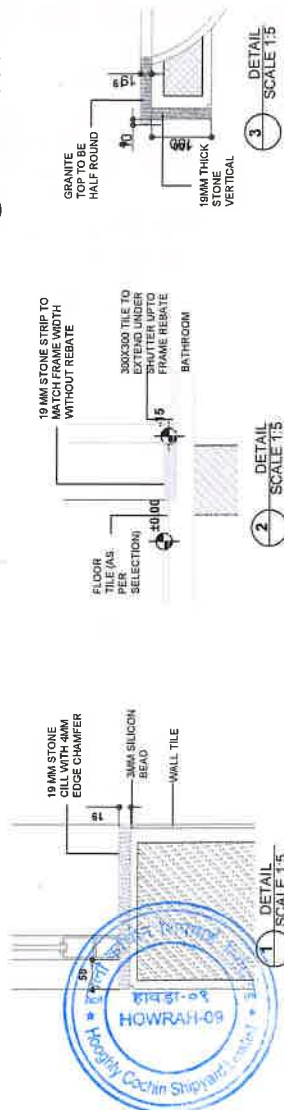
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SCHEDULE OF OPENINGS				
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL
D'	750	2400	F.F.L	2400
V1	914	914	1486	2400

	ITEM	DESCRIPTION
1	WALL TILE	600X 300 MM (Ceramic tile)
2	GRANITE TOP	AS PER SELECTION
3	FLOOR TILE	300X 300 MM (Matt finish, Anti Skid tile)
4	STONE	19MM THK. (as per selection)
5	WALL FINISH	OPB ABOVE 2100 HIGH

NOTE: **SANITARY FITTINGS AS PER
ARCH SELECTION**



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DOCUMENT CONTROL STATUS

Schematic layout

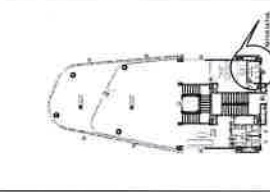
PRINTS

REVISIONS

NOTES

- 1 ALL DIMENSIONS ARE IN MM
- 2 ALL DIMENSIONS ARE TO FACE UNLESS OTHERWISE SPECIFIED
- 3 DRAWINGS TO BE READ & NOT SCALED
- 4 THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE GENERAL NOTES
- 5 IF ANY ARE TO BE BROUGHT TO THE NOTICE OF THE ARCHITECT FROM

KEY PLAN



PROJECT

SHIP REPAIRING FACILITY AT
PANDU, GUWAHATI (ASSAM)

CLIENT
COCHIN SHIPYARD LIMITED
INTCPWC - ITI National Technology
Center for Ports, Waterways and Coastal

STRUCTURAL CONSULTANT
AAA Engineering Consultant
100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

DRAWING TITLE

TOILET DETAILS - FIRST
FLOOR

DATE

18/11/2023

SCALE

AS - 1:50

PROJECT NO.

KNOWLEDGE

CHECKED BY

18/11/2023

PROJECT NO.

KNOWLEDGE

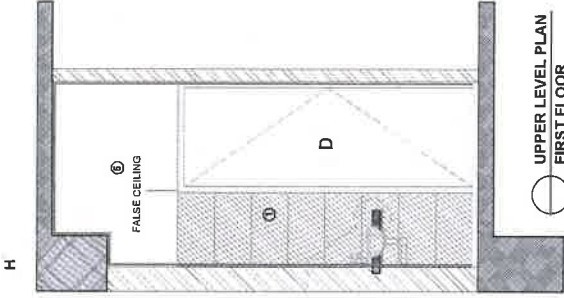
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18/11/2023

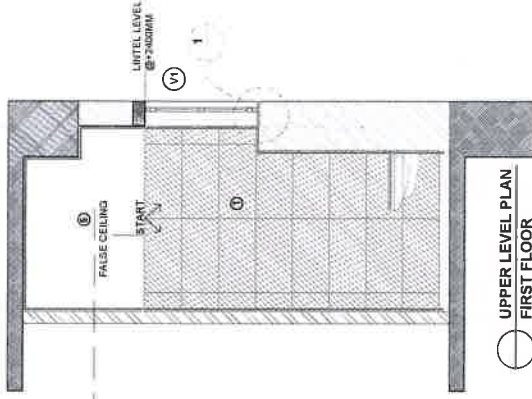
PROJECT NO.

KNOWLEDGE

NOTE:
SANITARY FITTINGS AS PER
ARCH SELECTION



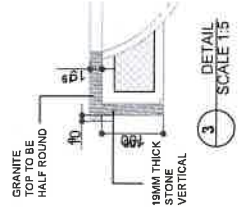
UPPER LEVEL PLAN
FIRST FLOOR



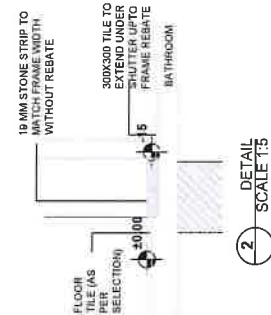
UPPER LEVEL PLAN
FIRST FLOOR

SCHEDULE OF OPENINGS				
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL
1	750	2400	F.F.L	2400
2	914	914	1486	2400

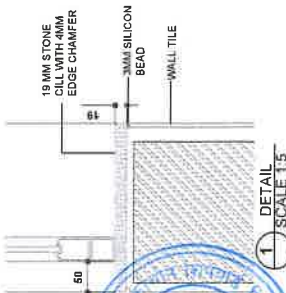
ITEM	DESCRIPTION
1	WALL TILE 600X 300 MM (Ceramic tile)
2	GRANITE TOP AS PER SELECTION
3	FLOOR TILE 300X 300 MM (Mat finish, Anti Skid tile)
4	STONE 19MM THK (as per selection)
5	WALL FINISH OBD ABOVE 2100 HIGH



DETAIL 1
SCALE 1:5



DETAIL 2
SCALE 1:5



DETAIL 3
SCALE 1:5



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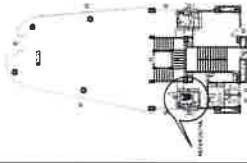
Schematic layout

PRINTS

REVISIONS

NOTES

1. ALL DIMENSIONS ARE IN MM
2. ALL LEVELS GIVEN WRT 1.5M SURVEY
3. DRAWINGS TO BE READ & NOT SCALED
4. ANY CHANGES TO BE MADE IN CONSULTATION WITH THE ARCHITECT
5. ANY ARE TO BE BROUGHT TO THE NOTICE OF THE ARCHITECT PRIOR



KEY PLAN

PROJECT

SHIP REPAIRING FACILITY AT
PANDU GUWAHATI (ASSAM)

CLIENT

COCHIN SHIPYARD LIMITED
(IN CPWC - ITI National Technology
Center for Paris, Waterways and Coast

STRUCTURAL CONSULTANT

AAA Engineering Consultant
10/10, 1st Floor, B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10, B-11, B-12, B-13, B-14, B-15, B-16, B-17, B-18, B-19, B-20, B-21, B-22, B-23, B-24, B-25, B-26, B-27, B-28, B-29, B-30, B-31, B-32, B-33, B-34, B-35, B-36, B-37, B-38, B-39, B-40, B-41, B-42, B-43, B-44, B-45, B-46, B-47, B-48, B-49, B-50, B-51, B-52, B-53, B-54, B-55, B-56, B-57, B-58, B-59, B-60, B-61, B-62, B-63, B-64, B-65, B-66, B-67, B-68, B-69, B-70, B-71, B-72, B-73, B-74, B-75, B-76, B-77, B-78, B-79, B-80, B-81, B-82, B-83, B-84, B-85, B-86, B-87, B-88, B-89, B-90, B-91, B-92, B-93, B-94, B-95, B-96, B-97, B-98, B-99, B-100, B-101, B-102, B-103, B-104, B-105, B-106, B-107, B-108, B-109, B-110, B-111, B-112, B-113, B-114, B-115, B-116, B-117, B-118, B-119, B-120, B-121, B-122, B-123, B-124, B-125, B-126, B-127, B-128, B-129, B-130, B-131, B-132, B-133, B-134, B-135, B-136, B-137, B-138, B-139, B-140, B-141, B-142, B-143, B-144, B-145, B-146, B-147, B-148, B-149, B-150, B-151, B-152, B-153, B-154, B-155, 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COCHIN SHIPYARD LIMITED
VTCPWC - IIT)National Technology

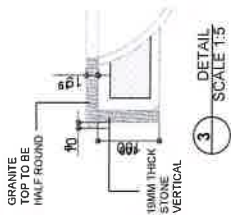
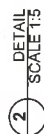
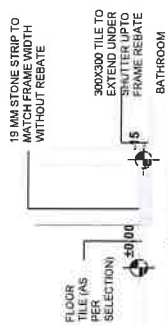
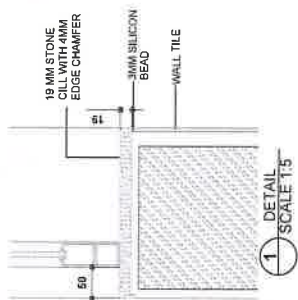
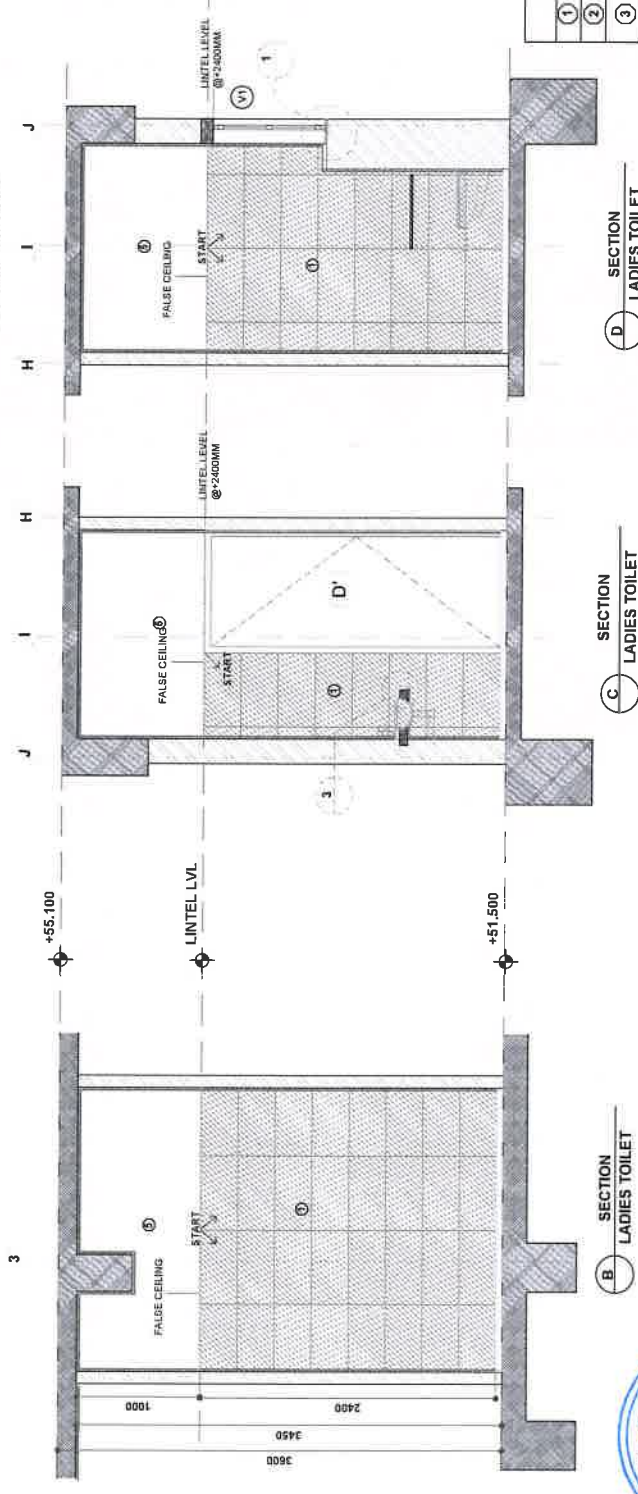
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South India, Bangalore 560027. Email: aaeng@rediffmail.com, aaeng@yahoo.com
in 560027, Bangalore, India.

TOILET DETAILS -LADIES
TOILET

DATE	SCALE	DRAWN BY
11 JUL 65	A2-130	MONITHA
PROJECT NO.	DRAWING NO.	REV NO.
SSS-1200-4-300	W-117	B2



Tel: 01 354 274 0026
 Fax: 01 354 274 0027
 Email: info@hospitals.ie
 Website: www.hospitals.ie
 100, 101 & 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 8



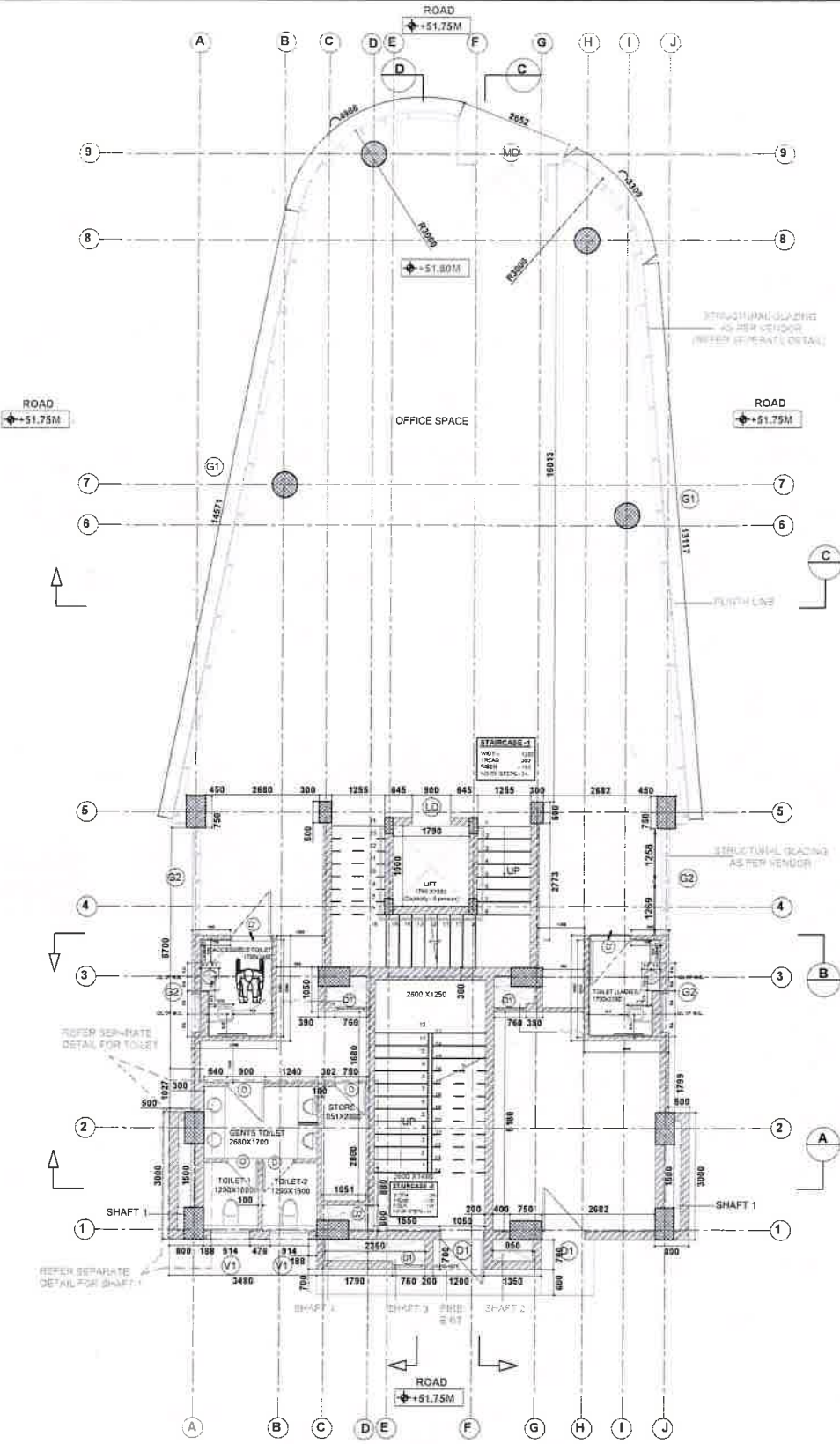
ITEM	DESCRIPTION
①	WALL TILE
②	GRANITE TOP
③	FLOOR TILE
④	STONE
⑤	WALL FINISH

SCHEDULE OF OPENINGS				
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL
D'	750	2400	F.F.L	2400
V1	914	914	1485	2400

NOTE:

- SANITARY FITTINGS AS PER ARCH SELECTION





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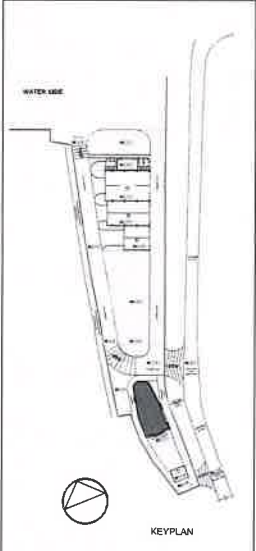
Schematic layout

PRINTS

REVISIONS

NOTES

1. ALL DIMENSIONS ARE IN MM.
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PROJECT

SHIP REPAIRING FACILITY AT PANDU, GUWAHATI (ASSAM)

CLIENT

COCHIN SHIPYARD LIMITED (NTPWC - IIT) National Technology Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT

AAA Engineering Consultant
Head Office: 104 D Nehru Road, Melsapalayam, Tirunelveli-627024
Branch Office: Door No-7, First Floor, Flat-D, Jayashree Apts, MGR Street, Ashok Nagar, Chennai-33
Ph: 04488122123, Email: aasec@aaaengg.com, project@aaaengg.com

DRAWING TITLE

ADMIN BLOCK -
GROUND FLOOR PLAN @ 51.8M LVL

DATE 12.10.2023 **SCALE** A2 - 1/75 **DRAWN BY** Ar. Lakshmi Kanth

PROJECT NO. 325-SRF Guwahati **DRAWING NO.** W-110 **REV NO.** -

CHECKED BY Ar. Kavya Ramani
APPROVED BY Ar. Jeganath J. Balakrishnan

JEGANATH JB ARCHITECTS
Contact: 91-9440570028
Email: jeganathjb@gmail.com
Web: www.jeganathjbarchitects.com
Address: 104 D Nehru Road, Melsapalayam, Tirunelveli, Tamil Nadu, India
Durgam Cheruvu Road, R.A. Putam, Chennai-600029

FLOOR	F.F.L
SITE	+51.75M
GROUND FLOOR	+51.80M
FIRST FLOOR	+55.40M
TERRACE FLOOR	+58.00M
PERGOLA ROOF	+62.80M
OHT FLOOR	+69.80M
OHT ROOF	+71.50M
PARAPET WALL TOP	+74.00M

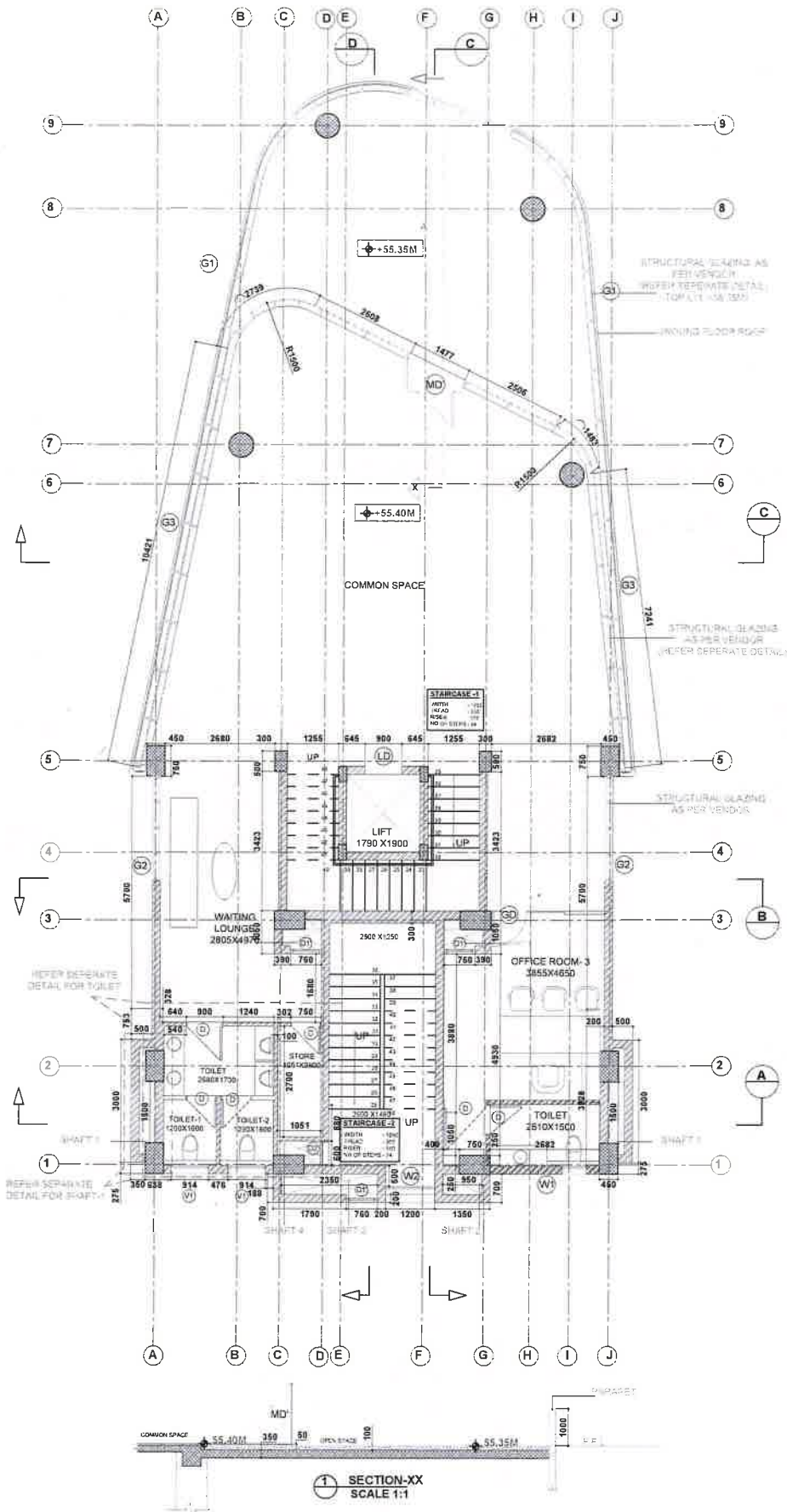
SCHEDULE OF OPENINGS									
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS OF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR
MD	1800	2400	F.F.L	2400	01	-	-	-	-
MD'	900	2400	F.F.L	2400	-	01	-	-	-
D	750	2400	F.F.L	2400	05	05	-	-	-
D1	1050	2400	F.F.L	2400	01	01	03	-	-
D1'	750	2100	F.F.L	2100	03	02	02	-	-
D2	600	2100	F.F.L	2100	01	01	-	-	-
LD	-	2100	F.F.L	2100	01	-	-	-	-
V1	914	914	1488	3400	02	02	-	-	-
W1	2400	1200	1200	2400	01	-	-	-	-
W2	1200	1200	1200	2400	-	01	01	01	01
D3	-	-	-	-	-	-	-	-	-
D4	-	-	-	-	-	-	-	-	-
D5	-	-	-	-	-	-	-	-	-

REFER STRUCTURAL DRAWING FOR FRAMING

- NOTE:**
- All levels with respect to ± 0.00 road level.
 - All levels mentioned are that of floor finishes.
 - Column size and location as per structural.
 - Lift as per vendor shop drawings.

SHAFT-1	3000MM WIDE
SHAFT-2	949X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	W-111
ELEVATIONS	W-112
STAIRCASE	W-114
JOINERY	W-119
TOILET	W-117
GLAZING	W-120
SHAFT-1	W-130



SECTION-XX
SCALE 1:1

FLOOR	F.F.L
SITE	+51.75M
GROUND FLOOR	+51.80M
FIRST FLOOR	+55.40M
TERRACE FLOOR	+59.00M
PERGOLA ROOF	+62.60M
OHT FLOOR	+69.80M
OHT ROOF	+71.50M
PARAPET WALL TOP	+74.00M

SCHEDULE OF OPENINGS										
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS OF	NOS OF	NOS OF	NOS OF	NOS OF	NOS OF
MD	1800	2400	F.F.L	2400	01	-	-	-	-	-
MD'	750	2400	F.F.L	2400	01	-	-	-	-	-
D	1600	2400	F.F.L	2400	01	01	03	-	-	-
D1	750	2100	F.F.L	2100	01	01	02	02	-	-
D2	600	2100	F.F.L	2100	01	01	-	-	-	-
LD	-	2100	F.F.L	2100	01	01	-	-	-	-
V1	914	914	1485	2400	02	02	-	-	-	-
W1	2800	1200	1200	2400	01	-	-	-	-	-
W2	1200	1200	1200	2400	01	01	01	01	01	01
G1	Refer separate detail									
G2	Refer separate detail									
G3	Refer separate detail									

REFER STRUCTURAL DRAWING FOR FRAMING

- NOTE:
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 - All levels mentioned are that of floor finishes.
 - Column size and location as per structural.
 - Lift as per vendor shop drawings.

DETAIL	DRAWING NO
SHAFT-1	3000MM WIDE
SHAFT-2	949X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

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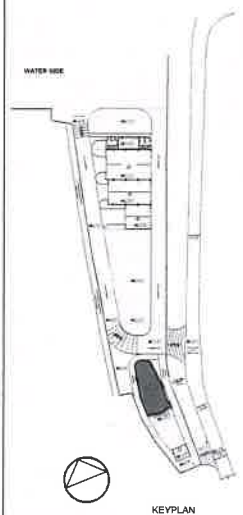
Schematic layout

PRINTS

REVISIONS

NOTES

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PROJECT

SHIP REPAIRING FACILITY AT
PANDU, GUWAHATI (ASSAM)

CLIENT

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Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT

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Branch Office: Door No-7, First Floor, Plot-3, Jayakrishna Apts,
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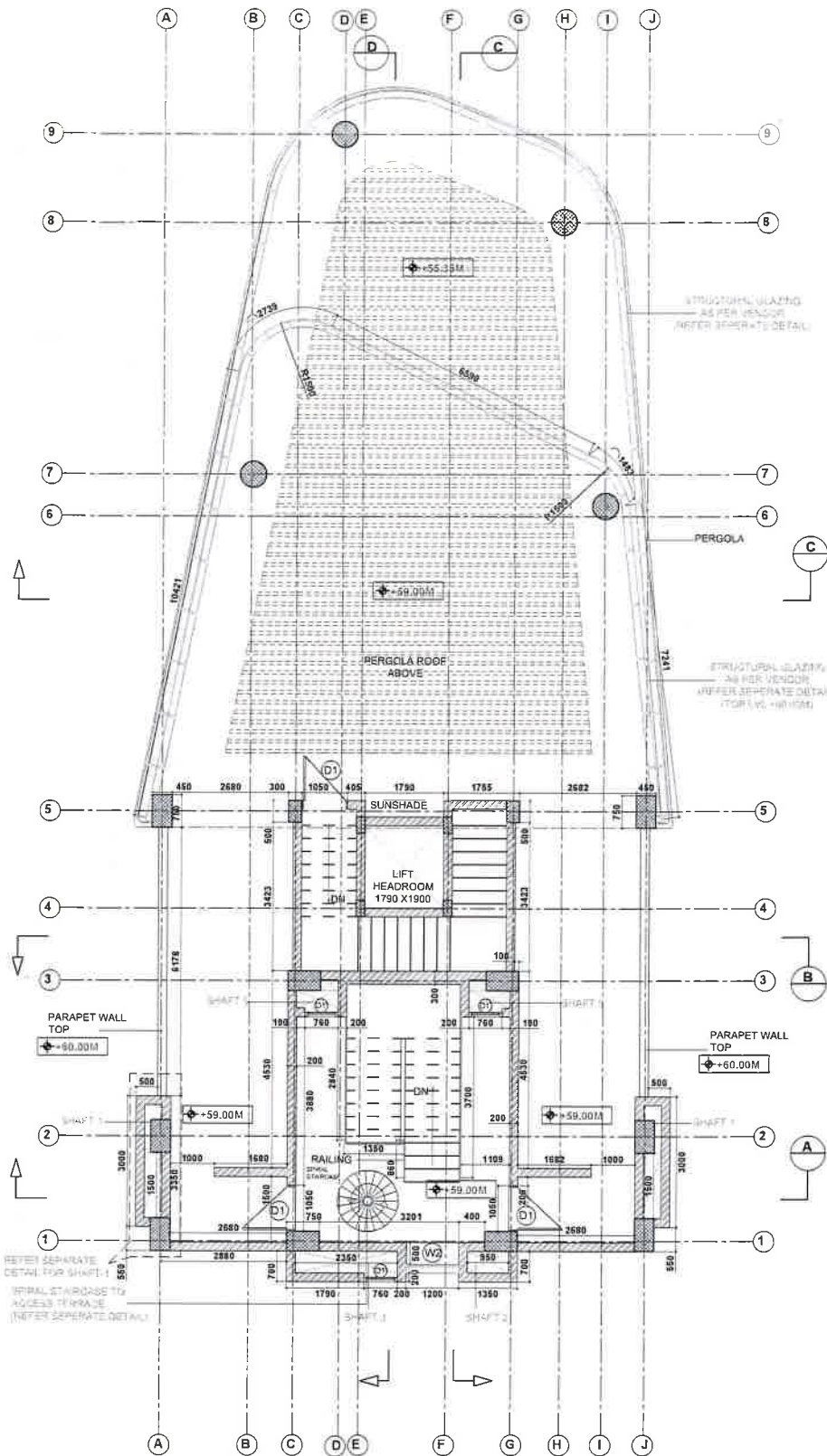
DRAWING TITLE

ADMIN BLOCK -
FIRST FLOOR PLAN @ 55.40M LVL

DATE	SCALE	DRAWN BY
12.10.2023	A2 - 1:75	Ar. Lakshmi

PROJECT NO.	DRAWING NO.	REV NO.
325-SRF Guwahati	W-110	-





REFER SEPARATE DETAIL FOR SHAFT-1
SPIRAL STAIRCASE TO ACCESS TERRACE (REFER SEPARATE DETAIL)

FLOOR	F.F.L
SITE	+51.75M
GROUND FLOOR	+51.80M
FIRST FLOOR	+55.40M
TERRACE FLOOR	+59.00M
PERGOLA ROOF	+62.60M
OHT FLOOR	+69.80M
OHT ROOF	+71.50M
PARAPET WALL TOP	+74.00M

SCHEDULE OF OPENINGS									
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR
MD	1800	2400	F.F.L	2400	01	-	-	-	-
MD'	900	2400	F.F.L	2400	-	01	-	-	-
D	750	2400	F.F.L	2400	05	05	-	-	-
D1	1150	2400	F.F.L	2400	01	01	03	-	-
D1'	750	2100	F.F.L	2100	02	02	02	-	-
D2'	900	2100	F.F.L	2100	01	01	-	-	-
LD	-	2100	F.F.L	2100	01	01	Lift width as per vendor drawing		
V1	914	914	1486	2400	02	02	-	-	-
W1	2680	1200	1200	2400	01	-	-	-	-
W2	1200	1200	1200	2400	-	01	01	01	01
G1	Refer separate detail								
G2	Refer separate detail								
G3	Refer separate detail								

REFER STRUCTURAL DRAWING FOR FRAMING

NOTE:

- All levels with respect to ± 0.00 road level.
- All levels mentioned are that of floor finishes.
- Column size and location as per structural.
- Lift as per vendor shop drawings.

SHAFT-1	3000MM WIDE
SHAFT-2	949X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	WH-111
ELEVATIONS	WH-112
STAIRCASE	WH-114
JOINERY	WH-119
TOILET	WH-117
GLAZING	WH-120
SHAFT-1	WH-130

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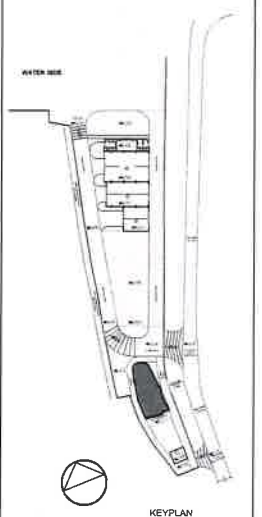
Schematic layout

PRINTS

REVISIONS

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PROJECT

SHIP REPAIRING FACILITY AT PANDU, GUWAHATI (ASSAM)

CLIENT

COCHIN SHIPYARD LIMITED (NTPCWC - IIT) National Technology Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT

AAA Engineering Consultant
Head Office: 104 D Vengal Rao, Madhavaram, Trunk Road-227003
Branch Office: Door No. 7, First Floor, Block, Jayaraman Nagar, 59th Street, Ashok Nagar, Chennai-63
Ph: 9466123123, Email: aasec1@gmail.com, aasec2@gmail.com

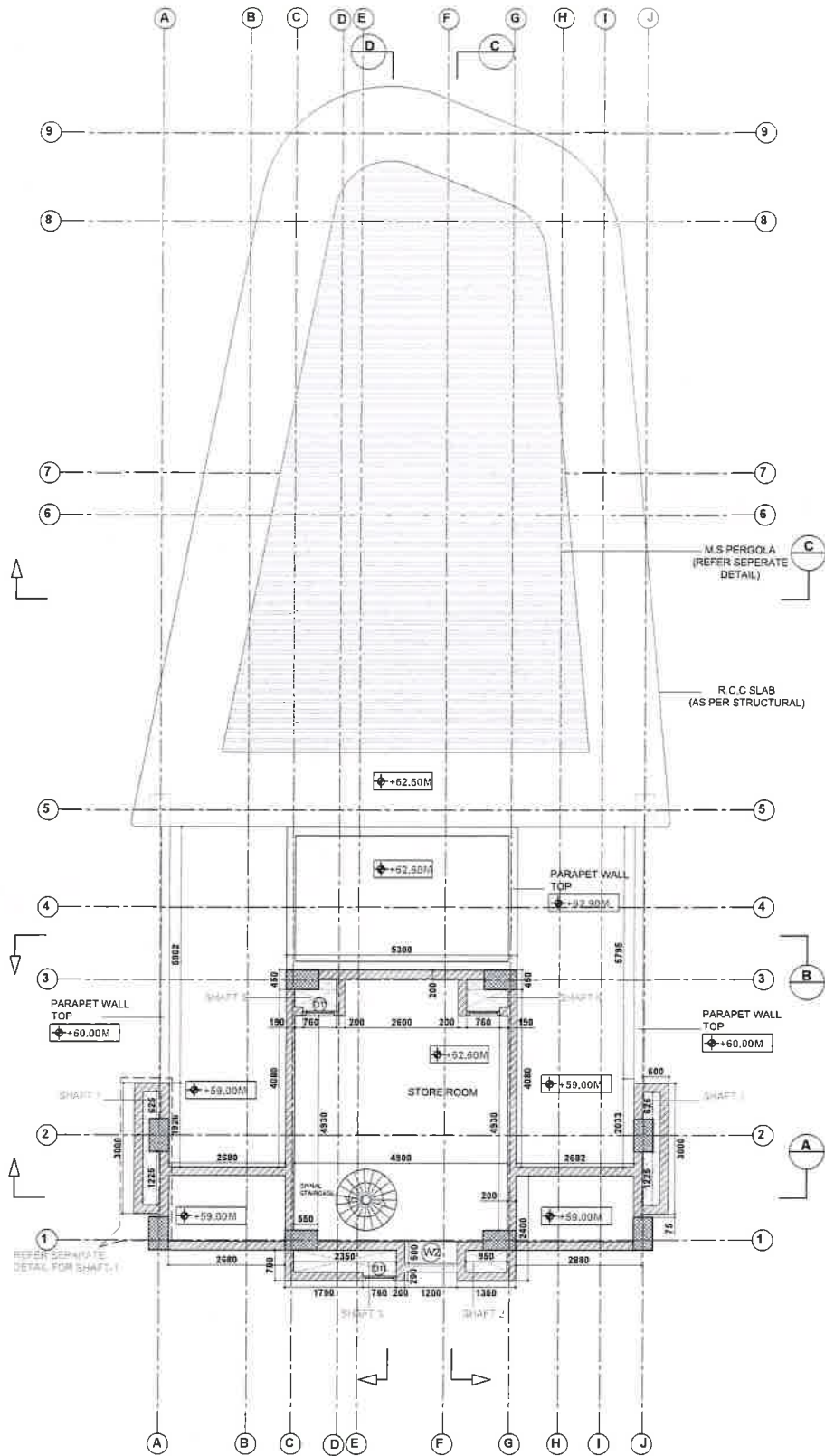
DRAWING TITLE

ADMIN BLOCK - TERRACE FLOOR PLAN @+59.0M LVL

DATE: 12.10.2023 SCALE: A2 - 1:75 DRAWN BY: Ar. Lakshmi Kanth

PROJECT NO. 325-SRF Guwahati DRAWING NO. W-110 REV NO.

CHECKED BY: Ar. Kavya Ramani
APPROVED BY: Ar. Jeganath J. Balakrishnan
JEGANATH JB ARCHITECTS
Ph: 9466123123, Email: aasec1@gmail.com, aasec2@gmail.com
Web: www.jeganathjbarchitects.com
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Branch Office: Door No. 7, First Floor, Block, Jayaraman Nagar, 59th Street, Ashok Nagar, Chennai-63
Ph: 9466123123, Email: aasec1@gmail.com, aasec2@gmail.com



REFER SEPARATE
DETAIL FOR SHAFT-1

FLOOR	F.F.L.
SITE	+51.75M
GROUND FLOOR	+51.80M
FIRST FLOOR	+55.40M
TERRACE FLOOR	+59.00M
PERGOLA ROOF	+62.60M
OHT FLOOR	+69.80M
OHT ROOF	+71.50M
PARAPET WALL TOP	+74.00M

SCHEDULE OF OPENINGS										
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR	NOS TERRACE FLOOR
MD	1800	2400	F.F.L.	2400	01	-	-	-	-	-
MD1	900	2400	F.F.L.	2400	-	01	-	-	-	-
D	750	2400	F.F.L.	2400	05	05	-	-	-	-
D1	1550	2400	F.F.L.	2400	01	01	03	-	-	-
D1'	750	2100	F.F.L.	2100	02	02	02	02	-	-
D2'	900	2100	F.F.L.	2100	01	01	-	-	-	-
LD	-	2100	F.F.L.	2100	01	01	Lift width as per vendor drawing	-	-	-
V1	914	914	1488	2400	02	02	-	-	-	-
W1	2680	1200	1200	2400	01	-	-	-	-	-
W3	1200	1200	1200	2400	-	01	01	01	01	01
G1	Refer separate detail									
G2	Refer separate detail									
G3	Refer separate detail									

REFER STRUCTURAL DRAWING FOR FRAMING

NOTE:	
•	All levels with respect to ± 0.00 road level.
•	All levels mentioned are that of floor finishes.
•	Column size and location as per structural.
•	Lift as per vendor shop drawings.

SHAFT	SIZE
SHAFT-1	3000MM WIDE
SHAFT-2	949X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	W-111
ELEVATIONS	W-112
STAIRCASE	W-114
JOINERY	W-119
TOILET	W-117
GLAZING	W-120
SHAFT-1	W-130

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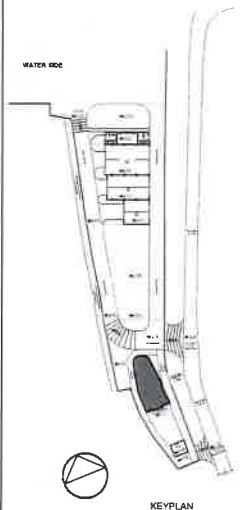
Schematic layout

PRINTS

REVISIONS

NOTES

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PROJECT
SHIP REPAIRING FACILITY AT
PANDU, GUWAHATI (ASSAM)

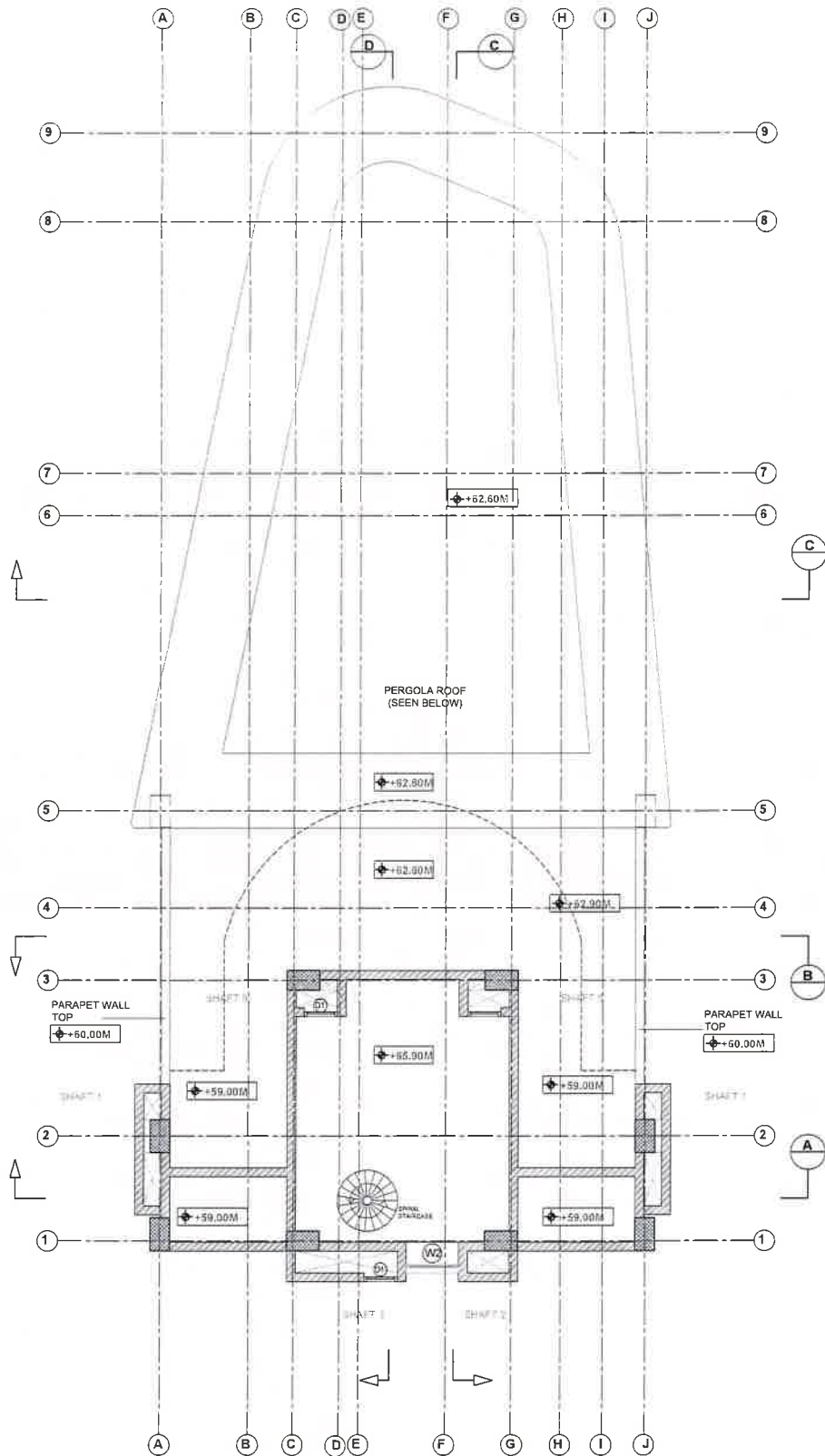
CLIENT
COCHIN SHIPYARD LIMITED
(NTPCW - IIT) National Technology
Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT
AAA Engineering Consultant
Head Office: 504 D, Hema, road, Vidyalayam, Trivendrum-557005
Branch Office: 1008 No. 7, First Floor, Block, Jayarampur, Kps
39th Street, Asrok Nagar, Chennai-63
Ph: 9466123123, Email: aaasec10@gmail.com, projects@aaasec.in

DRAWING TITLE
ADMIN BLOCK - PERGOLA ROOF
FLOOR PLAN @ 62.60M LVL

DATE: 12.10.2023 SCALE: A2 - 1/75 DRAWN BY: Ar. Lakshmi Kanth
PROJECT NO. DRAWING NO. REV NO.

325-SRF, Guwahati W-110
CHECKED BY: Ar. Kavya Ramesh
APPROVED BY: Ar. Jeganath J. Ballavindran
JEGANATH JB ARCHITECTS
Tel: 9466123123
Email: jeganathjb@gmail.com
Web: www.jeganathjbarchitects.com
Address: 1008 No. 7, First Floor, Block, Jayarampur, Kps
39th Street, Asrok Nagar, Chennai-63
R.A. Putnam, Chennai - 600 088



FLOOR	F.F.L
SITE	± +51.75M
GROUND FLOOR	± +51.80M
FIRST FLOOR	± +55.40M
TERRACE FLOOR	± +59.00M
PERGOLA ROOF	± +62.60M
OHT FLOOR	± +69.80M
OHT ROOF	± +71.50M
PARAPET WALL TOP	± +74.00M

SCHEDULE OF OPENINGS										
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR	NOS TERRACE FLOOR
MD	1800	2400	F.F.L	2400	01	-	-	-	-	-
MD'	900	2400	F.F.L	2400	-	01	-	-	-	-
D	750	2400	F.F.L	2400	05	05	-	-	-	-
D1	1050	2400	F.F.L	2400	01	01	03	-	-	-
D1'	750	2100	F.F.L	2100	03	03	02	-	-	-
D2'	600	2100	F.F.L	2100	01	01	-	-	-	-
LD	-	2100	F.F.L	2100	01	01	-	-	-	-
V1	914	914	1486	2400	02	02	-	-	-	-
W1	3000	1200	1200	3000	01	-	-	-	-	-
W2	1200	1200	1200	2400	-	01	01	01	01	01
G1	Refer separate detail									
G2	Refer separate detail									
G3	Refer separate detail									

REFER STRUCTURAL DRAWING FOR FRAMING

- NOTE:
- All levels with respect to ± 0.00 road level.
 - All levels mentioned are that of floor finishes.
 - Column size and location as per structural.
 - Lift as per vendor shop drawings.

SHAFT-1	3000MM WIDE
SHAFT-2	848X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	W-111
ELEVATIONS	W-112
STAIRCASE	W-114
JOINERY	W-119
TOILET	W-117
GLAZING	W-120
SHAFT-1	W-130

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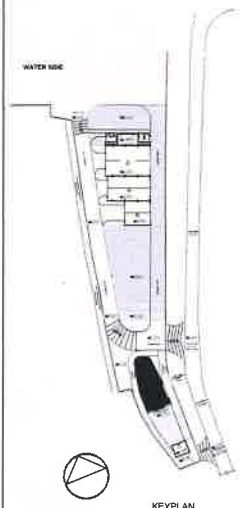
Schematic layout

PRINTS

REVISIONS

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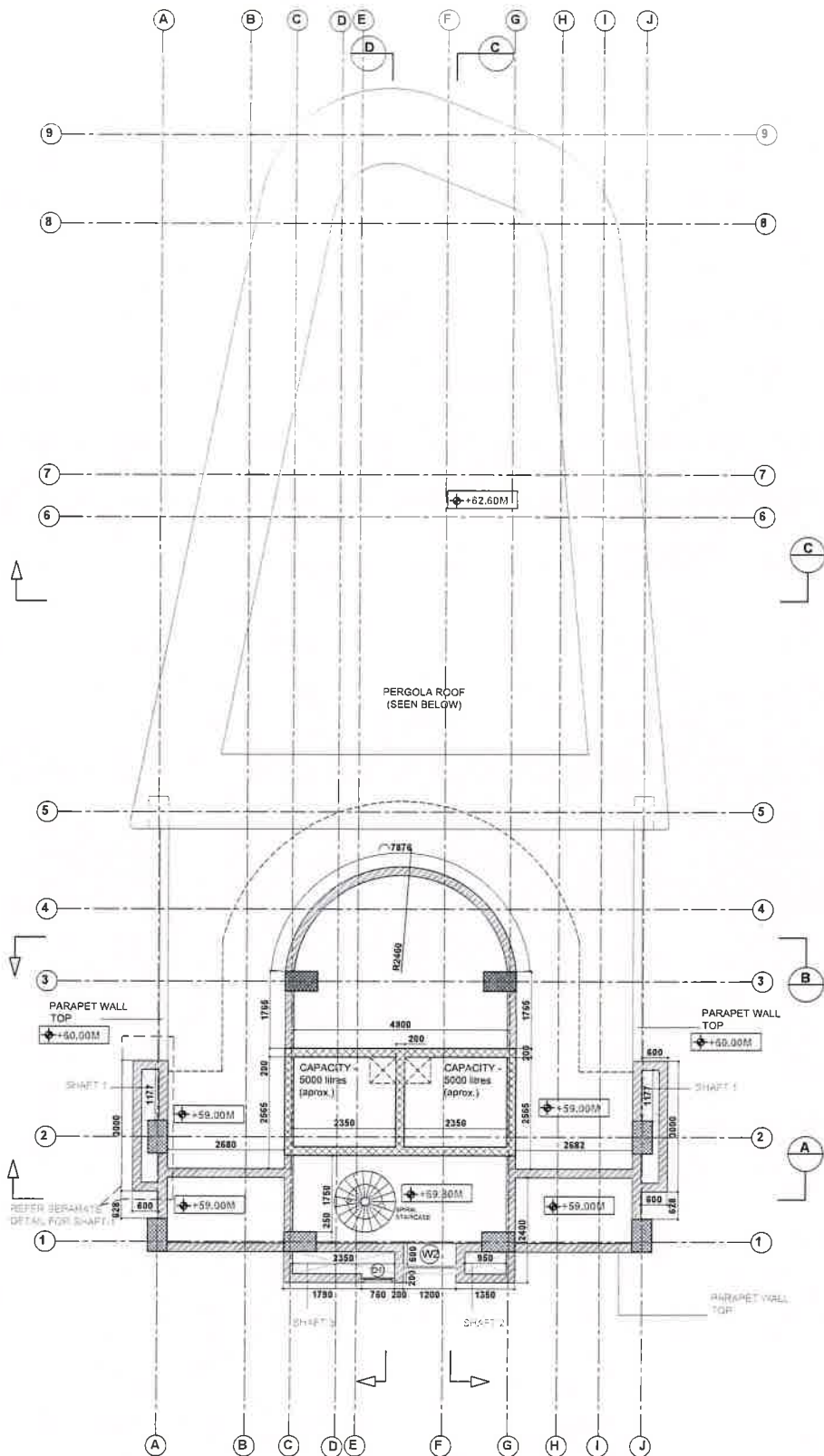
DRAWING TITLE

ADMIN BLOCK - OHT FLOOR PLAN @ 65.9M LVL

DATE: 21.08.2025 SCALE: A2 - 1/75 DRAWN BY: Ar. Lakshmi Kanth

PROJECT NO: 325-SRF Guwahati DRAWING NO: W-110 REV NO:





FLOOR	F.F.L.
SITE	+51.75M
GROUND FLOOR	+51.80M
FIRST FLOOR	+55.40M
TERRACE FLOOR	+59.00M
PERGOLA ROOF	+62.60M
OHT FLOOR	+69.80M
OHT ROOF	+71.50M
PARAPET WALL TOP	+74.00M

SCHEDULE OF OPENINGS										
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR	NOS TERRACE FLOOR
MD	1800	2400	F.F.L.	2400	01	-	-	-	-	-
MT	900	2400	F.F.L.	2400	-	01	-	-	-	-
D	750	2400	F.F.L.	2400	06	06	-	-	-	-
D1	1050	2400	F.F.L.	2400	01	01	03	-	-	-
D1'	750	2100	F.F.L.	2100	02	02	02	-	-	-
D2	400	2100	F.F.L.	2100	01	01	-	-	-	-
LD	-	2100	F.F.L.	2100	01	01	-	-	-	-
V1	914	914	1488	2400	02	02	-	-	-	-
W1	2680	1200	1200	2400	01	-	-	-	-	-
W2	1200	1200	1200	2400	-	01	01	01	01	01
G1	-	-	-	-	-	-	-	-	-	-
G2	-	-	-	-	-	-	-	-	-	-
G3	-	-	-	-	-	-	-	-	-	-

REFER STRUCTURAL DRAWING FOR FRAMING

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SHAFT-1	3000MM WIDE
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SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	WH-111
ELEVATIONS	WH-112
STAIRCASE	WH-114
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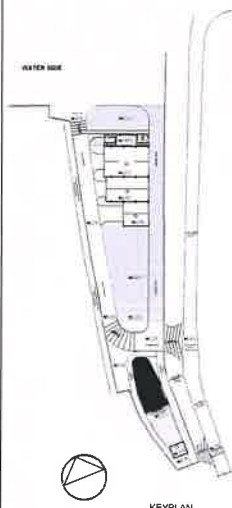
Schematic layout

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Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT

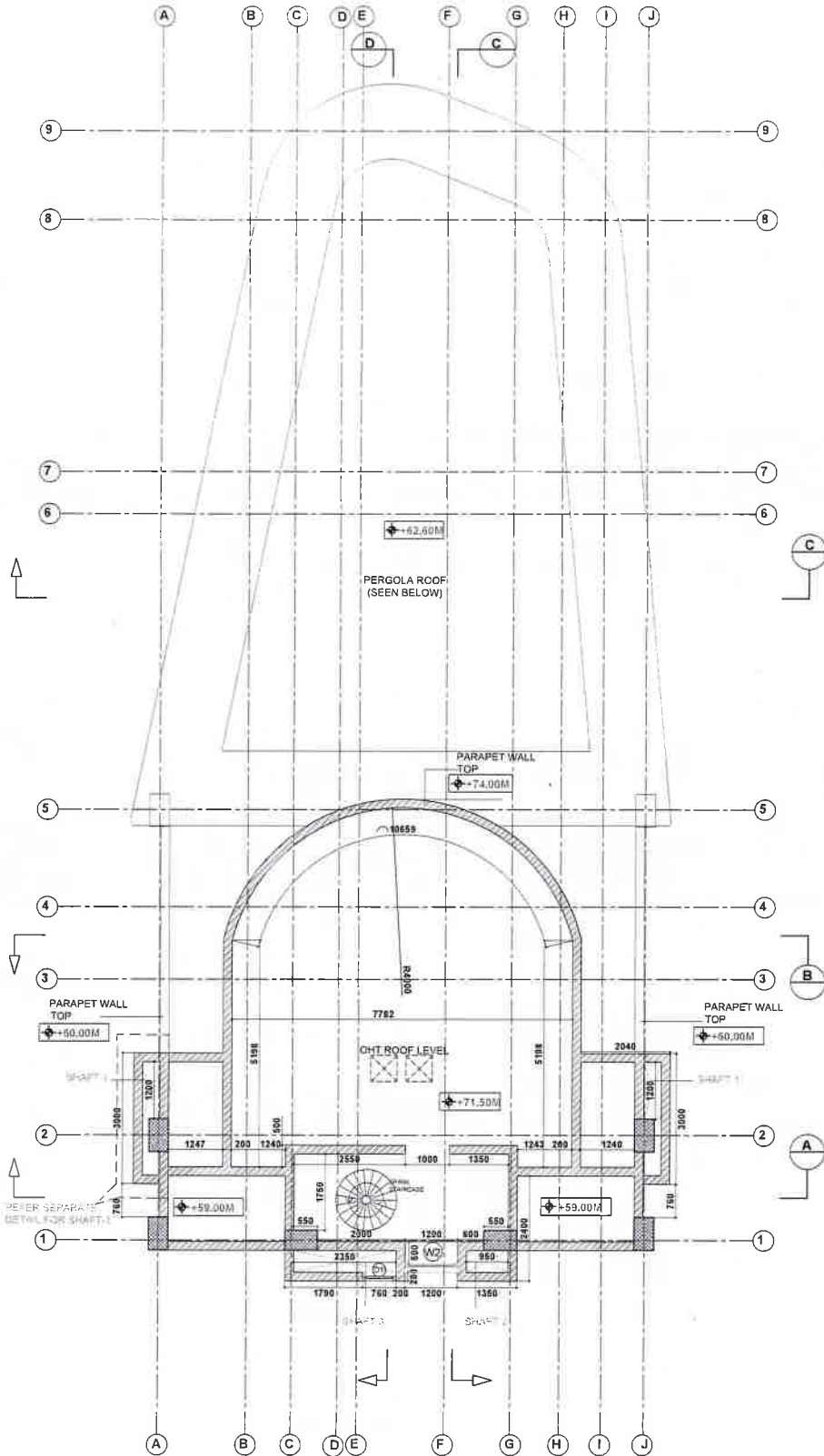
AAA Engineering Consultant
Head Office: 104 G. K. Road, 1st Floor, Guwahati, Assam - 781005
Branch Office: 2nd Floor, 1st Floor, 1st Floor, Guwahati, Assam - 781005
10th Street, Assam Nagar, Chennai-63
Ph: 9445122121, Email: aaaaec@aaaec.com, aaaaec@aaaec.com

DRAWING TITLE
ADMIN BLOCK -
OHT FLOOR PLAN @ 69.8M LVL

DATE 12.10.2023 SCALE A2 - 1/75 DRAWN BY Ar. Lokeshkumar

PROJECT NO. 325-SRF Guwahati DRAWING NO. W-110 REV NO. -

CHECKED BY: Ar. Kavya Ramesh
APPROVED BY: Ar. Jaganath J. Sankar
JEGANATH JB ARCHITECTS
1st Floor, 31, 32/5/2023
Email: jaganathjb@gmail.com
Web: www.jaganathjbarchitects.com
Address: 105-5th Floor, 1st Floor, 1st Floor, Guwahati, Assam - 781005
Guwahati, Assam - 781005
R. A. Putnam, Chennai - 600 021



FLOOR	F.F.L
SITE	±51.75M
GROUND FLOOR	±51.90M
FIRST FLOOR	±55.40M
TERRACE FLOOR	±59.00M
PERGOLA ROOF	±62.60M
OHT FLOOR	±68.80M
OHT ROOF	±71.50M
PARAPET WALL TOP	±74.00M

SCHEDULE OF OPENINGS										
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR	NOS TERRACE FLOOR
MD	1930	2400	F.F.L	2400	01	-	-	-	-	-
MD'	300	2400	F.F.L	2400	-	01	-	-	-	-
D	780	2400	F.F.L	2400	05	05	-	-	-	-
D1	1050	2400	F.F.L	2400	01	01	03	-	-	-
D1'	760	2100	F.F.L	2100	03	02	02	-	-	-
D2'	800	2100	F.F.L	2100	01	01	-	-	-	-
LD	-	2100	F.F.L	2100	01	01	-	-	-	-
V1	914	314	1486	2400	02	02	-	-	-	-
W1	1080	1200	1200	2400	01	-	-	-	-	-
W2	1200	1200	1200	2400	-	01	01	01	01	01
G1	Refer separate detail									
G2	Refer separate detail									
G3	Refer separate detail									

REFER STRUCTURAL DRAWING FOR FRAMING

- NOTE:
- All levels with respect to ± 0.00 road level.
 - All levels mentioned are that of floor finishes.
 - Column size and location as per structural.
 - Lift as per vendor shop drawings.

SHAFT-1	3000MM WIDE
SHAFT-2	949X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	W-111
ELEVATIONS	W-112
STAIRCASE	W-114
JOINERY	W-119
TOILET	W-117
GLAZING	W-120
SHAFT-1	W-130

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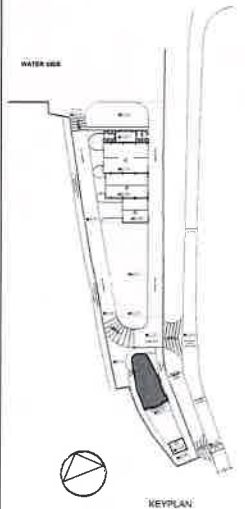
Schematic layout

PRINTS

REVISIONS

NOTES

1. ALL DIMENSIONS ARE IN MM.
2. ALL LEVELS GIVEN W.R.T. SITE SURVEY DRAWING GIVEN BY CLIENT
3. DRAWING TO BE READ & NOT SCALED.
5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH RELEVANT CONSULTANTS DRAWINGS. DISCREPANCIES IF ANY ARE TO BE BROUGHT TO THE NOTICE OF THE ARCHITECT PRIOR.



PROJECT
SHIP REPAIRING FACILITY AT
PANDU, GUWAHATI (ASSAM)

CLIENT
COCHIN SHIPYARD LIMITED
(NTCPWC - IIT) National Technology
Center for Ports, Waterways and Coast

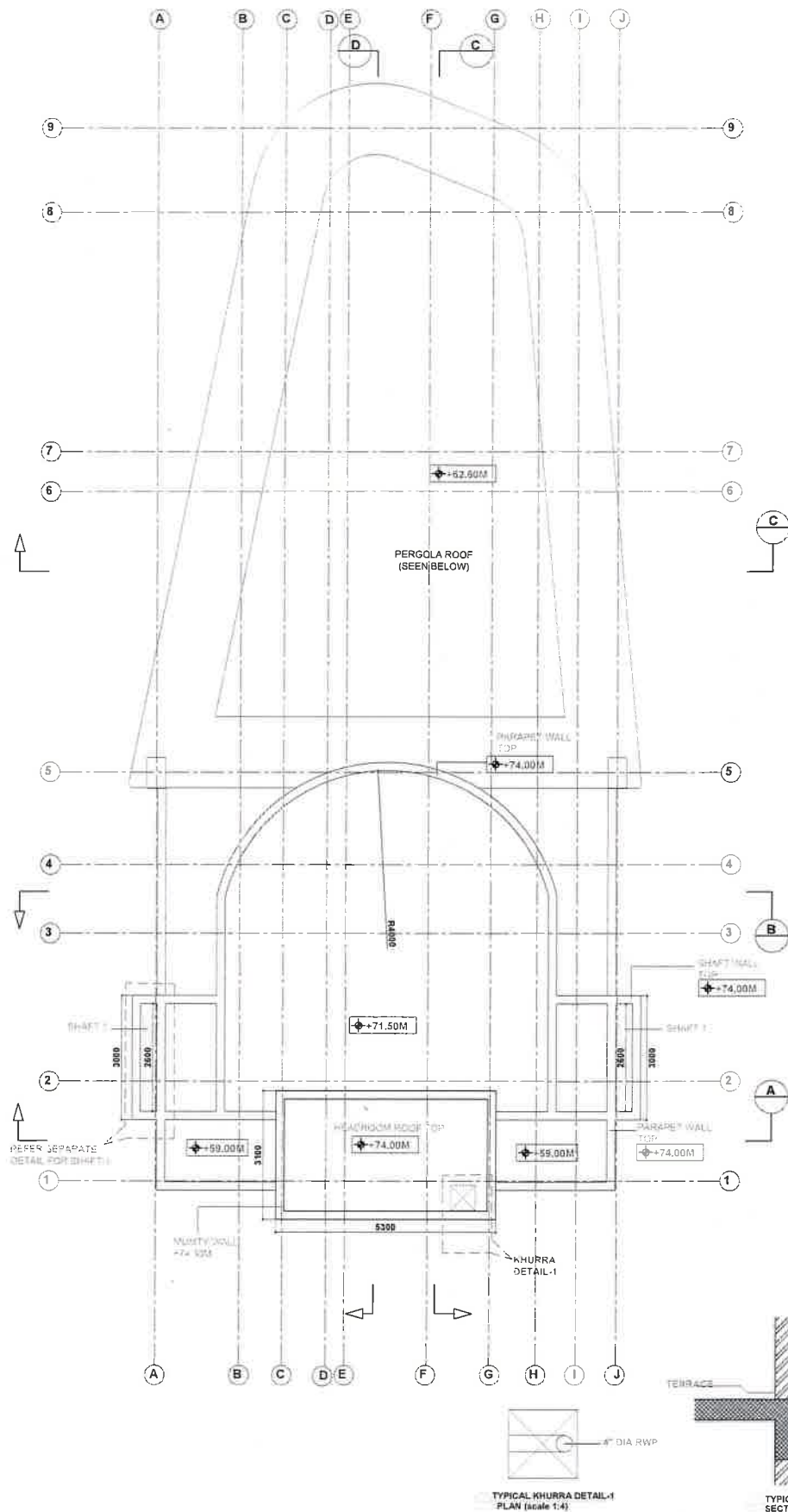
STRUCTURAL CONSULTANT

AAA Engineering Consultant
Head Office: 104 D Nandan Road, Madhavaram, Chennai-600028
Branch Office: 104/105, First Floor, Rajahmundry, Andhra Pradesh-522002
89th Street, Anna Nagar, Chennai-600060
Ph: 9445123123, Email: aaaa@aaa.com, aaaa@aaa.com

DRAWING TITLE
ADMIN BLOCK -
OHT ROOF PLAN @ 71.5M LVL

DATE 12.10.2023 SCALE A2 - 1/75 DRAWN BY Ar. Lakshminarayana
PROJECT NO. 325-SRF Guwahati, W-110 REV NO.

CHECKED BY Ar. Naveen Ramesh
APPROVED BY Ar. Jaganath J. Balakrishnan
JEGANATH JB ARCHITECTS
104/105, First Floor, Rajahmundry, Andhra Pradesh-522002
Ph: 9445123123, Email: aaaa@aaa.com, aaaa@aaa.com
R.A. Patra, Director, J.B.



FLOOR	F.F.L
SITE	+51.75M
GROUND FLOOR	+51.80M
FIRST FLOOR	+55.40M
TERRACE FLOOR	+59.00M
PERGOLA ROOF	+62.50M
OHT FLOOR	+69.80M
OHT ROOF	+71.50M
PARAPET WALL TOP	+74.00M

SCHEDULE OF OPENINGS										
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR	NOS TERRACE FLOOR
MD	1800	2400	F.F.L	2400	01	-	-	-	-	-
MD	900	2400	F.F.L	2400	-	01	-	-	-	-
D	750	2400	F.F.L	2400	05	05	-	-	-	-
D1	1050	2400	F.F.L	2400	01	01	03	-	-	-
D1	750	2100	F.F.L	2100	03	02	02	-	-	-
D2	600	2100	F.F.L	2100	01	01	-	-	-	-
LD	-	2100	F.F.L	2100	01	01	-	-	-	-
V1	314	314	1486	2400	03	02	-	-	-	-
W1	2680	1200	1200	2400	01	-	01	01	01	01
G1	-	-	-	-	-	-	-	-	-	-
G2	-	-	-	-	-	-	-	-	-	-
G3	-	-	-	-	-	-	-	-	-	-

REFER STRUCTURAL DRAWING FOR FRAMING

- NOTE:
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 - All levels mentioned are that of floor finishes.
 - Column size and location as per structural.
 - Lift as per vendor shop drawings.

SHAFT-1	3000MM WIDE
SHAFT-2	849X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	W-111
ELEVATIONS	W-112
STAIRCASE	W-114
JOINERY	W-119
TOILET	W-117
GLAZING	W-120
SHAFT-1	W-130

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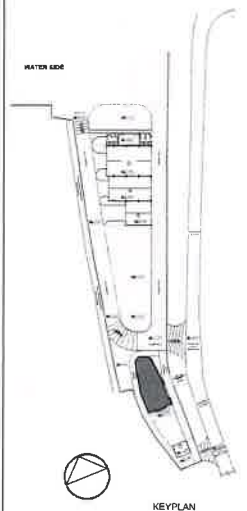
Schematic layout

PRINTS

REVISIONS

NOTES

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PROJECT
SHIP REPAIRING FACILITY AT
PANDU, GUWAHATI (ASSAM)

CLIENT
COCHIN SHIPYARD LIMITED
(NTCPWC - IIT) National Technology
Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT
AAA Engineering Consultant
Head Office: 104 D Nethaji Road, Metapalayam, Tirunelveli-627002
Branch Office: Door No-7 First Floor, Plot-D, Jayarama Apts,
19th Street, Azhok Nagar, Chennai-63
Ph: 9445123123, Email: aaac@10@gmail.com, projects@aaac.in

DRAWING TITLE
ADMIN BLOCK - SPIRAL STAIRCASE
HEADROOM ROOF @ 74.0M LVL

DATE: 12.10.2023 SCALE: A2 - 1:75 DRAWN BY: Ar. Lakshmi Kanth

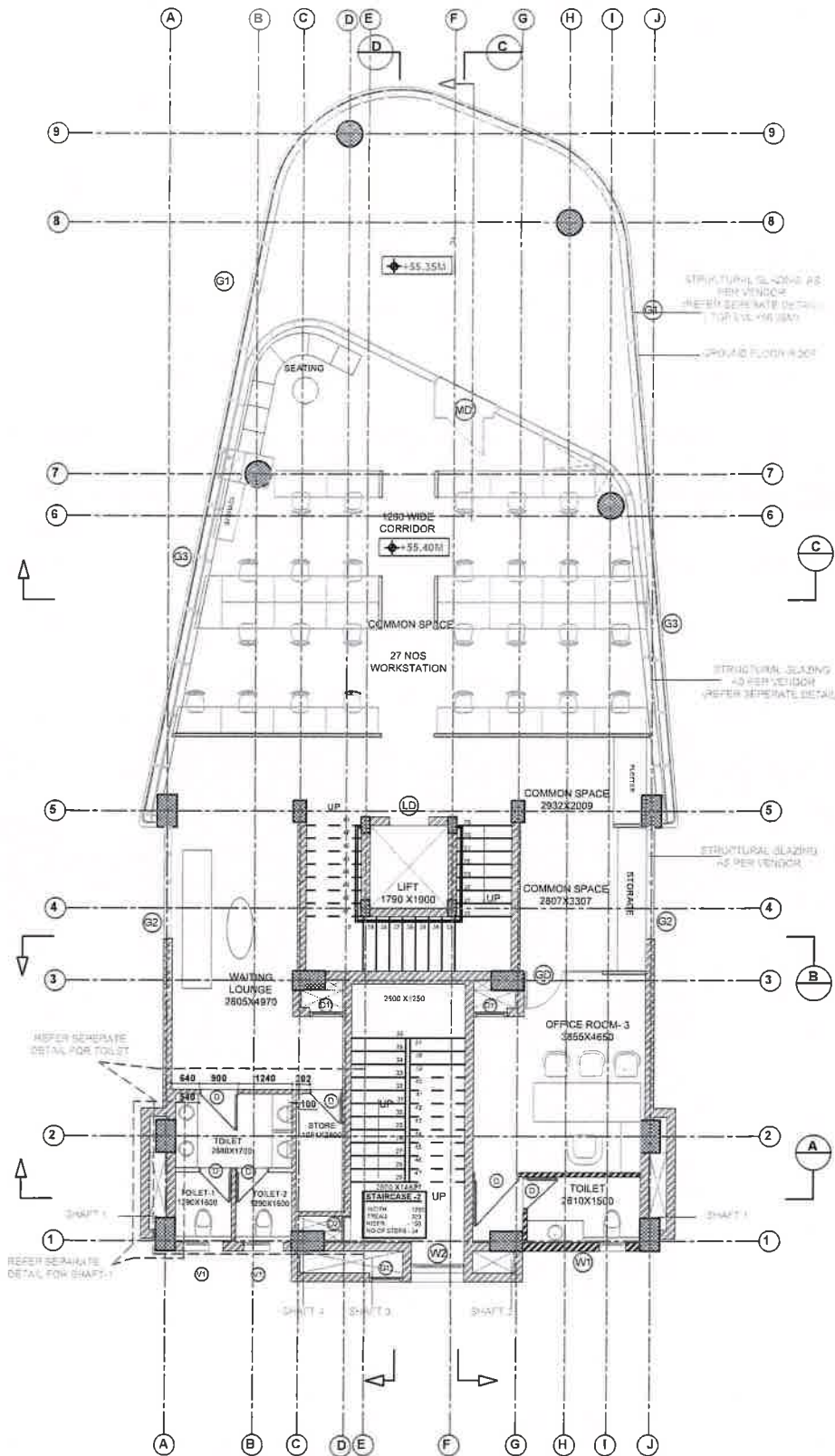
PROJECT NO: 325-SPT-Spiral Staircase REV NO: 1

CHECKED BY: Ar. Kavya Ramesh

APPROVED BY: Ar. Jaganath JB

JEGANATH JB ARCHITECTS

Address: 104 D Nethaji Road, Metapalayam, Tirunelveli-627002
Durgabai Deshmukh Road
R/A Purani, Chennai - 28



ARCHITECTURE LAYOUT FOR SANITARY FITTINGS AND PLUMBING SUPPLY LAYOUT

FLOOR	F.F.L.
SITE	±51.75M
GROUND FLOOR	±51.80M
FIRST FLOOR	±55.40M
TERRACE FLOOR	±59.00M
PERGOLA ROOF	±62.60M
OHT FLOOR	±69.80M
OHT ROOF	±71.50M
PARAPET WALL TOP	±74.00M

SCHEDULE OF OPENINGS									
OPENING	WIDTH	CLEAR HEIGHT	SILL LEVEL	LINTEL LEVEL	NOS GF	NOS FF	NOS SF	NOS TF	NOS OHT FLOOR
MD	1850	2400	F.F.L.	2400	01	-	-	-	-
MD'	950	2400	F.F.L.	2400	-	01	-	-	-
D	750	2400	F.F.L.	2400	05	05	-	-	-
D1	1050	2400	F.F.L.	2400	01	01	03	-	-
D1'	750	2100	F.F.L.	2100	03	02	02	-	-
D2'	600	2100	F.F.L.	2100	01	01	01	-	-
D3	1000	2100	F.F.L.	2100	-	-	-	-	01
LD	-	2100	F.F.L.	2100	01	01	-	-	-
V1	910	910	1450	2400	03	02	-	-	-
W1	3710	1200	1200	2400	01	01	-	-	-
W2	1200	1200	1200	2400	-	01	01	01	01
G1	Refer separate detail								
G2	Refer separate detail								
G3	Refer separate detail								

REFER STRUCTURAL DRAWING FOR FRAMING

- NOTE:
- All levels with respect to ± 0.00 road level.
 - All levels mentioned are that of floor finishes.
 - Column size and location as per structural.
 - Lift as per vendor shop drawings.

SHAFT-1	3000MM WIDE
SHAFT-2	949X500
SHAFT-3	2351X500
SHAFT-4	1051X350
SHAFT-5	951X400

DETAIL	DRAWING NO
SECTIONS	W-111
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STAIRCASE	W-114
JOINERY	W-119
TOILET	W-117
GLAZING	W-120
SHAFT-1	W-130

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DOCUMENT CONTROL STATUS

Schematic layout

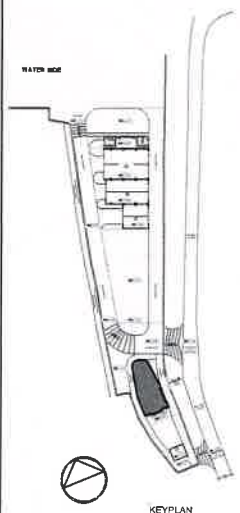
PRINTS

REVISIONS

R1 - 04.06.2024
R2 - 24.06.2024
R3 - 21.08.2025 - LAYOUT UPDATED AS PER TOILET CHANGES

NOTES

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PROJECT

SHIP REPAIRING FACILITY AT PANDU, GUWAHATI (ASSAM)

CLIENT

COCHIN SHIPYARD LIMITED
NTPCWC - IIT National Technology Center for Ports, Waterways and Coast

STRUCTURAL CONSULTANT

AAA Engineering Consultant
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Branch Office: Door No. 7, First Floor, Flax-D, Jayaramnagar, 45th Street, Adrak Nagar, Chennai-60
Ph: 9456123123, Email: aasec19@gmail.com, project@aaaec.in

DRAWING TITLE

ADMIN BLOCK - INTERIOR LAYOUT
FIRST FLOOR PLAN @ 55.40M LVL

DATE: 21.08.2025 SCALE: A2 - 1:75 DRAWN BY: Ar. Lakshminiketh

PROJECT NO. 325-SRF Guwahati W-130 DRAWING NO. W-130 REV NO. R3





SHIP REPAIR FACILITY AT GUWAHATI

PREAMBLE TO BILL OF QUANTITIES



1. The scope of work covered in this Bill of Quantities (BOQ) pertains to the Plumbing execution works for Ship Repair Facility at Guwahati, complete in all respects as shown in the working / construction drawings to be issued progressively during construction and vendor drawings to be prepared and furnished by the contractor and as indicated in the specifications and as directed by the Engineer.
2. The following materials will be issued by the Employer to the Contractor (successful Tenderer) on free-issue basis:
 - a) Tenderer to quote against all relevant Items in the Bill of Quantities accordingly.
 - b) No separate unloading, loading / re - loading, handling, conveyance, transport, storage charges are payable to the Contractor, the various Bill of Quantities Item-rates being deemed to cover all such costs.
 - c) Accounting, billing, reconciliation, etc. against these shall be as stipulated in the Special Conditions of Contract.

Sl. no.	Description of material	Remarks
1.	Nil.	-

- d) Where the Employer provides certain other materials, plant, tools, water, electricity, etc. and certain facilities such as accommodation at site, the cost of the same would be debited to the Contractor's account, at rates mutually agreed upon and spelt out in the Letter of Acceptance from the Employer.
3. All the stipulations and procedures in submitting the tender, as elaborated in the Invitation to Tender, shall be adhered to. Rates for all items of works are to be filled in by the tenderer in figures as well as in words, in ink, in English language and corrections, if any, must be initialled by the tenderer.
4. The tenderer shall carefully go through all the parts of the Tender Document, more particularly the clauses in the Invitation to Tender, Articles of Agreement, General and Special Conditions of Contract, Specifications, Bill of Quantities and Drawings, and shall include in his rates any sum he may consider necessary to cover his fulfillment of the requirements, provisions, obligations and duties against various clauses contained therein, taking into account all aspects and factors incidental thereupon.
5. Where any provision of the specification is repugnant to or at variance unless a different intention appears, provision of the Bill of Quantities shall be deemed to override the provisions of the specification and shall to the extent of such repugnance or variation prevail.
6. The items of works and the unit prices stated in the Bill of Quantities shall be inclusive of everything necessary to complete the said items of work within the contemplation of the Contract and beyond the unit prices no extra payment will be allowed for any incidental or contingent work, labour, materials and plant, subsidiary and enabling operations required, whether or not enumerated in the items or in the Preamble or Specifications.
7. The rate indicated against each item shall be for the finished works in all floors and at all levels and will be deemed to include the cost of all materials, labour, tools and





tackles, plant and equipment where needed, implied and allied items, etc. involved in the work as actually executed, except in cases where the item description indicates to the contrary.

8. It is to be clearly understood that the rates in the Bill of Quantities include all direct and indirect costs in connection with the works, including but not limited to the following:
- Transport of Electrification materials, personnel etc., to the site at the start of the work and their withdrawal on completion of the work.
 - Preparation of vendor drawings/as-built drawings and obtaining approvals thereof.
 - Supplying, transporting to site, unloading, protecting and installation of materials in accordance with the Specification and storage of materials at site and hoisting and lowering to all levels.
 - Accommodation of the Contractors staff and labour and owner's site engineers office.
 - Protection of all equipment falling within this section of the Specification.
 - Necessary care and precautions against damage to equipment, if any, supplied by the Owner and / or by other contractors.
 - Attending to the works during the maintenance period.
 - All expenses towards supervision, book-keeping, overheads, profit, taxes, duties, octroi, insurance, testing and any statutory payments/contributions in connection with labour and personnel deployed.
 - Testing, inspections, statutory inspections and cost of all modifications to comply with directions of the statutory authorities.
9. The quantities of the items of work indicated in the Bill of Quantities are probable quantities only, indicated for the guidance of the tenderer and it must be clearly understood that the Contract is not a lumpsum contract, that neither the probable quantities nor the value of the individual items of work nor the aggregate value of the entire tender will form part of the contract and the Employer does not in any way assure the tenderer or guarantee that the probable quantities are correct or that the work should correspond thereto.
10. No change in the unit rate will be admissible for any variation in quantities, save and except where provided for in the Contract.
11. Mode of measurement for all the items in Bill of Quantities shall be as per standard practice. Unless otherwise specified, all measurements will be in metric units.
12. In case of alternative specifications or alternative items, wherever indicated in the Bill of Quantities for certain items of work, the tenderer shall quote his rates for all the alternatives specified therein. Employer reserves the right to choose any of the alternatives for execution.
13. Items and materials of the specified brands / makes mentioned in the Specifications, Bill of Quantities and drawings are to be provided in the concerned works against the relevant BOQ items.

14. No variation shall vitiate this contract. All variations authorised by the employer shall be subsequently sanctioned by him in writing.
15. **Tenderers are advised to quote self-standing rates and avoid irrational rates, either on the higher side or on the lower side. The Employer may, during evaluation of the tender or anytime thereafter, call for detailed analysis of the Tenderer in respect of any rate against any particular Item in the BOQ.**

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**BILL OF QUANTITIES OF PLUMBING SYSTEM FOR
SHIP REPAIRING FACTORY (SRF) AT PANDU, GUWAHATI**

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
A	SANITARY FIXTURES AND CP FITTINGS INSTALLATION WORKS:						
	Admn. Block - Sanitary and CP fittings supply by client scope						
1.0	Supply, fixing, testing and commissioning of white colour vitreous European Water Closet - Floor mounted type with extended 'S' trap, with exposed coupled slimline PVC flush tank with matching colour solid plastic seat cover and lid with C P hinges, rubber buffers, C.I / M.S Brackets, 40 mm diameter flush bend with fittings and clamps, overflow arrangements with specials and 15mm dia C.P angle stop cock with wall flange, 15mm dia cold water connection pipe etc. The cost shall include extension piece, sealant, painting of fittings and brackets, cutting and making good the wall and floor wherever required, including cost of materials, labour including lead and lift charges, all complete as per specifications. (Make: Parryware, Model: C0278, E8377, E8388, T9828A1 & T2334A1)	Nos.	7				
2.0	Supply and fixing of health faucet with regulator of approved quality with flexible pipe 1.5 m long, wall hook complete as required. (Make: Parryware, Model: T9805A1)	Nos.	7				
3.0	Supply and fixing of 15 mm CP 2way bib cock with necessary CP flexible, CP wall flange etc., (Make: Parryware, Model: T2334A1)	Nos.	7				
4.0	Supply, fixing, testing and commissioning of white colour Vitreous China below counter wash Basin , installed with specially fabricated MS brackets (2 coats of primer and paints) with adjustable SS screws and nuts to suit the wash basin, 15mm dia pillar cock provision, 32mm dia CP waste coupling, 32mm dia CP brass bottle trap, 15mm dia CP angle stop cock for cold & hot water supply lines with wall flanges etc.,. The work shall include cutting and making good the wall and floor wherever required, necessary extension piece, sealant, including cost of labour including lead and lift charges, all complete as per specifications. (Make: Parryware, Model: Cascade NXT, T320A1, T9828A1 & T9899A1)	Nos.	7				
5.0	Supply and fixing of 15mm dia CP pillar cock for wash basins with pipe nipples, teflon tape, all accessories required etc. The cost shall include cutting and making good the wall wherever required, including cost of materials, labour, all complete as per specifications (Make: Parryware, Model: T2303A1)	Nos.	7				
6.0	Supply and fixing of CP twin robe coat hook with flanges, countersunk SS screws etc. The cost shall include cutting and making good the wall wherever required, including cost of labour, all complete as per specifications. (Make: Parryware, Model: T6007A1)	Nos.	7				
7.0	Supply, fixing and commissioning of white vitreous china urinal of model and make as specified in list of makes with CP spreader, C.P. wastecoupling, C.P.brass bottle trap, operated by manual push cock. Includes suitable brackets & rag bolts etc. all complete as per specifications (Make: Parryware, Model: C0583, C0571, T3202A1, T9954A1 & G2007A1)	Nos.	4				
8.0	Supply and fixing of SS-304 grade floor trap cover (Make: NEER / RUHE)	Nos.	11				
9.0	Supply and Fixing of paper holder , The cost shall include cutting and making good the wall wherever required, including cost of labour, all complete as per specifications. (Make: Parryware, Model: T6005A1)	Nos.	7				
10.0	Supply and fixing of liquid soap dispenser , The cost shall include cutting and making good the wall wherever required, including cost of labour, all complete as per specifications. (Make: Parryware, Model: T518199)	Nos.	7				

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
11.0	Supply and Fixing of towel ring. The cost shall include cutting and making good the wall wherever required, including cost of labour, all complete as per specifications. (Make: Parryware, Model: T6002A1)	Nos.	7				
12.0	Supply and Fixing of towel rod 600mm long. The cost shall include cutting and making good the wall wherever required, including cost of labour, all complete as per specifications. (Make: Parryware, Make: T6001A1)	Nos.	7				
13.0	Supply and fixing of long body bibcock (Make: Parryware, Model: T2306A1)	Nos.	10				
	SUB - TOTAL (A)						
B	INTERNAL DRAINAGE WORKS:						
	Admn. Block- internal drainage works:						
1.0	Supply, fixing, testing and commisioning uPVC Pressure pipe (Ring-fit) soil waste vent pipe of Class 3 (6 Kgf/cm2) conforming to IS 4985-2000 including all fittings (IS 7834 for moulded fittings and IS 10124 for fabricated fittings), Eg: Bends, tees, elbows collars, junction, inspection doors, cowls, offset access pipes, jointing with PVC solvent, running of pipes suspended from the ceiling with FRP brackets and SS fasteners, chasing / chipping walls using groove cutting machine, making bores / core cutting in slab / beam / wall and making good of the same, cost shall include providing steel brackets, FRP supports, Pipe supports and fasteners. The cost shall include transportation, lead and lift all complete as required						
1.1	50 mm dia	Rmt	QRO				
1.2	40 mm dia	Rmt	25				
2.0	Supply, fixing, testing and commisioning of uPVC SWR (Type B, Ring fit) soil waste vent pipe conforming to IS 13592-1992 including all fittings (IS 14735-1999), Eg: Bends, tees, elbows collars, junction, inspection doors, cowls, offset access pipes, jointing with PVC solvent, running of pipes suspended from the ceiling with FRP brackets and SS fasteners, chasing / chipping walls using groove cutting machine, making bores / core cutting in slab / beam / wall and making good of the same, cost shall include providing steel brackets, FRP supports, Pipe supports and SS fasteners. The cost shall include transportation, lead and lift all complete as required						
2.1	110mm dia	Rmt	QRO				
2.2	75mm dia	Rmt	60				
	SUB - TOTAL (B)						
C	EXTERNAL DRAINAGE WORKS:						
	From workshop area to ETP & From Admn. Block to STP						
	(TEMPORARILY CONNECTED TO SEPTIC TANK)						
2.0	Supply, fixing, testing and commisioning of uPVC SWR (Type B, Ring fit) soil waste vent pipe conforming to IS 13592-1992 including all fittings (IS 14735-1999), Eg: Bends, tees, elbows collars, junction, inspection doors, cowls, offset access pipes, jointing with PVC solvent, running of pipes suspended from the ceiling with FRP brackets and SS fasteners, chasing / chipping walls using groove cutting machine, making bores / core cutting in slab / beam / wall and making good of the same, cost shall include providing steel brackets, FRP supports, Pipe supports and SS fasteners. The cost shall include transportation, lead and lift all complete as required						
2.1	110mm dia	Rmt	QRO				
2.2	75mm dia	Rmt	40				
3.0	Supply, fixing, testing and commisioning of uPVC Pressure pipe (Ring-fit) soil waste vent pipe of Class 5 (10 Kgf/cm2) conforming to IS 4985-2000 including all fittings (IS 7834 for moulded fittings and IS 10124 for fabricated fittings), for pipes buried below ground, jointing with PVC solvent, encasing the pipe with 150mm thick 1 : 4 : 8 PCC. Pipe shall be layed on consolidated surface with pre determined slope. The cost shall include transportation, lead and lift all complete as required. Cost for excavation, back filling the earth and consolidating the same will be measured and paid separately.						
a	160 mm dia	Rmt	120				

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
b	110 mm dia	Rmt	QRO				
c	75 mm dia	Rmt	30				
4.0	Supply and fixing PVC 'P' or 'S' of multi port, deep seal floor trap with self cleansing design. The cost shall include cutting and making good the floor wherever required, including cost of materials, labour including lead and lift, all complete as per specifications. (100mm dia inlet and 50 mm / 75mm outlet)	Nos.	6				
6.0	Providing and fixing of square mouth SW gully trap 100mm dia grade 'A' complete with C.I grating burnt brick masonry with CM (1:4) and plastering with water tight heavy duty double seal C.I cover, frame of 45x45 cm size The weight of the cover to be not less than 4.52 kg of frame to be not less than 2.75 Kg.						
a	450 X 450mm size 'P' trap	Nos	4				
7.0	Constructing brick masonry for manholes/ inspection chambers with burnt bricks & cement mortar 1 : 5. Foundation concrete 1: 4: 8, inside plastering 15mm thick with C.M 1:2 finished smooth with floating coat of cement neatly finished with water proofing to required grade and making channel in cement concrete 1:3:4 neatly finished complete as per standard design and as per the drawing. Each manhole should be provided with CI rungs placed appropriately conforming to IS standards. Note: 1. All manholes to be constructed as per IS 4111 (Part1) specification 2. Manhole covers are separately listed below						
a	Inside size of 450mm x 450mm and depth not exceeding 500mm	Nos	QRO				
b	Inside size of 600mm x 600mm and depth not exceeding 800mm	Nos	2				
c	Inside size of 900mm x 900mm and depth not exceeding 1000mm	Nos	2				
d	Inside size of 1200mm x 1200mm and depth not exceeding 2200mm	Nos	8				
8.0	Supply and fixing of double seal, pre-cast RCC, heavy duty inspection chamber cover with frames of the following sizes. Construction of pre-cast RCC cover to be made to withstand atleast 25 metric tonnes of loading of following size						
a	600mm x 600mm	Nos	12				
	SUB - TOTAL (C)						
D	INTERNAL WATER SUPPLY PIPING WORKS						
	Admn. Block- internal water supply works:						
1.0	Supply, fixing, testing and commisioning of CPVC pipes (SDR 11) conforming to ASTM D-2846 standard including all CPVC fittings like tees, elbows, bends, unions, coupling, reducer tees, collars etc. The work shall include cutting jointing with solvent cement, pressure testing the joints / pipeline for 10 kg/sq.cm hydraulic pressure, for 2 hours etc. making holes, including chasing in solid block masonry walls with groove cutting machine to required width and depth, making bores / core cutting in walls / beams / foundations and RCC slabs, making good the walls and bores in CC or CM 1:3 as applicable clearing the debris, wrapping of concealed pipes with chicken wire mesh, SS hooks / FRP angle supports for fixing pipes and making good the walls and floors.						
	NOTE: (1) Strictly use SDR-11 grade CPVC pipe and fittings for internal domestic cold water supply up to 54 mm dia. (2) Rate Quoted shall be inclusive of cost of other consumables like hacksaw blade, solvent for CPVC pipe up to 54 mm dia etc.						
a	20 mm dia	Rmt	20				
b	25 mm dia	Rmt	35				
c	32 mm dia	Rmt	10				
d	40 mm dia	Rmt	30				
e	50 mm dia	Rmt	15				
4.0	Supplying, fixing and testing of lever operated Ball valves with fittings of screwed end type. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
a	50 mm dia	Nos.	QRO				
a	40 mm dia	Nos.	4				

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
b	32 mm dia	Nos.	2				
c	25 mm dia	Nos.	2				
d	20 mm dia	Nos.	2				
5.0	Supplying, fixing, testing and commissioning of Slim seal standard lever operated type Butterfly valve PN 1.6 with Bronze / Gunmetal seat duly ISI marked complete with SS nuts, SS bolts, SS washers, gaskets and flanges conforming to IS 13095, of following sizes all complete as required. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications.						
a	65 mm dia	Nos	QRO				
6.0	Supplying, fixing, testing and commissioning of Wafer type C.I. Dual plate Check valve (Non-return) as per IS:5312 with required flanges, SS nuts, SS bolts and gaskets etc. all complete as required of the following sizes. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
a	50 mm dia	Nos	1				
b	40 mm dia	Nos	QRO				
c	32 mm dia	Nos	QRO				
d	25 mm dia	Nos	QRO				
7.0	Supplying, fixing and commissioning Brass body "Y" type Strainer with SS mesh , suitable flanges, SS nuts, SS bolts, gaskets etc. all complete as required. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
a	50 mm dia	Nos	1				
8.0	Supplying & fixing of brass Auto Air vent with isolation valve for cold water supply risers, suitable for working pressure not less than 10 Kg/Sq.cm.						
a	32 mm dia	Nos	QRO				
b	25 mm dia	Nos	QRO				
c	20 mm dia	Nos	1				
9.0	Supplying and fixing high pressure type gunmetal ball float valve of approved quality.						
a	32 mm dia	Nos	2				
10.0	Construction of valve chambers with burnt bricks in CM (1:4) and plastering including excavation and providing heavy duty C.I cover with frame as required.						
a	600 X 600 X 750mm deep for supply	Nos	2				
	SUB - TOTAL (D)						
E	EXTERNAL WATER SUPPLY PIPING WORKS:						
1.0	From RO potable water to match line / river side						
	NOTE: (1) CPVC pressure pipes and fittings - SDR 11 & Schedule 80 PRO (2) Rate Quoted shall be inclusive of cost of other consumables like hacksaw blade, bevel edge cleaning remover, rough emery sheet, pipe cleaner and solvent cement etc.						
a	65 mm dia. (SCH 80) CPVC piping works	Rmt	66				
b	25mm dia. CPVC piping works	Rmt	18.75				
c	20mm dia. CPVC piping works	Rmt	56.25				
1.1	Supplying, fixing and testing of lever operated Ball valves with fittings of screwed end type. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
a	25 mm dia	Nos.	2				
b	20 mm dia	Nos.	2				
1.2	Supplying, fixing, testing and commissioning of Slim seal standard lever operated type Butterfly valve PN 1.6 with Bronze / Gunmetal seat duly ISI marked complete with SS nuts, SS bolts, SS washers, gaskets and flanges conforming to IS 13095, of following sizes all complete as required. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications.						
a	65 mm dia	Nos	1				

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
2.0	From Raw water to water softner treatment plant						
a	80mm dia. CPVC piping works	Rmt	25				
b	65mm dia. CPVC piping works	Rmt	18.75				
c	50mm dia. CPVC piping works	Rmt	12.5				
2.1	Supplying, fixing and testing of lever operated Ball valves with fittings of screwed end type. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
a	50 mm dia	Nos.	1				
2.2	Supplying, fixing, testing and commissioning of Slim seal standard lever operated type Butterfly valve PN 1.6 with Bronze / Gunmetal seat duly ISI marked complete with SS nuts, SS bolts, SS washers, gaskets and flanges conforming to IS 13095, of following sizes all complete as required. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications.						
a	80 mm dia	Nos	1				
b	65 mm dia	Nos	1				
3.0	From treated domestic water to match line / river side						
a	80mm dia. CPVC piping works (SCH-80)	Rmt	QRO				
b	65mm dia. CPVC piping works (SCH-80)	Rmt	12.5				
c	50mm dia. CPVC piping works.	Rmt	12.5				
c	25mm dia. CPVC piping works.	Rmt	37.5				
3.1	Supplying, fixing and testing of lever operated Ball valves with fittings of screwed end type. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
a	50 mm dia	Nos.	1				
c	25 mm dia	Nos.	1				
3.2	Supplying, fixing, testing and commissioning of Slim seal standard lever operated type Butterfly valve PN 1.6 with Bronze / Gunmetal seat duly ISI marked complete with SS nuts, SS bolts, SS washers, gaskets and flanges conforming to IS 13095, of following sizes all complete as required. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications.						
a	80 mm dia	Nos	1				
a	65 mm dia	Nos	1				
4.0	From treated domestic water to match line / river side						
a	80mm dia. CPVC piping works (SCH-80)	Rmt	82				
c	20mm dia. CPVC piping works.	Rmt	70				
4.1	Supplying, fixing and testing of lever operated Ball valves with fittings of screwed end type. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications						
d	20 mm dia	Nos.	1				
4.2	Supplying, fixing, testing and commissioning of Slim seal standard lever operated type Butterfly valve PN 1.6 with Bronze / Gunmetal seat duly ISI marked complete with SS nuts, SS bolts, SS washers, gaskets and flanges conforming to IS 13095, of following sizes all complete as required. The cost shall include cost of materials, labour including lead and lift charges, all complete as per specifications.						
a	80 mm dia	Nos	1				
	SUB - TOTAL (E)						
F	RAIN WATER DISPOSAL PIPING WORKS:						
	Admn. Block & Work shop areas - Rain water piping works:						
1.0	Supply, fixing, testing and commnsioning of uPVC Pressure pipe (Ring-fit) soil, waste vent pipe of Class 3 (6 Kg/cm²) conforming to IS 4985-2000 including all fittings (IS 7834 for moulded fittings and IS 10124 for fabricated fittings), Eg: Bends, tees, elbows collars, junction, inspection doors, cowls, offset aces pipes, jointing with PVC solvent, running of pipes in the shafts / ceiling with FRP brackets and SS fasteners, chasing / chipping walls using groove cutting machine, making bores / core cutting in slab / beam / wall and making good of the same, cost shall include providing steel brackets, FRP supports, Pipe supports and SS fasteners. The cost shall include transportation, lead and lift all complete as required						

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
a	110 mm dia	Rmt	145				
b	75 mm dia	Rmt	QRO				
2.0	Supply, fixing, testing and commisioning of uPVC Pressure pipe (Ring-fit) soil waste vent pipe of Class 5 (10 Kg/cm ²) conforming to IS 4985-2000 including all fittings (IS 7834 for moulded fittings and IS 10124 for fabricated fittings), for pipes buried below ground, jointing with PVC solvent, encasing the pipe with 150mm thick 1 : 4 : 8 PCC. Pipe shall be layed on consolidated surface with pre determined slope. The cost shall include transportation, lead and lift all complete as required. Cost for excavation, back filling the earth and consolidating the same will be measured and paid separately						
a	160 mm dia	Rmt	150				
b	110 mm dia	Rmt	QRO				
3.0	Making rain water Spouts/ grating with PVC bends, elbows, tees etc., 150 X 150mm C.I grating.	Nos	4				
4.0	Providing, fixing, testing and commissioning of PVC fabricated rain water head / khurras dome type grating with puddle flange to fix head in RCC slab specially fabricated from minimum 4mm thick PVC sheet, including removable heavy duty PVC grating of 50 x 3 mm thick PVC flats (Round or Square) as per approved design The quoted rate shall include for necessary grouting the khurras base with approved sealant complete all as shown in the drawing and as specified.	Nos.	4				
	SUB - TOTAL (F)					-	-
G	PUMPS INSTALLATION WORKS:						
1.0	Supply, installation, testing and commissioning of centrifugal mono bloc for domestic transfer pump of following duty condition. Cost to include necessary fittings, starters, panel and accessories all complete as required <i>Duty Condition:</i> 2.8 LPS at 30 m head Note: One set consists of 1 working and 1 standby pump	Nos.	2				
	SUB - TOTAL (G)						
H	REVERSE OSMOSIS (RO)						
	Supply, installation, testing and commissioning of 500LPH RO plant considering pumps, interconnecting pipe, rejection water drain pipe, control panel and electrical control cables etc., including all necessary accessories as required.	LS	1				
	SUB - TOTAL (H)						
I	MISCELLANEOUS WORKS:						
1.0	Supply and fixing of FRP supports, channels and other supporing structure for suspending, mounting pipes and other fittings.	Kgs	350				
2.0	Supply and fixing of water metering station ball valves, water meter, check valve, strainer, expansion belows, flanges, couplings and consumables etc. as per standard specifications.	Nos.	1				
3.0	Making of core cutting in RC slab of maximum 150mm thick of following diameter						
a	75mm dia	Nos.	QRO				
b	100mm dia	Nos.	15				
c	125mm dia	Nos.	15				
d	150 mm dia	Nos.	QRO				
4.0	Providing and fixing of MS brackets fabricated out of L- angle/ flats of required sizes with 6mm / 8mm GI 'U' clamps GI washers for clamping uPVC pipes. The work shall including with one coat of anti-corrosion and one coat of black enamel paint has to be done, grouting in RCC slabs, masonry wall / ducts with cement concrete and making good the walls. (at every 2.5m c/c intervals)	Kgs	600				

S.NO	DESCRIPTION	UNIT	QTY	RATE		AMOUNT	
				SUPPLY	ERECTION	SUPPLY	ERECTION
5.0	Providing and fixing in place liquid level controller with high and low level indicator in the Overhead tanks and underground sump along with associated wiring and connections. All complete as required	Nos	2				
6.0	Supply and grouting of SS rungs made of 20mm dia SS pipe 150mm wide for UG sump, to be fixed as per the detailed drawing	Nos	42				
5.0	Provision of puddle flanges with M.S. plate of 6mm thick, the plate to be welded to GI pipe of following sizes for storage water tanks (refer drawing for construction)						
a	40 mm dia	Nos	3				
b	50 mm dia	Nos	4				
c	65 mm dia	Nos	3				
d	80 mm Dia	Nos	3				
e	150 mm Dia	Nos	1				
f	200 mm Dia	Nos	2				
	SUB - TOTAL (I)						
	TOTAL						
	GST 18%						
	TOTAL - SUPPLY AND INSTALLATION						

Note:

L1 will be arrived based on the total amount quoted for works excluding GST.

Un-Price bid: Price bid without price & with percentage of taxes & duties and details like quoted/Nil/Included, shall be submitted along with the technical bid.