National Highways and Infrastructure Development Corporation Ltd
(Ministry of Road Transport & Highways)
Government of India

NATIONAL COMPETITIVE BIDDING

Supplying, Installation & Commissioning of Fire Fighting System from Automated Car Parking Building in Transport Bhawan to Pump Room of Shram Shakti Bhawan at Connaught Place,New Delhi.

BID DOCUMENT

PTI Building, 3rd Floor, Parliament Street, New Delhi
May, 2018

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(SECTION-I)
NOTICE INVITING TENDER

National Highways & Infrastructure Development Corporation Ltd.

Notice Inviting Tender

(National Competitive Bidding through e-Tendering mode only)

1. NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. of India (hereinafter called "the Employer") hereby invites item rate bids on two bid systems through e-tendering for the following work from experienced firms/organizations excluding those firms who have been declared as non- performing by MoRTH/NHAI/MoSHIP/NHIDCL or the firms those are blacklisted/ debarred for specified period by MoRTH/NHAI/MoSHIP/NHIDCL and against whom such action is under process by MoRTH/ NHAI/MoSHIP/NHIDCL.

Name of Work	Contract No.	Estimated Cost (Rs. in Lakh)	Time of Completion
Supplying, Installation & Commissioning of Fire Fighting System from Automated Car Parking Building in Transport Bhawan to Pump Room of Shram Shakti Bhawan at Connaught Place, New Delhi.	NHIDCL/ACP/Fire Fighting System/2018	37.28	2 months

2. Cost of Bid Documents (Non-Refundable): Rs. 10,000/-

3. The preliminary requirements of bidding firm/contractor for the above work are mentioned as under: (detailed requirements are given in the Bid Document).

Bid Security (Rs.)	Average Annual Turnover during last 3 financial years (Rs. in Lakh)	Work of Similar Nature during last 5 years.
75,000/-	**14.91/-**	**One work of Rs. 29.82 lakhs (80% of estimated cost)** **(or)** **Two works of Rs. 22.37 lakh (60% of estimated cost)** **(or)** **Three works of Rs. 14.91 lakh (40% of estimated cost)**

4. The scope of work:

The Scope of Work is as per Bill of Quantities and Technical Specification (as in Section VI of RFP) for the subject work.

5. The authorized signatory holding Power of Attorney shall only be the Digital Signatory. In case, authorized signatory holding Power of Attorney and Digital Signature are not the same, the bid shall be considered non-responsive.

6. The detailed tender document can be viewed from the website www.eprocure.gov.in & www.nhidcl.com from 18.05.2018 to 18.06.2018 upto 17:00 Hrs. "NHIDCL e-procure portal is to be used through computer having Window Operating System only"

7. The Complete Bid Document can be downloaded with effect from 18.05.2018 to 18.06.2018 upto 17:00 Hrs from the NHIDCL e-Tendering portal free of cost. To participate for bidding, bidders have to pay non-refundable document fee of Rs. 10,000/- in the form of DD drawn on any schedule bank in India in favour of "**National Highways & Infrastructure Development Corporation Ltd."** payable at New Delhi.

8. Bid should be submitted online in the prescribed format given in the website. No other mode of submission is acceptable.

9. The Amendments/clarifications to the bid document if any will be hosted on the above website only.

10. For any clarification, the following office may be contacted:

Col Rajeev Sood (Retd)
General Manager (Technical)
National Highway & Infrastructure Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street,
New Delhi-110001
Ph. 011-**2346 1621**
Email: gm5@nhidcl.com

11. Conditional bids would be rejected.

12. NHIDCL reserves the right to accept/reject any or all the bids without assigning any reasons thereof.

13. Schedule of Bidding Process

The Authority shall endeavour to adhere to the following schedule:

Bid Document /NIT Publishing Date	18.05.2018 (1500hrs)
Bid Document Download / Start Date	18.05.2018 (1500 hrs)
Clarification Start Date (Pre bid queries)	18.05.2018 (1500 hrs)
Clarification End Date(Last date for receipt of pre bid query)	25.05.2018 (1100 hrs)
Pre bid meeting	25.05.2018 (1500 hrs)
Authority's response to queries latest by	30.05.2018 (1500 hrs)
Bid Submission Start Date	01.06.2018 (1000 hrs)
Bid submission End Date (online & physical Copy)	18.06.2018 (1700 hrs)
Opening Date of Technical Bid	19.06.2018 (1300 hrs)
Date of uploading of list of Technically Qualified Applicants	To be intimated later
Date of Opening of Financial Bids of Qualified Applicants	To be intimated later

Col Rajeev Sood (Retd)
General Manager (Technical)
NHIDCL, 3rd Floor, PTI building 4, Parliament Street, New Delhi-110001
Ph. 011-**2346 1621**
Email: gm5@nhidcl.com

(SECTION-II)
INSTRUCTIONS TO BIDDERS
&
APPENDIX TO BID

Section II: Instructions to Bidders

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Section II: Instructions to Bidders (ITB)

A. General

1. Scope of Bid

1.1 The National Highways & Infrastructure Development Corporation Ltd (NHIDCL) hereinafter called " The Employer " invites short term bids for the work "**Supplying, Installation & Commissioning of Fire Fighting System from Automated Car Parking Building in Transport Bhawan to Pump Room of Shram Shakti Bhawan at Connaught Place,New Delhi"**

CONTRACT PACKAGE NO: NHIDCL/ACP/Fire Fighting System/2018

1.2 The successful bidder will complete the contract works in **2 months** period commencing within 10 days from the date of issue of notice to proceed with the works.

Throughout these bidding documents , the terms " bid " and " tender " and their derivatives (bidder/tenderer, bid/tender , bidding/tendering etc.) are synonymous .

1.3 The Scope of Work is as per BoQ for the subject work.

2. Source of Funds

The expenditure on this project will be met by National Highways & Infrastructure Development Corporation Ltd. (NHIDCL).

3. Eligible Bidders

I. List of Similar Projects completed during last 5 years along with copy of the Work Orders, Client's Completion Certificate, etc. (at least one work of 80% of the estimated cost (or) 2 works of 60% of the estimated cost (or) 3 works of 40% of the estimated cost, each work completed during the last 5 years). The original WO and Client's Completion Certificate shall be produced on demand during the evaluation of technical bid.

II. Audited Balance Sheet and Profit & Loss Account Report of last 3 Financial Years i.e. ending 31st March 2018

III. Permanent Account Number (PAN).

IV. **GST Registration** details as applicable.

V. Copy of valid license for the company as applicable to be furnished.

This Invitation for Bids is open to all bidders meeting the qualification requirements prescribed in this document.

Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent

practices by the Central Government, the State Government or any public undertaking, autonomous body, authority by whatever name called under the Central or the State Government.

4. Qualification of the Bidder

4.1 NHIDCL has to finalize its purchase / contracts within a limited time schedule. Therefore, it may not be feasible for NHIDCL to seek clarifications in respect of incomplete offers. Prospective bidders are advised to ensure that their bids are complete in all respects and conform to NHIDCL"s terms, conditions and bid evaluation criteria of the tender. Bids not complying with NHIDCL"s requirement may be rejected without seeking any clarification.

All bidders shall furnish the following information and documents with their bids in Section-III, Qualification Information.

(a) Scanned copies of original documents defining the constitution or legal status, place of registration, and principal place of business; scanned copy of written Power of Attorney of the signatory of the Bid to commit the Bidder; & original copy of Written Power of Attorney to be submitted in the envelop of physical form. (Pl. refer clause 12 of ITB).

(b) Scanned copy of experience certificate of works of similar nature for each of the last five financial years (commencing from year 2012-13) as mentioned in Cl. 3 (I) with certificates from the concerned officer of the rank of Executive Engineer or equivalent;

(c) Scanned copy of reports on the financial standing of the Bidder, and a certificate from Chartered Accountant as a proof of turnover for the last three financial years;

(d) Scanned copy of information regarding any litigation or arbitration during the last five years in which the Bidder is involved, the parties concerned, the disputed amount, and the present status;

Deleted.

A. To qualify for award of the contract, each bidder in its name should have the following;

(a) Achieved an average annual financial turnover equal to 40% of total estimated cost the amount indicated in NIT during last three financial years (ending financial year 2017-18), duly certified by Chartered Accountant.

(b) Satisfactorily completed, as a prime contractor (or as a nominated subcontractor provided further that all other qualification criteria are satisfied) similar works during last five years (i.e. during the period commencing from the year 2012-13) are satisfied.

Similar Works include Supplying, Installation & Commissioning of Fire Fighting System.

B (a) Each bidder must upload the scanned copies of following documents along with the Submission of online bidding:

(i) An affidavit on a Stamp Paper, duly attested from the Notary Public, that the information furnished with the bid documents is correct in all respects; and

(ii) Such other certificates as defined in Section- III.

(iii) Failure to submit the certificates/documents as specified above shall make the bid non- responsive.

(b) Deleted

Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

(i) Made misleading or false representations in the forms, statements, affidavits and Attachments submitted in proof of the qualification requirements; and/or

(ii) Record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc. or debarring from MoRTH/NHIDCL/NHAI/MoSHIP work etc.

(iii) Tampered the bid document in any manner.

5. One Bid per Bidder

(a) Each Bidder shall submit only one Bid for each package. A Bidder who submits more than one Bid for the same work, will be disqualified. The Bidder can, however, submit bids for more than one package if meeting the qualifying criteria.

6. Cost of Bidding

(a) The Bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will, in no case, be responsible or liable for those costs.

7. Site Visit

(a) The Bidder, at his own cost, responsibility and risk, is encouraged to visit, examine and familiarize himself with the Site of Works and its

surroundings.

(b) Contractor has to obtain all kind of road permits (Being New Delhi Parliament Street-Highly security sensitive area) and labour permissions from concern authority to enter the building. The costs of visiting the Site shall be at the Bidder's own expense. He may contact the concerned officer of NHIDCL in this regard.

8. Content of Bidding Documents

The set of bidding documents comprises the documents listed below and addenda (if any) issued in accordance with Clause 10:

Volume- I:-

1. Notice Inviting Tender
2. Instructions to Bidders & Appendix to Bid
3. Qualification Information
4. Forms of Bank Guarantee, Agreement & LOA
5. Conditions of Contract & Contract Data
6. Technical Specifications
7. Additional Conditions

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The bidder is expected to examine carefully all instructions, conditions of contract, contract data, forms, terms, specifications, bill of quantities, etc. in the Bid Document. Failure to comply with the requirements of Bid Documents shall be at the bidder's own risk.

Bids, which are not substantially responsive to the requirements of the Bid Documents, shall be rejected.

9. Clarifications on Bid Documents

A prospective Bidder requiring any clarification on the bid documents may notify the Employer in writing or through e-mail at the Employer's address within the time frame indicated in the Notice Inviting Tender. The Employer will respond to any request for clarification r within the time frame indicated in the Notice Inviting Tender. Copies of the Employer's response will be hosted on website or which are required in the opinion of the Employer, including a description of the enquiry, but without identifying its source.

10. Amendment of Bidding Documents

Before the deadline for submission of bids, the Employer may modify the Bidding Documents by issuing addenda.

Any addendum thus issued shall be part of the Bidding Documents and shall be hosted on NHIDCL website and e-tendering portal. Bidders are advised to keep them self updated of all the addendums issued on e-

tendering portal by daily checking the e-tendering portal and, NHIDCL does not assume any responsibility in case the bidder fails to do so and does not take any action, if required, with respect any relevant addendum.

C. Preparation of Bids

11. Language of Bid

All documents relating to the Bid shall be in English.

12. Documents Comprising the Bid

The e-bid submitted by the bidder shall be in two separate parts for each package.

Part-I - This shall be named Technical Bid and shall comprise of information submitted in Section-III.

Part-II - It shall be named Financial Bid and shall comprise of Priced Bill of Quantities.

Documents to be submitted in physical form must reach the NHIDCL by 17:00 Hrs on Bid Due Date.

Though, the scanned copies of following documents is required to be uploaded during submission of e-bid on the e-tendering portal of NHIDCL, as per clause 12 above, however, following original documents in physical form shall be submitted in a sealed envelope by 17:00 Hrs on the date of submission of bid and addressed to the addressee given in the NIT duly super scribed “Name of Work, Contract number, Bid due date and time”. Name and address of the bidder should also be indicated on the envelope.

a) Copy of Acknowledgement for Tender Submission and EMD/Bid Security
b) Bid Document Fee (Cost of Bid Document)
c) Written Power of Attorney of the signatory (whose digital signature certificate is used during e-tender submission) of the bidder to commit the bid
d) Affidavit duly notarized (as per the format provided in Section III)
e) Original experience certificate or Notarized copy of certificate duly signed by authorized signatory.
f) Undertakings mentioned in Section III (Qualification Information) of this document (duly notarized).

The following documents, which are not submitted with the bid, will be deemed to be part of the bid.

Section	Particulars
1.	Notice Inviting Tender
2.	Instruction to the bidders
3.	Conditions of Contract
4.	Contract Data
5.	Scope of work (BoQ)
6.	Technical Specifications

13. Bid Prices

3.1 The Contract shall be for the whole Works, as described in Clause 1.1 based on the priced Bill of Quantities submitted by the Bidder.

3.2 The bidder shall quote bid prices on appropriate format enclosed as part of tender document on e-tender portal of NHIDCL. The items for which no rate or price is entered by the Bidder will be required to be executed free of cost and shall be deemed covered under the other rates and prices in the Bill of Quantities quoted.

3.3 The Price quoted by the Bidder shall be considered inclusive of all taxes including GST.

3.4 The rates and prices quoted by the Bidder shall be fixed for the duration of the Contract and shall not be subject to adjustment. No extra cost towards escalation shall be payable on the contract package.

14. Currencies of Bid and Payment

4.1 The unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees. All payments shall be made in Indian Rupees.

15. Bid Validity

15.1 Bids shall remain valid for a period of **120 days** after the deadline date for bid submission specified in Clause 20. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

15.2 In exceptional circumstances, prior to expiry of the original time limit, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be

made in writing or by cable. A bidder may refuse the request without forfeiting his bid security. A bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his bid security for aperiod of the extension, and in compliance with Clause 16 in all respects.

16. Bid Security

16.1 The Bidder shall furnish, as part of the Bid, Bid Security in form DD, for the amount as specified in the Appendix to ITB. The Bid Security shall be in favour of **National Highways & Infrastructure Development Corporation Ltd**, payable at New Delhi as indicated in Appendix to ITB.

16.2 Any bid not accompanied by an acceptable bid security as mentioned above shall be rejected by the Employer as non -responsive.

16.3 The Bid Security of unsuccessful bidders will be returned within 28 days of the end of the Bid validity period specified in Sub-Clause 15.1 or award of contract package, whichever is earlier.

16.4 The Bid Security of the successful Bidder will be discharged when the Bidder has signed the Agreement and furnished the required Performance Security.

16.5 **The Bid Security will be forfeited:**

a) if the Bidder withdraws the Bid after its submission during the period of Bid validity;
b) in the case of a successful Bidder, if the Bidder fails within the specified time limit to
   (i) Sign the Agreement; and/or
   (ii) Furnish the required Performance Security.
   (iii) Commence the work after signing the Agreement within 10 days.

17. Alternative Proposals by Bidders

Bidder shall submit offers that fully comply with the requirement of the Bidding Documents. Conditional offer or alternate offer will not be considered further in the process of evaluation and the bid will be declared non-responsive.

18. Format and Signing of Bid

18.1 The Bidder shall submit e-bid comprising of the documents as described in Clause 12 of the ITB.

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18.2 The documents to be submitted in the physical form along with the Bid security (DD) for fees/security shall be typed or written in ink and shall be signed by a person duly authorized to sign on behalf of the bidder. All the pages of the documents as mentioned here shall be signed by the person/persons signing the bid. Documents as mentioned here shall contain no overwriting, alterations or additions, except those to comply with instructions, issued by the employer or as necessary to correct errors made by the bidder, in which case such corrections shall be made by scoring out the cancelled portion, writing the correction and signing and dating it along with the stamp by the person or persons signing the Bid.

D. Submission of Bids

19. Marking of Bids

The documents to be submitted in physical form as per clause 12 of ITB shall be submitted in a sealed Envelope super scribed as “Documents in Physical Form ” at the top left corner. In case of any discrepancy between documents submitted online and documents submitted in the physical form, the documents submitted in physical form shall prevail over the documents submitted through online process.

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20. Deadline for Submission of Bids

20.1 The Bidder shall ensure that the complete e-Bid is uploaded on NHIDCL e-tender portal on or before the Bid Due Date before the time specified in NIT/e-portal “NHIDCL e-procure portal is to be used through computer having Window Operating System only”. The Bidder is further required to submit Documents in Physical Form on or before the Bid Due Date and before the time of submission as specified in Clause 12 of ITB, at the following address:-

Col Rajeev Sood (Retd)
General Manager (Technical)
National Highway & Infrastructure Development Corporation Ltd. PTI Building, 3rd Floor, 4, Parliament Street,
New Delhi-110001
Ph. 011-23461621
Email: gm5@nhidcl.com

20.2 In the event of the specified date for the submission of documents in Physical form being declared a holiday for the Employer, the same will be received up to the specified time on the next working day.

20.3. NHIDCL assumes no responsibility for inability of a bidder to submit bids through NHIDCL's e-tendering portal on account of delay in submission at bidder's end. Bidder shall ensure that they submit the bid well before the "Due Date & Time of Bid-Submission". NHIDCL shall not be responsible if bidder is not able to submit the bid on account of failure in network/internet connection or any other technical reason.

20.4 The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will then be subject to the new deadline.

21. Late Submission of Document in Physical Form:

Any document in physical form if received by the Employer after the deadline prescribed in Clause 20 will be returned unopened to the Bidder and also the e-bid submitted by such bidder shall not be considered.

22. Modification and Withdrawal of Bids

22.1 Bidders may modify or withdraw their e-bids as directed on the e-tendering portal, before the Bid Due Date and time as prescribed in Clause 20.

22.2 No bid may be modified after the deadline for online submission of bids.

22.3 Withdrawal or modification of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15.1 above or as extended pursuant to Clause 15.2 shall result in the forfeiture of the Bid security pursuant to Clause 16.

22.4 Bidders may modify the prices of their bids before deadline of online submission of bid.

22.5 No Late and delayed bids after Bid Due date/time shall be permitted in e tendering portal System. Time being displayed on our e-Tendering Portal shall be final and binding on bidder and bids have to be submitted by bidders considering this time only and not the time as per their location/country.

E. Bid Opening and Evaluation

23. Bid Opening

23.1 Bid opening shall be carried out in two stages. Firstly, 'Technical Bid' of all the bids received (except those received late) shall be opened on the date and time mentioned in Notice Inviting Tender (NIT). 'Financial Bid' of those bidders whose technical bid has been determined to be substantially responsive shall be opened on a subsequent date through online process of e- tendering, which will be notified to such bidders.

23.2 The Employer will open the "Technical Bid" of all the bids received (except those received late), in the presence of the bidders/bidders' representatives who choose to attend at the time, date and place specified in the **NIT**. In the event of the specified date for the submission of bids being declared a holiday for the Employer, the Bids will be opened at the appointed time and location on the next working day.

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23.3 In all cases, the amount of Bid Security, forms and validity shall be announced. Thereafter, the Employer at the opening as the Employer may consider appropriate, will announce the bidders' names and such other details.

23.4 The Employer will prepare Minutes of the Bid opening, including the information disclosed to those present.

(i)The bids accompanied with valid bid security, bid document fee, Tender Processing fee will be taken up for evaluation with respect to the information Furnished in Part I of the Qualification Information and other bid.

(ii) As soon as possible, the Evaluation Committee will finalize the list of responsive bidders whose financial bids are eligible for consideration. However, to assist in the examination, evaluation of technical bids, the Employer may at his discretion, ask any bidder for clarification of his bid, however, no additional documents in support of clarification will be entertained.

23.5 The Employer shall inform the bidders, whose technical bids are found responsive, of the date, time and place of opening of the financial bids. The bidders so informed, or their representative, may attend the meeting of opening of financial bids.

23.6 At the time of the opening of the 'Financial Bid', the names of the bidders whose bids were found responsive will be announced. The financial bids of only these bidders

will be opened. The responsive bidders' names, the Bid prices, the total amount of each bid, and such other details as the Employer may consider appropriate will be announced by the Employer at the time of bid opening. Any Bid price, which is not read out and recorded, will not be taken into account in Bid Evaluation.

23.7 The Employer shall prepare the Minutes of the opening of the Financial Bids.

24. Process to be Confidential

27.1 Information relating to the examination, clarification, evaluation, and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other person not officially concerned with such process until the award to the successful Bidder has been announced. Any attempt by a Bidder to influence the Employer's processing of bids or award decisions may result in the rejection of his Bid

25. Clarification of Bids and Contacting the Employer

28.1 To assist in the examination, evaluation, and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing or by cable, but no change in the price or substance of the Bid shall be sought, offered, or permitted.

28.2 No Bidder shall contact the Employer on any matter relating to his bid from the time of the bid opening to the time the contract is awarded.

28.3 Any effort by the Bidder to influence the Employer in the Employer's bid evaluation, bid comparison or contract award decisions may result in the rejection of the Bidders' bid.

26. Examination of Bids and Determination of Responsiveness

29.1 During the detailed evaluation of "Technical Bids", the Employer will determine whether each Bid

(a) meets the eligibility criteria defined in Clauses 3 and 4 of ITB;

(b) the required documents in physical form submitted by the bidder as well as the documents uploaded by the bidder are in order; and

(c) Is substantially responsive to the requirements of the Bidding Documents. During the detailed evaluation of the "Financial Bids", the responsiveness of the bids will be further determined with respect to the remaining bid conditions, i.e., priced bill of quantities, technical specifications etc.

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27. Evaluation and Comparison of Financial Bids

27.1 The Employer will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 26.

27.2 If the Bid of the successful Bidder is seriously unbalanced in relation to theEngineer's/Employer's estimate of the cost of work to be performed under the contract, theEmployer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the performance security set forth in Clause 32 be increased and an additional performance security of 05 (five) percent may be obtained at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.

27.3 A bid, which contains several items in the Bill of Quantities which are unrealistically priced low and which cannot be substantiated satisfactorily by the bidder, may be rejected as non-responsive.

28. Price Preference

There will be no price preference to any bidder.

F. Award of Contract

29. The Employer will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the bidding documents and who has offered the **Lowest Bid Price**, provided that such Bidder has been determined to be:

(a) Eligible in accordance with the provisions of Clause 3, and
(b) Qualified in accordance with the provisions of Clause 4

30. Employer's Right to Accept any Bid and to Reject any or all Bids

Notwithstanding Clause 30, the Employer reserves the right to accept or reject any Bid, and to cancel the bidding process and reject all bids, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or bidders or any obligation to inform the affected Bidder or bidders of the grounds for the Employer's action.

31. Notification of Award and Signing of Agreement.

31.1 The bidder whose Bid has been accepted will be notified of the award by the Employer prior to expiration of the Bid validity period by cable, telex or facsimile confirmed by registered letter. This letter (hereinafter and in the Part I General Conditions of Contract called the"Letter of Acceptance") will state the sum that the Employer will pay to the Contractor in consideration of the execution, completion and maintenance of the Works, by the Contractor as prescribed by the Contract (hereinafter and in the Contract called theContract Price").

31.2 The notification of award (LOA) will constitute the formation of the Contract, subject Only to the furnishing of a performance security in accordance with the provisions of Clause 32.

31.3 The Agreement will incorporate all agreements between the Employer and the successful Bidder. It will be signed by the Employer and the successful Bidder after the performance security is furnished.

31.4 Upon furnishing by the successful Bidder of the Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful.

32. Performance Security

33.1 Within 10 (ten) days after receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security of **05 (five) percent of the Contract Price**, valid for the period of 28 days after the expiry of defect liability period of 12 (twelve) months plus additional security for unbalanced Bids.

33.2 The performance security shall be in the form of a Bank Guarantee in the name of the Employer, from a Bank as applicable in case of bid security defined in Appendix to ITB.

33.3 Failure of the successful bidder to comply with the requirement of sub-clause 32.1 shall constitute sufficient ground for cancellation of the award and forfeiture of the bid security.

33.4 The successful bidder to whom 'LOA' has been issued is required to sign the agreement at Employer's Office within 15 days of issue of LOA.

33. Advances- Deleted

34. Corrupt or Fraudulent Practices

34.1 The Employer will reject a proposal for award if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question and will declare the firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract with National Highways & Infrastructure Development Corporation Ltd. / MoRTH/NHAI/MoSHIP/ and any other agencies, if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for the contractor, or in execution.

34.2 The Employer requires the bidders/Contractors to strictly observe the laws against fraud and corruption enforced in India, namely, Prevention of Corruption Act, 1988.

35. WARRANTY AND SUPPORT

The Warranty shall be:

1. On-site, comprehensive and back-to-back from OEM for a period of 6 months from the date of acceptance/installation of products or as recorded in MB.
2. Advanced replacement of hardware
3. Software updates and upgrades at no cost to MoRTH
4. L2 support from OEM
5. On-site support from bidder for day to day operational issues as and when arises.

Appendix to ITB

The Employer should fill out this Appendix to ITB before issuing the bidding documents The insertions should correspond to the information provided in the Invitation for Bids.

Instructions to Bidders:
Clause Ref: (1.1)
The Employer is **"**Managing Director, National Highways & Infrastructure Development Corporation Ltd., PTI Building, 3rd Floor , 4, Parliament Street, New Delhi-110001

Clause Ref: (16)

The amount of Bid Security for the package shall be as indicated below and must be in **the form of DD** in favour of "National Highways & Infrastructure Development Corporation Ltd." payable at New Delhi.

Bid Security: Rs.75,000/-

Demand Draft should be from any scheduled Indian Bank or a foreign Bank located in India**/**and approved by the Reserve Bank of India (RBI).
Bid Security may be issued by the following banks.

(i)State Bank of India or its subsidiaries

(ii) Any Indian nationalized bank

(iii) IDBI/ICICI bank

(iv) A Foreign bank (issued by a branch outside India) with a counter guarantee from SBI or its subsidiaries or any Indian nationalized Bank.

(v) Export Import bank of India

(vi) Any RBI approved scheduled commercial bank having net worth of more than Rs.500 Crore as per latest Annual Report of the bank. In the case of a

Foreign Bank (issued by a branch in India), the net worth in respect of the Indian operation shall only be taken into account and acceptable to Employer.

The acceptance of the Guarantee shall also be subject to the following conditions

i) The capital adequacy of the Bank shall not be less than the norms prescribed by RBI (presently 9, with effect from 31st March 2003, 10)

ii) The Bid Security issued by a cooperative Bank shall not be accepted.

SECTION III

QUALIFICATION INFORMATION

(To be filled by Bidder)

The information to be filled in by the Bidder in this section & document submitted in physical form will be used for the purposes of post qualification as provided for in Clause 4, Section II of the "Instructions to Bidders". This information will not be incorporated in the Contract.

Qualification Information

1. For Individual Bidders

(a) Year of Constitution

(b) Legal status of Bidder (Proprietorship/Partnership or Pvt. Ltd. firm)

[Upload scanned copy of original]

(c) Place of registration:

_____

(d) Principal place of business:

_____

Power of attorney of signatory of Bid *[Upload scanned copy & also supply Original copy in envelop of physical form]*

1.2. Total value of similar type of work performed in the last five years **(refer ITB Clause 4.4 A (a)**

1.3 Average Annual Turnover:

(Upload scanned copies of certificate from Chartered Accountant & also supply original certificate from Chartered Accountant)

2017-2018----------

2016-2017----------

2015-2016----------

Total ----------

Average per year

1.4 Work of a similar nature, performed as prime contractor during the last five years as per ITB Clause 4.4A (b).

Project Name	Name of the Employer	Descriptio of work	Contrac No.	Value of Contrac (Rs. Crore)	Date of issue of work order	Stipulated Period of completion	Actual date of completion	Remarks explaining reasons delay & work Complete

**** Upload certificate(s) from the Employer (to be given by an officer at the rank of Executive Engineer or equivalent & also supply original or certified copy in physical form in envelope)***

1.5 Deleted.

1.6 , Deleted

1.7. Information on litigation history in which the Bidder is involved.

Other Party (ies)	**Employer**	Cause of Dispute	**Amount involved**	**Remarks showing Present Status**

2. Bidders should upload the scanned copy of the following affidavits/ undertakings as per formats enclosed hereinafter & also send original copy of Affidavit/Undertakings:

(i) Affidavit (it should be on stamp paper attested by Notary Public)

(ii) Undertaking that the Bids shall remain valid for the period specified in Clause 15.1 (it should be on stamp paper attested by Notary Public).

AFFIDAVIT (on Non - Judicial Stamp Paper)

1. I, the undersigned, do hereby certify that all the statements made in the enclosed attachments are true and correct.

2. The undersigned also hereby certifies that neither our firm M/s _____ have abandoned any work on National Highways & Infrastructure Development Corporation Ltd nor any contract awarded to us for such works have been rescinded, during last five years prior to the date of this bid.

3. The undersigned hereby authorize(s) and request(s) any bank, person, firm or corporation to furnish pertinent information deemed necessary and requested by NHIDCL to verify this statement or regarding my (our) competence and general reputation.

4. The undersigned understands and agrees that further qualifying information may be requested, and agrees to furnish any such information at the request of the NHIDCL and within the prescribed time.

_____

(Signed by the Authorised Representative of the Firm)

_____

Name of the Representative

_____

Name of Firm

_____

DATE

(To be notarized by Notary)

UNDERTAKING (on Non- Judicial Stamp Paper)

I, the undersigned do hereby undertake that our firm M/s _____ agree to abide by this bid for a period of **120** days after the date fixed for receiving the same and it shall be binding on us and may be accepted at any time before the expiration of that period.

_____

(Signed by an Authorised Representative of the Firm)

_____

Name of the Representative

_____

Name of Firm

_____

DATE

(To be notarised by Notary)

(SECTION-IV)

FORMS OF BANK GUARANTEES, BANK CERTIFICATE, LETTER OF APPLICATION, LOA & AGREEMENT.

FORM OF BANK GUARANTEE FOR PERFORMANCE SECURITY

[CONTRACT PACKAGE NO: NHIDCL/ACP/Fire Fighting System/2018]

To
Managing Director, NHIDCL
National Highway & Infrastructure Development Corporation Ltd.
PTI Building, 3rd Floor , Parliament Street
New Delhi-110001

WHEREAS…… (name and address of contractor) hereinafter called "the contractor" has undertaken, in pursuance of LOA No……. Dated …….. to execute…….. (Name of Contract and brief description of Works) (hereinafter called "the contract").

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

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

NOW THEREOF we hereby affirm that we are the guarantor and responsible to you on behalf of the Contractor, up to a total of Rs…… (amount of guarantee) (Rupees……. (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 there under or of any of the contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall also be opera table at our ....., New Delhi office, from whom, confirmation regarding the issue of this guarantee or extension / renewal thereof shall be made available on demand. In the contingency of this guarantee being invoked and payment there under claimed, the said branch shall accept such invocation letter and make payment of amounts so demanded under the said invocation.

The liability of Bank under this Guarantee shall not be affected by any change in the

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

Notwithstanding anything contained herein before, our liability under this guarantee is restricted to Rs. (Rs. in words) and the guarantee shall remain valid till _____. Unless a claim or a demand in writing is served upon us on or _____before all our liability under this guarantee shall cease.

Signature and Seal of the Guarantor with Name……
Designation……..
Employee Code……..

Name of the Issuing Bank…….
Branch……
Address…….
Phone no……

An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract including additional security for unbalance bids, if any and denominated in Indian Rupees.

Not to be a part of BG:

Note: Information about the issuance of Performance Bank Guarantee may be submitted through SFMS gateway to the Syndicate Bank, Transport Bhawan, New Delhi (SYNB009062) to aid in the process of confirmation of Bank Guarantee.

FORM OF LETTER OF APPLICATION

To,

Col Rajeev Sood (Retd),
General Manager (Technical)
National Highway & Infrastructure Development Corporation Ltd.
PTI Building, 3rd Floor ,
4, Parliament Street,
New Delhi-110001

Description of Works: **Suppling, Installation & Commissioning of Fire Fighting System from Automated Car Parking Building in Transport Bhawan to Pump Room of Shram Shakti Bhawan at Connaught Place,New Delhi.**

CONTRACT PACKAGE NO: NHIDCL/ ACP/Fire Fighting System/2018

Dear Sir,

Having examined the Bid Document, Instruction to Bidders, Qualification Information, Scope of works, etc. for the subject work, we, hereby submit our bid for the subject work.

It is certified that the information furnished in this document is true and correct. The proposal is unconditional and unqualified. We undersigned accept that NHIDCL reserves the right to reject any or all application without assigning any reason.

Thanking you,

Yours faithfully,

(Authorized Signatory) for and on behalf of M/s _____

FORM OF LETTER OF ACCEPTANCE

No. ……. Dated ……....

To

M/s…….

Sub.: ……. Name of Work ……

Sir,

Based on your bid submitted on ……..in compliance of bidding document of NHIDCL for execution of the work of …… … it is hereby notified that your bid for a contract price of Rs…… (Rupees in words……) has been accepted for and on behalf of NHIDCL.

You are hereby requested to furnish Performance Security plus additional security in the form detailed in para 33.2 of ITB for an amount equivalent to **Rs**……..... **(Rupees in words……..)** within 10 days as per provisions of clause 33.1 of ITB of the bid document and sign the contract agreement failing which the actions as stipulated in clause-33.3 of ITB shall be taken.

Thanking you,

Yours faithfully,

…….

G.M (Tech)

FORM OF AGREEMENT

This agreement made the _____ day of _____ 2018 between the National Highway Infrastructure Development Corporation Ltd, New Delhi (hereinafter called "the Employer" of the one part and (here in after called "the Contractor") of the other part.AND WHEREAS the Employer invited bids from eligible bidders of the execution of certain works, viz. "**(.....name of work…….....)** ." **CONTRACT PACKAGE NO: NHIDCL/ACP/Fire Fighting System/2018**

AND WHEREAS pursuant to the bid submitted by the Contractor, vide _____ (here in after referred to as the "BID" or "ÖFFER") for the execution of works, the Employer by his letter of acceptance dated _____ accepted the offer submitted by the Contractor for the execution and completion of such works and the remedying of any defects thereon, on terms and conditions in accordance with the documents listed in para 2 below.

AND WHEREAS the Contractor by a deed of undertaking dated _____ has agreed to abide by all the terms of the bid, including but not limited to the amount quoted for the execution of Contract, as stated in the bid, and also to comply with such terms and conditions as may be required from time to time.

AND WHEREAS pursuant to the bid submitted by the Contractor vide _____ (hereinafter referred to as the "the Offer"), the employer has by his letter of acceptance no. _____ dated _____ accepted the offer submitted by the Contractor for the execution and completion of such works and the remedying of any defects therein, on terms and conditions in accordance in the conditions of particular application and condition included hereinafter;

AND WHEREAS the contractor has agreed to undertake such works and has furnished a performance security pursuant to Clause 33 of the instructions to bidders (Section-I).

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this agreement works and expressions shall have the same meanings as are respectively assigned to them in the conditions of contract hereinafter referred to;
2. The following documents shall be deemed to form and be read and constructed as part of this agreement viz.
    a) The Contract Agreement,
    b) Letter of Acceptance,
    c) Contractor's Bid,
    d) Contract Data,
    e) Conditions of Contract including Special Conditions of Contract
    f) Technical Specifications,

g) Bill of Quantities
h) Any other document listed in the Contract Data.

3. The foregoing documents shall be constructed as complementary and mutually explanatory one with another. Should any ambiguities or discrepancy be noted then the order of precedence of these documents shall subject to the condition of particular applications be as listed above.

4. 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 respect with the provisions of the contract.

5. the employer hereby covenants to pay the contractor in consideration of the execution and completion of the works and the remedying of defects therein the contract price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS WHEREOF the parties here to have caused this agreement to be executed the day and year first before written.

Signed, sealed and delivered by the said Employer through his Authorized Representative and the said Contractor through his Power of Attorney holder in the presence of:

For and on behalf of National Highway& Infrastructure Development Corporation Ltd	For and on behalf contractor
Witness	Witness
1. Name:	1. Name:
Address:	Address:
2. Name:	2. Name:
Address:	Address:

(SECTION-V)

CONDITIONS OF CONTRACT

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Section V

CONDITIONS OF CONTRACT

Part I General Conditions of Contract (GCC) and Contract Data

A. General

1. Definitions

Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.

The Completion Date is the date of completion of the Works as certified by the Engineer.

The Contract is the Contract between the Employer and the Contractor to execute, complete, and maintain the Works. It consists of the documents listed in Clause 2.2

The Contract Data defines the documents and other information, which comprise the Contract.

The Contractor is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The Contractor's Bid is the completed upon the online submission of the Bid and subsequent submission of documents to be submitted in the physical form as required under the ITB.

The Contract Price is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days; months are calendar months.

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

The Defects Liability Certificate is the certificate issued by Engineer, after the Defect Liability Period has ended and upon correction of Defects by the Contractor.

The Defects Liability Period is 12 (Twelve) months calculated from the Completion Date.

The Employer is the party as defined in the Contract Data, who employs the Contractor to carry out the Works .The Employer may delegate any or all functions to a person or body nominated by him for specified functions.

The Engineer is the person named in the Contract Data (or any other competent person appointed by the Employer and notified to the Contractor, to act in replacement of the Engineer) who is responsible for supervising the execution of the Works and administering the Contract.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The 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 after the approval from Employer.

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

Plant is any integral part of the Works that shall have a mechanical, electrical, electronic, chemical, or biological function.

The **Site** is the area defined as such in the Contract Data.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer.

The **Start Date** is the date within 10 (ten) days after the date of issue of Notice to Proceed with the work.

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

A **Variation** is an instruction given by the Engineer after the approval from NHIDCL, which varies the Works.

The **Works** are what the Contract requires the Contractor to construct, install, maintain, and hand over to the Employer, as defined in the Contract Data.

2. Interpretation

In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter, and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer will provide instructions clarifying queries about these Conditions of Contract.

The documents forming the Contract shall be interpreted in the following order of priority:

(a) Agreement,
(b) Letter of Acceptance,
(c) Notice to Proceed with the Work,

(d) Contractor's Bid,
(f) Contract Data
(g) Conditions of Contract including Special Conditions of Contract
(h) Technical Specifications,
(i) Drawings, if any
(j) Bill of Quantities, and

(k) Any other document listed in the contract data as forming part of the contract

3. Language and Law

The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Engineer's Decisions

Except where otherwise specifically stated, the Engineer will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

The Engineer, duly informing the Employer, may delegate any of his duties and responsibilities to other people except to the Adjudicator, after notifying the Contractor, and may cancel any delegation after notifying the Contractor.

6. Communications

Communications between parties that are referred to in the Conditions shall be effective only when in Writing. A notice shall be effective only when it is delivered.

7. Personnel

The Contractor shall employ the technical personnel named in the Contract Data or other technical persons approved by the Engineer. The Engineer will approve any proposed replacement of technical personnel only if their relevant qualifications and experiences are substantially equal to or better than those of the personnel stated in the Contract Data. If the personal stated in the contract data are not deployed on site by the contractor, it will treat as a breach of contract and action will be taken as per clause 40.2.

If the Engineer asks the Contractor to remove a person who is a member of the Contractor's staff or work force, stating the reasons, the Contractor shall ensure that the person leaves the Site within seven days and has no further connection with the Works in the Contract.

8. Employer’s and Contractor’s Risks

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.

9. Employer’s Risks

The Employer is responsible for the excepted risks which are (a) in so far as they directly affect the execution of the Works in India, the risks of war, hostilities, invasion, act of foreign enemies, rebellion, revolution, insurrection or military or usurped power, civil war, riot commotion or disorder (unless restricted to the Contractor’s employees), and contamination from any nuclear fuel or nuclear waste or radioactive toxic explosive, or (b) a cause due to

solely to the design of the Works, other than the Contractor's design.

10. Contractor's Risks

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.

11. Insurance

The contractor at his cost 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; and
(d) Personal injury or death.

Policies and certificates for insurance shall be delivered by the contractor to 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.

If the Contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the Contractor should have provided and recover the premiums the Employers has paid from payments otherwise due to the Contractor or, if no payment is due, the payment of the premiums shall be a debt due.

Alternations to the terms of an insurance shall not be made without the approval of the Engineer.

Both parties shall comply with any conditions of the insurance policies.

12. Queries about the Contract Data

The GM (Tech), NHIDCL, New Delhi will clarify queries on the Contract Data.

13. The Works to Be Completed by the Intended Completion Date

The Contractor may commence execution of the Works on the Start Date and shall carry out the Works in accordance with the Programme submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

14. Approval by the Engineer

The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer, who is to approve them if they comply with specifications and drawings.

The Contractor shall be responsible for design of Temporary Works.

The Engineer's approval shall not alter the Contractor's responsibility for design of the Temporary Works.

The Contractor shall obtain approval of third parties to the design of the Temporary Works, where required.

All Drawings prepared by the Contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer before their use.

15. Safety

The Contractor shall be responsible for the safety of all activities on the Site. The Contractor shall make necessary arrangement for safety of traffic as the road is in-service.

All the construction activities are to be performed on the Highways with heavy traffic. For the safety of road users, and that of Labourer working at site, traffic management installations are to be set up by the contractor in accordance with MORT&H clause no.112. A schematic figure / arrangement showing various components of traffic management installations should be submitted by the contractor to the engineer for his approval.

For the purpose of this contract, setting up and removal of traffic management installation shall be permissible for the time period as approved by the Engineer

16. Possession of the Site

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 Compensation Event.

17. Access to the Site

The Contractor shall allow the Engineer and any person authorized by the Engineer access to the Site, to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured/fabricated/assembled for the works.

18. Instructions

The Contractor shall carry out all instructions of the Engineer, which comply with the applicable laws where the Site is located.

The Contractor shall permit the Employer to inspect the Contractor's accounts and records relating to the performance of the Contractor and to have them audited by Auditors appointed by the Employer if so required by the Employer.

19. Disputes

If the Contractor believes that a decision taken by the Engineer 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 Dispute Review Expert within 14 days of the notification of the Engineer's decision.

20. Procedure for Disputes

The Dispute Review Expert shall give a decision in writing within 28 days of receipt of a notification of a dispute.

The Dispute Review Expert shall be paid daily at the rate specified by NHIDCL time to time together with reimbursable expenses of the types specified by NHIDCL and the cost shall be divided equally between the Employer and the Contractor, whatever decision is reached by the Dispute Review Expert. Either party may given notice to the other to refer a decision of the Dispute Review Expert to an Arbitrator within 28 days of the Dispute Review Expert's written decision. If neither party refers the dispute to arbitration within the next 28 days, the Dispute Review Expert's decision will be final and binding.

The arbitration shall be conducted in accordance with the arbitration procedure stated in the Special Conditions of Contract.

21. Replacement of Dispute Review Expert

Should the Dispute Review Expert resign or die, or should the Employer and the Contractor agree that the Dispute Review Expert is not fulfilling his functions in accordance with the provisions of the Contract, a new Dispute Review Expert will be jointly appointed by the Employer and the Contractor. In case of disagreement between the Employer and the Contractor, within 30 days, the Dispute Review Expert shall be designated by the Appointing Authority designated in the Contract Data at the request of either party, within 14 days of receipt of such request.

B. TIME CONTROL

22. Programme

The work shall be executed as per followings schedule –

Schedule	Duration	Expenditure
Milestone-I	Within 30 days	40 % of contract value
Completion date	Within 60 days	100% of contract value

In event that the Contractor fails to achieve Milestone - I mentioned above within a period of 15 days from date Set forth for such Milestone, unless such failure occurs due to Authority fault, it shall pay damages in a sum calculated at the rate of Rs. 0.025% of Contract value rounded off to nearest thousand per day (Maximum limit is 5% of the contract price) until

such Milestone is achieved.

Within the time stated in the Contract Data the Contractor shall submit to the Engineer for approval a Programme as per Clause 22.1 showing the general methods, arrangements, order, and timing for all the activities in the Works along with monthly cash flow forecast.

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.

The Contractor shall submit to the Engineer, for approval, an updated Programme at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Programme within this period, 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.

The Engineer's approval of the Programme shall not alter the Contractor's obligations. The

Contractor may revise the Programme and submit it to the Engineer again at any time. A revised Programme is to show the effect of Variations and Compensation Events.

23. Extension of Completion Date

The Engineer shall extend the Completion Date in case full justification exists, only after the approval of NHIDCL, 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 Works, which would cause the Contractor to incur additional cost. No price variation will be payable during the extended period

The Engineer shall decide whether and by how much time to extend the Indented Completion Date within 21 days of the Contractor asking the Engineer for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Indented Completion Date.

C. Quality Control

24. Identifying Defects

The Engineer shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's

responsibilities. 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.

25. Tests

The contractor shall be solely responsible for:

a. Carrying out the mandatory tests prescribed in the specification of Ministry of Shipping, and
b. For the correctness of the test results, whether preformed in his laboratory or elsewhere.

If the Engineer instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does, the Contractor shall pay for the test and any samples.

26. Correction of Defects noticed during the Defect Liability Period.

It is the terms of contract that quality of repair and maintenance work shall be of very high standard, requiring no major repairs for at least 12 (Twelve) months after the date of completion of works.

If any defects including shrinkage, cracks, other faults appear in the work within 12 (Twelve) months of “Taking over” certificate, the Engineer shall give notice to the Contractor of any defects before the end of the Defects Liability Period, which begins at Completion, and is for 12 (Twelve) months thereafter. The Defects Liability shall be extended for as long as defects remain to be corrected.

Every time notice of a defect is given, the Contractor shall correct the notified defect at his own cost within the length of time specified by the Engineer’s notice. If the contractor is in default, the Engineer shall cause the same to be made good by other workmen and deduct the expense from any sums that may be due to the contractor.

27. Uncorrected Defects

If the Contractor has not corrected a Defect, to the satisfaction of the Engineer, within the time specified in the Engineer's notice, the Engineer will assess the cost of having the Defect corrected, and the Contractor will pay this amount, on correction of the Defect.

D. COST CONTROL

28. Variations

The Engineer shall, having regard to the scope of the Works has power to order Variations he considers necessary or advisable during the progress of the Works. Such

Variations shall form part of the Contract and the Contractor shall carry them out. Oral orders of the Engineer for Variations, unless followed by written confirmation, shall not be taken into account.

29. Payments for Variations

If rates for Variation items are specified in the Bill of Quantities, the Contractor shall carry out such work at the same rate.

If the rates for Variation are not specified in the Bill of Quantities, the Engineer shall derive the rate from similar items in the Bill of Quantities.

If the rate for Variation item cannot be determined in the manner specified in Clause 29.2 the Contractor shall, within 14 days of the issue of order of Variation work, inform the Engineer the rate which he proposes to claim, supported by analysis of the rates. The Engineer shall assess the quotation and determine the rate based on prevailing market rates within one month of the submission of the claim by the Contractor and approval from
NHIDCL will be taken. As far as possible, the rate analysis shall be based on the standard data book and the current schedule of rates of the district public works division. The decision of the Employer on the rate so determined shall be final and binding on the Contractor.

30. Payment Certificates

The Contractor shall submit to the Engineer monthly statements of the value of the work executed less the cumulative amount certified previously supported with detailed measurement of the items of work executed.

The Engineer shall check the Contractor's monthly statement within 10 days and certify the amount to be paid to the Contractor after taking into account any credit or debit for the month in question.

The value of work executed shall be determined, based on measurements by the Engineer.

The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.

The value of work executed shall also include the valuation of Variations and Compensation Events.

The Engineer / Employer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

The final bill shall be submitted by the contractor within one month of the actual date of completion of the work; otherwise the Engineers certificate of the measurement and of the total amount payable for work accordingly shall be final and payment made accordingly within a period of sixty days as far as

possible.

31. Payments

Payment shall be adjusted for deduction for, retention, other recoveries in terms of the contract and taxes at source, as applicable under the law. The Employer shall pay the Contractor the amounts Engineer had certified within 10 days of the date of each certificate by a designated office of the Project Director, NHIDCL. All payment shall be made in Indian Rupees.

The Employer may appoint another authority, as specified in the Contract Data (or any other competent person appointed by the Employer and notified to the contractor) to make payment certified by the Engineer.

Items of the Works for which no rate or price has been entered in the Bill of Quantities, will not be paid for by the Employer and shall be deemed covered by other rates and prices in the Contract.

No Payment shall be made by NHIDCL unless the Bank Guarantee (BG) towards the Performance Security is verified. In case the BG received from the Contractor is later found to be fake, Authority shall not make any payment of the executed works.

32. Tax

The rates quoted by the Contractor shall be considered inclusive of all taxes including GST.

As per provision in Building and Other Construction Worker Welfare Cess Act, 1996, Employer will deduct Cess, as decided by the Government, by notification, from time to time, from contractor's running account bill.

33. Security Deposit / Retention Money

The Employer shall retain security deposit of **05 (five) percent** of the amount from each payment due to the Contractor until Completion of the whole of the Works i.e. including Defect liability period of 12(Twelve) months.

The security deposit/retention money and the performance security aggregating to 10 (ten) percent of the Contract price will be released to the Contractor when the Defect Liability period is over, and the Engineer has certified that the Defects, if any, notified by the Engineer to the Contractor before the end of this period have been corrected.

34. Liquidated Damages

The Contractor shall pay liquidated damages to the Employer at the rate or part thereof stated in the Contract Data for each day that the Completion Date is later than the Intended Completion Date. The total amount of liquidated damages shall not exceed the amount defined in the Contract Data. The

Employer may deduct liquidated damages from payments due to the Contractor. Payment of liquidated damages shall not affect the Contractor's other liabilities.

If the Intended Completion Date is extended after liquidated damages have been paid, the Engineer shall correct any over payment of liquidated damages by the Contractor by adjusting the next payment certificate. The Contractor shall not be paid interest on the over payment calculated from the date of payment to the date of repayment.

35. Payment terms :-

1. On delivery of material at site 45% of the contract value on certification of the bill by the Engineer in charge.
2. On Pro rata basis completion of the item 35% of the contract value as per the running bills submitted & certified by the Engineer in charge.
3. On successful completion of the work 15% of the contract value as per the final bills certified by the Engineer in charge.
4. Balance 5% to be held as Retention money for a Defects Liability Period of 12 months or releasable against the Performance Bank Guarantee as per the prescribed format from a Nationalized Bank valid for12 months from the date of successful completion & handing over of the work.

36. Securities

The Performance Security equal to 05 (five) percent of the contract price and additional security for unbalanced bids shall be provided to the Employer no later than the date specified in the Letter of Acceptance and shall be issued in the form given in the Appendix to ITB (Clause 33.2) by a scheduled commercial bank. The Performance Security shall be valid until a date 28 days from the date of expiry of Defect Liability Period and the additional security for unbalanced bids shall be valid until a date 28 days from the date of issue of the certificate of completion.

E. Finishing the Contract

37. Completion

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 Works is completed.

38. Taking Over

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

39. Final Account

The Contractor shall supply the Engineer with a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account 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. If the Final Account is still 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 revised account.

40. Termination

The Employer may terminate the Contract if the Contractor causes a fundamental breach of the Contract.

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 authorized by the Engineer;
b) the Contractor is declared as bankrupt or goes into liquidation other than for approved reconstruction or amalgamation;
c) the Engineer/Employer 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;

d) the Contractor has delayed the completion of the Works by the number of days for which the maximum amount of liquidated damages can be paid, as defined in clause 26; If theContractor, in the judgement of the Employer, has engaged in the corrupt or fraudulent practice in competing for or in executing the Contract. For the purpose of this clause,

"corrupt practise" means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in Contract execution. "Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid process at artificial non-competitive levels and to deprive the Employer of the benefits of free and open competition.

Notwithstanding the above, the Employer may terminate the Contract for

convenience.

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.

When either party to the contract gives notice of a breach of contract to the Engineer for a cause other than those listed under Sub Clause 40.2 above, the Engineer shall decide whether the breach is fundamental or not.

41. Payment upon Termination

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 and Materials ordered less advance payments received up to the date of the issue of the certificate and less the percentage to apply to the value of the work not completed, as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

If the Contract is terminated at the Employer's convenience, 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 up to the date of the certificate, less other recoveries due in terms of the Contract, and less taxes due to be deducted at source as per applicable law.

42. Property

All materials on the Site, Plant, 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. **F. Special Conditions of Contract**

43. Labour

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

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 numbers of the several classes of labour from time to time employed by the Contractor on the Site and such other information as the Engineer may require.

44. Compliance with Labour regulation

During continuance of the Contract, the Contractor and his sub-Contractors shall abide at all times by all existing labour enactments and rules made there under, 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 notification that may be issued under any labour law in future either by the State or the Central Government or the local authority. 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 there under, regulations or notifications including amendments. 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/Rules/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 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.

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

45. Drawings and Photographs of the Works

The contractor shall do photography/video photography of the site firstly before the start of the work, secondly mid-way in the execution of different stages of work and lastly after the completion of the work. No separate payment will be made to the contractor for this.

No photographs/ Video photography shall be published or otherwise circulated without the approval of the Engineer in writing.

46. The Apprentices Act, 1961

The Contractor shall duly comply with the provisions of the Apprentices Act 1961 (III of 1961), the rules made there under and the orders that may be issued from time to time under the said Act and the said Rules and on his failure or neglect to do so he shall be subject to all liabilities and penalties provided by the said Act and said Rules.

Arbitration (GCC Clause 20.3)

Any dispute in respect of which an amicable settlement has not been arrived at shall be finally settled by arbitration as set forth below. The arbitral tribunal shall have full power

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to open up, review and revise any decision, opinion, instruction, determination, certificate or valuation of the Engineer related to the dispute.

(i) In case of dispute or difference arising between the Employer and a domestic

Contractor relating to any matter arising out of or connected with this agreement, such disputes shall be finally settled by arbitration in accordance with the Arbitration & Conciliation Act, 1996, or any statutory amendment thereof. The arbitral tribunal shall consist of 3 (three) Arbitrators, one each to be appointed by the Employer and the Contractor. The third Arbitrator shall be chosen by the two Arbitrators so appointed by the Parties and shall act as Presiding Arbitrator. In case of failure of the two Arbitrators, appointed by the parties to reach upon a consensus within a period of 30 days from the appointment of the arbitrator appointed subsequently, the Presiding arbitrator shall be appointed by the Appointing Authority as specified in the contract data to GCC.

(ii) Neither party shall be limited in the proceedings before such tribunal to the evidence or arguments before the other party /Independent Consultant.

(iii) Arbitration may be commenced during or after the Contract period, provided that the obligations of the Employer and the Contractor shall not be altered by reason of the arbitration being conducted during the Contract Period.

(iv) If one of the parties fails to appoint its arbitrator in pursuance of Sub-clause (i) above, within 30 days after receipt of the notice of the appointment of its Arbitrator by the other party, then the Chairman of the Executive Committee of the Indian Road Congress, shall appoint the Arbitrator. A certified copy of the order of the Chairman of the Executive Committee of the Indian Road Congress making such an appointment shall be furnished to each of the parties.

(v) Arbitration proceedings shall be held at Delhi, India and the language of the arbitration proceedings and that of all documents and communications between the parties shall be English.

(vi) The expenses incurred by each party in connection with the preparation, presentation etc of its proceedings shall be borne by each party itself.

(vii) The fees and expenses payable to the Arbitrators shall be as per the schedule of remuneration and expenses for Arbitrators notified by NHAI vide letter 11041/217/2007-Admn dated 13 Jan 2010 reproduced herein below, or any amendment thereof:

Sl. No	**Particulars**	**Schedule Amount payable per Arbitrator / per cases**
1	Arbitrator fee	Rs 15,000/- per day subject to a maximum of Rs 4 lacs per case
		Or
		Rs 2.5 lacs (lump sum) subject to publishing the Award within 12 months. 12 months will be reckoned from the date of first hearing.

2	Reading Charges	Rs 15,000/-
3	Secretarial Assistance and incidental charges (telephone, fax, postage etc)	Rs 20,000/-
4	Charges for publishing / declaration of the Award	Maximum of Rs 20,000/-
5	Others expenses (actual against bills subject to the prescribed ceiling) – applicable for the days of hearing only.	
	Travelling expenses Lodging and Boarding	Economy class by air, first class AC by train, AC car by Road
		(i) Upto Rs 15,000/- per day (metro cities)
		(ii) Upto Rs 7,000/- per day (other cities)
		(iii) Rs 3,000/- per day (own arrangement)
6	Local Travel	Rs 1,500/- per day
7	Extra charges for days other than hearing/ meeting days (maximum for 2 days)	Rs 3,500/- per day
Note	1. Lodging boarding and travelling expenses shall be allowed only for those members who are residing 100 Kms away from place of meeting.	
	2. Delhi, Mumbai, Chennai, Kolkata, Bangalore and Hyderabad shall be considered as Metro cities.	

CONTRACT DATA TO GENERAL CONDITIONS OF CONTRACT

Items marked "N/A" do not apply in this Contract.

The Employer is : **Managing Director, NHIDCL**
Address : PTI Building, 3rd Floor, 4, Parliament Street,
New Delhi-110001 Ph. 011-23461600
: www.NHIDCL.com

Name of Authorized Representative:-

Col. Rajeev Sood (Retd.)
General Manager (Technical)
National Highway &Infrastructure Development Corporation Ltd.
PTI Building, 3rd Floor,
4, Parliament Street,
New Delhi-110001
Ph. 011-23461621

Clause Reference [Cl.1.1]

2. The Engineer is: To be intimated later [Cl.1.1]

3. The Intended Completion Date for this pakage is **2 months** from date of Commencement of work .

4. The location of Site is given in the Bid notice (Section- I) [Cl.1.1]

5. The Start Date shall be reckoned within 10 days after the date of issue of the Notice to Proceed with the work. [Cl.1.1]

6. (a) The name and identification number of the Contract is given in the Table given in NIT [Cl.1.1]

7. (a) The law which applies to the Contract is the Law of Union of India. [Cl.3.1]
(b) The language of the Contract documents is English [Cl.3.1]

8. Technical Personnel are as given in the ITB (SECTION II) [Cl. 7.1]

9. Amount of Insurance are:
(a) Rupees equivalent to Contract Price
(b) Rupees equivalent to 5% of Contract Price
(c) Rupees equivalent to 5% of Contract Price
(d) Rupees 20 lakhs for multiple Incidents[Cl. 11.1]

10. (a) Amount of liquidated damages for Delay in completion of works

0.1 percent of the Contract value rounded off to the nearest thousand, per day with the Minimum of Rs.1000/- per day

(b) Maximum limit of liquidated damages for delay in completion of work:

10 per cent of the Contract Price rounded off to the nearest thousand [Cl.34.1]

11. The following documents also form part of the contract: Addendum/corrigendum/ any clarification to the bid documents [Cl.2.2]

12. Fees and types of reimbursable expenses to be paid to the Dispute Review Expert (To be intimated later) [Cl.20.2]

Delete [Cl.21.1]

13. The period of submission of the programme for approval of Engineer shall be 15 days from the issue of Letter of Acceptance [Cl.22.2]

14. The period between programme updates shall be 30 days [Cl.22.4]

15. The amount to be withheld for later submission of an updated Programme shall be Rs.1.0 lakh [Cl.22.4]

16. Appointing Authority for the Arbitrator/Presiding Arbitrator –Managing Director, **National Highways and Infrastructure Development Corporation Ltd** [Cl. 47.1]

(SECTION-VI) TECHNICAL SPECIFICATIONS

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Section F1. General Instructions

35. F1.1 Fire suppression works specified in the tender have to be executed in accordance with:

F1.1.1 The rules and regulations of Local Fire Authority as per the statutory regulations applicable for obtaining the occupation certificate from the Local Development / Fire Authority.

F1.1.2 The contractor has also to ensure compliance of the Rules of the Tariff Advisory Committee (TAC) of the Insurance Association of India, as amended up to date to enable the Project Managers to apply for getting the maximum rebate on insurance premium for the building. Contractors responsibility for compliance will be only with respect to the items of work put to tender. He will prepare and submit a set of drawings and calculations and such other information as required for making the application. He will also assist the Project Managers in providing all technical clarifications, corrections to drawings and calculations as required by the TAC.

F1.1.3 Applicable norms laid down by the National Building Code of Bureau of Indian Standards (B.I.S.) shall be followed as applicable.

F1.1.4 The codes of the National Fire Protection Association of USA (N.F.P.A.) shall used as a general guide for good engineering practice, design and workmanship norms. No certificate of compliance to NFPA codes will be required.

F1.1.5 All materials used in the works shall have Bureau of Indian Standards valid certification stamped, marked or cast on the material in an acceptable and approved manner.

F1.1.6 It is the contractor's responsibility to ensure the competence of design to meet the above requirements.

F1.1.7 Drawings issued with the tenders are schematic and indicate the concept. Contractor shall make his shop drawings on basis of Architectural and Interior design drawings issued by the Engineer-in-Charge. Work will be executed only as per approved shop drawings.

36. F1.1.8 Quantities in the tender document are approximate worked out on the tender drawing issued.

F1.1.9 Contractors are invited to highlight any aspects of the contract document that may need revision or reconsideration before the work is started. He must furnish a details of any variations in the specifications or the quantities that may be necessary for him to comply with the Code and statutory requirements. These may be identified and approval of the Project managers taken before the start of the work.

F1.1.10 Contractors shall furnish detailed Shop drawings, hydraulic and other design calculations for submission and approval of the Local Fire Authority and for Insurance Companies

F1.1.11 It is the sole responsibility of the contractor to get the approval of the Local Fire Authority for the work done by him and nothing extra shall be payable including the official and other charges.

F1.2 System Design

37. Fire suppression system for the building is based on the concept of "total protection" by the wet riser hydrant and sprinkler system for the entire premises with excepted areas identified on the drawings or as instructed by the Project Managers.

F1.3 Water Storage & Pump House

F1.3.1 A static underground RCC water storage tank having gross water storage capacity of 120 cum will be provided. The tank will be provided with manholes, inserts, puddle flanges, ladders inside and outside the tanks.

F1.3.2 One over head water storage tank of 75 cum capacity as a secondary water source for the sprinkler system /hydrant system will be provided on the terrace.

F1.3.3 The pump house and U.G. water tanks are located in the first basement so as to provide net positive suction to all pumps. Test lines from pumps shall discharge back into the fire tank to conserve water.

F1.3.4 Configuration and operating conditions of pumps are given in the Specifications.

F1.4 Wet Riser Hydrant System

F1.4.1 The building will be provided with a wet riser system. Hydrants are fed from a 150 mm dia M.S. pipe running in first basement.

F1.4.2 External fire hydrants with butterfly isolation valves will be provided on the ring main. Hydrants shall be located at least 2 m away from the building.
Internal wet risers for the building shall be connected to the ring main with an non return valve and a three way fire brigade inlet connection with isolation butterfly valve for each wet riser connection.

F1.4.3 Hydrant stations and cabinets shall be provided at all designated locations inside and along with the external hydrants. The hydrant stations shall be located in a MS steel fire cabinets as per drawings and will contain all items described in the specifications.

F1.5 Sprinkler System

F1.5.1 A separate and independent riser for sprinkler shall be provided as shown on the drawings. The system will be divided in several zones with their own installation valves, located in the basement or near the fire pump room.

F1.5.2 The entire building is protected with automatic sprinkler system with permitted exceptions e.g. electrical switch rooms, power transformers and D.G. rooms plant rooms as identified.

F1.5.3 Types of sprinklers to be used shall be as given in specifications, BOQ and approved by the Project Managers

F1.6 Pumping System

F1.6.1 The pumping system shall provide the water supply and pressure to the wet riser fire and sprinkler mains. Diesel Engine will be a common stand by.

F1.6.2 Provide a full bore test valve on the by pass line with rate of flow meter on the common pump header to discharge in the water tank. Also provide an isolation valve on headers outlet to each circuit to enable pressure setting and testing of pumps.

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End of Section F1. General Instructions

Section F2. Fire Hydrant & Automatic Sprinkler System

F2.1 Scope of work

F2.1.1 Wet riser fire hydrant system (internal & external)

F2.1.2 Automatic sprinkler system

F2.1.3 Fire hydrant & sprinkler pumps.

F2.1.4 Valves, suction and delivery connections and headers.

F2.1.5 Hand appliances.

F2.1.6 Pipe protection, painting, sleeves & minor civil works other than specifically mentioned in the tender.

F2.1.7 Electrical installations.

F2.1.8 Specialised protection as specified.

F2.1.9 Testing and commissioning.

F2.2 General Requirements

F2.2.1 All materials shall be new of the best quality conforming to the specifications and subject to the approval of the Project Managers.

F2.2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.

F2.2.3 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.

F2.2.4 Pipes shall be securely fixed to walls, and ceilings by suitable clamps at intervals specified. Only approved type of anchor fasteners shall be used for RCC ceilings and walls.

F2.2.5 Valves and other appurtenances shall be so located that they are easily accessible for operations, repairs and maintenance.

F2.3 Pipes

38. F2.3.1 All pipes within and outside the building in exposed locations and shafts including connections buried under floor shall be M.S. Pipes as follows:

F2.3.1 Pipes 150 mm dia and below IS: 1239 Medium Class

F2.3.2 Pipe 200 mm dia and above IS 3589 of thickness specified.

F2.4 Pipe Fittings.

F2.4.1 Pipes and fittings means tees, elbows, couplings, flanges, reducers etc. And all such connecting devices that are need to complete the piping work in its totality.

F2.4.2 Screwed fittings shall be approved type malleable or cast iron with reinforced ring on all edges of the fittings suitable for screwed joints.

F2.4.3 Forged steel fittings of approved type with “V" groove for welded joints.

F2.4.4 Fabricated fittings shall not be permitted for pipe diameters 50 mm and below.

F2.4.5 When used, they shall be fabricated, welded and inspected in workshops under supervision of Project Managers whose welding procedures have been approved by the TAC as per TAC rule 4102 for sprinkler system and applicable to hydrant and sprinkler system. For "T" connections, pipes shall be drilled and reamed. Cutting by gas or electrical welding will not be accepted.

F2.5 Jointing

F2.5.1 Screwed (50 mm dia pipes and below)

Joint for black steel pipes and fittings shall be metal-to-metal thread joints. A small amount of red lead may be used for lubrication and rust prevention. Joints shall not be welded or caulked.

F2.5.2 Welded (65 mm dia and above)

Joints between M.S. and pipes and fittings shall be made with the pipes and fittings having "V" groove and welded with electrical resistance welding in an approved manner. Butt-welded joints are not acceptable. Buried pipes will be subject to X Ray test from an approved agency as per the TAC norms at the cost of contractor.

F2.5.3 Flanges.

Flanged joints shall be provided on :

a) Straight runs not exceeding 30 m on pipelines 80 mm dia and above.

b) Both ends of any fabricated fittings e.g. bends, tees etc. of 65 mm dia or larger diameter.

c) For jointing all types of valves, appurtenances, pumps, connections With other type of pipes, to water tanks and other places necessary and required as good for engineering practice.

d) Flanges shall be as per I.S. with appropriate number of G.I. nuts and bolts, 3 mm insertion neoprene gasket complete.

F2.5.4 Unions

Provide approved type of dismountable unions on pipes lines 65 mm and below in similar places as specified for flanges.

F2.6 Excavation

F2.6.1 Excavation for pipe lines shall be in open trenches to levels and grades shown on the drawings or as required at site. Pipe lines shall be buried to a minimum depth of 1.2 meter or as shown on drawings.

F2.6.2 Wherever required contractor shall support all trenches or adjoining structures with adequate timber supports.

F2.6.3 On completion of testing and pipe protection, trenches shall be refilled with excavated earth in 15 cms layers and consolidated.

F2.6.4 Contractor shall dispose off all surplus earth with in a lead of 200 m or as directed by Project Manager.

F2.7 Anchor Thrust Blocks

F2.7.1 Contractor shall provide suitably designed anchor blocks in cement concrete to encounter excess thrust due to water hammer & high pressure.

F2.7.2 Thrust blocks shall be provided at all bends & tees & such other location as determined by the Project Manager.

F2.7.3 Exact location, design, size and mix of the concrete block shall be approved by the Project Manager prior to execution of work.

F2.8 Valves

F2.8.1 Ball Valves

a) Valves 40 mm dia & below shall be heavy type nickel plated Brass body screwed type , with chromium plated brass balls, PTFE Teflon seating and gland packing tested to a hydraulic pressure of 20 kg/sq cm including coupling and gunmetal handle conforming to B.S. 5351 with female screwed ends.

b) All valves shall be approved by the Project Manager before they are allowed to be used on work.

F2.8.2 Butterfly Valves

Butterfly Valves shall be cast iron body and shall be of class P.N. 1.6 tested to 20 kg/cm^2 with following details :-

a) Disc shall be CI heavy duty electrolyses nickel plated abrasion resistant.

b) The shaft be EN-8 Carbon Steel with low friction nylon bearings.

c) The seat shall be drop tight constructed by bonding resilient elastometer inside a rigid backing.

d) Built in flanged rubber seals.

e) Actuator to level operated for valves above ground and T Key operated for valves below ground.

f) Built in flanges for screwed on flanged connections.

Manufacturer's details on fixing and installation will be followed.

F2.8.3 Non Return Valves (NRV)

Where specified non return valve (swing check type) shall be C.I. / MS. Wafer type, suitable for PN-1.6 pressure, EPDM / Nitrile seat, provided through which flow can occur in one direction only. It shall be single door swing check type of best quality.

F2.9 Air Vessel / Air Cushion tank.

F2.9.1 Air cushion tank shall be of size and capacity indicated in schedule of quantities. It shall be provided at the top most point/points and/or in pump house (as specified). The tank shall be complete with 20mm dia. Brass Air Valve (Ball type), Stop Valve (20mm dia), Drain valve (20mm dia) and pressure gauge including 20mm dia. Mild Steel Galvanised pipes and fittings, unions, etc. as required to complete the work as per site conditions.

F2.9.2 Air Cushion tank shall be measured by numbers and shall include Air Valve, Pressure Gauge, Globe Valves for testing and draining, M.S. Clamps, Pipes, Fittings, Tees Elbows Union and all other items required to complete the work.

F2.10 Orifice Flanges

Provide orifice flanges fabricated from 6 mm thick stainless steel plate to reduce pressure on individual hydrants to restrict the operating pressure to 3.5 Kg/sq.cm. and allow a discharge of 560 lpm. The contractor shall submit design of the orifice flanges for approval before installation

F2.11 Drain Valve

Provide 25 mm dia black steel pipe to IS: 1239 (heavy class) with 25 mm Ball valve for draining any water in the system in low pockets.

F2.12 Inspection & testing assembly

Inspection and testing of the sprinkler system shall be done by providing an assembly consisting of gunmetal valves, gunmetal sight glass, bye-pass valve. The drain pipe beyond the valve upto the drainage point shall be measured with the pipe.

F2.13 Pump test assembly

Provide on the main fire sprinkler header a 150 mm dia bye pass valve located in an accessible manner along with a rate of flow rotometer calibrated in lpm and able to read 200 % of the rated pump capacity. The delivery shall be connected to the fire tank.

F2.14 Pressure Gauge

Pressure gauge shall be provided near all connections to hydrant system and isolation valves of sprinkler system and where required. Pressure gauge shall be 100 mm dia gunmetal Bourden type with gunmetal isolation cock, tapping and connecting pipe and nipple. The gauge shall be installed at appropriate level and height for easy readability.

F2.15 Hydrant/valve chambers

F2.15.1 Contractor shall provide suitable brick masonry chambers (wherever required) 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 40 mm nominal size) 15 mm thick cement plaster inside and outside finished with a floating coat of neat cement inside with cast iron surface box approved by fire brigade including excavation, back filling complete.

F2.15.2 Valve chambers shall be 60x60 cms. for depths up to 100 cms.

F2.16 Flow switch

F2.16.1 Flow switches shall be provided on sectional mains and branch lines of sprinkler systems where indicated on drawings, or necessary and required and directed by the Project Manager.

F2.16.2 Flow switch should be suitable to actuate for opening of a single sprinkler and shall be suitable for connection to a central annunciation panel.

F2.17 Fire brigade connections

Provide as shown on drawings separate gunmetal 4 way collecting head with four 63 mm instantaneous type inlets with built in check valves and 150 mm dia outlet connected to the fire and sprinkler main. Collecting head shall be installed on a stand post and provided with horizontal C.I. reflux valve and location to be approved by Project Manager. Provide etched gunmetal label plates with 50mm height letter. The plates should be firmly fixed to the FB connection and any support system.

F2.18 Fire hydrants

F2.18.1 External hydrants

a) Contractor shall provide external hydrants. The hydrants shall be controlled by a cast iron butterfly valve installed in underground lockable chambers. Hydrants shall have instantaneous type 63 mm dia outlets. The hydrants shall be single outlet conforming to I.S.5290-1969 with C.I duck foot bend and flanged riser of required height to bring the hydrant to correct level above ground.

b) Contractor shall provide for each external fire hydrant two numbers of 63 mm dia. 15 m long rubberized perm line hose pipe with gunmetal male and female instantaneous type couplings machine wound with G.I. wire (hose to I.S. 8423 and couplings to I.S. 903 with M.S. certification), gunmetal branch pipe with nozzle to I.S. 903.

F2.18.2 Internal hydrants

a) Contractor shall provide on each landing and other locations as shown on the drawings **two** double headed gunmetal landing valve with 63 mm dia outlet mounted on a common 100 mm inlet (I.S.5290-1969). Landing valve shall have flanged inlet and instantaneous type outlets as shown on the drawings.

b) Instantaneous outlets for fire hydrants shall be of standard pattern approved and suitable for fire brigade hoses.

c) Contractor shall provide for each internal fire hydrant station two numbers of 63 mm dia. 15 m long rubberized fabric linen hose pipes with gunmetal male and female instantaneous type coupling machine wound with G.I. wire (hose to I.S. 636 Type 2 and couplings to I.S. 903 with I.S. Certification), fire hose reel, gunmetal branch pipe with nozzle I.S. 903 and Fire man's axe.

d) Each hose box shall be conspicuously painted with the letters "FIRE HOSE".

F2.19 Fire hose reels

Contractor shall provide standard fire hose reels with 20 mm dia high pressure rubber hose 36.5 m long with gunmetal nozzle and control valve, shut off valve, all mounted on circular hose reel of heavy duty mild steel construction and cast iron brackets. Hose reel shall be connected directly to the wet riser. Hose reel shall conform to IS:884-1969 and rubber hose to IS: 5132.

F2.20 Hose Cabinets

Provide hose cabinets for all internal fire hydrants. Hose cabinets shall be fabricated from 16 gauge M.S. sheet of fully welded construction with hinged double front door partially glazed with locking arrangement, stove enameled fire red paint with "FIRE HOSE" written on it prominently.(Size as given in the Bill of Quantities).

F2.21 Pipe protection

F2.21.1 All pipes above ground and in exposed locations shall be painted with one coat of zinc chromate primer and two or more coats of synthetic enamel paint of approved shade.

F2.21.2 Pipes in chase or buried underground shall be painted with two coats of zinc chromate primer and wrapped with one layer of 4 mm thick PYPCOAT or equivalent multi layer sheet as per standard manufacturer's specifications.

F2.22 Pipe Supports

39. F2.22.1 All pipe clamps and supports shall be galvanised steel. When fabricated from M.S. steel sections, the supports shall be factory galvanised before use at site. Welding of galvanised clamps and supports will not be permitted.

40. F2.22.2 Pipes shall be hung by means of expandable anchor fastner of approved make and design (Dash Fastners or equivalent). The hangers and clamps shall be fastened by means of galvanised nuts and bolts. The size/diameter of the anchor fastener and the clamp shall be suitable to carry the weight of water filled pipe and dead load normally accounted.

Pipe Spacing Table

		<---------- Pipe commercial dia. ---------- ---------- ----------							
S.No.	**Pipes & Position**	15/20	20/25	32/40	50	75/80	100/11	150/16	200
1	**Vertical**								
1.1	GI /MS	2.4	2.4	3	3.6	4.5	4.5	5.4	5.4
1.2	CI Pipes IS 1729/3989	x	X	<---------- 3 m ----------					
1.3	CI Heavy Duty IS 1536	x	X	<---------- 3.6 m ----------					
1.4	uPVC SWR Systems	x	X	0.5	0.7	0.9	0.9	1.0	
1.5	uPVC Water Supply								
1.6	Polybutylene	<--- As per manufacturer's Reccomendations ---------- ---------- ----------							
1	**Horizontal**								
1.1	GI /MS	2.0	2.0	2.4	3.0	3.6	4.0	4.5	4.5
1.2	CI Pipes IS 1729/3989	<---------- 3 m ---------->							
		<---------- Pipe commercial dia. ---------- ---------- ----------							

S.No.	**Pipes & Position**	15/20	20/25	32/40	50	75/80	100/11	150/16	200
1.3	CI Heavy Duty IS 1536					3.0	3.6	3.6	4.5
1.4	uPVC SWR Systems				1.2	1.8	1.8	1.8	
1.5	uPVC Water Supply								
1.6	Polybutylene	<---------- As per manufacturer's recommendations ---------->							

F2.23 Installation Valve

F2.23.1 Installation valves shall be installed on the sprinkler circuits as shown on the drawings.

F2.23.2 Contractor shall submit his detailed shop drawings showing the exact location, details of installation of the valve and alarm in all its respects.

F2.23.3 Installation valve shall comprise of a 150 mm dia vertical alarm valve complete with 50 mm dia drain and 15mm dia test valve with a provision to install water operated turbine alarm and an electrical alarm bell. A 150 mm dia slim seal butterfly valve shall be provided on up stream of alarm valve, double seated clapper check valves as alarm valve with pressure gauge and orifice assembly and drain pipe with bye pass on check valve to regulate differential pressure and false alarm, one water operated turbine alarm motor including all accessories necessary and required and as supplied by original equipment manufacturer and required for full and satisfactory performance of the system.

F2.24 Sprinkler Heads

F2.24.1 Sprinkler heads shall be provided at appropriate spacing to cover 9 m^2 per sprinkler head in the basements and 12 m^2 per sprinkler on upper floors. The spacing shall however be in conformity with the drawings and properly co-ordinated with electrical fixtures, ventilation ducts, grills, etc., **The deflector of the sprinkler shall be provided not more than 150 mm from the ceiling**

F2.24.2 Sprinkler heads shall be quartzoid bulb type with a temp. rating of 68deg. C. with gunmetal body fully approved and having current certification of the fire laboratory of the C.B.R.I. Roorkee, Underwriter's laboratory (UL) and under the approved certified list of the Fire Office Committee (FOC) of U.K. or NFPA of USA. Any one of the certification as acceptable to the local fire authorities obtained prior to the procurement and approved and accepted by the Project Manager.

F2.24.3 Sprinkler heads shall be installed in conformity with approved shop drawings and in co-ordination with electrical fixtures, ventilation ducts, cable galleries and other services along the ceiling.

F2.24.4 Following type of sprinklers shall be used:

Sl.No.	Type of Sprinkler	Temp rating
1	Conventional,Pendant or Upright	68%
2	Special applicationside wall type with throw suitable for room size of 8m length (extended throw type)	68%
3	Pendent type (recessed/rosette)	68%
4	High temperature (for kitchen)	72%

F2.24.5 Spacing and coverage of sprinkler shall be in accordance with risk classification of area in which they are installed, design density and TAC regulation.

F2.25 Spare Sprinklers

F2.25.1 Provide a lockable enamel painted steel cabinet including following type of spare sprinklers

a) Conventional/Pendent type 24
b) Upright 24
c) Semi concealed. 24

d) Sidewall 24

e) The cabinet should also contain one pair of wrenches (of each size of the same are different) for the sprinklers.

f) Spare sprinklers shall be of the same specifications as that of the original sprinklers specified.

F2.26 Testing

F2.26.1 All piping in the system shall be tested to a hydrostatic pressure of 1.5 times the working pressure or 14 kg/sq.cm (whichever is more) without drop in pressure for at-least 2 hours.

F2.26.2 Rectify all leakages, make adjustments and retest as required and directed.

F2.27 Cables

F2.27.1 Contractor shall provide control cables from supervisory valves and switches to the annunciation panels.

F2.27.2 All control cables shall be copper conductor pvc insulated armored and PVC sheathed 1100 volt grade.

F2.27.3 All cables shall have stranded conductors. The cables shall be in drums as far as possible and bear manufacturer's name.

F2.27.4 All cable joints shall be made in an approved manner as per standard practice.

F2.28 Cable Trays

F2.28.1 All cables shall be routed in approved locations in coordination with all other services in a proper manner.

F2.28.2 Cable trays shall be of galvanized steel and hung from the ceiling by galvanised rods supported by appropriate size and type of expandable expansion fasteners drilled into the slabs and walls by an electric drill.

F2.29 Annunciation Panel

a) Provide one solid state electronic annunciation panel, fully wired with visual display unit to indicate:

b) Flow condition in any flow indicating valve

c) The panel should give a visual and audible alarm for any of the above conditions.

d) The panel should be standard manufacturer's factory made. All details shall be submitted with the tender.

F2.30 Measurement

41. F2.30.1 Mild steel pipes shall be measured per linear meter of the finished length and shall include all fittings, flanges, welding, jointing, clamps for fixing to walls or hangers, anchor fasteners, painting and testing complete in all respects.

F2.30.2 Sluice and full way valves, check valves, installation valves, air valves & flow switches shall be measured by numbers and shall include all items necessary and required for fixing and as given in the specifications and bill of quantities.

F2.30.3 Fire hydrants, hose reels, fire brigade connections, orifice flanges shall be measured by number and include all items given in the specifications and bill of quantities.

F2.30.4 Fire hose and boxes specified shall be measured by number and include all items given in specifications and Bill of Quantities.

F2.30.5 Fire extinguishers shall be measured by number and shall include full charge.

F2.30.6 Spare sprinkler cabinets with spare sprinklers specified and spanners shall be measured as per actual item given in the specifications and Bill of Quantities.

F2.30.7 Sprinkler heads shall be measured by numbers.

F2.30.8 Cables and cable trays shall be measured per linear meter shall include clamps, hangers, anchor fasteners complete in all respects.

End of Section F2. Fire Hydrant & Automatic Sprinkler System

Section F3 Fire Pumps & Ancillary Equipment

F3.1 Scope of Work

F3.1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install electrically operated and diesel driven pumps as required by the drawings and specified hereinafter or given in the schedule of quantities.

F3.1.2 Without restricting to the generality of the foregoing, the pumps and ancillary equipment shall include the following:-

Electrically operated and diesel driven pumps with motors, base plates and accessories.

Alarm system with all accessories wiring and connections

Pressure gauges with isolation valves & piping, bleed and block valves.

M.S. pipes, valves, suction strainers, delivery headers & accessories.

Foundations, vibration eliminator pads and foundation bolts.

F3.2 General Requirements

F3.2.1 Pumps shall be installed true to level on suitable concrete foundations. Base plate shall be firmly fixed by foundation bolts properly grouted in the concrete foundations.

F3.2.2 Pumps and motors shall be truly aligned by suitable instruments.

F3.2.3 All pump connections shall be standard flanged type with appropriate number of bolts. In case of non standard flanges companion flanges shall be provided with the pumps.

F3.2.4 Manufacturer's instructions regarding installation, connections and commissioning shall be followed with respect to all pumps and accessories.

F3.2.5 Contractor shall provide necessary test certificates and performance charts with NPSH requirement of the pumps from the manufacturer. The Contractor shall provide facilities to the Project Manager or their authorised representative for inspection of equipment during manufacturing and also to witness various tests at the manufacturers works without any cost to the owners.

F3.2.6 Each pump shall be provided with a 150 mm dia pressure gauge, isolation cock and connecting piping, bleed and block valve.

F3.2.7 Provide vibration eliminating pad and connectors for each pump.

42. F3.2.8 The Contractor shall submit with this tender a list of recommended spare parts for two years of normal operation and quote the prices for the same.

F3.3 Fire, Sprinkler & Jockey Pumps

F3.3.1 Pumping Sets

a) Pumping sets shall be single stage horizontal centrifugal single outlet with cast iron body and bronze dynamically balanced impellers. Connecting shaft shall be stainless steel with bronze sleeve and grease lubricated bearings.

b) Pumps shall be connected to the drive by means of spacer type love joy couplings which shall be individually balanced dynamically and statically.

43. c) The coupling joining the prime movers with the pump shall be provided with a sheet metal guard.

d) Pumps shall be provided with approved type of mechanical seals.

F3.3.2 Pumps shall be capable of delivering not less than 150% of the rated capacity of water at a head of not less than 65% of the rated head. The shut off head shall not exceed 120% of the rated head.

F3.3.3 The pump shall meet the requirements of the Tariff Advisory Committee and the unit shall be design proven in fire protection services.

F3.4 Electric drive

F3.4.1 Electrically driven pumps shall be provided with totally enclosed fan cooled induction motors. For fire pumps the motors should be rated not to draw starting current more than 3 times normal running current.

F3.4.2 Motors for fire protection pumps shall be at least equivalent to the horse power required to drive the pump at 150% of its rated discharge and shall be designed for continuous full load duty and shall be design proven in similar service.

F3.4.3 Motors shall be wound for class B insulation and winding shall be vacuum impregnated with heat and moisture resistant varnish glass fiber insulated.

F3.4.4 Motors for fire pumps shall meet all requirements and specifications of the Tariff Advisory Committee.

F3.4.5 Motors shall be suitable for 415 ± 10% volts, 3 phase 50 cycles a/c supply and shall be designed for 40 deg C ambient temperature. Motors shall conform to I.S. 325.

F3.4.6 Motors shall be designed for two start system.

F3.4.7 Motors shall be capable of handling the required starting torque of the pumps.

F3.4.8 Contractor shall provide inbuilt heating arrangements for the motors for main pumps to ensure that motor windings shall remain dry.

F3.4.9 Speed of the motor shall be compatible with the speed of the pump.

3.5 Diesel Engine

F3.5.1 Diesel engine shall be of 6 cylinders with individual head assemblies. The engine shall be water cooled and shall include heat exchanger and connecting piping, strainer, isolating & pressure reducing valves, bye-pass line complete in all respects.

F3.5.2 Engine shall be direct injection type with low noise and exhaust emission levels.

F3.5.3 The speed of the engine shall match the pump speed for direct drive.

F3.5.4 The engine shall be capable of being started without the use of wicks, cartridge heater, plugs or either at engine room temperature of 7 deg.C. and shall take full load within 15 seconds from the receipt of the signal to start.

F3.5.5 The engine shall efficiently operate at 38 deg.C ambient temperature at 50 metres above mean sea level.

F3.5.6 Noise level of the engine shall not exceed 105 DBA (free field sound pressure) at 3 meters distance.

F3.5.7 The engine shall be self starting type upto 4 deg C and shall be provided with one 24 volts heavy duty DC battery, starter, cut-out, battery leads complete in all respects. One additional spare battery shall be provided. The battery shall have a capacity of 180 to 200 ampere hours and 640 amps cold cranking amperage.

F3.5.8 A battery re-charger of 10 to 15 amperes capacity with trickle and booster charging facility and regulator shall be provided.

F3.5.9 The engine shall be provided with an oil bath or dry type air cleaner as per manufacturer's design.

F3.5.10 Engine shall be suitable for running on high speed diesel oil.

F3.5.11 The system shall be provided with a control panel with push button starting arrangement also and wired to the engine on a differential pressure gauge.

F3.5.12 The entire system shall be mounted on a common structural base plate with ant vibration mountings and flexible connections on the suction and delivery piping.

F3.5.13 One self supported one day oil tank fabricated from 5 mm thick MS sheet electrically welded with a capacity of 8 hours working load but not less than 200 lit shall be provided. Level indicating gauge glass on the day oil tank and low fuel level indication on the control panel shall also be provided.

F3.5.14 One exhaust pipe with suitable muffler (residential type) to discharge the engine gases to outside open air as per site conditions shall be provided.

F3.5.15 All other accessories fittings & fixtures necessary and required for a complete operating engine set shall be provided.

F3.5.16 Contractor shall indicate special requirements, if any, for the ventilation of the
pump room.

F3.5.17 The materials of construction for the major components are as follows:

Casting	: Cast iron
Impeller	: Bronze
Shaft	: EN-8
Wear Rings	: Bronze
Gland Packing	: Graphite Asbestos
Type of Bearing	: Ball bearing/Roll Bearing
Type of coupling	: Flexible couplings

F3.5.18 Instrumentation

The diesel engine shall be provided with the following instrumentation:

a) Temperature indicator in cooling water inlet and outlet
b) Temperature indicator in lubricating oil outlet from the oil cooler
c) Pressure gauge for lubricating oil system
d) Speed indicator
e) Lubricating oil sump level indicator
f) Fuel oil tank level indicator
g) Voltmeter and ammeter in battery charging circuit
h) Cooling water high temperature alarm
i) Oil pressure low alarm

A local instrument panel shall be provided with the engine for mounting all the above instruments and annunciation.

F3.5.19 Pumps and motor engine shall be mounted on a common base frames fabricated from M.S. structural and placed in suitable concrete foundations with the help of approved cushy foot mountings (Anti-vibration pads) to avoid vibrations. The anti vibration pads shall be of heavy duty type.

F3.6 Air Vessel

F3.6.1 Provide one air vessel fabricated from 10 mm M.S. plate with dished ends and suitable supporting legs. Air vessel shall be provided with a 100 mm dia flanged connection from pump, one 25 mm dia drain with valve, one gunmetal water level gauge and 15 mm sockets for pressure switches. The vessel shall be 450 mm dia x 2000 mm high and tested to 20 kg/sq cm pressure.

F3.6.2 The fire pumps shall operate on drop of pressure in the mains as given in para 7 below. The pump operating sequence shall be arranged in a manner to start the pump automatically but should be stopped manually by starter push buttons only.

F3.6.3 Operating conditions for fire & sprinkler pumps.

a) Operating pressure 6.0 Kg/sq cm

	Cut in	Cut out
b) Jockey pump Hydrant and Sprinkler	5.311 kg/sq cm	6.0 kg/sq.cm
c) Fire Electric Sprinkler Pump	4.961 Kg/sq cm	manual
d) Fire Electric Hydrant Pump and Sprinkler	4.611 Kg/sq cm	manual
e) Diesel Engine Driven Stand by	4.261 Kg/sq cm	manual

Notes:

a) Jockey pump shall start and stop through pressure switch automatically.
b) Jockey pump shall stop when main pump starts.
c) Main pump shall start automatically on fall of pressure but stopping shall be manual.

F3.7 Vibration Eliminators

Provide on all suction and delivery lines double flanged reinforced neoprene flexible pipe connectors. Connectors should be suitable for a working pressure of each pump and tested to the test pressure given in the relevant head. Length of the connector shall be as per manufactures details.

F3.8 Measurements:

F3.8.1 Fire, sprinkler pumps shall be measured by numbers and shall include all items as given in the specifications and schedule of quantities.

F3.8.2 Air vessel, fire alarm, installation valve, sluice valves, non return valves, vibration eliminators, flanges and suction strainer shall be measured by numbers and shall include all items as given in the schedule of quantities and specifications.

F3.8.3 Pump headers, shall be measured per linear meter and shall include all items given in the specifications and schedule of quantities.

End of Section F3 Fire Pumps & Ancillary Equipment

Section F4 Commissioning and Guarantees

F4.1 Scope of work

Work under this section shall consist of pre-commissioning, commissioning, testing and providing guarantees for all equipment, appliances and accessories supplied and installed by the contractor under this contract.

F4.2 General Requirements:

F4.2.1 The rates quoted in this tender shall be inclusive of the works given in this section.

F4.2.2 Contractor shall provide al tools equipment, metering and testing devices required for the purpose.

F4.2.3 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.

F4.3 Precommissioning

F4.3.1 On completion of the installation of all pumps, piping, valves, pipe connections, and water level controlling devices the contractor shall proceed as follows:-

Fire protection system:

i) Check all hydrant valves and close if any valve is open. Also check hat all suction and delivery connections are properly made.

ii) Test run and check rotation of each motor and correct the same if required.

B Pipe work

i) Check all clamps, supports and hangers provided for the pipes.

ii) Fill up pipes with water and apply hydrostatic pressure to the system as given in the relevant section of the specifications. If any leakage is found, rectify the same and retest the pipes.

F4.4 Commissioning & testing

A. Fire hydrant system

i) Pressurize the fire hydrant system by running the main fire pump and after attaining the required pressure shutoff the pump.

ii) Open bypass valve and allow the pressure to drop in the system. Check that the jockey pump cuts-in and cuts out at the pre-set pressures. If necessary adjust the pressure switch for the jockey pump. Close bye-pass valve.

iii) Open hydrant valve and allow the water to flow into the fire water tank in order to avoid wastage of water. The main fire pump should cut-in at the pre-set pressure and should not cutout automatically on reaching the normal line pressure. The main fire pump should stop only by manual push button. However the jockey pump should cut-out as soon as the main pump starts.

iv) Switch off the main fire pump and test check the diesel engine driven pump in the same manner as the electrically driven pump.

v) When the fire pumps have been checked for satisfactory working on automatic controls, open five hydrant valves simultaneously and allow the hose pipes to discharge water into the fire tank to avoid wastage. The electrically driven pump should run continuously for eight hours so that its performance can be checked.

vi) Check each landing valve, male and female couplings and branch pipes for compatibility with each other. Any fitting which is found to be incompatible and does not fit into the other properly shall be replaced by the contractor. Landing valves shall also be checked by opening and closing under pressure.

B. Sprinkler system:

i) Start the pump and develop the required pressure in the sprinkler pipes.

ii) Open the test valve to test the automatic starting of the pump. If necessary, make necessary adjustments in the setting of pressure switch. The sprinkler fire alarm should also operate when the test valve is open.

iii) After satisfactory operation of the pump the contractor shall set up mock fire and test the system.

F4.5 Handing over

F4.5.1 All commissioning and testing shall be done by the contractor to the complete satisfaction of the Project Manager, and the job handed over to the Project Manager, or his authorised representative.

F4.5.2 Contractor shall also hand over, to the Project Manager, all maintenance & operation manuals and all other items as per the terms of the contract.

F4.6 Guarantees

F4.6.1 The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

F4.6.2 The form of warranty shall be as approved by the Project Manager.

F4.6.3 The warranty shall be valid for a period of one year from the date of commissioning and handing over.

F4.6.4 The warranty shall expressly include replacement of all defective or under capacity equipment. Project Manager may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

F4.6.5 The warranty shall include replacement of any equipment found to have capacity lesser that the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Project Manager.

End of Division F4 Commissioning and Guarantees

Section F5 Electrical Installations

F5.1 Scope

The scope of this section comprises of fabrication, supply, erection, testing and commissioning of electric control panels, wiring and earthing of all air conditioning equipment, components and accessories, including supply, installation and wiring of remote control-cum-indicating light panel.

F5.2 General

Work shall be carried out in accordance with the Specifications, Local Rules, Indian Electricity Act 1910 as amended upto date, and rules issued thereunder, Regulations of the Fire Insurance Company and relevant BIS Code of Practice.

F5.3 Wiring System

All power wiring shall be carried out with 1100 volts grade PVC insulated, armoured, overall PVC sheathed aluminium conductor cables for sizes above 6 sq mm. Sizes 6 sqmm and below the power wiring shall be of copper conductor only. Cables shall be sized by applying proper derating factor. All control wiring shall be carried out by using 650 volts PVC insulated copper conductor wires in race ways or in conduit. Minimum size of control wiring shall be 1.5 sq.mm PVC insulated copper conductor wires. Minimum size of conductor for power wiring shall be 4 sq.mm 1100 volts grade PVC insulated copper conductor wires in conduit.

F5.4 Construction Features

F5.4.1 The control panel shall be metal enclosed sheet steel cubicle, indoor type, dead front, floor mounting / wall mounting type. The control panel shall be totally enclosed, and vermin proof. Gaskets between all adjacent units and beneath all covers shall be provided to render the joints dust proof. Control panels shall be arranged in multi-tier formation. All doors and covers shall be suitable for double padlocking .All mild steel sheets used in the construction of control panels shall be 14 SWG thick for floor mounted and 16 SWG for wall mounting and shall be folded and braced as necessary to provide a rigid support for all components. Joints of any kind in sheet metal shall be seam welded, all welding slag grounded off and welding pits wiped smooth with Plumber metal.

F5.4.2 All panels and covers shall be properly fitted and square with the frame and holes in the panel correctly positioned. Fixing screws shall enter into holes tapped into an adequate thickness of metal or provided with hank nuts. Self threading screws shall not be used in the construction of control panels. Base channel of 75 mm x 75 mm x 5 mm thick shall be provided at the bottom. Minimum clear space of 200 mm between the floor of control panel and bottom most unit (MCB or Bus Bar) shall be provided.

F5.4.3 The control panels shall be of adequate size with a provision of 25% spare space to accommodate possible future additional switch gear. Knockout holes of appropriate size and number shall be provided in the control panels in conformity with the location of incoming and outgoing

conduits / cables. All equipment such as meters and indicating lamps etc. shall be located adjacent to the unit with which it is associated and care shall be taken to achieve a neat and symmetrical arrangement. Facility shall be provided for termination of cables from top of the control panel. Clamps shall be provided to support the weight of the cables. All power wiring inside the control panel shall be colour coded and control wiring ferruled for easy identification. Circuit diagram showing the arrangement of circuits shall be pasted on the inside of panel door and covered with transparent plastic sheet and all labeling shall be provided in engraved anodized aluminium / bakelite strips on the front face of the panel board.

F5.5 Circuit Compartment

Each circuit breaker, contactor and relay shall be housed in a separate compartment and shall have steel sheets on top and bottom of compartment. Sheet steel hinged lockable door shall be duly interlocked with the breaker in the `ON' position. Safety interlocks shall be provided to prevent the breaker or contactor from being drawn out when the breaker is in `ON' position. The door shall not form an integral part of the draw out portion of the panel. Sheet steel barriers shall be provided between the tiers in a vertical section.

F5.6 Instrument Accommodation

Adequate space shall be provided for accommodating instruments, indicating lamps, control contactors and control fuses etc. These shall be accessible for testing and maintenance without any danger of accidental contact with live parts of the circuit breaker and bus bar.

F5.7 Bus Bars and Bus Bar Connections

The bus bar and interconnections shall be of aluminium and of rectangular cross sections suitable for full load current for phase bus bars, and half rated current for neutral bus bar and shall be extensible on either side. The bus bars and interconnections shall be insulated with PVC sleeve / tapes and shall be color coded. Alternatively special insulating paints / materials may be used for the purpose.

All bus bars shall be supported on unbreakable, non hygroscopic insulated supports at regular intervals, to withstand the forces arising in case of short circuit in the system. All bus bars shall be provided in separate chamber and properly ventilated. All bus bars connections, in main control panels shall be done by drilling holes with cadmium plated / hot dipped galvanized bolts, nuts and washers.

All bus bars connections in smaller control panels shall be done by drilling hole and connecting by brass bolts and nuts.

All connections between the bus bar and breaker, and between breaker and contactor shall be through copper strips of proper size to carry rated current and shall be insulated with PVC sleeves.

F5.8 Raceways

A horizontal race way with screwed covers shall be provided at the top to take interconnecting control wiring between different vertical sections.

F5.9 Cable compartments

Cable compartment of adequate size shall be provided in the control panels for easy termination of all incoming and outgoing cables entering from bottom or top. Adequate and proper supports shall be provided in cable compartments to support cables.

F5.10 Indications

1. `ON' lamps shall be provided on all outgoing feeders.

2. Cable alley and bus chamber shall be identified on all panels.

F5.11 Rubber Mat

Rubber mat shall be provided to cover the full length of front of all panels and rear of panels where back space shall be available for working from the rear.

F5.12 Materials

All materials shall be of the best quality complying with the BIS (Bureau of Indian Standards) specifications. Materials used shall be subject to the approval of the Owner's site representative and samples of the same shall be furnished where required.

F5.12.1 Moulded Case Circuit Breaker

MCCB shall comprise of switching mechanism, contact system, are extinguishing device and the tripping unit, Contained in a Compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanical stress.

Switching mechanism shall be of Quick Make- Quick Break type and the trip command shall override all other commands. MCCB shall employ maintenance free contact system to minimise the let thru `energies while handling abnormal currents.

The handle position shall give positive indication of `ON' `OFF' or tripped.

MCCB shall conform to IS- 2516 (Part I & II/Sec.1) 1985.

F5.12.2 Miniature Circuit Breaker

Miniature circuit breakers shall be quick make and break type, and shall conform to Relevant Indian Standards. The housing shall be heat resistant and having a high impact strength. The fault current shall not be less than 9 KA at 230 V and shall be BIS approved. MCBs shall be flush mounted and shall be provided with trip free manual operating liver and `ON" and `OFF" indications. The contacts shall be provided to quench the arc immediately. MCB shall be provided with magnetic thermal releases for over current and short circuit protection. The over load or

short circuit device shall have a common trip bar in the case of D P, TP and TPN miniature circuit breakers.

F5.12.3 Rotary Switches

Switches upto 60 amps shall be rotary type with compact and robust construction, built up from one or more stacks with contacts and a positioning mechanism with stop as required. Rotary switches shall have HRC fuse fittings of appropriate rating.

F5.12.4 Selector Switch

Where called for, selector switches of rated capacity shall be provided in control panels, to give the choice of operating equipment in selective mode.

F5.12.5 Starters

Each motors shall be provided with a starter of suitable rating. Starters shall be in accordance with relevant BIS Codes. All Star Delta and ATS Starters shall be fully automatic.

Starters contactors shall have 3 main and 2 Nos. NO / NC auxiliary contacts and shall be air break type suitable for making and breaking contact at minimum power factor of 0.35. For design consideration of contactors the starting current of connected motor shall be assumed to be 6 times the full load current of the motor in case of direct-on-line starters and 3 times the full load current of the motor in case of Star Delta / Reduced Voltage Starters. The insulation for contactor coils shall be of class "B".

Operating coils of contactors shall be suitable for 230 / 415 $\pm$ 10% volts AC, 50 cycles supply system. The contactors shall drop out when voltage drops to 90% of the rated voltage. The housing of the contactors shall be heat resistant and having high impact strength. Each starter shall have thermal overload protection on all three phases.

F5.12.6 Over Load Relays

Contactors shall be provided with a three element, positive acting ambient temperature compensated time lagged hand-reset type thermal over load relays with adjustable setting. Hand-reset button shall be flush with the front door for resetting with starter compartment door closed. Relays shall be directly connected for motors upto 35 HP capacity. C.T operated relays shall be provided for motors above 35 HP capacity. Heater circuit contactors may not be provided with overload relays.

F5.12.6 Current Transformers

Current transformers shall be of accuracy class I and suitable VA burden for operation of the connected meters and relays. These shall be resin bonded and apoxy coated.

F5.12.7 Single Phase Preventers

Single phase preventers shall be provided as per Bill of Quantities and shall be in conformity with relevant BIS Standards. Single phase preventers shall act when the supply voltage drops down to 90% of the rated voltage or on failure of one or more phases.

F5.12.8 Time Delay Relays

Time delay relays shall be adjustable type with time delay adjustment from 0-180 seconds and shall have one set of auxiliary contacts for indicating lamp connections.

F5.12.9 Indicating Led (22 mm dia) and Metering

All meters and indicating lamps shall be in accordance with BS 37 and BS 39. The meters shall be flush mounted and draw out type. The indicating lamp shall be of LED type. Each main panel shall be provided with voltmeter 0-500 volts with three way and off selector switch, CT operated ammeter of suitable range with three Nos. CTs of suitable ratio with three way and off selector switch, phase indicating lamps, and other indicating lamps as called for. Each phase indicating lamp shall be backed up with 5 amps fuse. Other indicating lamps shall be backed up with fuses as called for.

F5.12.10Toggle Switch

Toggle switches, where called for, shall be in conformity with relevant BIS Codes and shall be of 5 amps rating.

F5.12.11Push Button Stations

Push button stations shall be provided for manual starting and stopping of motors / equipment as called for. Green and Red colour push buttons shall be provided for `Starting' and `Stopping' operations. `Start' or `Stop' indicating flaps shall be provided for push buttons. Push buttons shall be suitable for panel mounting and accessible from front without opening door, Lock lever shall be provided for `Stop' push buttons. The push button contacts shall be suitable for 6 amps current capacity.

F5.12.12Conduits

Conduits shall be of mild steel and shall be Hard drawn, stove enameled inside and outside with minimum wall thickness of 1.6 mm for conduits upto 32mm diameter and 2 mm wall thickness for conduits above 32 mm diameter. GI pull wires shall be installed in the conduit while laying the conduit.

F5.12.12Cables

M.V.cables shall be PVC insulated aluminium conductor and armoured cables conforming to BIS Codes. Cables shall be armoured and suitable for laying in trenches, duct, and on cable trays as required. M.V Cables shall be termite resistant. Control cables and indicating panel cables shall be multi core PVC insulated copper conductor and armoured cables.

F5.12.13Wires

1100 volts grade PVC insulated copper conductor wires in conduit shall be used.

F5.13 Cable Laying

Cable shall be laid generally in accordance with BIS Code of Practice. Cables shall be laid on 14 gage perforated MS sheet cable trays, and cable drops / risers shall be fixed to ladder type cable trays fabricated out of steel angle. Access to all cables shall be provided to allow cable withdrawal / replacement in the future. Where more than one cable is running, proper spacing shall be provided to minimise the loss in current carrying capacity. Cables shall be suitably supported with Galvanized saddles when run on walls / trays. When buried, they shall be laid in 350 mm wide and 750 mm deep trench and shall be covered with 250 mm thick layer of soft sifted sand & protected with bricks, tiles. Special care shall be taken to ensure that the cables are not damaged at bends. The radius of bend of the cables when installed shall not be less than 12 times the diameter of cable. 1.1 KV cable shall be buried 600 mm below ground level.

F5.14 Wire Sizes

For all single phase / 3 phase wiring, 1100 volts grade PVC insulated copper conductor wires shall be used. The equipment inside plant room and AHU room shall be connected to the control panel by means of insulated aluminium conductor wires of adequate size. An isolator shall be provided near each motor / equipment wherever the motor / equipment is separated from the supply panel through a partition barrier or through ceiling construction. PVC insulated single strand aluminium conductor wires shall be used inside the control panel for connecting different components and all the wires inside the control panel shall be neatly dressed and plastic beads shall be provided at both the ends for easy identification in control wiring.

. The minimum size of control wiring shall be 1.5 sq.mm PVC insulated stranded soft drawn copper conductor wires drawn through conduit to be provided for connecting equipment and control panels.

Power wiring cabling shall be of the following sizes:

i. Upto 5 HP motors/5KW heatrers	3 x 4 sq.mm copper conductor wires.
ii. From 6 HP to 10 HP motors 6 KW to 7.5 KW heaters.	3 x 6 sq.mm copper conductor wires.
iii. From 12.5 HP to 15 HP motors	2 Nos. 3 x 6 sq.mm copper conductor wires.
iv. From 20 HP to 25 HP motors	2 Nos. 3 x 10 sq.mm aluminium conductor armoured cables.
v. From 30 HP to 35 HP motors	2 Nos. 3 x 16 sq.mm aluminium conductor armoured cables.
vi. From 40 HP to 50 HP motors	2 Nos. 3 x 25 sq.mm aluminium conductor

	armoured cables.
vii. From 60 HP to 75 HP motors	2 Nos. 3 x 50 sq.mm aluminium conductor armoured cables.
viii. 100 HP motors	1 Nos. 3 x 150 sq.mm aluminium conductor armoured cables.
ix. 150 HP motors	1 Nos. 3 x 240 sq.mm aluminium conductor armoured cables.
x. 250 HP motors	2 Nos. 3 x 240 sq.mm aluminium conductor armoured cables.
xi. 400 HP motors	3 Nos. 3 x 240 sq.mm aluminium conductor armoured cables.
xii. 600 HP motors	3 Nos. 3 x 400 sq.mm aluminium conductor armoured cables.

All the switches, contactors, push button stations, indicating lamps shall be distinctly marked with a small description of the service installed. The following capacity contactors and overload relays shall be provided for different capacity motors.

TYPE OF STARTER	CONTACTOR CURRENT CAPACITY		OVERLOAD RELAY RANGE
5 HP Motors	D O L	16 amps	6-10 amps
7.5HP Motors	D O L	16 amps	10-16 amps
10 HP Motors	D O L	32 amps	13-21 amps
12.5HP Motors	Star Delta	16 amps	10-16 amps
15 HP Motors	Star Delta	25 amps	10-16 amps
20 HP Motors	Star Delta	32 amps	13-21 amps
25 HP Motors	Star Delta	32 amps	13-21 amps
30 HP Motors	Star Delta	40 amps	20-32 amps
35 HP Motors	Star Delta	40 amps	20-32 amps
40 HP Motors	Star Delta	40 amps	28-42 amps
45 HP Motors	Star Delta	63 amps	28-42 amps
50 HP Motors	Star Delta	63 amps	28-42 amps
60 HP Motors	Auto Transformers/ Reduced Voltage.	125 amps	45-70 amps
75 HP Motors	-do-	125 amps	90-150 amps
100 HP Motors	-do-	200 amps	operated Relay
135 HP Motors	-do-	300 amps	-do-
150 HP Motors	-do-	300 amps	-do-
200 HP Motors	-do-	300 amps	-do-
250 HP Motors	-do-	400 amps	-do-
300 HP Motors	-do-	400 amps	-do-
400 HP Motors	-do-	600 amps	-do-
600 HP Motors.	-do-	900 amps	-do-

F5.15 Earthing

Earthing shall be copper strips / wires the main panel shall be connected to the main earthing system of the building by means of 2 Nos. 25 mm x 3 mm copper tapes. All single phase metal clad switches and control panels be earthed with minimum 2 mm diameter copper conductor wire. All 3 phase motors and equipment shall be earthed with two numbers distinct and independent copper wires / tapes as follows :

i. Motors upto and including 10 HP rating.	2 Nos 3 mm dia copper wires.
ii. Motors 12.5 HP to 40 HP capacity.	2 Nos.4 mm dia copper wires.
iii. Motors 50 to 75 HP copper capacity.	2 Nos 6 mm dia wires.
iv. Motors above 75 HP.	2 Nos 25 mm x 3 mm copper tapes.

All switches shall be earthed with two numbers distinct and independent copper wires/tapes as follows :

i. 3 phase switches and control panels upto 60	2 Nos 3 mm dia copper wires. amps rating.
ii. 3 phase switches and copper control panels 63 amps to 100 amps rating.	2 Nos 4 mm dia wires.
iii. 3 phase switches and copper control panels 125 amps to 200 amps rating.	2 Nos 6 mm dia wires.
iv. 3 phase switches, control panels, bus ducts, above 200 Amps rating	2 Nos 3 mm x 25 mm copper tapes.

The earthing connections shall be tapped off from the main earthing of electrical installation. The over-lapping in earthing strips at joints where required shall be minimum 75 mm. These straight joints shall be riveted with brass rivets & brazed in approved manner. Sweated lugs of adequate capacity and size shall be used for all termination of wires. Lugs shall be bolted to the equipment body to be earthed after the metal body is cleaned of paint and other oily substance and properly tinned.

F5.16 Drawings

Shop drawings for control panels and wiring of equipment showing the route of conduit/cable shall be submitted by the contractor for approval of Project Managers/ Consultant before starting the fabrication of panel and starting the work. On completion, four sets of complete "As-installed" drawings incorporating all details like, conduits routes, number of wires in conduit, location of panels, switches, junction/pull boxes and cables route etc. shall be furnished by the Contractor.

F5.17 Testing

Before commissioning of the equipment, the entire electrical installation shall be tested in accordance with relevant BIS Codes and test report furnished by a qualified and authorised person. The entire electrical installation shall be got approved by Electrical Inspector and a certificate from Electrical Inspector shall be submitted. All tests shall be carried out in the presence of Supervisor.

F5.18 Painting

All sheet steel work shall undergo a process of degreasing, thorough cleaning, and painting with a high corrosion resistant primer. All panels shall then be backed in an oven. The finishing treatment shall be by application of synthetic enamel paint of approved shade.

F5.19 Labels and Tags

Engraved PVC labels shall be provided on all incoming and outgoing feeders switches. Circuit diagram showing the arrangements of the circuit inside the control panel shall be pasted on inside of the panel and covered with transparent plastic sheet. All cables terminations at panels and at equipments shall be provided with tags as approved by Project Managers.

F5.20 All panels to have provision for padlocking and all MCCB's / MCB's to have provision for locking in off position.

F5.21 Measurement of Electrical Control Panels

Panels shall be counted as number of units. Quoted rates shall include as lump sum (NOT measurable lengths) for all internal wiring, power wiring and earthing connections from the control panel to the starter and to the motor, control wiring for inter-locking, power and control wiring for automatic and safety controls, and control wiring for remote start/stop as well as indication as per the specifications. The quoted rate for panel shall also include all accessories, switchgear, fuses, contactors, indicating meters and lights as per the specifications.

End of Section F5 Electrical Installations

Section F6 : List of Approved Makes of Materials

S.No.	Materials Name	I.S. No.	Brand	Manufacturer
1.	M. S. Pipes	1239 3589	TATA	TISCO Tubes Divn. Jamshedpur.
			Jindal	Jindal Tube Co. Hissar.
2.	Forged Steel Fittings	1879 (Part I to X)		TRUE FORGE/ SIMLESS/V.S.FORGE
3.	Gunmetal Valves (fullway Check and Globe Valves)	778	Leader	Leader Engg. Works, Jullunder.
			SANT	Sant Metal Works Jullunder
			Zoloto	Zoloto Marketting Co
4.	C.I.Double flanged sluice Valve	780	Kirloskar Pune	Kirloskar Bros.Ltd.
			Kartar Leader	Leader Engg. Works. Jullundar.
5.	Butterfly valves/ Wafer type Check Valve			Audco /Advance / SKF Veesons / Sant /Zoloto
6.	C.I.Double Flanged Non Return Valve	5312	Kirloskar	Kirloskar Bros. Ltd. Pune
			IVC	Indian Valve Co. LTD. Calcutta
			Leader	Leader Engg. Works.
7.	Fire Hydrant Valves.	5290	Minimax	Steelage Industries Ltd., Bombay.
			Newage	Newage, Gujrat
			Superex	Superex Fire Engineers. Wazirpur

7.1 Solar system. ARINA M/s Arina pvt ltd,Puri Pwr ltd. Parvati metal pvt ltd

S.No.	Materials	I.S. No.	Brand	Manufacturer Name
8.	Fire Hose Pipes		PADMINI	Padmini Ind.Ltd
			JYOTI	
	C.P. Hose	8423	Newage Ind.	
	R R.L. Hose	636	Rajendra Place	
9.	Fire Doors		Navair, Sakti, Godrej	
10.	Sprinkler Heads		SPRAYSAFE	Spraysafe Co, U.K.
			TYCO	
			H.D. Newage	H.D.fire Newage
			Omax	Grinnel, Central,
11.	Horizontal Centrifugal Pumps		Kirloskar, KSB	Mather & Platt
12.	Electric Motors		Kirloskar, Siemens,	Crompton
13.	Electrical Switch Gear & Starters.		Siemens, L & T	
14.	Cables /Wire		Havells, KEI	Polycab, Skytone/
	CCF/Coloster/Nitco			
16.	SPLIT AC		LG, SAMSUNG, Voltas ,Blue star	
17.	Suction Strainer		Leader	LeaderEngg.Works Jalandhar
			Sant	
			Zoloto	
18	Vibration Eliminator Connectors		Resistoflex	Relay Corp. NOIDA
19.	Single Phasing Preventor (Current operated)		L & T, Siemems, Minilec	
20.	Pipe coat material (pipe protection)		PYPKOTE	Integrated Water-Proofing Co Madras

S.No.	Materials	I.S. No.	Brand	Manufacturer Name
21.	Flow Switches			Potter System Sensor
22.	Diesel Engine TAC Approved	10000	ASHOK LEYLAND/ KIRLOSKAR /CUMMINS	
23.	Main control panel (Powder coated)		Trintron//Advance Elect.Control / Tricolite/Vidut Control	
24.	Fire Brigade Inlet	903	MINIMAX/NEWAGE/SUPEEREX	
25.	Rubber Hose Pipe	5132	PADMINI / JYOTI/TIGER	
26.	Hose Couplings branch Pipe & Nozzle	903	MINIMAX/NEWAGE/SUPEREX INDIAN RAYON/SUKAN/SBJ	
27.	Pressure Switches	TAC	DANFOSS/SWITZER	
28.	Pressure Gauge	3624(CL-I)	H.GURU/FIEBIG	
29.	Battery		EXIDE/PRESTOLITE	
30.	Welding Rods		Advani	
31.	Paint		J&N/ASIAN/NEROLAC/BERGER	
32.	Annunciater Panel For Sprinkler System	2189	PCD/SAFEWAY/AGNI (INDIA)	
33.	Alarm Valve & Hydraulic Alarm Motor with covering		MATHER & PLATT/CENTRAL SPRAY SAFE/HD/GRINNEL	
34.	Contactor		L&T/SIEMENS/GE	
35.	Thimbles/Ferrules		DOWEL	
36.	Cable Glands		Commex/Power/Gripwell	
37.	Power Capacitor		L&T/Crompton/Asian	
38.	Measuring Meter		L&T/Siemens/Rishab	
39.	UPS		Microtech, Nomeric,Sukaim	

End of Division F6 List of Approved Makes of Materials

ADDITIONAL CONDITIONS

1. Before tendering, the tenderer shall inspect the site of work and shall full acquaint himself the above terms and conditions with regard to site, nature of soil, availability of material suitable location for execution of work and time involved in the work (over the entire duration of contract) including local conditions that restrictions, obstructions and other conditions, as required for satisfactory and timely execution of the work. His rates should take into consideration all such factors like supply and storage of materials, man and machinery, land etc. and contingencies. No claim whatsoever shall be entertained by the NHIDCL on this account.
2. The contractor must study the specifications and conditions carefully before tendering.
3. Before the start of the work, the contractor shall submit the program of execution of work, get it approved from the Engineer/NHIDCL and strictly adhere the same for the timely completion of the project work.
4. The work shall be carried out in such a manner so as not to interfere or effect or disturb either works, being executed by other agencies, if any.
5. Any damage done by the contractor to any existing work shall be made good by him at his own cost.
6. The work shall be carried out in the manner complying in all respect with the requirement of relevant bye-laws of the local bodies under the jurisdiction of which the work is to be executed and nothing extra shall be paid on this account.
7. For completing the work in time, the contractor might be required to work in two or more shifts including night shifts and no claim whatsoever shall be entertained on this account notwithstanding the facts that the contractor will have to pay to the labourers and other staff engaged directly or indirectly on the work according to the provision of the law regulation and the agreement entered upon and/or extra amount for any other reason.
8. The contractor shall make his own arrangements for obtaining electric connection(s) as required and make necessary payment directly to the department concerned. The Department will however make all reasonable recommendations to the authority concerned in this regard.
9. The contractor or his authorized representative should always be available at the site of work to take instructions from Engineer or his authorized representative and ensure proper execution of work(s) or work should not be done in the absence of such authorized representative.
10. The structural and other drawings for the work, shall at all times, be properly corrected before executing the work.
11. The contractor shall maintain in good condition all works executed till the completion of the entire work allotted to the contractor.
12. The malba/garbage, removed from the site shall be disposed off by the contractor at any suitable place as directed by the Engineer.
13. All work and materials brought and left upon the ground by the contractor or by his order for the purpose of forming part of the works are to be considered to be the property of the NHIDCL and the same are not to be removed or taken away by the contractor or any other person without special license and consent in writing of the Engineer/NHIDCL but the NHIDCL is not be in any way responsible for any loss or damaged which may happen to or in respect of any such work or materials either by the same being lost or damaged by weather or otherwise.

14. The rates for all items of work, unless clearly specified otherwise, shall include the cost of all labour, materials dewatering and other inputs involved in the execution of the items. If any reason contractor fails to quote his rate for any item provided in the schedule of quantities it will be assumed that contractor is ready to execute that item free of cost.
15. Unless otherwise provided in the schedule of quantities the rates tendered by the contractor shall be all-inclusive and shall apply to all heights, depths, leads and lifts.
16. The contractor shall bear all incidental charges for cartage, storage and safe custody of materials.
17. The nature of work is such that contractor may have to carry out a part of work announced not less than Rs.50,000 (Fifty Thousand) or full work on short notice of 48 hours from Engineer in writing on site order book or through special messenger. Failure to comply with the instruction or delay in taking up the work as per schedule issued by the Engineer shall attract penalty clause as mentioned in the agreement. In addition a fine of Rs.1000/- per day for each day of default shall be recovered from contractor and decision of Engineer shall be final, binding and not open to arbitration.
18. Existing drains, pipes, cables, overhead wires, sewer lines, water line and similar services encountered in the course of the execution of the work shall be protected against the damages by the contractor. The contractors shall not store material or otherwise occupy any part of the site in a manner likely to hinder the operation of such services.
19. The contractor will not have any claim in case of any delay by the Engineer in removal of trees or shifting, removing of telegraph, telephone or electric lines (overhead and underground), water and sewer lines and other structure etc. if any, which may come in the way of the work. However, suitable extension of time can be granted to cover such delay.
20. Stipulated material shall be arranged by the contractor at site of work or all the items where such materials are required.

i) Tendered rates are inclusive of all taxes and levies payment under the respective statutes. However, pursuant to the constitution (46th amendment) Act 1982, it also further tax or levy is imposed by statute, after the date of receipt of tenders and the contractor there upon necessarily and properly pays such taxes/levies, the contractor shall be reimburse the amount so paid, provided such payment, if any, is not in the opinion of Regional Officer-NHIDCL whose decision shall be final and binding) attributable to delay in execution of the work within the control of the contractor.

ii) The contractor shall keep necessary books of account and other documents for the purpose of this condition as may be necessary and shall allow inspection of the same by a duly authorized representative of Govt. and further shall furnish such other information/ documents as Engineer may require.

iii) The contractor shall within a period of 30 days of imposition of any further tax or levy in pursuant to the constitution of (46th Amendment) Act 1982, given a written notice thereof to the Engineer that the same is given pursuant to this condition together with all necessary information relating thereto.

21. Contractor may be required to execute this work under foul position. The decision of the Engineer whether the position is foul or not shall be final and the binding of the contractor and nothing extra for executing the work in foul position is payable, beyond what is provided in the schedule of quantities.

To be signed by the bidder and same signatory competent/ authorized to sign the relevant contract on behalf of NHIDCL.